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BELGRADE, SERBIA 2020
HOTEL CROWNE PLAZA

22nd EUROPEAN CONGRESS OF PHYSICAL AND REHABILITATION MEDICINE

ABSTRACT BOOK



ESPRM

European Society of
Physical & Rehabilitation Medicine



Serbian Association of
Physical and Rehabilitation
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Abstract Book of ESPRM CONGRESS 2020, Belgrade, Serbia



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ABOUT ESPRM

The European Society of PRM was founded in 2003, changing the European Federation of the PRM Societies which was created in 1963.

The National societies (which in 1963 were only 5) had reached the number of 34 plus 3 cooperative.

In this period PRM strongly enriched its role all over Europe, gaining responsibilities in Health Services in many Countries (unfortunately having many differences in educational and professional fields) and receiving some acknowledgments by the European bodies too.

The Federation had become unsuitable in relation to these great changes, and due to its organizational complexity, as well as due to many important elements which asked for the creation of a new Organism:

- The integration among the European Countries and at the same time the complexity of the institutional, social and scientific relationships;
- The communal activities in the research, education and innovation field
- The growth of a "mutual feeling" among the European citizens with regards to the Health needs in general and to Rehabilitation in particular.

That is why in 2003 the European Society was founded, whose memberships are available also to individual members specialized in PRM, although the participation of National Societies remains its central element.

Furthermore, the role of the Society is strengthened with regards to its cooperation with other organisms (i.e. UEMS and Academy) which work at European level in the Physical and Rehabilitation Medicine field, as well as at International level with both other organisms and the International Society.

In these years, several colleagues have participated in the development of ESPRM, with various tasks and with many contributions with colleagues from all the European Countries.

For further information, visit www.esprm.net



Nicolas Christodoulou
President of ESPRM
2019 - 2023

ABOUT SAPRM

The Serbian School of Medicine was established in Belgrade in 1920. Three years later the Chair of Physical Therapy and Balneology was formed, so today's Serbian Association of PRM is a logical extension of almost a 100 years of organized PRM in Serbia. A huge progress in rehabilitation was seen shortly after the WWII, mostly after 1948. During 1950 and 1951, the rehabilitation programs developed by the UN were introduced and accepted. Based on these programmes, the first Clinic of Rehabilitation was established in 1952 as the Federal Institute for Rehabilitation of Yugoslavia.

The first Association of PRM in Serbia was established in 1952 as a PRM Section of the Serbian Medical Society. The new Serbian Association of PRM was founded in 2003 as the Association of Psychiatrists in Serbia and Montenegro and from 2006 it works as an independent association and the successor of the previous Association. In 2012 it became the Serbian Association of Physical Medicine and Rehabilitation, and from 2015 it is the Serbian Association of Physical and Rehabilitation Medicine.

The Association was founded with the goal of meeting the needs of establishing a better cooperation between professionals, patients and the public, as well as the necessary communication and cooperation with similar societies and associations in the world. The association regularly cooperates with medical associations in the country, with ESPRM, UEMS PRM Board and Section, Academy of PRM, ISPRM, with the Universities in the country and the Ministry of Health.

Besides this goal, other goals of the Association are the improvement of profession by providing solutions to expert and scientific issues within prevention and treatment in the field of PRM, coordination of member activities, improvement of their work and solving other questions important for the members and the profession in general. The aim is also to improve knowledge and cooperation of all dealing with prevention and treatment in the domain of PRM, improvement of studies, education, by-laws in the field, organization of meetings and congresses. For further information, visit www.fizijatri.org



Milica Lazović
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We are in the process of joining IAPCO and we will become a full member of this association until the next year.

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WELCOME FROM THE PRESIDENT OF ESPRM

Dear friends and colleagues,

We have reached the organization of the 22nd European Congress of Physical and Rehabilitation Medicine under the auspices of the European Society of Physical and Rehabilitation Medicine. This congress was planned to take place in Belgrade, the beautiful capital of Serbia. The president of the organizing committee Prof. Milica Lazovic, as well as her colleagues in Serbia have done an enormous effort to organize an extraordinary congress and welcome all of us in their own country. Unfortunately, the nightmare of COVID-19 has changed the plans of people around the planet and the congress organizers had to transform the congress to an online one.

Despite this change, the congress is going to serve its goals for bridging the gap between clinical practice and research. Thus, the vision of European Society of Physical and Rehabilitation Medicine that clinicians play an important part in the development of PRM, is served by the congress, by stimulating researches to organize relevant projects to clinical practice needs.

The 22nd European Congress of Physical and Rehabilitation Medicine is an excellent opportunity for both clinicians and researchers to present online their ideas, their needs and their results of studies. Oral presentations and other sessions will give the opportunity to participants for a better understanding of PRM and contribute to a further development of our specialty.

The Executive Committee of the ESPRM is very happy and grateful to the Serbian Society, the organizing and the scientific committee for taking responsibility for this 22nd European PRM congress. Working together, we hope this congress, first of its type, to be successful and be remembered for many, many years.



Nicolas Christodoulou
President of ESPRM
2019 - 2023

WELCOME FROM THE CONGRESS PRESIDENT

Dear Colleagues,

As president of the 22nd European Congress of Physical and Rehabilitation Medicine 2020 (ESPRM 2020) organized by the European Society PRM (ESPRM) and the Serbian Association PRM (SAPRM), it is my privilege and great pleasure to have you in VIRTUAL ESPRM CONGRESS – “NEW EXPERIENCE”.

In the interest of the health, safety and well-being of all registered attendees, as well as the general public, the ESPRM has decided to cancel all in-person attendance and face-to face activities at the 22nd EUROPEAN CONGRESS OF PRM and the 20th SAPRM CONGRESS to be held from 19th to 23rd September 2020 in Belgrade, Serbia, are turning into a VIRTUAL CONGRESS (Live Sessions and Recorded Sessions).

The motto of this ESPRM Congress 2020 is “Rehabilitation: Key for health in the 21st century”, since health systems in the 21st century face new challenges, as people live longer and with a higher degree of disability, especially during COVID 19 Pandemic which is violently changed the world.

This important scientific event is organized by the ESPRM and the SAPRM, in cooperation with the UEMS-PRM Section and Board, the European Academy of Rehabilitation Medicine with the support of the Serbian Academy of Sciences and Arts and the Medical Faculty University of Belgrade. The International Society of PRM (ISPRM) and other international PRM Organizations, including the World Health Organisation (WHO), the Cochrane Rehabilitation, the Mediterranean Forum of PRM, the Baltic – Nordic Forum of PRM, the National Societies from Europe, will also participate.

ESPRM 2020 offers a dynamic and engaging programme with daily plenary sessions and consists of LIVE Sessions: 9 plenary lectures by renowned speakers, covering some very different and interesting fields within PRM; 2 session with UEMS PRM Board, 4 joint session; session with ISPRM-WHO Collaborating Centre; Cochrane Rehabilitation session; 8 LAB session; and a selected part of ESPRM SISC and Scientific Session.

The selected part of ESPRM SISC and of Scientific Session are as recorded sessions that will be available on the site every day, as well as 3 months later, the same applies to all oral communications, oral and poster presentations. All papers that have been reviewed by the scientific committee of the congress have been prepared for publication in Abstract Book.

We will do our best to gain active participation of the most prestigious European and International professionals with clinical expertise and scientific recognition. The Associations of allied professionals and NGOs working on behalf of people with disabilities, will participate in the congress to help analyse models of comprehensive rehabilitation.

This, however, provides us with a most exciting opportunity: to disseminate the best ground-breaking PRM science in a totally new, digital experience. We are currently developing a variety of formats to produce the most engaging presentations and discussions, featuring key opinion leaders from around the Europe and world.

ESPRM 2020 will continue to meet the needs of the PRM community and to ensure continuous education and professional support. Registered participants will still be eligible to receive the number of CME credits attributed to the virtual conference, and authors whose abstracts were accepted will get digital exposure of their e-posters. I am convinced that this Congress and the book that accompanies it will ensure the continuity of knowledge and help the modern PRM doctor-practitioner to closely and continuously monitor what is happening in the world of science and medical practice. Certainly, the greatest merit therefore belongs to the authors of the lectures by invitation and oral presentations who invested all their knowledge and experience in order to achieve that goal.

In order for such a Congress to be designed and successfully completed, significant financial support is needed, so we thank the Industrial companies that helped us in that. You can visit the virtual commercial exhibition presented by the leading companies in the PRM field.

Let's act like we're at a congress - let's enjoy a five-minute exercise together!

We believe the ESPRM 2020 Virtual Congress will be a great success and are looking forward to meeting you online.

True success is never a product of chance, but the result of thoughtful teamwork and hard work.

Thank you for your collaboration,



Milica Lazović

President of the 22nd
European Congress of PRM

TOPICS

A. CONDITIONS IN PRM

A.1. Neurological Rehabilitation

A.1.1. Stroke

A.1.2. Spinal Cord Injury

A.1.3. Neurodegenerative Diseases (e.g. Parkinson's disease (PD) and PD-related disorders)

A.1.4. Autoimmune and Inflammatory Neurological Conditions (e.g. Multiple Sclerosis)

A.1.5. Traumatic Brain Injury

A.1.6. Peripheral nervous system disorders

A.1.7. Neuromuscular disorders (e.g. muscular dystrophy, ALS...)

A.1.8. Spasticity Management

A.1.9. Language and Speech Disorders

A.1.10. Disorders of Cognition

A.1.11. Miscellaneous

...A.2. Pain

A.2.1. Nociceptive Pain

A.2.2. Neuropathic pain

A.2.3. Complex Regional Pain Syndromes

A.2.4. Miscellaneous

A.3. Paediatrics Rehabilitation

A.3.1. Neuromuscular Disorders and conditions

A.3.2. Early rehabilitation in pediatric and surgically treated patients

A.3.3. Cerebral Palsy and Spina Bifida

A.3.4. Traumatic Brain Injury in Children

A.3.5. Musculoskeletal Disorders

A.3.6. Congenital Anomalies

A.3.7. Miscellaneous

A.4. Musculoskeletal Disorders, Trauma, Arthroplasty

A.4.1. Inflammatory Joint Diseases

A.4.2. Degenerative Joint Diseases (e.g. Osteoarthritis)

A.4.3. Bone Diseases (e.g. Osteoporosis)

A.4.4. Overuse Syndromes

A.4.5. Myofascial Syndrome

A.4.6. Back Pain and Spine Disorders

A.4.7. Musculoskeletal Trauma and Sports Injury

A.4.8. Miscellaneous

A.5. Other Conditions

- A.5.1. Cardiovascular Rehabilitation
- A.5.2. Pulmonary Diseases
- A.5.3. Bladder and Bowel Disorders
- A.5.4. Geriatrics
- A.5.5. Cancer
- A.5.6. Metabolic Disorders (e.g. Obesity, Diabetes Mellitus)
- A.5.7. Sports, Sports for the Disabled Persons
- A.5.8. Burns
- A.5.9. Rehabilitation after Limb Amputation
- A.5.10. Organ Transplantation
- A.5.11. Balneoclimatology
- A.5.12. Miscellaneous

B. PRM INTERVENCIONIS RESEARCH

- B.1. Physical Agents in Rehabilitation**
- B.2. Rehabilitation and Exercise**
- B.3. Lymph Therapy**
- B.4. Massage and Myofascial Techniques**
- B.5. Pharmacological Interventions**
- B.6. Acupuncture and Complementary Therapies**
- B.7. Current Trends in Physical Therapy**
- B.8. Extracorporeal Shock Wave Therapy**
- B.9. Prosthetics, Orthotics and Assistive Technology**
- B.10. Biomedical Rehabilitation Sciences**



Acknowledgements

The Organizing Committee of the 22nd European Congress of Physical and Rehabilitation Medicine (ESPRM 2020) would like to thank the following companies for their valuable contribution.

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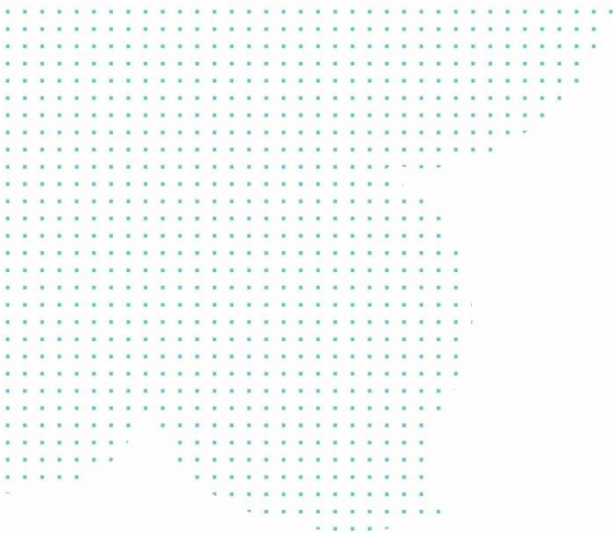
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PLENARY PRESENTATIONS



THE FUTURE OF PHYSICAL AND REHABILITATION MEDICINE IN EUROPE

Prof. Nicolas Christodoulou

President of European Society of PRM

The dream of Physical and Rehabilitation Medicine (PRM) for the future in Europe is presented together with the PRM goals which must be served. In order to reach the provisions of the dream for the future, the work which takes place within the PRM Organizations in Europe is presented, namely the Section of PRM of the Union of European Medical Specialists (UEMS) including the relevant Board, the European Society of Physical and Rehabilitation Medicine (ESPRM), the European Academy of Rehabilitation Medicine (EARM), the two Regional Fora of Mediterranean Area and Baltic & North Sea Area and in general the National PRM Societies of the European Countries.

More extensively, it is presented the work done in the UEMS PRM Section, the aims, the distribution of activities among its three bodies and the productivity of the last eight years in publishing evidenced based position papers in peer reviewed journals and in publishing electronic books, free for all PRM physicians, which are helpful in our daily practice.

Also, it is presented the work done in the European Society of PRM, mainly through the 24 special interest scientific committees, the organization of biannual European congresses and the guidance through the Executive Committee. The operation of several summer schools, offering free knowledge and practice to several topics of current interest is presented.

The European Academy of Rehabilitation Medicine with the small number of selected individual academicians is presented with its mission in Europe mainly on ethics issues.

There are two Regional Fora in Europe, the Mediterranean Forum of PRM and the Baltic and North Sea PRM Forum, which serve regional needs and organize regional congresses every two years.

Finally, the importance of the operation of the National PRM Societies is presented.

STATE OF REHABILITATION IN THE WHO EUROPEAN REGION AND CALL FOR ACTIONS

World Health Organization Regional Office for Europe

Satish Mishra

Technical Manager - Disability and Rehabilitation

WHO Regional Office for Europe

Abstract: There is a substantial and ever-increasing unmet need for rehabilitation worldwide – In WHO European region, rising prevalence of noncommunicable diseases, the ageing population, and improved access to emergency, trauma and medical care correspond with a growing demand for rehabilitation services and assistive technology. One in three people will need rehabilitation at some point in their life. This situation has been exacerbated by the COVID-19 pandemic, which has disrupted health systems and economies around the world. In many parts of the WHO European Region, however, the capacity to provide rehabilitation services and assistive technology is limited or nonexistent and fails to adequately address the needs of the population. Rehabilitation 2030: A Call for Action provides strategic direction for coordinated action and establishing joint commitments to raise the profile of rehabilitation as a health strategy relevant to the whole population, across the lifespan and across the continuum of care.

Keywords: 1. *Rehabilitation.* 2. *Assistive technology.* 3. *Disability.* 4. *Health.* 5. *World Health Organization.*

Paper: In the 21st century the world faces a new set of challenges: rapid population ageing accompanied with a rise in chronic conditions and multi-morbidity. The population aged over 60 is predicted to double by 2050 while the prevalence of noncommunicable diseases has already increased by 18% in the last 10 years. People are living longer and with disabling chronic conditions that impact on their functioning and well-being. Rehabilitation (Including assistive technology) has a critical role to play in preventing and minimizing the limitations in functioning associated with ageing and chronic conditions. This helps to minimize the health, social and economic impact of health conditions, and improves well-being.

The WHO Framework on Integrated People-centred Care places people, rather than diseases, at the centre of health care delivery. By its very nature, rehabilitation responds to individual's needs and priorities, and targets limitations in functioning across the continuum of care and throughout the lifespan. So, as countries move towards integrated person-centred care, it is imperative that quality rehabilitation is embedded in service delivery models.

At a time of COVID-19, when competition for funding and resources has arguably never been greater, we must remember that the very definition of Universal Health Coverage includes rehabilitation. Rehabilitation is an essential component of the pandemic response to reduce long term disability, is an investment with great returns that enables survivors to return to work, education, family life and participate in their communities, which, without rehabilitation they may not be able to do, being burdensome to their families and the economy. The 2 groups disproportionately affected by COVID-19, the elderly and disabled, were among the highest users of rehabilitation services prior to the pandemic, they will need rehabilitation even more now.

Despite the growing need for rehabilitation, there is lack of awareness about its role and the magnitude of unmet needs. Due to COVID-19, rehabilitation services have been disrupted in 63% of countries, largely as it is wrongly perceived as a non-essential health service when for many it is essential. The COVID-19 pandemic has thrown many health systems into turmoil, but it also represents an opportunity to come together, strengthen collaboration, and demonstrate the value of rehabilitation to population health. Now, more than ever, the rehabilitation community needs to be united, across disciplines, specializations, and countries, so that every person has access to the rehabilitation services they need.

WHO with the rehabilitation stakeholders launched Rehabilitation 2030: a call for action to scale up rehabilitation so that countries can be prepared to address the evolving needs of populations up to 2030 and ensure quality, affordable rehabilitation services available at all levels of the health system and extending into the community, that are accessible to anybody who are in need. To support countries in strengthening rehabilitation, WHO has developed various tools, guidance document and is actively supporting countries. However, we still need rehabilitation to be better resourced, coordinated and advocated so that it can be brought high to the political health agenda. Rehabilitation services and assistive technology supports countries to achieve Sustainable Development Goals as these services plays a key role in ensuring good health and well-being (Goal 3) and in addition, assists many children, adults and older people to achieve many of the other sustainable development goals and to participate in society on an equal basis.

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Web: <http://www.euro.who.int/en/health-topics/Life-stages/disability-and-rehabilitation>

AN INTRODUCTION TO CLINFIT: AN EMERGING ICF-BASED TOOL FOR CLINICAL ASSESSMENT AND REPORTING OF PATIENT FUNCTIONING IN REHABILITATION

Gerold Stucki^{1,2,3,4}, Melissa Selb^{2,3}, Aydan Oral⁵, Francesca Gimigliano^{1,6}

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For the clinical assessment and reporting of patient functioning, rehabilitation professionals rely on a wide range of suitable data collection tools. However, a universal and simple-to-use clinical data collection tool that can be tailored to the needs of clinicians all over the world, across a range of settings and patient groups is warranted. Ideally, this tool is based on the International Classification of Functioning, Disability and Health (ICF). As highlighted by WHO's "Rehabilitation 2030: A Call for Action" the ICF and its implementation in health systems is fundamental for strengthening rehabilitation in the 21st century. An emerging tool for ICF-based data collection in rehabilitation is ClinFIT – Clinical Functioning Information Tool. ClinFIT can be tailored for use across countries and a range of rehabilitation services, and can fulfil the specifications of national quality management systems for rehabilitation, meet the requirements of national and international standards for rehabilitation interventions and services provision, and be used in research. Continuous improvement is facilitated through feedback from clinicians and the scientific community as a whole. In this workshop, we will introduce the conceptualization of ClinFIT, detail the building blocks and guiding principles, and give participants insight on how ClinFIT can be implemented in Europe.

Insight into UEMS-PRM efforts to foster ICF-supported clinical quality management in rehabilitation in Europe

Mauro Zampolini^{1,2}, Melissa Selb^{3,4}, Mark Delargy^{5,6}, Carlotte Kiekens^{7,8}, Gerold Stucki^{3,4,9,10}

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Effectiveness in rehabilitation is achieved when desired clinical outcomes, i.e. optimal functioning, are reached. The reference system for the standardized reporting of functioning outcomes is the International Classification of Functioning, Disability and Health (ICF), including in clinical quality management in rehabilitation (CQM-R). To foster ICF implementation in CQM-R, the Physical and Rehabilitation Medicine Section and Board of the European Union of Medical Specialists (UEMS-PRM) approved an ICF implementation plan that includes identifying the types of currently provided rehabilitation services in Europe, implementing clinical assessment schedules (CLASs) for each of these service types (i.e. what aspects of functioning to document, for whom and when), and developing and promoting the intricate and multi-professional intervention scheme called “Individual Rehabilitation Project” (IRP) modelled after the one developed in Italy. The objective of this workshop is to familiarize the participants with the essential elements of the UEMS-PRM efforts (i.e. European framework of rehabilitation service types and corresponding CLASs and IRP) and concrete implementation activities. Participants will also have an opportunity to provide valuable expert input on how implementation of the European Framework, CLASs and IRP can be used in the continuous improvement of rehabilitation service provision in their respective countries and in Europe in general.

FRAILITY, SARCOPENIA, AND GERIATRIC REHABILITATION

Prof. Walter Frontera MD, PhD, FRCP

Department of Physical Medicine, Rehabilitation, and Sports Medicine

University of Puerto Rico School of Medicine

ISPRM Immediate Past-president

Important demographic changes have been reported by the World Health Organization during the last century in many countries around the world. These changes include an increase in life expectancy (to over 80 years in more than 20 countries), an increase in the number of men and women older than 60 years of age (projected to be as high as 40% in many countries by 2050), and an increase in the number of centenarians. These demographic changes are happening faster in recent years than in the past and have been reported in low, middle, and high-income countries. Frailty has been defined as a physiologic state of increased vulnerability to stressors that results from decreased physiologic reserves and even dysregulation of multiple physiologic systems. A phenotype of frailty has been defined as including three or more of the following: weakness, poor endurance, weight loss, low physical activity, and slow gait speed. Older persons have a high prevalence of impairments and limitations in ADL's and Instrumental ADL's as well as a high prevalence of chronic non-communicable health conditions. Frailty interrelates with both, disability and comorbidity (presence of 2 or more diseases in the same individual). Sarcopenia, a skeletal muscle disorder that includes skeletal muscle weakness, loss of muscle mass, and impaired motor performance, is an independent entity but contributes to frailty. The rehabilitation approach should contain various strategies including: 1) physical activity and exercise for the primary prevention of chronic illness, 2) interventions targeted to specific impairments and functional losses to limit disability, and 3) interventions that target the components of the frailty phenotype.

THE ISPRM HE ISPRM CORE CURRICULUM AND COMPETENCIES

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University of Puerto Rico School of Medicine

ISPRM Immediate Past-president

Medical education is divided in several stages, all of them important. Of particular relevance to this discussion is the stage known as graduate medical education, residency training, or specialization. This stage is more specific than previous stages and its content and structure depends on the medical specialty. The ISPRM has defined in detail the specialty of PRM including its definition, conceptual base, scope of work, scope of clinical practice, knowledge content, and organization. These elements served as a base for the development of an educational curriculum and are all included in the ISPRM Scope Book of PRM published for the first time in 2019 as a supplement to the Journal of ISPRM (<http://www.jisprm.org/showBackIssue.asp?issn=2349-7904;year=2019;volume=2;issue=5;month=June;supp=Y>). Furthermore, the ISPRM Education Committee published at the end of the year 2019 the core curriculum and competencies that should be included in the training of future PRM physicians. These can be accessed in the ISPRM website (<https://www.isprm.org/isprm-core-curriculum-and-competencies/>) and represent a consensus of experts around the world. One important challenge to the implementation of such a curriculum is the fact that the development of PRM is not uniform across nations. In addition, rehabilitation services vary greatly in different parts of the world. Its main goal is to provide a set of fundamental practical knowledge requirements and competencies expected in the professional practice of PRM. The ISPRM is not intended to be used as a mandatory curriculum, rather, to serve as a guide for educational programs. The content is matched with learning objectives with a focus on clinical knowledge and practical skills including principles of biomedical science, clinical diagnostics, functional assessment, intervention strategies, disease-specific approaches, and research. This document also includes core competencies that graduates of PRM training programs should achieved including interpersonal skills and communication, system-based learning, patient safety and quality of care, among others.

RESEARCH IN REHABILITATION: THE AMERICAN JOURNAL OF PM&R

Prof. Walter Frontera MD, PhD, FRCP

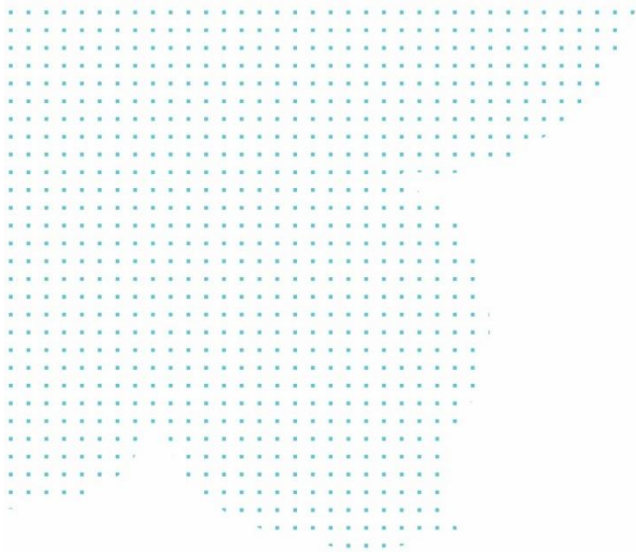
Department of Physical Medicine, Rehabilitation, and Sports Medicine

University of Puerto Rico School of Medicine

Editor-in-Chief AJPM&R

ISPRM Immediate Past-president

The American Journal of Physical Medicine & Rehabilitation (AJPM&R) was founded in 1922 and next year we will publish its 100th volume. The mission of the AJPM&R is to promote excellence in education, scientific research, and evidence-based clinical practice. It is the official journal of the United States Association of Academic Physiatrists (AAP) and it is owned and published by Wolters Kluwer. The journal's regular issue is published every month, a supplement on selected topics every year, and the abstracts of the AAP's annual meeting. We received approximately 950 submissions in 2019 from 45 countries including 67% from outside the United States. The acceptance rate was 29% in 2019 and is trending down. Time to first decision is, on average, 20 days. In addition to original research manuscripts and literature reviews, the AJPM&R publishes special sections on evidence-based physiatry, Cochrane Rehabilitation corners, visual vignettes, Para sport and Paralympic sport, and a video gallery. During the last 3 years we have given particular attention to the publication of randomized clinical trials, systematic reviews with meta-analysis, and more recently, protocols for proposed innovative clinical trials. In addition, we recently added a new section for residents and fellows with manuscripts written and reviewed by residents and fellows under the guidance of an associate editor. In the context of the COVID-19 pandemic the AJPM&R has been publishing for several months now a special section dedicated to this topic. The website of the journal (<https://journals.lww.com/ajpmr/pages/default.aspx>) includes collections of related papers including, clinical trials, supplements, specific conditions such as stroke, top cited articles, and videos. The AJPM&R is the official journal of the Latin American Rehabilitation Medicine Association (AMLAR) and all abstracts are translated into Spanish and available on the website. Further, the AJPM&R recently became the official journal of the Canadian Association of PM&R.



SPEAKERS PRESENTATIONS





SP101

CLIMATOLOGY: SUNSHINE EXPOSURE HAS POSITIVE EFFECTS

Albrecht Falkenbach

Pensions Versicherungs Anstalt SKA-RZ Bad Ischlfür Stütz-Bewegungsapparaterkrankungen
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Changes in UV exposure and the spectra can be expected in next years. The risk of UV exposure, in particular skin cancer development, has been widely discussed in recent years. On the other hand, there is growing evidence of beneficial effects, e.g. in oncology, osteology, angiology and cardiology.

Most benefits from sunshine exposure result from the UV-induced stimulation of vitamin D-precursors. After isomerisation of previtamin D in the skin, 25-hydroxylation in the liver and 1 α -hydroxylation in the kidney, the active form 1,25-dihydroxycholecalciferol may exert the beneficial effects in the prevention and treatment of several diseases, namely in rickets, osteomalacia and osteoporosis. Recent epidemiological studies point at benefits in colon-, breast- and prostate-cancer and arterial hypertension. Many more positive effects of UV-exposure and higher vitamin D levels are under discussion, eg. an improved muscle function and a risk reduction of falls, improved fetal brain development and cognitive function in the elderly. Also, a risk reduction for metabolic diseases is being discussed.

An UV-induced increase of vitamin D can be achieved by exposure to suberythemal doses of UVB-light, which, however, is deficient in northern Europe during wintertime. Humans at risk of vitamin D deficiency may benefit from winter sojourns in countries with abundant sunshine or exposure to artificial UV-light. Recently published papers support the view that beneficial effects of UV exposure (in reasonable doses) predominate.

SP102

THE EFFECT OF SULFURIC WATER AND MUD THERAPY ON SEROTONIN ACTIVITY AND OTHER BIOCHEMICAL PARAMETERS IN PATIENTS' PLASMA**Aleksandar Jokic**

Rehabilitation Specialized Rehabilitation Hospital, Banja Koviljaca, Serbia

Introduction: Sulfuric baths and mud wraps are known to have a positive effect in patients with osteoarthritis (OA) of the hip and/or knee joint. OA is a chronic degenerative disease accompanied by a constant pain that often leads to a change in the mood of patients suffering from it. Over the last few decades, numerous studies have described the various effects of sulfur water and peloid. Serotonin is one of the important neurotransmitters ranging in functions such as a role in the regulation of temperature, sleep, appetite, while its main function concerns the control of depression. Considering the belief that balneotherapy primarily has a general effect, we have begun the preparation of this study.

The Aim: The aim of this study is to examine the effect of peloid on serotonin levels and other biochemical parameters in the blood, as well as whether the application of hydrotherapy affects the obtained results.

Methods: Randomized controlled study included patients of both sexes, divided into two groups. Patients aged 50-65 who have been diagnosed with and X-ray-confirmed OA of the hip and/or knee joint participated in the study. The first group consisted of patients who were using peloid and bathing in sulphuric bathtub, while patients in the second group additionally had exercises in hygienic water. The duration of rehabilitation treatment was 12 days. Serotonin values, parameters of complete blood count, lipid status and inflammatory markers were analyzed.

Results: The preliminary results showing whether balneotherapy has an effect on serotonin levels and other biochemical parameters in patients' plasma will be announced at the upcoming congress.

Conclusion: We expect of this study to be another contribution to the enlightenment of potential beneficial effects of balneotherapy, as well as to show that mud therapy primarily has a general and then a local effect.

Keywords: osteoarthritis, balneotherapy, mud, sulfuric water, serotonin



SP103

THE ROLE OF HUMANOID ROBOT MARKO IN THE TREATMENT OF CHILDREN WITH CEREBRAL PALSY

Aleksandra Mikov

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Introduction- Humanoid robot MARKO (multimodal anthropomorphic robot with cognitive properties) was designed during research interdisciplinary project. The role of MARKO was to encourage children during kinesitherapy and show some simple exercises.

Objective-was to evaluate the role of the humanoid robot in the treatment of children with cerebral palsy.

Method- The research was conducted at the Clinic for Children's Habilitation and Rehabilitation, Institute for Child and Youth Health Care of Vojvodina, Novi Sad. In the study was included 15 children (7 girls, 8 boys, average age 12,1 year) with cerebral palsy (GMFCS I-IV) who had developed social contact. MARKO was controlled by a trained human operator, and children activities during the experiments were monitored by a physiatrist and physiotherapist. All sessions with robot were recorded with two cameras. At the beginning of the treatment, children and parents provided written consent to participate in the study.

Results- Research has shown that children were curious to get to know the robot before treatment began, as they often asked when they would see it. During the treatment, most of the children had active conversations with the robot, trying to understand the orders he was giving them, as well as to make the movements he showed them. The children showed increased motivation to perform the assigned activities, because they wanted to receive praise from the robot. It was the opinion of parents and therapists that children were more interested in the activities offered by the robot than by the physiotherapist.

Conclusion- Humanoid robots can be useful as an adjunctive therapeutic agent in children with chronic diseases where long-term cooperation and motivation of the child is required for the success of the treatment.

Supported by grant No III44008, Ministry of Education, Science and Technological Development of the Republic of Serbia

SP104

GAIT TRAINING OF SUBACUTE STROKE PATIENTS ASSISTED BY THE WALKAROUND®**Aleksandra Vidakovic**

Neurorehabilitation Faculty of Medicine, University of Belgrade, Belgrade, Serbia

Introduction: Improvement of gait abilities is one of the important goals of stroke rehabilitation. Current concepts in gait rehabilitation favor intensive, task-specific, repetitive training. Walkaround® is an assistive device for gait training. This device provides postural body support and trunk orientation using a lumbar belt that is connected to a powered rolling walker. Two motor units power the Walkaround® system. A joystick can control the speed and direction of motion. Training session with Walkaround® could take place in- or outdoor.

Objective: The objective of the study was to assess if the Walkaround® is more effective compared with conventional assistance during gait training.

Method: We conducted a randomized, single-blinded, 4-week clinical trial of 22 subacute stroke patients with a follow-up period of six months. Patients were divided into two identically sized groups: the treatment group (BPS) assisted by the Walkaround® and the control group (CON) that was assisted by conventional means (cane, therapist) during gait training. The gait training consisted of 30-min walking sessions five days a week for four consecutive weeks. The outcome measures were as follows: Barthel index, Fugl-Meyer score for the lower extremities, Berg balance test, and gait speed.

Results: Changes in the outcome measures were significant for the Berg Balance score after six months in both groups and gait speed among the BPS group at the end of therapy and after six months ($p < 0.05$) compared with the same outcome measures at the beginning of the trial. Significant differences were found in gait speed and Berg Balance test scores after four weeks and in gait speed after six months ($p < 0.05$) between the BPS and CON groups.

Conclusion: The results suggest that the added use of Walkaround® led to limited yet significant changes in gait speed and balance control.

SP105

EARLY REHABILITATION AND EARLY FUNCTIONAL ASSESSMENT – LOOK AT OUR PRACTICE**Aleksandra Vukomanovic**

Department for physical medicine and rehabilitation Military Medical Academy, Belgrade Serbia

Introduction: Early (or acute phase of) rehabilitation is connected with sudden patient's functional impairment caused by injury, disease or scheduled surgical procedure. Its aim is to help patient to regain basic activities of daily living as soon as possible.

Objectives: Two main questions for rehabilitation professionals team could be the following: what is real to achieve in a short period of time and how to assess patient's functional recovery during few days of early rehabilitation.

Method: Longitudinal study (5 days of early rehabilitation); 50 surgically treated patients with hip fracture (HF group) and 50 patients who underwent scheduled hip arthroplasty because of osteoarthritis (HO group); rehabilitation protocol was equal for both groups of patients and started on the 1st day after operation. Functional achievement was assessed every day until the 5th day of rehabilitation by the A-test (maximal score 50, safe and independent performing of 10 basic daily activities). Comparison between groups: Mann Whitney U test; day by day functional achievement: Wilcoxon signed-rank test.

Results: Although both group of patients significantly improved performing of basic activities of daily living from the 1st day until the 5th day of rehabilitation, comparison between groups revealed that patients from the HO group showed significantly better results of the A-test for each day of early rehabilitation than patients from the HF group ($p=0.000$). No patient from the HF group reached maximum score of the A-test, and majority still needed assistance from rehabilitation professionals at the end of early rehabilitation while walking or performing other basic activities.

Conclusions: Early rehabilitation is a crucial period for functional recovery of patients. Although this is a short period of time, we believe that performance-based tests should be applied for evaluating functional recovery. The results of this study illustrated heterogeneity of patients' population and possible achievement of rehabilitation goal.

SP106

HOW TO LEAD EVIDENCE CLINICAL TREATMENTS BY NEW TECHNOLOGY AND ROBOTICS IN REHABILITATION ?**Alessandro Giustini**

Rehabilitation San Pancrazio Hospital, Arco (TN), Italy

Development of Robotics treatments in Rehabilitation in the field of evidence and effectiveness, availability and sustainability too (having in mind indications from UEMS Position Paper in relation to argument) is really a big and critical point for PRM

Connecting experiences and working together others ESPRM we can overcome these criticisms also regarding the possible different evaluations (in efficacy and effectiveness) between these innovative treatments and older traditional ones . Now we are trying to better connect the 3 corner aspects this evaluation : scientific, etical, financial .

In particular regarding the aim to apply EBM in this field it could be necessary to have in mind the WHO-ICF perspective: Evidence (and Efficacy) in Rehabilitation must be more and more Individual/Specific - qualitative and in the same time quantitative (Technology -Based)

All the aspects of (new) technology in rehab. treatments are surely gold for research and evidences but must be connected with individual/global activity and functioning which is the aim of rehabilitation care. This can be the first side for our attempt.

On the other side it is necessary to connect the evaluations with the Bench Marking perspective :it means find a large consensus sharing the whole organization of treatments (modalities, methodologies , indications, education for professionals in charge and so on ...) in great groups of PRM colleagues and facilities at European level.

SP107

ROBOTICS AND ADVANCED TECHNOLOGIES IN REHABILITATION: EXPERIENCES, PERSPECTIVES AND CRITICISMS IN AGEING AND CHILDRENS**Alessandro Giustini**

Rehabilitation San Pancrazio Hospital, Arco (TN), Italy

Introduction: We all know very well how New Technologies and Robotic devices are actually invading rehabilitation fields, offering treatments and perspectives often previously quite unknown or impossible .

Often in this situation efficacy and effectiveness can be weak, in relation with hopes really much more strong among patients, families and professionals too.

Connecting and working together others ESPRM SICs (Ageing Persons, Children, Evidence Based Medicine) and involving other colleagues (not only PRM) working in these fields .

European Robotic Summer School was focused on developing and sharing research and experiences in robotic rehabilitation and its effects to face this critical problem, and to develop education for PRM at an international standard.

Robotics and new technologies in children and elderly people in any disable condition can be an evident and great example for these problems : in ageing persons like in children many "traditional " disabilities are still relevant and in the same time new conditions of disability are rising in neuro-motor and cognitive functions, and often with a so long and heavy impact in the life of persons.

New Technologies could be fundamental to treat and in the same time to measure and clarify to reach a real efficacy/effectiveness and PRM have surely the global competence to define and guide these treatments.

Next ERRSS Edition will be focused on the specific applications and results of new technologies in treatments for younger and elderly disable people involving other SISC

Surely it is very interesting to have in 2020 ESPRM Congress this scientific Session to be able to meet and discuss about these topics , and it will be a fundamental step to develop arguments for the 2021 School .

SP108

EARLY REHABILITATION AFTER ANEURYSMAL SUBARACHNOID HEMORRHAGE IN PATIENTS OPERATED IN THE ACUTE TERM - WHEN STARTED**Andjela Milovanovic**

Clinic of Physical Medicine and Rehabilitation, Medical Faculty, University of Belgrade, Clinical Center of Serbia, Belgrade, Serbia

Introduction. The term subarachnoid hemorrhage (SAH) refers to sudden extravasation of blood into the subarachnoid space, in most cases as a result of a ruptured arterial aneurism.. SAH can have many complications. Causal treatment is the surgical or endovascular approach. A surgical procedure may be performed in the acute phase or chronic.

Objective. The aim of this study was to develop a safe rehabilitation and verticalization protocol for patients who have undergone surgical repair of acute SAH.

Method. The study was a randomized, clinical experimental design. It was carried out in the Neurosurgery Clinic June 2013 to 2015. The investigation was approved by the Ethics Committee of the School of Medicine. These sixty-five subjects were evaluated in two groups. Group 1 (n=34) started early rehabilitation and verticalization on Days 2-5 post-bleeding, Group 2 (n=31) started early rehabilitation immediately post-surgery and verticalization was initiated approximately Day 12 post-bleeding. All patients were monitored for early complications, ischemia, anxiety (using the Zung scales), cognitive status (using the Mini-Mental State Examination, MMSE) functional status (using the Functional Independence Measure or the FIM instrument were assessed at discharge and at 1 and 3 months post-surgery.

Results. At discharge, Group 1 had a significantly higher proportion of patients with ischemia and patients with hemiparesis three months post-surgery. Patients in Group 1 scored significantly higher on the Zung anxiety scale at 1 and 3 months pos-surgery. Group 2 patients scored significantly higher on the MMSE and FIM scale at discharge and 1 month post-surgery.

Conclusion. The study has shown that verticalization in SAH patients should not be initiated prior to Day 12 post-bleeding, in particular since verticalization initiated 2-5 days post-bleeding did not have any effects on the prevention of early postoperative complications.

SP109

NEW MEASURE FOR QUANTIFYING SPASTICITY: EXTENDED PT+ SCORE**Antonina Aleksic, Radoje Čobeljic, Lana Popovic-Maneski, Dejan B. Popovic**

Institute of Technical Sciences of the Serbian Academy of Sciences and Arts, Belgrade Serbia

Introduction: The quantitative assessment of spasticity is of interest in selecting the appropriate treatment of persons with paresis/paralysis. The pendulum test (PT) score was shown to be correlated with the modified Ashworth scale [1]. We present here the extended PT score (PT+) for the better description of the spasticity.

Objective: Introduction of the new measure termed PT+ for quantifying the strength of spasticity and type and level of reflex responses that cause spasticity.

Method: Twenty-one chronic spinal cord injured patients participated in the study in the Clinic for rehabilitation "Dr. Miroslav Zotović", Belgrade. We used the custom-designed device for the PT measurements [1,2]. The seven parameters: R2n (relaxation index), N (number of swings), ϕ_{max} (first maximum), ω_{max} and ω_{min} (maximum positive and negative angular velocities), f (frequency) and P+ - P- (difference between the positive and negative areas between the goniogram and neutral line starting from the first minimum determine the PT score. We now formed the extended score PT+ as the vector with three members: PT score, R2n, f, and we add "+" or "-" in front of the vector-based on the signum of the difference P+-P-.

Results: The "-" PT+ indicates the flexion dominating spasticity, and the "+" indicates the dominant extension spasticity. The components in the PT+ score mean the following: PT score shows the level of spasticity, high level of relaxation R2n suggests that the dominant part of the reflex comes from the size of the stretch, and more significant f shows that the velocity of stretch dominantly causes the reflex.

Conclusions: PT+ score provides a more detailed quantification of the spasticity compared with the PT score.

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SP110

HOW TO TREAT FRAILITY IN THE ELDERLY**Aydan Oral**

Department of Physical Medicine and Rehabilitation Istanbul University, Istanbul Faculty of Medicine, Istanbul Turkey

Frailty is a clinical state characterized by vulnerability to poor homeostasis resolution when confronted with a stressor (which may be a newly exposed drug, infection, or surgery) that increases the risk of developing adverse outcomes such as disability, increased dependency, and mortality resulting from multisystem physiological dysfunction (1). The prevalence of frailty is high in individuals older than 65 years and reaches to 15% in this population (2). Frailty is not only associated with premature mortality but also with negative health outcomes such as limitations in activities of daily living, increased risk of hospitalization and length of hospital stay as well as falls and fractures (3) which need to be addressed with effective treatment strategies in order to reduce activity limitations and participation restrictions of the older persons with frailty. The multifaceted nature of frailty necessitates multidomain interventions to overcome a wide range of problems associated with frailty. Therapeutic options need to focus on physiological dysfunction in a variety of systems such as those in neuromuscular (muscle structure and function), hematologic, inflammatory, hormonal, immune, and other regulatory functions including brain functions for the improvement of the production of energy and use (4). Guidelines strongly recommend that there is a need for a comprehensive program of care to address polypharmacy, sarcopenia management, loss of weight, and fatigue-related causes such as hypotension, anemia, hypothyroidism, deficiency of vitamin B12, and depression (5). Evidence suggests that physical activity is one of the most effective interventions for frailty (6). Core components of the management of frailty in the elderly include multicomponent physical activity/exercise program including a patient tailored progressive, resistance-training component and nutritional interventions including protein/caloric supplementation for older persons in case of diagnosis of undernutrition or weight loss and/or the combination of nutritional/protein supplementation and physical activity as well as advice on the importance of oral health. Home-based training for the elderly with frailty including advice on improvement of health behaviors and modifications in home environment to facilitate functioning can be recommended. Provision of social support is also important to adhere to comprehensive program of care (5). In conclusion, frailty is a major public health problem due to the ageing of the world's population. It is a pressing priority to treat frailty in order to prevent disability associated with this health condition and to maintain and to improve older individuals' functioning, autonomy, and quality of life. Physical and Rehabilitation Medicine programs of care may well address the unmet needs of the frail elderly.

SP111

THE EFFECTIVENESS OF PULMONARY REHABILITATION IN PERSONS WITH RESPIRATORY CONDITIONS**Aydan Oral**

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Respiratory conditions, particularly chronic obstructive pulmonary disease (COPD) and asthma, are among significant causes of deaths and disability worldwide (1). COPD is associated with significant problems in functioning leading to impairments in body functions, activity limitations and participation restrictions resulting in poor health-related quality of life (HRQoL). Therefore, the management of chronic respiratory conditions, such as COPD, requires a biopsychosocial approach [i.e. the International Classification of Functioning, Disability and Health (ICF) (2)] to improve functioning and HRQoL. Pulmonary rehabilitation defined as “a multimodal comprehensive intervention including a thorough assessment of the patient and therapies such as education and exercise training as well as health enhancing behavioral changes aimed at improving the physical and psychological well-being of persons with chronic respiratory conditions” (3), is the main strategy for overcoming functioning problems. The effectiveness of pulmonary rehabilitation in COPD is well-established with meaningful favorable outcomes regarding dyspnea, fatigue, emotional function, exercise capacity, sense of self-disease control and HRQoL (4). It has been shown that patients with asthma may benefit from physical training which may induce significant improvement in maximum oxygen uptake (5). Rehabilitation interventions such as airway clearance techniques were found to be associated with potential improvements in HRQoL in patients with bronchiectasis (6). Positive expiratory pressure therapy was found more effective than high-frequency chest wall oscillation in reducing pulmonary exacerbations in individuals with cystic fibrosis (7). In conclusion, rehabilitation serves as an important component of the management of respiratory conditions and patients may benefit from a variety of rehabilitation interventions. It is a challenge for physical and rehabilitation medicine physicians having expertise in the rehabilitation of chronic respiratory conditions to lead pulmonary rehabilitation programs to address impairments in function, activity limitations, and participation restrictions with the aim of improving HRQoL of patients with respiratory conditions (8).

SP112

DEVELOPMENT AND IMPLEMENTATION OF AN ICF-BASED CLINICAL TOOL ACROSS EUROPE**Aydan Oral**

Department of Physical Medicine and Rehabilitation Istanbul University, Istanbul Faculty of Medicine, Istanbul Turkey

The International Classification of Functioning, Disability and Health (ICF) is an international standard and a common language for describing and measuring health and functioning/disability (1). Major Physical and Rehabilitation Medicine (PRM) bodies have initiated efforts for the system-wide implementation of the ICF in PRM, rehabilitation and health care system at large. The PRM Section of the Union of European Medical Specialists (UEMS) undertook the leadership role in this initiative for Europe (2). For this purpose, a workshop was held in January 2016 in Nottwil, Switzerland (3) during which an action plan was developed. One part of the action plan, among many others, was the development of a practical ICF-based clinical tool to collect data on functioning, to assess functioning of an individual along the continuum of rehabilitation care, and to assess and monitor the impact of interventions aiming to improve functioning (2). The first step for developing this ICF-based clinical tool involved establishing its foundation, i.e. simple, intuitive descriptions of the ICF categories in the ICF Rehabilitation Set (now called ICF Generic-30 Set) (4). The first country/language-specific version of the simple descriptions was produced in Italy (5), serving as the basis for other country/language-specific versions. The creation of the country/language-specific version involves several steps. The first step is the translation of the English-language version of the simple descriptions into national languages. Then, through a consensus conference among rehabilitation professionals, a consensus is reached on the final simple descriptions for each ICF category (6). UEMS PRM delegates throughout Europe were encouraged to get involved in this initiative for the system-wide implementation of an ICF-based clinical tool. In addition to the Italian version, Polish, Flemish Dutch/Dutch, Croatian and Turkish versions have been produced so far and several other country/language specific versions of the ICF-based clinical tool (Greek, German and French versions) are in progress. This promising initiative will pave the way for the implementation of the ICF in national health systems.

References:

SP113

THE EFFECT OF PRESSURE PAD LOCATION OF SPINAL ORTHOSIS ON THE TREATMENT OF ADOLESCENT IDIOPATHIC SCOLIOSIS**M. S. WONG CPO(HK), PhD, FHKSCPO, FISPO Associate Professor (Prosthetics and Orthotics) Department of Biomedical Engineering,**

The Hong Kong Polytechnic University, Hong Kong.

Abstract:

Scoliosis is a 3-dimensional (3-D) spinal deformity usually with lateral curvature of the spine and vertebral rotation. Most cases are with unknown cause and found in adolescence, thus, it is termed as adolescent idiopathic scoliosis (AIS). For moderate AIS, orthotic treatment is applied to the patients during their puberty to mechanically support the spine and prevent further deterioration. The outcome of orthotic treatment for AIS is generally considered being associated with the orthosis design and patient's compliance. There is lack of non-invasive, inexpensive and accurate assessment method to allow clinicians to reveal the change of scoliosis deformity during the processes of orthotic design and patient fitting. Moreover, the current orthotic methods and techniques are lack of enough scientific evidence although there are some studies demonstrated the spinal orthosis being effective. The relevant technical information such as "Where are the best locations to put the correcting pads and counteracting pads in the design of spinal orthosis under the 3-point pressure system in the 3 anatomical planes? How tight should the patients wear the orthoses? What should be an ideal strap tension? How long should the patient wear the orthoses? What is the patient's compliance to orthotic treatment? Whether all these factors are important, necessary and related to the clinical efficacy and outcome?" More clinical researches on these aspects are deserved. In this seminar, the speaker will share with the delegates his research studies, clinical experiences and scientific evidences to better understand the science behind the phenomenon that orthoses appear effective and go further for evidence-based practice. In addition, application of the state-of-art ultrasound technique to the assessment of spinal deformity and flexibility, as well as in the design and fitting of spinal orthosis will be discussed and the relevant clinical results will be reported in the scientific meeting.

SP114

LABS SESSION. RESEARCH IN A UNIVERSITY HOSPITAL DEPARTMENT: THE DEPARTMENT OF PHYSICAL MEDICINE AND REHABILITATION ISTANBUL FACULTY OF MEDICINE, ISTANBUL UNIVERSITY**Aydan Oral, Aysegul Ketenci¹, Demirhan Diracoglu¹, Emel Ozcan¹, Nalan Capan¹, Sina Esmailzadeh¹, Ekinilke Sen¹**

Department of Physical Medicine and Rehabilitation, Istanbul Faculty of Medicine, Istanbul University, Istanbul, Turkey 1

The Department of Physical Medicine and Rehabilitation is a university hospital department in Istanbul Faculty of Medicine (www.istanbulftr.org/en) and there are seven professors, two associate professors and one specialist as trainers. There are also fourteen trainees, one algology fellowship trainee, twenty-four physical therapists and other rehabilitation professionals in the rehabilitation team. In addition to PRM training of trainees, research is a priority in our department. We have numerous specialized outpatient clinics such as neurological rehabilitation (for stroke, spinal cord injury, multiple sclerosis patients and others), pediatric rehabilitation, urogynecological rehabilitation, post-astectomy/lymphedema rehabilitation, spinal disorders (including low back pain), rheumatic diseases, hand diseases, foot diseases, temporomandibular joint disorders, osteoporosis, musculoskeletal disorders and ergonomics, manual therapy, injection therapies (including prolotherapy among others), and vertigo units/clinics. In these specialized outpatient clinics, not only the patients receive good quality care, but also PRM training and research are conducted. The department has a variety of assessment and treatment units and tools. There are physical therapy and exercise units, two whole body vibration devices, and virtual reality equipments. There is a pilates gym and reformer device for exercises. In the electroneurophysiology laboratory, assessments in various diagnoses are made by an associate professor. Besides, there are isokinetic laboratory, occupational therapy, bone assessment (with a dual-energy X-ray absorptiometry and two quantitative ultrasound devices-calcaneal and multi-site) and extracorporeal shock wave therapy units. Two ultrasound devices are available to be used in diagnosis and interventional procedures in our department of algology. Researches are carried out on many different topics in our department. In the last two years (October 2017-December 2019), thirty three research articles were published in journals indexed in SCI or SCI-expanded. Our trainees are encouraged to participate in the studies and many studies were conducted interdisciplinarily. In addition, two projects of our department in which one of our associate professors and a trainee was involved (one about "good clinical practice" and the other "virtual reality") was founded by the Scientific and Technological Research Council of Turkey. Research/ publication topics are as follows: temporomandibular joint disorders, osteoarthritis, osteoporosis, chronic pain syndromes, vestibular pathologies, or healthy individuals and rehabilitation interventions such as physical agents, injection therapies, exercise, and validation studies of some assessment instruments and Cochrane review summaries. In conclusion, our department continues with research on diverse topics in rehabilitation.

SP115

ACUTE OSTEOPOROTIC FRACTURES: PHYSICAL AND REHABILITATION MEDICINE APPROACH**Ayşe Kucukdeveci**

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Osteoporosis and the resultant fragility fractures are associated with significant disability. Osteoporotic fractures most commonly occur at the vertebra, distal radius, proximal femur and proximal humerus. Aims in the management of acute osteoporotic fractures are to relieve pain, stabilize the fracture, improve functioning by appropriate rehabilitation programme and prevent subsequent fractures. Physical and rehabilitation medicine (PRM) interventions have an important role in the management of acute osteoporotic fractures. The aim of this session is to overview the PRM interventions (non-pharmacological) following acute osteoporotic fractures of the spine, hip, distal radius and proximal humerus. Vertebral compression fractures include 50% of all osteoporotic fractures. However only one third of these fractures are symptomatic and mostly treated by conservative approaches, including pain relief, activity modification, bracing, and subsequently exercises. Distal radius fractures are treated either by conservative (closed reduction and cast immobilization) or surgical (open reduction and internal/ external fixation) methods and afterwards require PRM interventions including exercises, physical modalities and occupational therapy. Proximal femur fractures are generally treated by surgery (arthroplasty or intramedullary nailing), and subsequently, postoperative rehabilitation programme, including early weight-bearing, ambulation and transfer training, range of motion and strengthening exercises, as well as balance, walking and stairs training is administered. Proximal humerus fractures are mostly (85%) treated conservatively by sling immobilization followed by early gentle mobilisation. Besides these region specific rehabilitation programmes, the effects of physical modalities and exercises on bone health and fractures will be discussed in the context of evidence-based medicine.

SP116

LABS' SESSION: RESEARCH ON COMPLEX REGIONAL PAIN SYNDROME IN A HAND REHABILITATION UNIT**Ayşe Kucukdeveci**

Physical Medicine and Rehabilitation Ankara University, Faculty of Medicine, Ankara Türkiye

Complex regional pain syndrome (CRPS) is a chronic pain syndrome characterized by localized pain, vasomotor and sudomotor disturbances, and sensory and trophic changes in the extremity, usually triggered by a noxious stimulus. Although the pathophysiology of CRPS is not fully understood, it is assumed that central and peripheral mechanisms play a role, accompanied by neurogenic inflammation and microvascular dysfunction. Functional imaging studies performed in the previous years have revealed that central somatosensory and motor systems play an important role in pathophysiology. Persistent tactile and nociceptive stimulation to the central nervous system leads to reorganization of somatosensory and motor cortex. Psychological factors might also have a role in the pathogenesis. Physical and rehabilitation medicine interventions comprise the basis of treatment in CRPS.

The aim of this presentation is to give information about the research activities related with CRPS at the Department of Physical Medicine and Rehabilitation, Ankara University Medical Faculty. Nearly fifty patients with CRPS receive therapy at the Hand Rehabilitation Unit each year. Patients have also been involved in research projects being conducted at the Unit in collaboration with researchers from other departments. Two research projects are associated with the treatment of CRPS: The first has investigated the effects of magnetotherapy, whereas the second that of mirror therapy. A third study aims to investigate the psychological status of people with CRPS and its relationship with functional outcomes. Another study explores the role of ultrasonography in the diagnosis and follow-up of the condition. Finally a new functional imaging project will be set out to investigate the cortical alterations in the brain with the stimulation of the affected hand in CRPS. We hope the results of these studies will add valuable information to the existing knowledge and will make contributions for better management of people with CRPS.



SP117

OPTIMAL TREATMENT OF PSORIATIC ARTHRITIS WITH BIOLOGICS, THE IMPORTANCE OF MULTIDISCIPLINARY APPROACH

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Psoriatic arthritis (PsA) is the disease with many faces. It could affect the joints with pain and swelling, also the tendons surrounding the joints, leading to swelling of whole digits (dactylitis), or it may lead to inflammation of the entheses (enthesitis). PsA belongs to the group of seronegative spondyloarthropathies, because it may also affect the axial skelet (spondylarthritis), and it is characterised by the presence of psoriatic skin lesions . The nails, the gut (inflammatory bowel disease) or the eyes (uveitis) could, also, be included. Active chronic PsA could be accompanied with cardiovascular, psychological and metabolic comorbidities. It is characterized by systemic inflammation, assessed by C-reactive protein (CRP) or the sedimentation rate. Patients with PsA have functional loss and impairment of quality of life. There has been much progress in the development of unidimensional and composite measures of disease activity the last couple of years, as well as questionnaires showing the patient's perspective in that kind of the disease.

Optimal treatment implies important number of disease-modifying antirheumatic drugs (DMARDs)-conventional synthetic DMARDs (csDMARDs) such as methotrexate (MTX), sulfasalazine and leflunomide, but also other targeted biological agents (bDMARDs), such as TNF, interleukin (IL)-12/23 and IL-17A, as well as targeted synthetic DMARDs (tsDMARDs) that inhibit phosphodiesterase-4 (PDE4) or Janus kinases (JAKs). Treatment of extraarticular manifestations (inflammatory bowel disease, uveitis, skin changes) also require the use of specific drugs. New recommendations for the treatment of psoriatic arthritis with pharmacological therapies, published in 2020. will help the clinician to easily and comprehensively approach the modern treatment of this disease.

SP118

REHABILITATION AFTER FLEXOR TENDON REPAIR-PRINCIPLES, CHALLENGES, COMPLICATIONS**Branka Mladenovic**

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The task to get good outcome in treating flexor tendon injuries of the hand is challenge for surgeons as well as for physiatrists. The goal is to obtain good tendon gliding with full range of motion. Healing of the tendon after repair passes from inflammatory phase, over proliferation to remodelling phase resulting in mature tendon. In this process different cytokines and mechanical force influence scar formation and tendon strength. Excessive scarring makes adhesions to adjacent tissues and disables natural tendon excursions. The goal of ideal rehabilitation programme is to apply controlled, incremental stress to promote tendon glide and collagen deposition and, also to facilitate strengthening of repaired site - avoid adhesions development and avoid tendon rerupture.

Rehabilitation protocols have started in the forties of the last century with insisting on immobilization, protecting the site of rupture. With researching in tendons biomechanics suggested protocol have changed into mobilisation regimens. First passive, then "place and hold" regimens, and with improvement of surgeons materials and technics nowadays are actual early active mobilisation (EAM) protocols or true active motion. However, there are not strong evidences to support one protocol as preferable choice for flexor tendon rehabilitation. Despite the continuous efforts in this field, ideal protocol remains controversial. Even combining the finest suture repair technics and optimal hand therapy protocols can't always ensure the full restoration of hand function. Whole recovery depends also on patient motivation, compliance, the nature of injury, concomitant injuries of soft tissues, nerves, fractures, type of tendon repair, development of oedema or appearance of postoperative complications like complex regional pain syndrome which are not rare. The best results in flexor tendon rehabilitation could be achieved with optimal choice of exercises, individually targeted and with careful follow-up with frequent check-ups and changings therapy on time.

SP119

SWALLOWING REHABILITATION: PRINCIPLES AND METHODS**Branka Mladenovic,**

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Swallowing, deglutition, is an extremely complex neuromuscular process. The role is to move food from the mouth into the digestive system. Food pathway crosses airway pathway so natural swallowing mechanism serves also as airway protection. Swallowing passes through three phases: oral, pharyngeal and esophageal. Each of them is controlled by different neurological mechanisms. Understanding the reasons of swallowing problems – dysphagia – is the base for creating the most appropriate approach for dysphagia treatment. First, it considers diagnostics procedures performed by different specialist, gastroenterologists, otorhinolaryngologists, neurologists and their treating according to findings. For assessing all the steps in complicated swallowing cascade the gold standard is radiographic method Modified Barium Swallow Study with The Penetration Aspiration Score. Useful functional bedside tests are Mini Nutritional Assessment Short Form (MNA-SF) and Functional Oral Intake Scale.

The goal of swallowing rehabilitation is to support the best nutrition and hydration and to minimize the risk of aspiration. Swallowing rehabilitation considers dietary modifications (changing texture and viscosity of the food), exercises (laryngeal elevation, Masaco hold, head lifting exercise, lingual isometric exercises) position/postural techniques (chin down posture, head rotation, head tilt), as well as specific maneuvers that change timing or strength of particular movement of swallowing (effortful swallow, Mandelsohn maneuver, supraglottic and supra-supraglottic swallow). Dysphagia treatment also includes stimulation, electrical and thermal/tactile as well as implementation of some utensiles.

SP120

MUSCULAR EVALUTATION ON PRM AND SPORT**Calogero Foti**

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The isokinetic method, born towards the end of the sixties, has in less than thirty years conquered a space in the world of rehabilitation. By now almost all the basic and clinical research reported in the international literature concerning muscle performance of any body sector cite the isokinetic method among the methods used. Distinctions must be made between its use in the re-educational field and in the evaluation field.

The processes of functional assessment of muscle contraction have also undergone a considerable boost in recent years; the possibility of evaluating human movement not subjectively, but objectivating it with absolute and comparable numerical values, allows the physiatrist valid and reliable longitudinal and transverse controls. The assessment of muscle strength, power, range of motion, stiffness and flexibility is important in exercise science. Similarly, evaluation of neuromuscular behavior is of extreme relevance and interest in the field of rehabilitation of the sport injuries. Consequently, several test methods and techniques have been used to provide information regarding the relevance of strength and power to various physical pursuits - and to monitor progress of rehabilitation from injuries.

Since the inception of the isokinetic concept, this form of exercise has been thought to be a valuable tool for assessment and evaluation of muscular function and pathology. Isokinetic devices allow individuals to exert as much force and angular movement they can generate. Some of the advantages of isokinetic exercise and assessment has been advocated to be the following: Gives the possibility to isolate muscle groups; Single joint assessment allows a better isolation of specific diagnostic problems than multi-joint test, and therefore it is desirable to utilize isolated test for identification of specific problem; Provides accommodating resistance to maximal exercise throughout the range of motion; Collects quantifiable data for analytic evaluation; Allows for the examination of muscle output at certain sub-maximal velocities (40% of V_{max}) throughout the movement range and therefore are often considered more specific to human physical performance than isometric assessment; Allows building the torque/velocity (T/V) relationship; Allows high reproducibility ($r=0.82-0.96$), of the tests protocol used if gravity correction and patient set-up are properly considered.

On the other hand, several limitations are connected with this peculiar muscular activity: Isokinetic motion shows non-specificity with typical human movement characterized by the acceleration and deceleration of a constant mass; Isokinetic tests have not always provided data that accurately differentiate performance between athletes of varying skill levels; The maximal velocity allowed by isokinetic apparatus reaches only 40% of the maximal velocity that can be developed by leg extensor muscles during ballistic motion and only 10% of the maximal velocity obtained by shoulder during throwing motion; Exercise occurs primarily from non-weight bearing Open-Kinetic Chain (OKC) positions, even if now day many isokinetic dynamometers can be used as a Closed-

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Kinetic-Chain (CKC); Recent results support the belief that isokinetic strength does not correlate strongly with functional tasks; Inability of the isokinetic dynamometer to detect increases in quadriceps performance has been also presented. Those findings should be taken in serious consideration since the isokinetic values are frequently used as criteria for return to functional activities. Although isokinetic tests have been extensively employed, recent observations are strongly questioning the real effectiveness of such evaluation. In this connection new approach for assessment of muscle functions in programming sport activity and rehabilitation exercises have been applied using iso-inertial evaluation.

In the rehabilitation field, the isokinetic exercise is recommended where strengthening of muscular performance is required. The accommodating resistance makes it sufficiently safe to avoid muscle and joint injuries from excessive load. The subject pushes the lever according to his possibilities, without exceeding in strength as can occur in isotonic contractions. The possible adoption of high speeds, the possibility of having sub-maximal work performed (isokinesis with and without effort), the selection of limited articular excursions, the use of devices (f.e. antishar Johnson) allow the adaptation of the exercise to each patient. Joint pathologies, primitive muscle damage, central and peripheral nerve damage, immobilization syndromes, determining deficits of strength and resistance, can benefit from training at a constant speed.

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SP121

VIBRATION ENERGY IN PHYSIOTHERAPY**Calogero Foti**

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Vibration Energy can be used both diagnostically and therapeutically in Rehabilitation Medicine and is gaining wider acceptance in sport rehabilitation. Vibration exposure can have positive or negative effects on the human body depending on the features and time of the characterizing wave. The human body is constantly subjected to different kinds of vibrations, inducing bones and muscles to actively modify their structure and metabolism in order to fulfill the required functions. Like any other machine, the body supports only certain vibration energy levels over which long-term impairments can occur. Short periods of vibration exposure and specific frequency values can induce positive adjustments. Whole Body Vibration is appropriate in treatments where a systemic response is required, while Local Vibration is the best solution for treating a specific body segment. In re-educational motor program, therapeutic exercise in hypergravity-like condition is applied to the patient using free or resistance motion in higher gravity field: this can be accomplished enhancing isoinertial and isometric contractions by vibration energy, that elicits tonic vibration reflex. Vibration exercise can be used for improving flexibility, range of motion, posture and proprioception. Its possible clinical applications include osteopenia, postmenopausal osteoporosis, nonunions, muscle impairments and retractions, peripheral nervous system lesions, ROM limitations, postural defects, proprioceptive deficits, balance disorders, reflex sympathetic dystrophy syndrome and postsurgical conditions. Vibration application needs a strict control by Physicians, and a precise and careful application by Physiotherapists.

In conclusion, we can affirm that vibration applications hold a primary role in adaptive response of the human body.

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SP122

MESOTHERAPY IN SPINE PAIN**Calogero Foti**

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Key-words: Mesotherapy; loco-regional injections; spine pain; Rehabilitation Medicine.

Mesotherapy (MT) is a therapeutic method used in Physical Medicine and Rehabilitation (PMR) and consists of multiple microinjections of small amounts of Official Pharmacopoeia drugs, loco-regionally placed on cutaneous areas projection of the tissues involved by pathological process. Pharmacologic mechanism of action is the main and better known one. Adding to this, some other phenomena, of reflexogenic and immunological nature, are described to be effective. The main feature of MT in any case consists of the strengthening of pharmacological effect achieved by adopting some simple technical procedures: A- selectively intra-dermal or subcutaneous performed microinjections; B- a proper distribution of microinjection on cutaneous site which is the projection of pathological tissue to be treated.

MT so induces an intradermal pool of drug and, following, a slower pharmacological turn-over and prolonged activity just on the receptors of anatomical tissues corresponding to the pathological district or surrounding it. Drug mostly reaches the target tissue in a direct way, by diffusion and by emo-lymphatic microcirculation, jumping systemic filters as the entero- hepatic one; in fact it can be found only a very low quote of drug in the systemic circulation after a mesotherapy treatment. This peculiar pharmacokinetics has these considerable advantages: a more intensive, quick and prolonged therapeutical action, with respect to the expected one for that drug dosage, in the site where it needs; the necessity to administer minimal doses of drugs; a diminished involvement of not pathological sites with a decrease in iatrogenic side effects and in liver and kidney work loading. These aspects can be very useful when patient clinical features contraindicate the systemic administration of drugs for the reduction of metabolic functions and the possible risk to enlarge drug action with overdosage side effects. MT improves pain, inflammation and muscular contracture. Some clinical indications of MT in PMR are: back pain; cervical or lumbar radiculopathy; shoulder impingement syndrome; insertional tendinopathies (i.e. epycondilitis); knee osteoarthritis; fibromyalgia syndrome. Main contraindications to MT are: allergies or intolerances for drugs used in the mixture; severe failures; systemic infections; pregnancy; needle-phobia. MT besides hasn't to be effected on precancerous, damaged or infective skin areas, neither where subsists any capillary fragility.

SP123

REHABILITATION 2030, A WHO INITIATIVE FOR THE STRENGTHENING OF REHABILITATION IN HEALTH SYSTEMS**Carlotte Kiekens**

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The World Health Organization (WHO) is the lead agency for international health in the United Nations (UN) system. WHO's goal is to achieve better health for everyone, everywhere and expand universal health coverage (UHC). However, there is a substantial and ever-growing unmet need for rehabilitation worldwide. Accessible and affordable rehabilitation is necessary for many people with health conditions to remain independent and live full lives. Therefore, WHO launched "Rehabilitation 2030: A Call for Action" in 2017, bringing together hundreds of rehabilitation stakeholders from around the globe. In a first meeting they committed to key actions focused on improving rehabilitation leadership, political support and investment; expanding high-quality rehabilitation workforces and services; building stronger partnerships; and improving rehabilitation data collection and research capacity. Two years after the launch of Rehabilitation 2030 it was time to share the ongoing work and collectively plan next steps to continue advancing the global rehabilitation agenda. The Second Global Rehabilitation 2030 meeting (July 2019) brought together over 260 rehabilitation stakeholders from 65 countries, including Member States, UN agencies, civil society, professional organizations, academia, rehabilitation experts and user groups. The meeting emphasized the importance of 'functioning' as WHO's third health indicator alongside mortality and morbidity, highlighting rehabilitation's central role in optimizing functioning. It was showcased that almost a third of the world's population lives with limitations in functioning and could benefit from rehabilitation. UHC was recognized as the vehicle for making sure that everyone who needs rehabilitation receives quality services. The need for strengthening health systems in general and primary health care in particular to deliver rehabilitation to reach all people in need was acknowledged. In this lecture the Rehabilitation 2030 project will be presented, as well as the different tools that are being developed to strengthen rehabilitation in health systems around the world: Rehabilitation in health systems: guide for action; Package of Interventions for Rehabilitation; Rehabilitation Competency Framework.

SP124

SPECIAL ISSUES OF WOMEN WITH SCI**Christina-Anastasia Rapidi**

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More individualized and specialized health services is a global initiation. Women's health is among these priorities. Gender has a potentially impact on the physiology and pathophysiology of the organism.

Women with SCI consist the minority of persons with SCI (about 20% of people with SCI). There are differences between men and women with SCI in the cause of injury and prevalence. Recent epidemiological studies show two peaks of SCI at different ages. One peak in young adults due to traumatic injuries mainly in men and a second peak in the ages over 60 years due to low energy trauma with a more equal distribution between men and women. In the following years it is likely that there will be an increase in elderly and women with SCI, at least in developed countries.

In the literature there are conflicting opinions concerning the effect of gender on recovery and outcome after SCI. Bladder management methods followed by women often differ from men's methods due to practical reasons. Women appear to have more urinary tract infections associated with bladder management than men. Urinary incontinence is more frequent in women with SCI, and it is associated with severely impaired mobility, unmarried status, and reduced quality of life.

Women with SCI have lower marriage rates than the general population or disabled men. Unlike men, women have normal reproductive function after SCI but more difficulties in family, social and occupational reintegration, and higher rates of depression. Women with SCI face special problems with menstruation, sexual health, pregnancy, delivery, menopause, and diagnosis and therapeutic management of gynecological conditions (cancer, pelvic floor disorders, etc.).

Aging affects differently women with SCI from men with SCI, and women without disabilities.

Consequently, it is important to develop specialized health services for women with SCI with more female-focused rehabilitation.

SP125

INTERNATIONAL CLASSIFICATION OF SERVICE ORGANIZATION IN REHABILITATION – AN UPDATES SET OF CATEGORIES (ICSO-R 2.0)**Christoph Gutenbrunner & ISPRM-ICSO-R-Working Group**

The WHO Global Disability Action Plan 2014-2021 sets the goal to strengthen rehabilitation services and to perform research on disability related services. In order to systematically describe rehabilitation services in 2015 a first proposal was published (Gutenbrunner et al. 2015). After pilot testing the International Classification of Service Organization in Rehabilitation has been revised (ICSO-R 2.0) (Gutenbrunner et al. 2020). It has two domains being the service provider and service delivery. The classification consists of 23 categories and 17 subcategories. For each domain a description as well as inclusions and exclusion were added. The revised version has been reviewed by an international panel of experts. ICSO-R 2.0 now can be used for different types of projects, e.g. assessing and comparing existing rehabilitation services, characterize prototype rehabilitation services and to systematically report relevant factors of service organization in rehabilitation research. Examples will be presented.

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SP126

APPROACHES TO STRENGTHEN IN REHABILITATION SERVICES AND WORKFORCE CAPACITY BUILDING IN EASTERN EUROPEAN COUNTRIES**Christoph Gutenbrunner&Boya Nugraha**

The WHO Initiative Rehabilitation 2030 – a call for action sets the goal to strengthen rehabilitation in health systems. This requires analysis of existing rehabilitation services and workforce capacity at national or province level in order to identify gaps and develop an action plan. Ideally this will be developed at government level using the WHO STARS methodology. However, if the government itself does not take action, academic institution also can contribute to the analysis and the development of recommendations (Gutenbrunner&Nugraha 2018). Such projects have been carried out in Ukraine and Albania as well as in the Democratic People’s Republic of Korea (Gutenbrunner et al. 2018 a, b). In these countries health and rehabilitation systems were organized in the tradition of the Soviet Union. For that reason the recommendation developed showed similarities, such as a lack of rehabilitation services for the acute and post-acute phase and, in particular, missing of an appropriate rehabilitation work force according to international standards of rehabilitation profession (e.g. Physical and Rehabilitation Medicine, Occupational Therapy). Experiences with developing and implementation of recommendations to strengthen rehabilitation in health systems will be demonstrated.

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SP127

BALNEOCLIMATOLOGY IN SERBIA – YESTERDAY, TODAY, TOMORROW**Dejan Nešić**

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During the Roman Empire period, special attention was paid to mineral and thermal water sources. Thus, in Ribarska Banja there was a settlement of Roman colonists; thermomineral water of Vrnjacka Banja was used in a kind of stationary for the rest and recovery of legionnaires, which was the practice of the Romans throughout Europe at that time. Fundamental research in modern balneology is the study of F. Hoffman, a physician and professor at the University of Halle (Germany), who devoted himself to the study of the chemical composition of mineral waters which was published in 1703 in his book "Methodus Examinandi Aquas Salubres". In 1856, E. P. Lindenmeyer published the book "Description of Mineral and Medicinal Waters", which is the first and more complete description of certain mineral springs in Serbia. Balneoclimatology is a medical discipline that deals with the study of the effects of certain physical and chemical factors of the environment on the human body and the possibilities of their application in medical purposes. All groundwater is more or less mineralized. In addition to mineralization, groundwater is characterized by certain physicochemical characteristics that distinguish them from "ordinary" fresh waters, namely, above all, chemical composition, mineral and oligoelements, radioactive elements, gaseous and organic matter. Modern balneotherapy is a complex therapeutic discipline that represents a complex of interreaction between the patient's organism and natural factors (thermomineral water and climate) as well as accompanying factors (change of environment, psychophysical rest). The essence of the problem in the effect of natural factors lies in finding an adequate relationship between the adequate "dose" of the natural factor and the general condition of the organism, which imposes the need to define the concept of an adequate balneotherapy dose. Combined specific and nonspecific factors of spa complex affects the human organism as a whole.

SP128

THE ROLE OF EARLY REHABILITATION IN CHILDREN WITH CONGENITAL HEART DEFECTS**Dejan Nikolic**

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Congenital heart defects (CHD) present heterogeneous group of congenital heart anomalies that are presented at birth. They are grouped into two broad groups: cyanotic CHD (cCHD) and non-cyanotic CHD (ncCHD). Due to the deformity severity, clinical manifestations may vary from sub-clinical at birth to severely affected individuals that are with life compromitiation.

Early rehabilitation is patient oriented, individually assessed and continuously performed. If there are no contraindications it could be implemented before surgical intervention, while after the one, patients are included only after stabilization of vital parameters and without any absolute contraindications.

In this presentation we aimed to present the role, importance and effects of early rehabilitation in pediatric population that were surgically treated with CHD.

In the period before surgical intervention, if needed, early rehabilitation is performed to maintain or increase patients overall vital and functional capacity, while in the period after CHD correction, the role of early rehabilitation is rather multidimensional. In very early stage it is performed to prevent secondary complications that will reduce consecutively the mortality. The preventions refers to: respiratory infections, thrombosis, muscle atrophy, and contractures in locomotor deformity. Along this, such rehabilitation is also implemented to facilitate recovery process and reduce in-hospital stays.

In the conclusion, early rehabilitation is important and integrated part of overall rehabilitation treatment of pediatric population with CHD. It reduces morbidity, mortality and enhance psychomotoric development, functional improvement and overall quality of life. Early rehabilitation as well enables smooth transition in secondary rehabilitation.



SP129

ELECTRODIAGNOSTIC OF MYOPATHIES IN CHILDREN

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Electrodiagnostic studies are valuable tool in assessment of nervous system and muscles pathology. Despite that fact that they are sensitive in diagnostics of peripheral nerve lesions, they can be used as additional diagnostic method in the evaluation of muscles pathology. The findings on electromyoneurography when assessing muscles usually is not specific, and might vary in different pathological conditions of muscles. Therefore, the presence of denervation potentials, even though often seen in acute nerve lesions, might imply to the presence of myositis, while reduction in motor unit action potentials recruitment might be seen in end-stage myopathies. Furthermore, pediatric population has its own specificity, when performing and assessing electrodiagnostic findings. Maturation of muscles and nerves particularly in early age will reflect the obtained findings, that thus need adjustment. Presence of lower amplitudes might be misinterpreted with myopathic potentials in healthy children. Additionally, in some cases not all of the muscle tissue might be affected, and thus electrodiagnostic studies may not reveal the presence of pathological changes. Therefore, such diagnostic tool should follow complete clinical examination along with laboratory findings.

Definite diagnosis should be established after the biopsy of the selected muscles on the same level as the electrodiagnostic testing was done but on the opposite side.

SP130

THE ROLE AND AIMS OF ROBOTIC SPECIAL INTEREST SCIENTIFIC COMMITTEE OF ESPRM

Daiana Popa

Rehabilitation Hospital Felix Spa Rehabilitation Hospital Felix Spa, Baile Felix Bihor România

A few years ago, ESPRM created the Robotic Special Scientific Interest Committee which brings together all interested members in robotic and advanced technologies applied in Rehabilitation Medicine, with the purpose of sharing expertise and perspectives for building a common standard in this field. The cornerstone was the UEMS Position Paper, which underlines the criticisms of the scientific and professional aspects of PRM.

SISC

- To involve ESPRM SISC in the scientific program of the ESPRM congress for this field,
- To prepare the ground for EU or international networks to apply for grants in the area of interest

Other related missions are:

- to evaluate the research activities of ESPRM in the field,
- to propose ways to improve the ESPRM research activities and to expand the types of research activities in the field;
- to increase the visibility of ESPRM research activities in this field,
- to communicate and disseminate information on this topic to the authorities, the public, the people with disabilities and their associations, the media.

In this Workshop we aim to collect all the accepted papers related to these field of interest, facilitating the meeting in the ESPRM Congress of all the colleagues and to promoting their active involvement in the development of this field.

SP131

UPPER LIMB ORTHOSES – THE DIPO APPROACH**Dick Plettenburg**

Delft Institute of Prosthetics and Orthotics Delft University of Technology, Delft, The Netherlands

Introduction: Upper limb orthoses - there are many. Not only because orthoses can help mitigate the effects of many health conditions, but also because for every health condition many different designs have been made, thus illustrating the idea that the ideal orthosis for a certain condition does not exist.

Objective: At the Delft Institute of Prosthetics and Orthotics we try to contribute to the developments in the field of upper limb orthotics. **Methods:** First, we try to sit and listen to the users: what do they really want? Second, we try to unravel which physical principle is suited best to help solve the problem at hand. Third, we develop and build prototypes which will be subjected to tests both in the laboratory and in a clinical setting.

Results: Several years ago, we developed the WILMER Shoulder Orthosis for persons with shoulder subluxation¹ and the WILMER Elbow Orthosis for persons not able to move their elbow actively². More recently, we got involved in a project within the Dutch Symbionics Programme, aimed at the design of hand orthoses for those suffering from Duchenne Muscular Dystrophy. An inventory of existing orthoses³, showed that most of these orthoses are electromechanical in nature. Alternatives are scarce, apparently for now good reason. Therefore, we decided to explore a hydraulically actuated alternative. A prototype, called the SymbiHand, was designed and build. Tests in the laboratory and in a single case clinical trial showed that the SymbiHand was able to increase the participant's grip strength from 2.5 to 8 N at 35% of the actuator's capacity. During a force tracking task that uses grasping force as input, muscular activation was decreased by more than 40% without compromising task performance.

Conclusion: The SymbiHand seems a promising alternative for the electro-mechanical orthoses⁴. The SymbiHand has the potential to decrease overall muscular activation and increase grip strength for individuals with DMD, adding to the hand a total mass of no more than 213 g. Changes in mass distributions and an active thumb support are necessary for improved usability, as well as a larger scale study in order to generalize its assistive potential.

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SP132

THE ROLE OF POST-STROKE EPILEPSY FOR REHABILITATION POTENTIAL FORMATION IN PATIENTS FOLLOWING STROKE**Dina Khasanova**

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The study aimed to investigate the burden of epileptic seizures for the rehabilitative potential in patients with post-stroke seizures.

Among 265 patients with ischemic stroke experienced epileptic seizures, two months after the onset of stroke, 52.5% of patients had no seizures (in 31% post-stroke epilepsy did not develop, in 21.5% seizures were controlled by antiepileptic drugs).

Hospital Anxiety and Depression Scale, modified Rankin Scale (mRS) and health status questionnaire SF-36 were applied in 180 patients (90 with and 90 without seizures, comparable in stroke subtype, lesion lateralization, and NIHSS scores) two months after the stroke onset in a case-control design.

The average SF-36 questionnaire scores were significantly higher for general health, vitality, social functioning, role emotional and mental health indicators in patients without seizures compared to patients experiencing seizures ($p < 0.01$). Significant differences in physical functioning, role-physical functioning, pain intensity in patients with and without seizures were not detected.

The Anxiety subscale test revealed 0 to 7 scores in 7.1% patients with and 19.4% without seizures ($p < 0.01$), 8 to 10 scores - in 51.6% patients with and 59.7% without seizures, 11 scores or higher in 43.3% patients with and 20.9% without seizures ($p < 0.001$); the Depression subscale scores were found 0 to 7 in 7.1% patients with and 19.4% without seizures ($p < 0.01$), 8 to 10 in 57.2% subjects with and 61.2% without seizures, 11 or higher in 35.7% with seizures and 19.4% without seizures ($p < 0.01$).

We observed 2 and 4 mRS scores with a statistically insignificantly different rate in patients with and without seizures (44.4% and 6.3% in patients with seizures; 51.1% and 5.8% - without seizures respectively), but a significant difference for this rate was observed in patients with 1 and 3 mRS scores (2.4% and 8.6% in patients with seizures; 49.9% and 34.5% - without seizures respectively, $p < 0.05$).

Thus, epileptic seizures reduce the rehabilitation potential and require timely, adequate treatment.

SP133

CONSERVATIVE TREATMENT OF SCOLIOSIS**Djurdjica Stevanovic - Papic**

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Scoliosis represents three-dimensional deformity of the spine, thorax and trunk. Structural scoliosis includes lateral deviation and rotation of the spine, along with impaired sagittal profile. It must be differentiated from functional scoliosis, which is caused by extraspinal causes (shortening of a lower limb or paraspinal muscle tone asymmetry).

In 80% of cases the cause remains unknown (idiopathic scoliosis), while 20% is secondary to other pathological processes, such as neuromuscular disorders or congenital deformities (secondary scoliosis).

Conservative treatment includes observation, physical therapy and bracing. For idiopathic scoliosis, physical therapy involves primarily physiotherapeutic scoliosis-specific exercises, with the same goal: three-dimensional correction or stabilization of deformity. In secondary scoliosis, physical therapy depends on the primary cause, but it has a common goal to preserve or strengthen the trunk muscles.

Brace treatment is recommended for curves from $20\pm 5^\circ$ of Cobb angle when there is a significant risk of further progression (early onset of scoliosis, low skeletal maturity, during the growth spurt). Brace construction is different for idiopathic and secondary scoliosis. In idiopathic scoliosis, braces are mostly rigid and should achieve 3D correction with three-point system. In secondary scoliosis, purpose of bracing is not to correct the spine, but to stabilize the trunk of the patients, reduce the pain and enable them better sitting position.

Operative treatment is required for deformities over $45\pm 5^\circ$ Cobb angle in idiopathic scoliosis or when deformities are painful and lead to respiratory dysfunction in secondary scoliosis.

There is a need to reduce or avoid health issues related to scoliosis in adulthood, such as back pain, possible further progression, impaired aesthetics or breathing function, all of which influence quality of life.

Key words: scoliosis, conservative treatment.

SP134

POSSIBILITY OF ACUTE REHABILITATION IN PATIENTS OF POST REANIMATION COMA IN INTENSIVE CARE UNITS**Dragana Matanovic**

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Management of coma after cardiac arrest has improved during the past decade, allowing an increasing proportion of patients to survive, thus prognostication has become an integral part of post-resuscitation care and rehabilitation takes a great role. Survivors of this conditions marked disability and impairments in physical and cognitive function that persist for years after their initial Intensive care units ICU stay.

The Aim of this work is to emphasize role o rehabilitation, especially acute rehabilitation for prevention of complications of this patient which are in ICU.

Acquired weakness is an increasingly recognized problem, with sequel that may last for month's even years following ICU discharge.

We have to ménage with cardiologist to make a good plane to help these patients to prevent complication in muscles, locomotors system, and respirator system, help cardiovascular system to put all complications in minimums score.

So we do inhalation, passive movement of all joint, prevent ion of chronic ulcer, and after coma, and mechanic ventilation do the best for minimize a complications. Early movements are mandatory as well as prevent muscle weakness.

Prognostication should never be based on a single indicator; although some variables have very low false positive rates for poor outcome, multimodal assessment provides reassurance about the reliability of a prognostic estimate by offering concordant evidence.

SP135

SIGNIFICANCE OF URODYNAMICS IN EVALUATION AND FOLLOW-UP OF CLINICAL SYMPTOMS IN OCCULT SPINAL DYSRAPHISM**Dragana Cirovic**

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Spina bifida occulta (SBO) is congenital anomaly that is characterized by heterogenous spine anomalies with various degrees of neurological impairments, among them voiding dysfunction. Along dysfunctional voiding patients might have enuresis or incontinence of various degrees. Children with SBO could have voiding dysfunction as the only sign, but rather frequently associated symptoms are present. Urodynamics is useful method in estimation presence and degree of voiding dysfunction. Obtained results distinct hypo from hypertonic bladder, and measure capacity and residual urine. Urodynamic parameters are important in treatment decision making. Therefore, such diagnostic tool is of great importance particularly in children with SBO and voiding dysfunction as the only sign.

We aimed to present the importance of urodynamic findings in early detection of SBO complications (voiding dysfunction, enuresis and encopresis), and its role in prognosis and treatment of children with SBO.

Our clinical practice stressed importance of urodynamic diagnostics as an useful tool in diagnosis and prognosis of voiding dysfunction in children with SBO. Presence of abnormal findings on urodynamic evaluations, should rise further concerns, implying to implementation of other diagnostic tools for determining and treatment the cause, that might frequently be tethered cord. Therefore, control urodynamic evaluations are of importance for follow-up of symptoms and treatment decision plans and outcome. Obtained findings that are patient oriented suggest that for timely and adequate diagnostics and treatment of SBO patients with voiding dysfunction, evidence based recommendations should be followed.

SP136

WEIGHT REGAIN: MECHANISMS AND MANAGEMENT**Dragan D. Micic**

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Aim of obesity management is to achieve loss of body weight and to maintain it after that. Different ranges of body weight loss could influence therapeutic benefit in the treatment of certain obesity complications. One of important therapeutical aim is the prevention of body weight regain. Body weight maintenance is possible due to the interaction of different factors, which include homeostatic mechanisms, environmental factors and behavioural factors. Normal physiological reaction of human body after weight loss is to promote weight regain and, in order to maintain its own body weight, one must adapt his/her behaviour to counteract physiological mechanism that results in body weight regain. Celularity and metabolic characteristics of adipose tissue after weight loss and restrictive intake of energy may explain biological drive for body weight gain during weight maintenance period and dynamic process of weight regain. Loss of fat mass after body weight loss results in shrinkage of adipocytes. Shrinkage of adipocytes is accompanied with cellular stress, inflammation, changes in adipokines secretion and reduction in lipolysis. During the shrinkage of adipocytes, remodelling of extracellular matrix is missing, and mechanical stress appears between reduced adipocytes and overemphasized extracellular matrix, leading further to inhibition of lipolysis and release of free fatty acids from adipocytes. Persons with increased leucocyte activity after first weeks of losing body weight have an increased risk of regaining body weight, contrary to persons with resistance for development of inflammation in fat tissue, who have a reduced risk for body weight regain. Possible existence of obesogenic memory was suggested due to inflammation in fat tissue followed by mechanical stress. Following therapeutical measures that are focussed to adipose tissue, in order to prevent weight regain, are used: increase in physical exercise; increase in protein content of the food; use of certain anti-obesity drugs; meal replacement; use of supplements in food; prolonged care after weight loss and every day control of body weight.

SP137

NUTRITION FOR OSTEOARTHRITIS – HYALURONIC ACID, GLUCOSAMINE AND CHONDROITIN – a literature review**Dušan Đuric^{1,2}, Vladimir Biočanin³, Olivera Milovanovic¹, Milena Jurišević¹, Radiša Pavlovic¹, Milica Lazovic^{2,4}**¹Faculty of Medical Sciences, University of Kragujevac, Serbia, Department of Pharmacy²Institute for rehabilitation, Belgrade, Serbia,³Faculty of Stomatology, Pančevo, University of Business Academy, Serbia, Department of Oral Surgery,⁴University of Belgrade, Faculty of Medicine

Osteoarthritis is a chronic disorder caused by damage or breakdown of joint cartilage between bones that is characterized by pain or aching, stiffness, decreased range of motion or flexion and swelling. In this common condition that affects people in increased age, the resulting cartilage becomes worn or damaged. As with any disease, osteoarthritis has a spectrum of severity. Effective management and treatment of osteoarthritis requires clinicians and patients to work together to balance pharmacologic and nonpharmacologic interventions and prevent further organ damage. Recent clinical trials suggest that the approach of using monotherapy for the control of osteoarthritis is not likely to be successful in most patients. Combination therapy may be theoretically favoured by the fact that multiple factors contribute to osteoarthritis, and achieving control of pain and stiffness with single agent acting through one particular mechanism may not be possible. To assess the evidence for the efficacy of the life changes, pain relief medications, physical therapies and supplements and complementary treatments, for improving clinical outcomes in adults with the following electronic data sources were explored: PubMed, Embase, Scopus and ISRCTN registry. Randomized controlled trials conducted in adults 40 years or over diagnosed with osteoarthritis, comparing the interventions of interest were included. Glucosamine and chondroitin, produced naturally in the body, are available as dietary supplements. Studies of hyaluronic acid, glucosamine and chondroitin for pain from osteoarthritis of the knee have looked at whether the combination can have beneficial effects on joint structure. Some of these studies found evidence that hyaluronic acid /glucosamine/chondroitin combination might have beneficial effects on joint structure and were associated with improved pain.

SP138

EVOLUTION OF EXTRACORPOREAL SHOCK WAVE TREATMENT – FROM OLD PARADIGMS TO NEW CONCEPTS**Elena Ilieva Aleksandrallieva**

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After the first application of ESWT in musculoskeletal disorders in the 90-ties, the evidence about its efficacy and effectiveness has changed and some of the old paradigms were replaced by new concepts.

Despite the methodological issues associated with tremendous heterogeneity in application, lack of dosing precision, great variety of outcome measures, difference of outcomes for proportions vs mean change in scores, a great number of meta-analysis of randomized control trials provided good evidence about the effectiveness of extracorporeal shock wave treatment in chronic tendinopathies and other musculoskeletal disorders.

The authors present the updated evidence and grade of recommendations in different disorders based on the level of evidence.

Thanks to basic research nowadays the mechanisms of the effect of ESWT are well understood: the different phases – physical, physicochemical, chemical, biological are presented. The induction of functional proteins promoting chondro-protective effect, neovascularisation, anti-inflammation, anti-apoptosis, tissue and nerve regeneration is discussed.

There is growing evidence about the effectiveness of ESWT in some exceptional indications as osteoarthritis, carpal tunnel syndrome, etc.

Some of the old concepts have been changed: the recommendation of the use of high energy only, focused SWT, local anesthesia, imaging guided application, only in chronic conditions when other conservative methods have failed. New concepts based on new evidence in literature changed the old paradigms.

SP139

METHODOLOGY OF "PHYSICAL AND REHABILITATION MEDICINE PRACTICE, EVIDENCE BASED POSITION PAPER-THE EUROPEAN POSITION"**Elena Ilieva**

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Main focus of the Professional Practice Committee (PPC) of the Physical and Rehabilitation Medicine (PRM) Section of the European Union (EU) of Medical Specialists (UEMS) is description and development of the Field of Competence (FoC) of the PRM specialist in Europe. FoC is an umbrella term for expertise, skills and professionalism of PRM specialists as well as the way of cooperation and interaction with other specialties and health professionals. The PPC has been producing Position Papers on the role of PRM physicians for patients with different health conditions or related topics of PRM Interest since 2009. These position papers represent the official position of the PRM Section and the European Union in the specific field. They are published in medical journals and also in an e-book, that is accessible at the website of the PRM Section to UEMS. After the publication of the first 16 position papers, the UEMS PRM Section defined the methodological approach to a position paper. The aim is to increase the quality, representativeness and visibility of this production for the benefit of all PRM specialists in (and out) of Europe. Since the position papers have to be evidence based they comprise systematic review (Cochrane reviews, Randomized Control Trials and Guidelines of professional practice interest), as well as a consensus procedure among the National Societies, delegates. The final consensus on recommendations must be reached through a Delphi procedure, usually in four major rounds. The evidence based position papers produce final recommendations for Physical and Rehabilitation Medicine Practice in Europe.

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SP140

PAIN IN EARLY REHABILITATION – DO CHANGES IN PAIN AFFECT EARLY AND LATE FUNCTIONAL OUTCOMES IN PATIENTS AFTER KNEE ARTHROPLASTY?**Emilija Dubljanin Raspopovic**

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Backgrounds: Early rehabilitation, return to daily life activities and function are the ultimate goals of perioperative care. It is unclear which pain-related patient-reported outcome measures (PROM) mirror treatment effects or are related with early and late functional outcomes.

Methods: We examined associations between two approaches of pain management (scheduled vs 'on demand') and PROMs on post-operative days one and five (POD1, 5) with function on POD5 and 3 months after surgery in patients undergoing Total Knee Arthroplasty (TKA) in a single centre.

Results: On POD1, patients in the scheduled treatment group reported reduced severity of worst pain, less interference of pain with activities in-bed and sleep, and a higher proportion got out of bed. Furthermore, tests of function, extension and flexion ranges, Barthel index and 6 minutes walking test on POD5, and the Knee Injury and Osteoarthritis Outcome Score (KOOS) 3 months later were better in the scheduled treatment compared to the 'on demand' treatment group. PROMs of perceived pain relief at POD1 and worst pain, time in severe pain, interference with activities in bed and with sleep, and participation in treatment decisions on POD5 were significantly associated with KOOS 3 months later.

Conclusions: Our study demonstrates that decreased pain management immediately after TKA has substantial impact not only on PROMs in the early days after surgery but also on important physical function up to 3 months later. Pain related PROMs assessed at POD1 and especially at POD5 are associated with functional recovery up to 3 months.

SP141

CURRENT TRENDS IN TENIDOPATHY MANAGEMENT**Emilija Dubljanin Raspopovic**

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Tendinopathy is a prevalent clinical disease mostly in active and sporting people. Tendon pain and dysfunction are the presenting clinical features of tendinopathy. Excess load is the primary cause of tendinopathy. Despite ongoing research, there is no consensus on tendon pathoetiology and the complex relationship between tendon pathology, pain and function is incompletely understood. The diagnosis of tendinopathy is primarily clinical, with imaging only useful in special circumstances.

Management strategies that control pain and maintain performance are required. The evidence supports a slowly progressive loading program, rather than complete rest, with other treatment modalities used as adjuncts mainly targeted at achieving pain relief. Other interventions such as intratendinous injection therapies and other direct tendon modalities can be provocative at worst and without effect at best.



SP142

MANUAL MEDICINE IN TEMPORO-MANDIBULAR DISORDERS

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Temporo-mandibular disorders are frequent processes today, causing significant discomfort to the subjects who suffer from them, with important limitation in their activity and social participation. PRM physician has an important field of competence, both in assessment and treatment using manual medicine for these disorders. Muscle direct and indirect relaxation techniques, facial bone mobilizations, etc., as well as a good patient education, are among others, with or without other PRM techniques methods that the doctor has to prevent and relieve symptoms of the subjects providing him a better quality of life. Throughout the lecture we will see interesting aspects of all this.

As conclusion, the PRM physician must know and apply manual medicine techniques to assess, treat and prevent temporo-mandibular disorders

SP143

REHABILITATION OF PATIENTS WITH COMPLEX REGIONAL PAIN SYNDROME**Erieta Nikolikj Dimitrova**

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Introduction. Complex regional pain syndrome (CRPS) is a chronic pain syndrome. There are two types of CRPS: CRPS I in which there is no nerve injury, and CRPS II in which there is nerve injury. CRPS type 1 may be connected with musculoskeletal trauma, central or peripheral nerve system illness, lesions of visceral organs etc. CRPS I is characterized by continuous pain, allodynia, hyperalgesia, vasomotor disturbances and trophic changes. The treatment usually is conservative. Physical therapy and rehabilitation interventions are crucial.

Objective. Aim of the study is to present current knowledge from the literature about effectiveness of physical therapy interventions and rehabilitation procedures in the treatment of patients with complex regional pain syndrome.

It is important to use multimodal treatment with medications, physical therapy and rehabilitation interventions, and psychological therapies.

Aims of the management are to treat signs and symptoms, to reduce pain intensity, to improve the functional status and to reduce functional disability. It is important to begin with its treatment as soon as possible.

Physical medicine and rehabilitation interventions included: electrotherapy, contrasts baths, low-intensity electromagnetic fields, therapeutic ultrasound, laser therapy, manual lymphatic drainage, therapeutic exercise, aquatic exercise therapy, mirror therapy, occupational therapy, desensitization techniques, kinesiotaping, graded motor imagery and education.

Conclusion. There is low quality evidence that some rehabilitation interventions provide clinically meaningful improvements in patients with CRPS. The most important is to recognize the syndrome in the acute phase and begin with early treatment to achieve good functional outcome. Future research about effectiveness of rehabilitation interventions are warranted.

SP144

EVALUATION OF PHYSICAL ACTIVITY AND RELATED FACTORS IN A SAMPLE OF TURKISH PATIENTS WITH STROKE**Evrin Karadağ Saygi**

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Introduction: Understanding level of physical activity (PA) levels and associated factors is crucial because PA is a potentially modifiable factor for stroke prevention.

Objective: The aim of this study was to investigate the relationships between PA level and related factors in patients with chronic stroke and to compare PA levels with healthy individuals.

Method: The amount of PA of patients with chronic stroke (n=25) and their age and sex matched controls (n=25) were monitored by accelerometer (Actical) and Physical Activity Scale for the Elderly (PASE). Patients were assessed via Mini Mental test for cognitive function, Fugl Meyer Assessment (FMA) for motor function, Berg Balance Test (BBT) and computerized posturography analysis for balance, Barthel Index (BI) for daily activities, Stroke Impact Scale (SIS) for quality of life, Functional Ambulation Scale (FAS) for ambulatory status and Brunnstrom recovery stage (BRS) for motor recovery status. Mann-Whitney U and Kruskal Wallis tests were used for intergroup comparisons. Spearman correlation analysis were performed to analyze association between variables.

Results: Total activity counts (AC) and PASE scores of patients with stroke were significantly lower compared to controls. Total AC were detected highest during light activity in patients with stroke while it was detected highest during moderate activity in controls. There were statistically significant correlations between PASE total score and BRS, FMA, BI, SIS, BBS, walk across step length (WASL) and walking speed (WS). Total AC were positively correlated with FAS, FMA lower extremity, BBS, WASL, WS, movement velocity (LSMV) and directional control (LSDC) during limits of stability test. There were no differences in terms of PA levels between patients with normal weight, underweight and overweight according to body mass index.

Conclusions: PA level of patients with stroke were significantly lower compared to controls. Motor and functional impairments are related to PA levels and should be addressed.

SP145

W.I.N WHAT IS NEW IN HAND OSTEOARTHRITIS? UPDATE IN PHYSICAL AND REHABILITATION MEDICINE ON HAND OSTEOARTHRITIS**Fitnat Dincer**

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Objective(s): In this research ,especially the Management and PRM / Physical and Rehabilitation Medicine, of HOA is outlined depending essentially on the recent Evidence Based Recommendations (EBR) and literature.

Material and Methods: EBR for the Diagnosis of HOA, according to; risk factors, clinical, subsets, differential diagnosis, images and laboratory tests is mentioned in details with Levels of Evidence. Optimal Management of Hand OA requires a combination of Nonpharmacological & Pharmacological treatment.

In Nonpharmacological treatment essentially and especially the applications of Physical Medicine and rehabilitation procedures play an important role. Education concerning joint protection (how to avoid adverse mechanical factors) together with an exercise ,both range of motion&strengthening exercises, are recommended for all patients with HOA. Local application of heat (egparaffinwax, hotpack), Especially prior to: Exercise&ultrasound are beneficial treatments. Also EBR for the Management of HOA developed through three Delphi rounds ,according to ; general, nonpharmacological, pharmacological,surgical, with Levels of evidence is given through the lecture.

Results: The results of 3 Delphi rounds ,for Diagnosis 108 , for Management of HOA 309 literature depending on Evidence Based Medicine and Hierarchy with Levels of Evidence is presented.

Conclusions: Pain relief , restoration of function remain the primary treatment objective. These are best achieved by a combination of pharmacological & nonpharmacological treatment especially by application of PRM procedures. Surgery remains the last resort for restoration of function if all else fails .

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SP146

EVIDENCE BASED TREATMENTS FOR URINARY INCONTINENCE**Francesca Gimigliano**

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Urinary incontinence affects 25% to 45% of women worldwide. Urinary incontinence presents in the following forms: stress urinary incontinence (involuntary loss of urine through physical exertion or effort, coughing or sneezing); urgency urinary incontinence (involuntary loss of urine associated with a sudden and compelling desire, urgency, to urinate that is difficult to delay); mixed urinary incontinence (involuntary loss of urine associated with both stress and urgency).

The main outcomes of the rehabilitative treatments for urinary incontinence are: cure (number of women with self-reported continence); improvement (number of women with self-reported improvement); incontinence-specific quality of life (assessed with King's Health Questionnaire, Incontinence Severity Index, or ICI-Q).

The rehabilitative management of Urinary incontinence include: physical therapies such as pelvic floor muscle training with or without biofeedback, electrical stimulation or magnetic stimulation, vaginal cones, bladder training, prompted voiding, anti-incontinence devices, lifestyle interventions such as weight reduction, and acupuncture.

There are available Cochrane evidence on these interventions, however, the quality of the evidence is limited due to inadequacy of treatment description and dose offered, lack of training report, small and underpowered trials. Much larger, well conducted trials, using CONSORT guidelines for data reporting, are needed.

SP147

COCHRANE REHABILITATION E-BOOK AND PRIORITIZATION PROJECT**Francesca Gimigliano, Carlotte Kiekens, Stefano Negrini**

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Systematic reviews are a powerful method for summarizing and synthesizing evidence and create a methodological opportunity for preparing data integration tables to enable review-level synthesis of the evidence. One of the main tasks of Cochrane Rehabilitation is to make it possible to improve the application of evidence-based clinical practice by all rehabilitation professionals, and to facilitate policy-makers in decision-making according to the best evidence. In this context arises the need to diffuse the high-quality evidence of Cochrane Systematic Reviews (CSR), through synthetic and easy-to-use messages for the different rehabilitation audiences. Cochrane Rehabilitation has recently launched the production of a live ebook including all the evidence coming from the CSR tagged by its Review Committee as of rehabilitation interest with the final aim to enhance the application of evidence in clinical practice, medical education, health system policies, and in the community. This will be a powerful tool for the dissemination of evidence-based practice, education and knowledge, as well as to support political decisions for both effective organization and resource allocation in rehabilitation field. This effort will also result in the mapping of evidence in Rehabilitation thus giving the opportunity to prioritize future research in Rehabilitation.



SP148

COCHRANE EVIDENCE FOR THE REHABILITATIVE TREATMENT OF LOW BACK PAIN

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Low back pain is defined as pain and discomfort, localised below the costal margin and above the inferior gluteal folds, with or without leg pain. It is the leading cause of disability worldwide, as it affects at least 80% of all individuals at some point in their lifetime, and is the 5th most common reason for all physician visits in the United States.

The treatment of low back pain is multifactorial including drugs, rehabilitation and changes in life style.

Among rehabilitative treatments, there are available Cochrane evidence on the following interventions: exercise, massage, spinal manipulation, tractions, back school, acupuncture, physical therapies, orthoses, Pilates, tai chi, and yoga.

SP149

BIOLOGIC THERAPY AND FUNCTIONAL OUTCOME IN INFLAMMATORY RHEUMATIC DISEASES**Frane Grubisic**

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Functioning is one of key determinant of the International Classification of Functioning, Disability and Health (ICF) which encompasses function, activity and participation. In order to prevent disability in patients with inflammatory rheumatic diseases early diagnosis and the introduction of timely treatment are crucial. Both pharmacological and nonpharmacological treatment modalities are aimed to decrease inflammation and prevent structural damage (e.g. joints, cartilage, muscle, synovium). Physical impairment in patients with rheumatoid arthritis (RA) results primarily from joint involvement, although extra-skeletal features should be also taken into account (e.g. atherogenesis, sleep deprivation). Patients with psoriatic arthritis (PsA) experience a substantial burden of impairment resulting not only from joint involvement, including enthesitis, dactylitis or axial disease, but also from psoriasis as well. Ankylosing spondylitis (AS) is characterized by reduced spinal mobility and subsequent limitations in physical functioning. Physical function in all these conditions has been identified as one of the core domains in outcome measurements. In RA and PsA, physical function is most commonly assessed using the patient-reported Health Assessment Questionnaire - Disability Index (HAQ-DI), while in AS patients it is assessed by the BASFI (Bath Ankylosing Spondylitis Functional Index).

We are witnessing an important step forward in the pharmacological treatment of patients with the most common inflammatory rheumatic disease during the last two decades. Early and adequate use of biologic disease-modifying anti-rheumatic drugs (bDMARDs) and targeted synthetic molecules, as well as treat-to-target (T2T) approach resulted in achieving remission or low disease activity in large proportion of these patients, with a well-known and acceptable safety profile. Data from numerous randomized control trials (RCT) and/or systematic reviews of treating patients with RA, PsA and AS using biologics and targeted synthetic drugs showed significant improvements in various endpoints measuring function, with consequent effect on reducing the level disability.

SP150

MINIMUM STANDARDS OF CARE FOR PATIENTS WITH SPASTICITY**Frane Grubisic**

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Spasticity is a common symptom seen in many neurological conditions (stroke, multiple sclerosis, spinal cord injury, traumatic brain injury and other central nervous system lesions). Untreated spasticity leads to muscle shortening and contractures, worsening of posture and function, which in turn increase the risk of further disability, pain, pressure sores and loss of quality of life. Prior to the treatment of spasticity, it is important to perform a detailed neurological examination and functional assessment and to set up reasonable short and long-term goals of treatment for the patient proposing the time-frame in which it should be delivered. Major goals in the treatment of spasticity include fol

owing: restoring the loss of functional abilities, providing adaptive devices to enhance functional independence, providing psychosocial care and support to patients and their families. Rehabilitation protocols require multi-disciplinary team approach combining both pharmacological treatment and non-pharmacological interventions. Different databases provide large number of references concerning the above-mentioned interventions (systematic reviews, various clinical trials) highlighting individual approach to patients with spasticity, taking care of comorbidities. In addition, it is important to set up minimum standards of care for these patients: verticalization on the tilt table, sitting in a modular wheelchair, strengthening of the upper limbs, upper body activities of daily living (ADL) training coordinated by the physiotherapist and occupational therapist, 24-hours care (bladder/bowel scheme, prevention of sore ulcers, regular bathing and monitoring of vital functions) performed by nurses. Focal and regional treatments should be strongly considered before introducing oral or systemic medication along to regular counselling regarding pharmacological treatment (eg. pain, depression, anxiety, infections...), family intervention and education.

SP151

ROBOTS IN REHABILITATION POST-STROKE: CAN THEY REALLY IMPROVE THE OUTCOME?**Gabor Fazekas**

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Robots for supporting therapy were developed mainly for improving upper limb functions and walking in patients post-stroke. During the past thirty years several rehabilitation robots and “robot-like” devices were developed, but only a small part of them were commercialized. The results of more than a hundred clinical trials are available, and several systematic reviews had been prepared. In a systematic review Mehrholz et al. (1) analysed 45 randomized controlled trials with 1619 participants concerning the robot mediated therapy of the upper limb. They stated that this therapeutic method can contribute to the improvement of muscle strength and arm function (including activities of daily living). Nevertheless, 24 different devices were used in these trials with a quite different methodology. The Robot Assisted Training for the Upper Limb after Stroke (RATULS) trial involved 770 participants: it has been the highest number up to now (2). Authors did not find evidence that the applied robot with the applied programme can provide advantage for the patients. Concerning the electromechanical gait training Mehrholz et al. (3) evaluated 36 trials with 1472 subjects. According their results patients post-stroke had a higher chance to achieve independent walking if their received this type of therapy besides the traditional physiotherapy. There are still several open questions regarding the robot assisted therapy post-stroke. So as to answer these issues harmonization of the methodology would be essential (4).

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SP152

THE RESULT OF LARGE CLINICAL TRIAL "DEVELOPMENT OF MEDICAL REHABILITATION IN RUSSIA" (DOME): THREE LEVEL PATIENT-ORIENTED, MULTIDISCIPLINARY AND PROBLEM-FOCUSED REHABILITATION OF STROKE PATIENT**Galina Ivanova**

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Purpose: to compare "patient-oriented, multidisciplinary and problem-focused model of rehabilitation" and "biomedical model of rehabilitation" of patients with stroke in Russian large clinical trial "Development Of Medical rehabilitation in Russia" (DOME).

Methods. 1021 patients with acute stroke were enrolled in large clinical trial "Development Of Medical rehabilitation in Russia (DOME)" (ClinicalTrials.gov Identifier: NCT02793934). The study design was comparative, consistent and consisted of two phases. Software «ICF-reader" was used as CRF. Primary Outcome Measures: Recovery of functions, activity and participation assessed with modified Renkin scale (mRS) 18 months after stroke.

Results. 498 people were included in phase 1 (biomedical model of rehabilitation), and 523 people - in the phase 2 (patient-oriented, multidisciplinary and problem-focused model of rehabilitation). 20 and 10 people entered in the second and third stages of the phase 1, respectively. 121 and 74 people entered in the second and the third stages of the second phase of study, respectively. Patients in phase 1 didn't immediately get into next rehabilitation stages, but could receive rehabilitation after a certain time.

The number of patients who had a score of 0-1 mRS was 18% higher ($p < 0.0001$) in the second phase of the study, compared with the first phase. Duration of hospitalization was less in the second phase of the study - 14 [12; 19] compared with the first phase - 16 [14; 20] bed/day ($p < 0.001$). We received information by phone from the 239 patients included in the study. The level of disability after 1.5 years was lower in group 2 compared with group 1 (Fisher's exact test, $p < 0.05$). Mortality in both groups was comparable and didn't differ (Group 1 - 15.5%, group 2 - 16%, criterion Chi Pearson square, $p = 0.532$).

Conclusion: Rehabilitation of patients with cerebral stroke in a three-stage patient-centered, problem-oriented multidisciplinary model is more effective than in the "biomedical" model of medical rehabilitation, which is manifested by a faster achievement of the result of rehabilitation and better remote functional outcomes of rehabilitation.

SP153

OPTIMIZING FUNCTIONING AND HEALTH AFTER LUNG TRANSPLANTATION: THE ROLE OF THERAPEUTIC EXERCISE**Gerold Ebenbichler**

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For patients suffering from various end stage lung diseases, lung transplantation (LuTX) remains the only therapeutic option to extend survival and improve quality of life and functional health status. However, despite removal of respiratory limitations to exercise, exercise capacity as well as functioning and health may remain inferior in LuTX recipients (LuTXr). Such limitations widely relate to alterations in skeletal muscle structure and function and may be affected by all 1) preexisting impairments in muscle structure and function that occur with chronic end stage lung disease before LuTX, 2) possible side effects of immunosuppressive medication to muscles, 3) malnourishment, 4) a sedentary life style behavior after LuTX, and 5) and a reduced reserve capacity with advancing age. In addition and despite immune-suppression, LuTXr are prone to impairments in bone structure and in functions of the cardiovascular, metabolic and endocrine systems (arterial hypertension, diabetes mellitus, hyperlipidemia and metabolic syndrome) that all expose them to an increased risk for cardiovascular events, malignancies, bone fractures, all interfering with their life expectancy after LuTX. Thus, optimizing exercise capacity following LuTX is of utmost relevance to all, the recipient's functioning and health, quality of life and probably also long term survival. Whereas therapeutic exercise based rehabilitation programs are typically offered - as gold standard - to LuTXr for a limited period of time after discharge from the acute hospital stay (subacute rehabilitation), these patients are usually not eligible to continue with supervised long-term training programs close to their homes. Despite of this, it remains widely unknown, when - i.e. how many months after LuTX, optimization of the recipients exercise capacity would be best attempted. Functioning data of LuTXr one year after LuTX and those collected from LuTX recipients who had successfully participated in a Kilimanjaro mountain tour (5895m) will be presented relative to data collected from healthy age- and sex-matched individuals.

SP154

TARGETING AGE-RELATED CHANGES IN BACK MUSCLE FUNCTION: IS THERE A ROLE IN PREVENTING EARLY FUNCTIONAL DECLINE AND FRAILITY IN THE ELDERLY?**Gerold Ebenbichler**

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Aim: This activity will provide participants with the current clinical knowledge about mechanisms involved in an early age related decline in back/ trunk muscle function and its impact on mobility decline in elderly individuals. In particular function diagnostic tools intended to objectively identify early signs of back muscle decline before a major age related drop in back strength is detected will be presented.

Content: With advancing age, neuronal loss and sarcopenic alterations in trunk muscle may – if not sufficiently compensated by exercise and other interventions result in a major trunk muscle functional decline (muscle strength and endurance). In fact when compared to other muscle groups, both poor back-extensor strength and endurance in elderly were both found repeatedly more predictive of future falls, impaired mobility, frailty, and the need for institutionalization. This association would be supported from observations that found age dependent changes in 1) trunk alignment, gait and movement, 2) a higher rate of loss in back-extensor muscle mass than in other muscles groups, and 3) back muscle weakness all associated with a decline in body balance and postural control. Pain syndromes of the back alike with other medical conditions likely facilitate the weakening of aging back extensors thereby further increasing the risk of falls and loss of mobility as well as independency.

The research group of this author recently demonstrated function-diagnostic tests based on surface electromyography to reliably identify very early indicators of sarcopenic back-extensor function before a major decrease in back muscle strength becomes overt. Such tests are safe to perform in both pain-free individuals and those affected with back pain. If further developed to a screening tool, these tests would assist with very early identifying those individuals at risk for frailty and institutionalization in later years, a target population that could reasonably benefit best from early interventions intended to prevent back muscle loss and to minimize the risk of future impairment.

SP155

PAIN TREATMENT OF MUSCULOSKELETAL DISORDERS**Gordana Devecerski**

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The term musculoskeletal disorder includes any injury, damage or disruption of joints and/or soft tissues of the extremities or back.

Musculoskeletal disorders represent a global social problem, which is becoming increasingly prevalent in daily clinical work. That perspective in clinical practice implies the importance of diagnosis and appliance of multimodal methods of treatment in a timely manner.

Almost every fourth person in the world is considered to have musculoskeletal disorders, and the data are similar in our country as well. The increase in the prevalence is influenced by the age structure of the population, the epidemic of obesity and physical inactivity as results of new civilization trends, but we should also take in consideration new occupations that require forced labor positioning and sitting long hours. Rapid and adequate treatment, along with patients' education can prevent acute pain from becoming chronic. It is important because if it becomes chronic it will result not only in impaired quality of life but in additional financial costs.

The use of adequate therapy, both preventive and curative, helps the recurrence of the long-term effects that musculoskeletal pain carries with it in a bio-psychosocial sense.

Pharmacological and non-pharmacological methods of treatment are applied, i.e. methods of physical medicine and rehabilitation which can be combined. Complementary medicine methods and procedures have been officially approved, which have proven to be effective in prevention and treatment. In combination with existing methods, they provide significantly better effect than when applied alone. The accepted concept of multimodal analgesia, through different mechanisms of action, leads to more adequate analgesia in the management of acute and chronic pain in patients with musculoskeletal disorders.

In most cases, it is necessary to combine pharmacotherapy with other measures and therapeutic methods of physical medicine and rehabilitation. But, they should also be combined with complementary medicine methods. Each patient should have an individual and holistic approach when choosing treatment therapy, because patients respond differently to therapy.

Keywords: musculoskeletal disorders, pain therapy, physical procedures.

SP156

HOW DIFFERENT IS PEDIATRIC EMG? WHY DO WE NEED IT?**Gulseren Akyuz**

Physical Medicine and Rehabilitation Marmara University School of Medicine, Istanbul Turkey

Electroneuromyography (ENMG) is a useful diagnostic tool in children suspected of having acquired or inherited neuromuscular diseases. The technical limitations of performing ENMG in children require that the physician should be selective in deciding how to approach the study. The assessment of children in the electrophysiology laboratory needs special care because of the discomfort of the tests. If the child is old enough to understand the procedure, it is important to explain it to the child as well as the parent. Infants and toddlers do not understand the purpose of the study, have a limited tolerance for it, and often squirm and withdraw during testing. Therefore, infants may be more comfortable sitting in a parent's lap on the examination table or in a chair. Pacifiers and toys are often effective in calming infants and toddlers. In selected cases, sedation is helpful to obtain adequate data. Topical anesthetic creams can also be used in some pediatric EMG laboratories, which can help reduce pain. Even school-age children and adolescents may feel more comfortable if a parent sits or stands near them during the study. In evaluating for generalized processes, examination of one or two extremities is often adequate to narrow the differential diagnosis. EMG is also used to evaluate hypotonia in infants, assess the severity and localization of perinatal brachial plexus injuries, and distinguish between different possible causes of gait difficulties in older children. Electrophysiological testing may also contribute to the diagnosis of many disorders including spinal muscular atrophy (SMA), brachial plexus injury, hereditary polyneuropathy, acquired polyneuropathy, disorders of neuromuscular transmission, myopathy, muscular dystrophy, and myotonic disorders.



SP157

RESTORATIVE REHABILITATION AND ELECTRICAL NEUROMODULATION TECHNIQUES IN THE TREATMENT OF NEUROPATHIC PAIN

Gulseren Akyuz

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Neuropathic pain (NP) has a complex, severe and persistent character with varying intensity and duration. It is an important problem because of its complex natural history, unclear etiology, and poor response to standard therapy regimens. The primary goals of the management of NP are to detect the underlying cause, to define the differential diagnosis and eliminate risk factors, and to control pain. Pain rehabilitation programs focus on reducing pain and the amount of analgesic medication, improving dysfunction, increasing quality of life and physical capability. Since the new rehabilitation techniques addresses the cortical neuroplastic changes, their roles in the treatment of NP are being increased. Mirror therapy and graded motor imagery (GMI) could be accounted as new therapeutic methods for the rehabilitation of NP. They aim at restoring the integrity of neural processing in the sensory-motor cortex in individuals with complex regional pain syndrome and central post-stroke pain syndrome. Beneficial effects of visual mirror feedback on pain severity and vasomotor function have been suggested. In the recent years, neuromodulation techniques present as a promising alternative methods for more effective treatment of NP. These techniques can be classified as non-invasive (repetitive transcranial magnetic stimulation (rTMS) and transcranial direct current stimulation (tDCS)) and invasive (deep brain stimulation (DBS), motor cortex stimulation (MCS), and spinal cord stimulation (SCS)). Peripheral nerve stimulation (PNS) and nerve root stimulation (NRS) are also the other interventional treatment approaches in intractable cases with NP. However, it is now early to comment on these techniques because of the lack of adequate publications. Further randomized controlled studies are needed in order to determine the effectiveness of these treatment methods.



SP158

LYMPHEDEMA TREATMENT STRATEGIES

Gulseren Akyuz

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Lymphedema is characterized by generalized or local collection of interstitial fluid, rich in protein which is caused by congenital or acquired disruption of lymphatic circulation. In the world, secondary lymphedema may arise after breast cancer and/or cancer therapy. In the patients with breast cancer, lymphedema is caused by disrupted lymphatic drainage of upper extremity because of axillary lymph node dissection and/or after axillary radiotherapy. The diagnosis of lymphedema is mostly depends on clinical criteria. Additionally, heaviness and fullness sensation, pain, limited range of motion, tiredness, tingle, weakness and tightness may be seen as a result of lymphedema. Circumference measurements, volumetric measurements, ultrasonography (USG) and lymphoscintigraphy are used in evaluation of lymphedema. The aims of lymphedema treatment are to decrease the swelling in extremity, to control the symptoms and to reduce the complications. In the early stages, protective recommendations and detailed information should be given to the patients. Active range of motion exercises are suggested to sustain the mobility of the extremity. The treatment strategies of lymphedema are complex decongestive therapy (CDT), manual lymphatic drainage (MLD), pneumatic compression, compression bandaging, compression garments, exercises, physical therapy modalities, kinesiological taping, and extremity elevation. CDT has been accepted as an international current standard therapy method for the treatment of lymphedema. Pneumatic pumps are used in lymphedema treatment to apply external compression, decrease the edema formation and remove the extra fluid collection at the extremity. Compression bandaging also decreases the interstitial fluid collection, prevents the lymphatic return and increases the pump function of the muscles. Compression garments increases the lymphatic drainage, decreases the proteinous material and increases the venous return. As a conclusion, prevention and early treatment of lymphedema are important for prognosis.



SP159

EXTRACORPOREAL SHOCKWAVE THERAPY IN SPASTICITY; FROM EXPERIENCE TO EVIDENCE

Henk Stam

Rehabilitation medicine Erasmus University Medical Centre, Sint-Jan Steen Nederland

Introduction: ESWT has been successfully applied in musculoskeletal pathology for many decades. Since 2005 the first scientific papers describing the beneficial effect of ESWT on spasticity in patients with stroke and cerebral palsy have been published.

Objective

1. To provide an update on the current evidence for the effectiveness of ESWT in spasticity.
2. To discuss how ESWT may be applied in clinical practice.
3. To discuss how ESWT relates to other interventions for spasticity

Methods

A literature review will be presented with recent evidence for ESWT in spasticity management.

Personal observations will be shared with the audience

Results

ESWT is a promising tool in the treatment of spasticity and should be considered in addition to other interventions

Discussion

The exact and optimal pressure, number of shots and frequency is still subject to debate. Studies are needed to determine optimal treatment and duration of effect

This presentation is one topic in a special session dedicated to ESWT with Nicolas Barotzis and Elena Ilieva as co-presenters

SP160

BOTULINUM TOXIN IN SPORTS MEDICINE**Hervé Collado**

Saint Martin Sport Clinic, Marseille, University Public Hospital Marseille

The way to treat tendinopathies by botulinum toxin is to relax the muscle and therefore to rest the tendon to promote healing. For muscle compartment syndrome or piriform muscle syndrome the action of BT is on muscle hypertrophy.

Regarding osteoarthritis injections into the joint, the toxin decreases the excretion of vesicles containing P substance P, CGRP and Glutamate which generate painful sensations in osteoarthritis.

Usually, botulinum toxin is used for the treatment of lateral epicondylitis, athletic pubalgia and piriform muscle syndrome. More frequently also in Iliotibial band syndrome, femoropatellar syndrome and plantar fasciitis.

The principle of lateral epicondylitis treatment is a moderate common tendon paralysis, by injection of the extensor carpi radialis brevis, after failure of a well-conducted medical treatment (rehabilitation, steroid injection, PRP, splint). The TB injection will be associated with a rehabilitation protocol to improve the TB benefits.

In athletic pubalgia, (with adductors enthesopathy), the TB injection will cause also the rest of the common tendon. The target injected muscle will be the adductor longus muscle. It is then a medical alternative after a long course of the tendinopathy and before tendon surgery.

In plantar fasciitis, the injection can be performed in 2 area: First in the gastrocnemius and soleus muscle with the aim of relaxation and paralyzing effect in order to weaken the triceps sural and limit the stress and tension on the plantar fascia. This allows a relative rest and healing of the fascia. The second site of injection is directly into the plantar fascia for a direct analgesic effect.

In conclusion, botulinum toxin seems to be interesting for the management of several osteo-articular diseases without serious side effects.

Further studies will be needed to increase our knowledges in this field. But most sports medical doctors know botulinum toxin is a serious way to treat osteomuscular diseases in the future.

SP161

OXYGEN THERAPY UNDER HYPERBARIC CONDITIONS IN CORRELATION WITH PROSTHETIC REHABILITATION OF LOWER LIMB AMPUTEES**Igor Simanic**

Hospital Director Specialized Hospital for Rehabilitation and Orthopedic Prosthetics, Belgrade Serbia

This study aims at assessing the effects of hyperbaric oxygen (HBO) therapy on prosthetic rehabilitation of patients with unilateral lower limb amputation.

This study was conducted in Specialized Hospital for Rehabilitation and Orthopedic Prosthetics enrolling 60 patients who had sustained unilateral amputation of lower limb due to diabetic gangrene, vascular diseases or trauma. We randomly assigned subjects to either an experimental or control group. The experimental group was, besides standard prosthetic rehabilitation, subjected to 15 one-hour HBO treatments in multiplace chamber where they breathed 100% oxygen on pressure of 1.7 ATA.

The tests which were used to assess functional abilities of amputees at admission and discharge from hospital include Narang's scale, Locomotor capabilities index, Manual Muscle test and the 2-min walk test. We also maintained records of some clinical parameters whose improvement leads to better mobility of patients: thigh and calf circumference, strength of the residual limb, presence of residual limb contractures and occurrence of some other complications of the residual limb, time of prosthetic rehabilitation, blood oxygenation levels and pulse palpation. Our results confirm that hyperbaric oxygenation facilitates prosthetic rehabilitation of lower limb amputees. HBO treated patients were discharged from hospital faster than the controls and they had improved arterial Hb saturation and pulse palpability, a reduced number of complications associated with the amputation stump, higher thigh circumference on the contralateral side, stronger residual limb and better functional capabilities as measured by adapted Narang's scale and Locomotor capabilities index. Despite these encouraging results, the authors suggest a need for conducting multicenter studies involving a larger number of participants.

SP162

IN-PATIENT ONCOLOGICAL REHABILITATION DURING INTENSIVE CANCER TREATMENT**Iuly Treger**

Rehabilitation Soroka University Medical Center, Mazkeret Batya Israel

Although modern treatment advances have led to improved survival rates, a stigma still exists in the medical community that cancer patients are perceived as a palliative population with short survival and poor rehabilitation potential. However, our findings over the past three years are that oncology patients with physical or psychological impairments, due to either, their disease or its treatment, can benefit from rehabilitation, even in the acute stage of intensive cancer treatment. A multidisciplinary rehabilitation program can be essential in improving the physical performance and functional capacity necessary for successful continuation of oncological treatment.

The hematology - oncology and rehabilitation departments at the Soroka Medical Center established a protocol for the inter-departmental management of chemotherapy and rehabilitation between two wards during the patient's hospitalization. Flexibility in determining the treatment goals, duration of hospitalization and various therapies are necessary due to the changing needs of the patient and his family. Results of the study was very positive. Functional scores for all patients increased throughout the hospitalization in rehabilitation department and showed only small decrease after oncological treatment rounds. Our data strengthen the need for continued co-operation between the oncological and rehabilitation units in a joint program, that ensures that the patient not only survives the disease but is also able to lead a more fulfilling life. Even more, in some cases strengthening rehabilitation program during intensive oncological treatment is essential for patient's survival.

Managing a multidisciplinary in-patient rehabilitation program for this group of patients is especially challenging for staff of both departments and there is a strong need for development of protocols and professional algorithms for achievement of optimal medical and functional outcomes. Those protocols and approaches according to international and Israeli experience will be discussed.

SP163

ADDRESSING THE ISSUE OF CONTINUITY OF CARE: PROGRAMS AND ALGORITHMS FOR EARLY MANAGEMENT AND APPROPRIATE TRANSFER FROM ACUTE DEPARTMENTS TO REHABILITATION SETTINGS**Iuly Treger**

Rehabilitation Soroka University Medical Center, Mazkeret Batya Israel

IN WORKSHOP: STRENGTHENING PRM IN THE HEALTH CARE SYSTEMS: LESSONS FROM PRACTICE

The advances of modern medicine, prolonging the average life-span, and especially the recognition of medical rehabilitation as a vital part of the recovery process after acute health problems and injuries, have created rapid development in the field among most of the countries worldwide. Early and professional decision about rehabilitation need and potential in the acute treatment period and appropriate transfer of the patient to the optimal facility is a crucial point for best functional outcome. Unfortunately, mostly PRM doctor is not a part of professional staff in acute care department, so making an optimal decision can prove to be challenging.

In the last decades the Israeli health system has gained much experience in this process, especially in acute general hospitals with rehabilitation department as a part. The Insurance-type of the Israeli health system has developed optimal programs, algorithms and management mechanisms to solve this problem in most effective and professional way. Generally, we can divide the subject to two different, but connected goals: 1) to obtain a "rehabilitation" patient and 2) to find the best rehabilitation facility to achieve an optimal functional result at the end of process.

In Soroka Hospital we try to achieve the best level of cooperation between 4 main players:

- Acute department medical staff (doctors, nurses, social workers)
- Rehabilitation department multidisciplinary staff
- Health fund rehabilitation staff
- Patient and his family

The main components of the program in Soroka are:

- Building of simple algorithm for all process players
- Education of non-rehabilitation staff
- Interdepartmental staff meetings in complicated cases

Transparency of medical information in single electronic patient's record system.

SP164

CLINICAL APPLICATION OF INFRARED THERMOGRAPHY**Irena Dimitrijevic**

Physical medicine and rehabilitation Institute For Treatment and Rehabilitation "NiškaBanja", Niš, Serbia

Infrared thermography (IRT) is a simple, safe, non-invasive and accurate method that provides information about physiological changes by detecting infrared rays emitted by the body. The aim of this work is to point out the possibilities of applying IRT in the diagnosis and therapy of numerous pathological conditions that lead to changes in skin temperature.

The basis of clinical application of IRT is founded on the correlation between the skin temperature change and the physiological state of the organism. By detecting infrared rays emitted from the surface of the body, IRT visualizes the regional distribution of skin temperature values. Symmetrical body heat distribution is the most important element when interpreting IRT images. It is possible to accurately quantify the values of temperature asymmetry, based on the difference between the values of temperatures measured on both sides in homologous regions of interest. In this way, IRT contributes to the diagnosis of diseases that directly or indirectly affect the vascular tone of the microcirculation, which is regulated by the autonomic nervous system.

IRT has the ability to diagnose a pathological condition based on a change in skin temperature caused by the pathological process. Changing skin temperature values is often the first sign of some pathological conditions, suggesting the possibility of IRT to detect particular pathological conditions before they are clinically manifest. IRT can provide information on musculoskeletal and vascular system dysfunction, local inflammatory process, skin, and the localization of some malignancies.

By repeated thermographic examination of the patient for the duration of a particular pathological condition, it is possible to monitor the course of the disease, based on the comparison of thermograms obtained before and after the therapy.

IRT has wide application potential in clinical work. It can be used as a complementary diagnostic and follow-up method for many pathological conditions.

SP165

RECORDING BRAIN SIGNAL IN PRM**Isabelle Laffont**

Department of Psychiatry Centre Hospitalier Sainte Anne, Paris France

From basic science to rehabilitation: the way knowledge in motor control can help in building the future of our practices

Physical and Rehabilitation Medicine has grown. Rehabilitation basically aims to act on learning and adapting processes, in order to favor the best functional recovery. During the past decades, we demonstrated our capacity to anchor our practices in basic science. Bridging the gap between neurophysiologic knowledge and daily rehabilitation is crucial to understand the underlying mechanisms of recovery after diseases or traumatism. The best we understand these phenomena, the best we can act on them to improve the efficiency of rehabilitation. Recording brain signals and electrophysiological data is now possible in clinical setting. Recording movement or behavioral markers becomes easy through the dramatically increasing number of technologically driven digital rehabilitation devices. In this lecture, I will illustrate the way we can "Close the loop" between these fundamental knowledge and our daily practices, opening the closed window of the understanding of neural/behavioral plasticity, and learning how to act on it to improve recovery.

SP166

NEURO-ORTHOPEdic DISORDERS IN SEVERELY IMPAIRED NEUROLOGICAL PATIENTS**Isabelle Laffont**

Department of Psychiatry Centre Hospitalier Sainte Anne, Paris France

Neuro-orthopedics disorders include limbs and spine deformities related to various neurological diseases, mostly in a context of spastic troubles. Severely injured patients after brain damage or spinal cord injury frequently develop such disorders, potentially increasing their functional impairment. This situation can cause pain and discomfort, worsening spasticity and sometimes leading to behavioral troubles, or motor and functional decline. Unfortunately, these symptoms can lead to the prescription of drugs or physical restraints and can cause caregivers burden, directly or indirectly increasing medical costs. Preventing and breaking out these escalatory phenomena is mandatory.

The better understanding of the musculoskeletal and neurological physiopathology underlying these phenomena has enabled us to improve our preventive and curative approaches. The clinical assessment of spastic and neuro-orthopedic deformities is based on a rigorous anatomical and physiological knowledge. The evaluation of their functional consequences relies on a patient-centered approach including fine-grained analysis of gait and of upper limb function. Motor blocks, dynamic EMG and movement analysis raise an increasing interest in these indications. The treatment of spasticity and its consequences is based on an integrative multimodal approach including rehabilitation, drugs, local treatments like botulinum toxin injections, and micro-invasive or conventional surgery in a multidisciplinary perspective.

Ongoing research in the field includes basic science, non-pharmacological and pharmacological studies, surgical procedures improvements, and technological developments, both in a curative and in a preventive approach.

SP167

PHYSIATRIC CHALLENGES IN DIAGNOSTICS AND TREATMENT OF CHILDREN WITH SYNDROMES**Ivana Petronic Markovic**

Physical Medicine and Rehabilitation Faculty of Medicine, University of Belgrade, Belgrade, Serbia

Rare syndromes are named due to the low incidence in onset in children. A large portion of them is diagnosed at birth, enabling early inclusion in diagnostics protocol and adequate treatment. Recently, there is increase of patients with atypical forms at the time of diagnostics, or are lately diagnosed syndromes. Unclearly differentiated syndromes are often only manifested by deformities of locomotor system or with the delayed psychomotoric development of the first examination.

The aim of the study is twofold: clear syndrome at birth is to stress the importance of timely diagnosis and inclusion in multidisciplinary treatment. The aim of those with unclear manifestations and with several symptoms of unknown etiology is timely and adequate diagnostic evaluation for inclusion in optimal and proper treatment.

According to clinical and neurological examination, imaging, neurophysiological and genetic evaluations are performed. The up-to-date genetical findings, including cytogenetical, molecular and phenotype investigations, enable recognition of genetic mutations and syndromes that were undetectable by regular analyses previously. These tools enable determination of testing syndrome as well as the type of its expression. Having said all this, such analyses enable specific treatment modes inclusion and proper follow-up during growth and development.

Therapy of syndromes is patient oriented. Multidisciplinary treatment is the cornerstone of patient survival, while, psychiatric therapy along with rehabilitation plan are implemented for prevention of secondary complications and optimal functional recovery. Psychiatric treatment is individually assessed with medical devices and orthotics and must be in line with the clinical manifestations and the diagnosis of evaluating syndrome.

In the conclusion, it is important to emphasize that early recognition of specific syndromes and continuous physical and rehabilitation treatment enables better functional recovery, socialization and optimal quality of life in adolescence and adulthood.

SP168

DIAGNOSTIC AND PROGNOSTIC RELEVANCE OF NEURO-PHYSIOLOGICAL FINDINGS IN PEDIATRIC REHABILITATION**Ivana Petronic Markovic**

Physical Medicine and Rehabilitation Faculty of Medicine, University of Belgrade, Belgrade, Serbia

In the evaluation of neurological disorders both central and peripheral, clinical neurophysiology plays important role along with in depth clinical evaluation. Various diagnostic methods are readily available, including evoked potentials (EP) that are performed to assess the degree and severity of afferent pathways affection and primary somatosensory cortical zones affection in central nervous system (CNS). Additionally, several EP modes are used: visual (VEP), somatosensory (SEP) and auditory (AEP) evoked potentials. They are noninvasive and sensitive, but not specific. They are also of great value in CNS maturation follow-up, particularly in younger age when CNS plasticity is increasingly expressed. Furthermore, for assessment of peripheral nervous system (PNS) lesions as well as pathology related to neuromuscular junctions and muscle, electromyoneurography (EMNG) is performed. Such methods is used to evaluate degree and level of pathological process, and has prognostic values by monitoring recovery or deterioration. However, it should be underlined that the complete diagnostic evaluation including multidisciplinary approach is necessary for proper diagnosis, reliable prognosis, appropriate treatment mode and follow-up until functional recovery or the end of growth and development in children with lesions and/or dysfunctions of CNS and afferent pathways.

SP169

MARTE MEO METHOD**Iva Papic**

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MarteMeo is the method which is based on an interaction analysis of a video recording, thus giving detailed and practical information to parents, guardians and experts who take care of the child. The information is used to support social, emotional and communicational abilities in everyday activities. The aim of MarteMeo therapy is to identify, activate and develop the interactions assisting the developmental process in the child.

MarteMeo method was developed in 1970s by Maria Aarts. At the time, Maria Aarts worked with autistic children that were institutionalized not because their parents were unable to take care of them but because it was believed that only trained professionals were able to take care of children with developmental disabilities. Maria Aarts recognized the need to develop a program that would help parents to support their child's development in everyday interactions. Observing a large number of interactions in different cultures, she concluded that parents use the same elements in communication with their children. Those universal elements are necessary for a child to develop properly and are present in everyday interactions. Those are: monitoring, waiting, confirmation, naming own, child's and someone else's initiative, naming own, child's and someone else's feelings, positive direction and positive guidance. Having found these elements, which parents around the world use in upbringing their children, Maria Aarts started applying them to support developmental dysfunctional processes. In that way, she developed MarteMeo therapy. MarteMeo therapy is used worldwide, in over 40 countries. Copying universal natural models, a large number of children were helped to activate their own strengths in order to develop.

Key words: MerteMeo method, early intervention

SP170

MANAGEMENT STRATEGIES FOR IMPROVEMENT POSTURAL STABILITY AND PREVENTING FALLS IN PARKINSON'S DISEASE-LITERATURE REVIEW**Ivona Stankovic**

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Parkinson's disease (PD), as the second most common neurodegenerative disease manifesting itself with motor and non-motor signs, results in progressive disability in patients with PD. The treatment for PD has traditionally been focused on medication therapy, but even with optimal medication, annual rates of progression are between 2% and 7% in general. There has been increasing support for the application and inclusion of rehabilitation therapies in the treatment process, as complementary to drug treatment, as well as increasing tendency to move towards multidisciplinary approach in the treatment of the disease.

Referring the patients with PD to physiotherapy has historically been rare due to weak base of evidence on effectiveness and poor availability of physiotherapy services. In recent period, positive effects of physiotherapy have been documented in numerous studies and meta-analyses, as well as its neuroprotective potential for patients with PD and the ability to slow down the progression of PD. Physical therapy, such as aerobic training, balance exercises, resistance and continuous endurance training improve physical functioning, thereby enhancing patients' quality of life.

The aim of physiotherapy is to improve functional ability of the patients, focusing on upper limb function, posture, transfer, balance (fall prevention), gait, cognitive movement strategies, and exercises for increasing the patient's independence, safety, and quality of life.

Strong evidence suggests that postural instability/gait difficulties are predictive of faster progression of the disease, while being resistant to drug treatment and physiotherapy. As the disease progresses, impaired balance results in falls, fear of falling, and limited physical activity.

In general, the interest of this paper and literature review was to show how physical exercises can improve balance and walking ability in individuals with PD and reduce the risk of falling in short-term and long-term periods, which can provide guidelines for treatment and future research in the population of patients with PD. Are there bodies of evidence on exercise programmes that can reduce the risk of falling? Future studies should examine it in order to propose an optimal protocol for improving posture and preventing falls in persons with PD.

SP171

ESPRM SISC SESSION ON SPORTS AFFAIRS - NEW THERAPEUTIC IN SPORTS MEDICINE AND MSK**Jérémy Magalon, PharmD, PhD (Marseille, APHM, FRANCE) : Use of Stem cells in musculoskeletal disease**

Regenerative medicine has the potential to heal or replace tissues and promising clinical data to date support the possibility for treating several musculoskeletal disorders. In this context, the use of stem cells is becoming more popular as they are defined as undifferentiated cells with self-renewal potential, differentiation into several types of cells and excessive proliferation. Ideally, a stem cell for regenerative and rehabilitative clinical applications should be i) produced in abundant quantities (millions to billions of cells); ii) harvested by minimally invasive procedures, iii) differentiated along multiple cell lineage pathways in a reproducible manner, iv) safely and effectively transplanted to an host. Researchers have at their disposal a large variety of stem cells that can be found at the embryonic stage or directly in the adult. Among them, mesenchymal stem cells (MSCs) are the progenitors of mesoderm cell types, including osteoblasts, adipocytes, and chondrocytes. MSCs were first isolated from adult bone marrow, but have also been identified in a variety of tissues throughout the body, including peripheral blood, umbilical cord, dental pulp, adipose tissue, periosteum...

In this presentation, we will describe the different types and sources of stem cells that can be used in the musculoskeletal area and we will present major results from clinical trials using stem cells based strategies in this field.

SP172

THE NEW ESCEO-IOF ALGORITHM FOR THE MANAGEMENT OF PATIENTS AT LOW, HIGH AND VERY HIGH RISK OF OSTEOPOROTIC FRACTURES**John A. Kanis · NC Harvey · E McCloskey · O Bruyère · N Veronese · M Lorentzon · C Cooper · R Rizzoli · G Adib · N Al-Daghri · C Campusano · M Chandran · B Dawson-Hughes · K Javaid · F Jiwa · H Johansson · JK Lee · E Liu · D Messina · O Mkinsi · D Pinto · D Prieto-Alhambra · K Saag · W Xia · L Zakraoui · J-Y Reginster**

Bone Australian Catholic University, Melbourne, Australia

In 2019 the International Osteoporosis Foundation (IOF) and the European Society for Clinical and Economic Evaluation of Osteoporosis and Osteoarthritis (ESCEO) published updated guidance for the diagnosis and management of postmenopausal osteoporosis. The algorithm supplements this guidance to recognise that the risk of a subsequent osteoporotic fracture is particularly acute immediately after an index fracture and wanes progressively with time. Additionally, new anabolic agents with more rapid and greater fracture risk reduction compared to antiresorptive treatments have been developed. These have the potential to revolutionise treatment strategies, particularly in individuals at very high fracture risk. These considerations argue for the identification of individuals at very high risk of fracture.

The algorithm follows the guidance of the IOF and ESCEO in the use of age-dependent intervention thresholds with the use of FRAX. In addition to the categories of low and high risk espoused in the current IOF-ESCEO guideline, very high risk can be identified as a fracture probability that exceeds the current intervention threshold by 20%. In women age 50 years or more from the UK, 64.8% would be categorised at low risk, 19.7% at high risk and 15.6% at very high risk. A FRAX adjustment is provided to take account that the probability of second fracture is particularly high in the first 2 years after a clinical vertebral fracture. The 10-year probability of a major osteoporotic fracture is multiplied by 1.04 to 2.47, depending on age. FRAX adjustments are still needed men and for index fractures other than spine fracture.

The rationale for the more refined characterisation of risk is to direct appropriate interventions. Thus, initial treatment recommendations for women at high risk might most usually start with an inhibitor of bone resorption. In contrast, women at very high risk might be more suitably treated with an anabolic treatment followed thereafter by an inhibitor of bone resorption. Such regimens save more fractures than inhibitors of bone resorption followed by anabolic agents.

SP173

PROVOCATION TESTS IN INFRARED THERMOGRAPHY**Jovana Kojovic Avramovic^{1 2}, Kocic M^{3,4}, Dimitrijevic I^{3,4}, Lazovic M^{1 2},**Institut za rehabilitaciju, Beograd¹, Medical Faculty University of Belgrade²,Clinic for Physical Medicine and Rehabilitation, Clinical Center Niš³, Medical Faculty University of Niš⁴

Infrared thermography (IRT) is a non-invasive and safe diagnostic method which visualizes functional abnormalities by measuring infrared light emitted from the body. It has been used effectively in the diagnosis of numerous diseases and in the evaluation of treatment effects. When using the provocation test the sensitivity and specificity of IRT is enhanced.

Depending on the stress factor, the provocation tests are recognized as thermal stress (cold, warm), pharmacological (chemicals, drugs), mechanical stress (vibration, exercise) and visual stress provocation tests. The distribution of body heat is considered to be the most important element when interpreting IRT images. When the restoration of temperature is asymmetrical after removal of stress, it is suggested that physiological abnormalities exist.

Among these, the cold provocation test is frequently used. IRT and cold provocation test revealed to be a useful tool in the diagnosis of Raynaud's phenomenon and VWF (Vibration-induced white finger), secondary type of Raynaud's phenomenon (RP) caused by exposure to hand-arm vibration. Few studies confirmed the high diagnostic sensitivity and specificity of cold challenge for the CRPS.

Tests and IRA are mainly helpful to obtain information regarding the nature and extent of the disease, and to guide the clinician in proper management of pain.

Provocation tests are sensitive and specific, easy to perform, equipment is safe and cheap. In order to establish the standardized guideline more clinical trials are recommended to be performed.

SP174

OBSERVING THE EFFECTS OF VOJTA'S REFLEX LOCOMOTION AND THERAPEUTIC RIDING IN INFANTS AT HIGH RISK OF CEREBRAL PALSY**Karol Hornáček**

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Introduction: Stimulative positioning on a horse (SPH) is a form of hippotherapy we utilize in babies with cerebral palsy (CP) where we use positions adequate to their development age.

Objective: Our randomized controlled clinical trial and case-control study focused on investigating the effect of SPH in infants at high risk of CP.

Method: Thirty-five prematurely born 6 months infants at high risk of CP were randomized into 2 groups, receiving complex rehabilitation. The control group with 20 babies continued in kinesiotherapy with Vojta's reflex locomotion (VRL) 4 times daily. The experimental group with 15 babies continued in the same rehabilitation but in addition received SPH twice a week. On those days, this group received VRL only 3 times.

During a period of 6 months, every two months, we evaluated spontaneous motor skills (rolling, creeping, sitting, etc), postural reactions (Landau, Collis, etc.), development of primitive reflexes (Babinsky, Mooro, etc.), and muscular tonus (hypotony of the trunk, incipient spasticity of the limbs). Also, according to their development, we classified the infants into locomotion stages according to Vojta (0-7). Based on this classification, we selected 10 babies from each group (experimental and control) and paired them according to their corresponding locomotion stage at the time of the entry evaluation into subgroups.

We evaluated our results using nonparametric tests ($\alpha = 0,05$): Wilcoxon, Mann-Whitney, Kruskal-Wallis, Friedman.

Results: The observed indicators (spontaneous motor activity, postural reactions, primitive reflexes, muscular tonus, locomotion stages according to Vojta) in both groups and in the selected subgroups resulted in significant improvements, often after two months of treatment. The combination of VRL and SPH was statistically significantly more effective than monokinesiotherapy with VRL.

Conclusions: Although VRL indicated significant improvement in the psychomotor development of the infants at high risk of CP, its combination with SPH is more effective.

SP175

PLATELET-RICH PLASMA (PRP) IN TENDINOPATHIES**KAUX Jean-François**

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Tendinopathy is a major problem in medicine and sports traumatology. It is due, inter alia, to mechanical overload. It remains a challenge for the medical world to the extent that its frequent resistance to conventional treatments never promises the patient a favourable response following therapeutic management. The development of platelet-rich plasma (PRP) is a new hope when therapeutic treatments such as NSAIDs, corticosteroid injections, eccentric rehabilitation, shock waves, etc. have shown their limits. Furthermore, it is no longer included on the list of doping substances.

Indeed, platelets contain various growth factors which participate to the tendon healing process. PRP is obtained by centrifugation of autologous blood to obtain a platelet concentration greater than that of the blood, which varies according to the production method. PRP also contains a variable amount of lymphocytes and erythrocytes that can have a detrimental effect on wound healing. Currently, there is no formal consensus regarding the production method or the biological composition of PRP.

Many laboratory studies (in vitro and/or on animal) emphasize the acceleration of the healing tendon process after injection of PRP, each growth factor exerting a specific action during healing. PRP would cause the proliferation, migration and differentiation of cells derived from circulation, improving the initial phase of the tendon healing. This anabolic process initiates the type I collagen synthesis.

Although currently the effectiveness of PRP on tendon healing in vitro or in animals seems to be confirmed, clinical studies are currently still controversial. In addition, there is still only a limited number of randomized and controlled studies reviewing PRP for treating tendinopathy. However, it seems that PRP can be efficient to treat lateral epicondylitis, patellar tendinopathies and plantar fasciitis, even if the level of proofs remains low. Up to now there is not enough proofs concerning the use of PRP to treat rotator cuff or Achilles tendinopathies. More randomized, controlled and blinded studies remain needed.

In conclusion, experimentally, PRP, through the local release of various growth factors stimulates tendon healing. This therapy could optimize the healing of pathological human tendons. PRP should be analysed to see whether it improves tendon healing in both humans and animals through other randomized controlled trials.

SP176

THE USE OF BALNEOTHERAPY-CLIMATOLOGICAL-FACTORS AND RESOURCES AT THE DEAD SEA IN THE TREATMENT OF PSORIASIS AND PSORIATIC ARTHRITIS**Khalil Al Abbadi**

Arab Center for PRM RPRIVATE, AMMAN JORDAN

Background: In the PMR field the Balneotherapy is well known for its therapeutic and recreational purposes in treating various diseases and physical disorders.

Objective: To explore the effect of using different Dead Sea minerals (i.e.: Water, mud, tar, Radon-222), Thalassotherapy, and sun rays Solarium in the treatment of people with Psoriasis and Psoriatic Arthritis.

Methods: 219 patients were divided into two groups: first group consisted of 146 Psoriasis patients in the age of 20-60 years, which received different Dead Sea minerals therapy. Second group consisted of 73 Psoriatic arthritis patients in the age of 40-60 years, which received different Dead Sea mineral therapy and physical therapy. The duration of treatment for the two groups was 4 weeks.

Results: Both groups showed improvements of the dermatological symptoms (Almost disappearing of the squam, softening and elasticity of the skin). In addition the second group showed decrease of pain during movement, decrease of pain at night time, decrease of morning stiffness, increase in ROM, increase in muscle power, and almost stopped the use of analgesics.

Conclusion: There are advantages of using the special characteristics of the Dead Sea region which proved positive effectiveness in the treatment of Psoriasis and Psoriatic arthritis. In addition, the therapeutic characteristics of the Dead Sea region may also be effective in treating certain rheumatic diseases, Neuro-musculo-skeletal conditions, and Respiratory problems that will need further investigation in future studies.

SP177

TREATMENT OF FOCAL AND GENERALIZED SPASTICITY**Klemen GRABLJEVEC, MD, MSc, FEBRPM**

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Head of Acquired Brain Injury Rehabilitation Department – University Rehabilitation Institute of Slovenia

President of Slovenian Society for PRM

Member of Executive Committee of the European Society for PRM

Spasticity is disordered sensorimotor control of movement, which results from lesion of upper motor

neurons, which regulate muscle control. It causes imbalance of signals between CNS and muscles and so presents as intermittent or sustained involuntary activation of muscles. Formally is characterized by velocity-dependent increase in muscle tone to passive movement. Functionally can represent only a mild inconvenience for a patient, on other hand it can cause restricted function with severe limitation in the activity and participation.

Long term consequences of neglected spasticity leads to secondary clinical complications and furthermore to severe morbidity and functional impairment. In some cases spasticity means functional benefit – enabling transfers and ambulation. Furthermore, spasticity is expensive, often undertreated condition, presenting as heavy economic burden on patients, caregivers and society. Increased dependence on family and institutional caregivers for activities of daily living is well known and evidenced in literature. Complications such as joint contractures and pressure sores presents a presumable cost for healthcare systems, but for patients severely decreased quality of life. On the other hand, patients are often undertreated due to side effects of oral antispastic medication.

Treatment of spasticity is initiated when:

- Spasticity interferes with functioning, positioning, comfort and care
- Spasticity is not useful (e.g. during transfers)
- Treatment expected to provide meaningful improvement

Treatment is only successful with goals that are specific, realistic, reflective of impact of spasticity on daily function, comfort, caregiving, medical conditions, psychosocial issues. They should be set jointly by patient, family, other caregivers and entire multidisciplinary healthcare team and documented prior to initiation of treatment. By working together, individualized treatment plan can be developed that addresses full range of patient needs.

The therapeutic methods as first line approach are many and are widely used: muscle stretching, serial casting, orthotic approach, elastic adhesive tape therapy, restraint therapy, vibration therapy, shock wave therapy, electrical stimulation, therapeutic ultrasound, etc. In addition to improving passive function, these rehabilitative therapeutic procedures can also have a beneficial

neurophysiological and biomechanical effect on spastic movement disorders. Unfortunately there is little evidence-based support or guidelines for use of mentioned techniques. Also success of techniques are often based upon motivation of patient and caregiver, as well as skills of physical therapist

Identifying and eliminating noxious stimuli that exacerbate spasticity is first step and most important in management of spasticity.

The choice of treatment for spasticity depends on the distribution of spasticity: focal and segmental distribution demands antispastic positioning with orthotics and / or Botulin Neurotoxin injections.

The mechanism of Botulin Neurotoxin effect after injection is quite complex: internalisation of BoNT molecule inside vesicular particles results in splitting the proteins needed for vesicles fusion (SNARE complex). This prevents release of Ach in the neuro-muscular synapse and results in temporary and dose dependent muscle paralysis. It effects also the intrafusal fibers – and depress the afferent impulses from the muscles. Central effects of Botulin Neurotoxin are not completely researched, because centripetal migration and retrograde axonal transport is very slow and molecule does not pass the brain blood barrier.

On the other hand in generalised spasticity the oral therapy (mostly tizanidin and baclofen) or Intrathecal baclofen (ITB) therapy is indicated.

Oral antispastic therapy is indicated when generalised stiffness, spasms, or clonus interfere with daily functioning or sleep, but very frequently two or more drugs may be necessary. It may need to combine with another type of therapy (e.g. injection therapy, ITB Therapy®).

Therapy with surgically implanted pump for intrathecal baclofen delivery is indicated when patient is in favourable general condition, is above age of four (but less is possible!), has a bodyweight at least 10 kgs, is in clinically stable condition, and can not be treated successfully with oral baclofen therapy and combination of other conventional therapies.

Conclusion: Spasticity as a clinical problem has nevertheless an important influence on patients ability and quality of life after central nervous system lesion. Therefore it represents a major rehabilitation problem and should be a focus of rehabilitation specialists.

SP178

**RESEARCH AT THE DIVISION OF REHABILITATION MEDICINE AT KAROLINSKA
INSTITUTET, STOCKHOLM SWEDEN****Kristian Borg**

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The division of Rehabilitation Medicine at Karolinska Institutet has a long history of research and education. One main research interest has been the area of rehabilitation of long-standing non-malignant pain including vocational rehabilitation. During the last decade the research has focused on motor and cognitive impairments in different central nervous conditions such as traumatic brain injury and stroke. Recently a study on the effect of training with exoskeletons was finalized and studies of rehabilitation of visual impairments are on-going. Furthermore, we have studied different peripheral nerve conditions such as Post-Polio Syndrome and Charcot-Marie-Tooths disease as well as muscle disorders such as Inclusion Body Myositis, Welander Distal Myopathy and Myotonic Dystrophy.

Our research has been multi-professional and has covered all ICF aspects including studies from genetics to quality-of -life.

SP179

PHYSIOTHERAPY INTERVENTIONS FOR CHILDREN WITH CEREBRAL PALSY: IS "MORE" REALLY BETTER?**Lidija Dimitrijevic**

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Introduction: It is widely known that cerebral palsy is a chronic condition and can not be completely cured, but its effects can be modified and the manner in which we managed the condition may influence the quality of life of both the child and family. What is needed is the realistic approach.

Objectives: The aim of this study was to systematically review the literature to investigate the effectiveness of physiotherapy interventions for children with cerebral palsy, according to its frequency and quantity (dose).

Methods: A literature search in 3 electronic databases was performed, extracting literature published between 2008 and 2018 focusing on physical therapy interventions. Data sources included: MEDLINE, The Cochrane Collaboration, and Google Scholar. Searches were restricted by language to English publications. General search terms used were: "cerebral palsy" and "physiotherapy", "physical therapy", "exercise", and "training". More specific search terms were: "treatment frequency", "treatment quantity", "treatment dose", "quality of life".

Results: The overview of the available researches showed that it is still unclear what dose and frequency of physiotherapy interventions should be taken as optimal. Majority of studies suggest that therapy should be adjusted to each child and family, since they all have different needs. Most of the researchers agree that the focus is on optimal functioning and quality of life.

Conclusion: This systematic review of the literature on trials on children with cerebral palsy provides some moderate, but mostly limited evidence on the precise dose, frequency and type of the various physical therapy interventions. Well-designed, randomized studies and trials on current and focused physical therapy interventions are needed in the future, as are new methods for analyzing the effects of comprehensive physical therapy interventions



SP180

WHERE INNOVATIVE TECHNOLOGIES IN NEUROREHABILITATION IS HEADED

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Introduction: The research field of innovative technologies in neurorehabilitation has increased in the last decades. Increasing of disability and unsatisfactory effects of existing methods of neurorehabilitation, on the one side and promising clinical results of different types of innovative technologies, emphasis needs to be translated in their clinical relevance and future applications.

Objective: To highlights the state of the art and main challenges in the field of virtual reality, robotics, brain-computer interfaces technology, and wearable systems in neurorehabilitation.

Methods: Narrative review and synthesis of relevant literature sources and clinical experience.

Results: Innovative technologies in neurorehabilitation could be defined as regard to biological, computational, and rehabilitation modalities. The key classification criteria are the priming, augmenting, and task-specific practice, which is correspondent to body functions and structures, activities, and participation. A trend to innovative technologies is sustained by imagining and neurophysiology studies that have demonstrated changes in cortical plasticity and motor learning.

Nevertheless, the mechanisms of clinical evidence are still unknown. Despite the potential for improving limb functions after stroke, many unanswered questions about the specificity of modality in itself, possible combining effects, and some new operating underlying mechanisms remain. **Conclusions:** Clinical and experimental evidence supports further interdisciplinary research of innovative technologies aimed at identifying the underlying mechanism and selection principles for delivery the most suitable rehabilitation interventions for the individual patient.

Keywords: neurorehabilitation, innovative technologies, interdisciplinary research

SP181

FUNCTIONAL OUTCOME IN PATIENTS WITH ACUTE ISCHEMIC STROKE FOLLOWING ACUTE REHABILITATION**Ljubica Nikcevic Krivokapic**

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Stroke is the leading cause of long-term adult disability worldwide. The main role of rehabilitation for these patients is to prevent functional, cognitive and social impairments, as well to improve patients' quality of life. Rehabilitation efficacy in after-stroke patients correlates to the certain degree with period between stroke onset and the beginning of rehabilitation treatment, and treatments duration and intensity. Acute rehabilitation begins when the patient is cardiologically and neurologically stable, ie. the next day after a stroke in the case of ischemia. Early mobilisation after stroke, comprising in-bed exercise and out-of-bed sitting, standing, and walking, is thought to contribute to the powerful effect of stroke-unit care and is recommended in many guidelines. Principles of acute rehabilitation are: a multidisciplinary team; individual approach depending on the severity of neurological deficit, comorbidity or motoric ability; early mobilization; early release from the institution, and the continued recovery in the home environment which includes training close relatives in the basic principles of rehabilitation treatment.

In our study we assessed effects of acute rehabilitation on functional outcome in 100 patients (51 females/49 males) after acute ischemic stroke. Functional outcome measured by modified Rankin scale (mRS) was assessed at admission (RANKIN 1) and at discharge from hospital, 14 days from onset (RANKIN 2). There was significant reduction in mRS scores between two measurements. We gained non significant difference in mRS score values between genders, both at admission and at discharge.

Conclusion: On-time and early implementation of rehabilitation treatment in patients with acute ischemic stroke reduces the complications frequency, mortality and duration of hospitalization. Acute rehabilitation treatment in patients with acute ischemic stroke significantly increases positive treatment outcome in both genders of all evaluated age groups.

Key words: acute ischemic stroke; acute rehabilitation; modified Rankin scale

SP182

NEUROPLASTICITY ASSESSMENT IN STROKE REHABILITATION**Marco Franceschini, Michela Goffredo & Sanaz Pournajaf**

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Introduction: Stroke is one of the main causes of disability worldwide, leading different types of functional limitations. The prominent goal of Stroke rehabilitation is the recovery of impaired functions. It amplifies the neural plasticity, modifying the cortical networks through an experience-dependent modality. However, studies on neuroplasticity during stroke rehabilitation treatments are limited. Therefore, the clinical research in neurorehabilitation needs new approaches for assessing neuroplasticity and thus, the abilities of the person affected by the cerebrovascular lesions. These neurophysiological phenomena are generally studied with different techniques: fMRI, TMS, EEG, and NIRS. In this study, we applied the EEG for assessing neuroplasticity changes induced by rehabilitation in stroke subjects.

Objective: To study the effects (changes of cortical activity) of innovative technology-based neurorehabilitation: a translational approach from basic neuroscience to rehabilitation.

Method: The subjects are assessed before and after the rehabilitative treatment with a multimodal approach based on clinical and instrumental assessments: the EEG (Geodesic 400 - 128 channels) is acquired in the following conditions: open eyes resting state; closed eyes resting state; and during a voluntary self-paced basic motor task of upper (finger tapping) and lower limb (ankle flexion-extension). Cortical motor event-related responses and brain connectivity are analyzed. The artifacts are removed with an algorithm based on independent component analysis (MATLAB2019). Low-Resolution Electric Tomography software (eLORETA) is employed for localizing the source currents and analyzing the connectivity. EEG frequency analysis is performed and the following frequency bands are considered: delta (0.5–4 Hz), theta (4.5–7.5 Hz), alpha (8–12.5 Hz), beta (13–30 Hz), and gamma (30.5–60 Hz).

Results: The expected results would be a modulation of the pre-post cortical responses in favor of greater cortical efficiency and increased pattern connectivity in patients who underwent repetitive, intensive, and innovative treatments.

SP183

RESPONSIVENESS AND MINIMAL CLINICALLY IMPORTANT DIFFERENCE OF THE FEAR AVOIDANCE AND BELIEFS QUESTIONNAIRE IN ITALIAN SUBJECTS WITH CHRONIC LOW BACK PAIN UNDERGOING MULTIDISCIPLINARY REHABILITATION**Marco Monticone**

Medical Sciences and Public Health University of Cagliari, Cagliari, Italy

Introduction: Despite the Fear-Avoidance Beliefs Questionnaire (FABQ) properties have been investigated in various different languages, there is still a lack of information concerning responsiveness and MIC, limiting its use for clinical and research purposes.

Objective: To examine responsiveness and minimal clinically important difference (MIC) of the FABQ in subjects with chronic Low Back Pain (LBP).

Methods: Design: Methodological research based on a prospective single-group observational study. At the beginning and the end of a multidisciplinary programme (8-week), 129 subjects completed the FABQ. Responsiveness was calculated both by distribution-based and anchor-based methods, using as external criterion the global perceived effect scale (GPE; 7 levels, ranging from -3 "made things a lot worse" to +3 "helped a lot"), rated by each individual.

Results: The standard error of measurement was 1.70 for FABQ-Physical Activity scale (FABQ-PA), and 2.19 for FABQ-Work scale (FABQ-W), with minimum detectable change (MDC) values of 3.97 (MDC90) and 4.71 points (MDC95) for FABQ-PA; and 5.11 (MDC90) and 6.07 points (MDC95) for FABQ-W, respectively. In receiver-operating characteristics curves, splitting GPE data into null/minimal/moderate improvement vs. large improvement (GPE 0-2 vs. GPE 3): 1) for FABQ-PA, the area under the curve (AUC) was 0.97. The best cutoff score identifying a large improvement in fear-avoidance beliefs about physical activity was a change of 4 points; 2) for FABQ-W, the AUC was 0.97 and the best cutoff score for a large improvement in fear-avoidance beliefs about work activities was a change of 7 points.

Conclusions: The two FABQ scales were sensitive in detecting clinical changes in this clinical context. The MICs provided represent cutoffs that seem to accurately identify important change in fear-avoidance beliefs, according to subject's judgement.

SP184

NERVE ENTRAPMENT NEUROPATHIES IN THE UPPER AND LOWER LIMB**Mark Lissens**

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Nerve entrapment neuropathies are among the most frequent neurological disorders, often leading to disability and work incapacity.

The most frequent nerve entrapment in the human body involves the median nerve at the wrist: carpal tunnel syndrome (CTS). Several electrodiagnostic techniques were described to diagnose CTS: sensory and motor nerve conduction studies, electromyography (EMG) and others. In this workshop nerve conduction studies will be shown in order to detect CTS at an early stage and to follow-up accurately this common entrapment neuropathy.

The second most frequent entrapment neuropathy in the upper limb is the compression of the ulnar nerve at the elbow, also known as cubital tunnel syndrome. Here, pitfalls will be shown in order to diagnose this pathology accurately and to avoid wrong diagnosis and conclusions.

Other less frequent entrapment neuropathies in the upper limb involve the ulnar nerve at the wrist in the Guyon tunnel, the radial nerve (including the posterior interosseus nerve), the axillary nerve, the musculocutaneous nerve, the long thoracic nerve and the suprascapular nerve.

In the lower limb, the most frequent entrapment neuropathy is the compression of the peroneal nerve at the fibular head just inferior to the lateral knee.

Other quite frequently seen entrapment neuropathies in the lower limb are the tarsal tunnel syndrome, involving one of the branches (medial plantar nerve, lateral plantar nerve, calcaneal nerve) of the distal posterior tibial nerve at the ankle, and meralgia paraesthetica, where the lateral cutaneous femoral nerve is causing typical symptoms. Electrodiagnostic techniques are shown to diagnose these disorders correctly and to avoid misdiagnosis.

Less frequent nerve entrapment neuropathies in the lower limb include the saphenous nerve, sciatic nerve, femoral nerve, obturator nerve, ilioinguinal nerve and genitofemoral nerve.

SP185

ELECTRODIAGNOSIS OF THE RESPIRATORY SYSTEM**Mark A. LISSENS**

Thomas More University College, Geel, K.U. Leuven University, Belgium

Previously, the diaphragm was thought to be the only important contracting muscle during quiet breathing in humans. Now it is known that the diaphragm together with the scalenes and the parasternal intercostals are the primary inspiratory muscles, and that during expiration in most body positions except during lying the abdominal muscles and the transversus thoracis muscle (also called triangularis sterni or sternocostalis muscle) are regularly active, making quiet expiration an active process instead of a purely passive maneuver as was previously thought. The external intercostal muscles, the levatorescostarum longi and breves muscles, the sternocleidomastoid muscle, and the serratus posterior superior and inferior muscles can be regarded as accessory inspiratory muscles. The pyramidalis and internal intercostal muscles are regarded as accessory muscles of expiration.

Several respiratory diseases and neuromuscular disorders, such as amyotrophic lateral sclerosis, Guillain-Barré syndrome, muscular dystrophies, myasthenia gravis, brachial neuritis, critical illness neuropathy, leprosy, metabolic disorders etc. can affect respiration, often in the critical care unit. Nowadays, electroneuromyographic techniques can be applied and can be of great value in more precisely determining the nervous system cause, if present, for respiratory failure or insufficiency. Several electrodiagnostic techniques now are available to examine the respiratory muscles and their innervation. Nerve conduction studies of the phrenic nerve and intercostal nerves, and needle as well as surface electromyography of most respiratory muscles can be performed. To measure central conduction in order to assess the integrity of the corticospinal tracts and central respiratory drive magnetic transcortical and nerve root stimulation now can be performed.

SP186

THE USE OF MOTOR EVOKED POTENTIALS IN REHABILITATION**Mark A. LISSENS**

Belgium

The technique of transcranial magnetic stimulation (TMS) is a painless and easily applicable technique to investigate the central motor conduction properties of various muscle groups, both in healthy humans and in patients with various neurological disorders. Since the MEP-latency times and central motor conduction times (CMCT) show a good reproducibility and a very small variability, these variables can be used as parameters in the diagnosis and follow-up of these diseases. For the MEP-amplitudes on the other hand, some caution needs to be taken into account, since they show a much higher variability. Here, left to right comparison is necessary, on condition that electrode placement is correct and similar for both sides and that stimulus parameters are the same bilaterally.

MEPs can be useful in physical therapy and rehabilitation. In the acute phase of several locomotor disorders, mainly in stroke, MEPs are a useful tool for the early prediction of motor and functional outcome. After the acute phases, MEPs can be helpful to document rehabilitation progress. This allows the health professionals of the rehabilitation staff, who are dealing with either restoring the impaired spinal cord functions or compensating for the losses by enhancing the residual functions, to direct and evaluate the therapeutic procedures throughout the course of the rehabilitation. On the other hand it provides a helpful tool to motivate the patients, which may eventually lead to a better outcome result.

In stroke patients for example MEPs are a quantitative and objective method to document motor activity recovery, as they parallel improvement of motor function. MEPs can be used as a qualitative and quantitative measurement of motor function and motor control at follow-up during rehabilitation.

In spinal cord injury patients there are short and long latency MEPs. Short and constant delay in MEP latency time can be explained by impaired conduction of long descending axons. Long and variable MEP latencies on the other hand probably result from the interposition of a spinal interneuron system between upper and lower motor neurons. In these patients TMS is a simple and non-invasive method to not only provide insight into the status of suprasegmental influence below the spinal cord lesion, mainly in subjects with residual motor control, and to describe the supraspinal innervation pattern for locomotion, but also can be applied to document the evolution of motor control in follow-up studies, particularly when different therapeutic or restorative procedures or interventions are applied.

In high cervical spinal cord injuries, as well as in several neuromuscular disorders, such as amyotrophic lateral sclerosis, Guillain-Barré syndrome, muscular dystrophies, myasthenia gravis, brachial neuritis, critical illness neuropathy, leprosy, metabolic disorders etc., often in the critical care unit, the respiratory muscles can be affected. To measure central conduction in order to assess the integrity of the corticospinal tracts and central respiratory drive magnetic transcortical and nerve root stimulation of the respiratory muscles now also can be performed.

SP187

RESEARCH IN PRM – LIGHTS AND SHADOWS**Maria Gabriella Ceravolo**

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For several years, the credibility of rehabilitation approaches has been seriously challenged by those advocating evidence-based reports of treatment efficacy. It has been highlighted that although rehabilitation is known as an extraordinarily effective health care process (increasing life expectancy in both brain and spine injured patients), it decidedly suffers from the difficulty of characterizing its nature. One immediate consequence arising from such inconvenience is that “research in rehabilitation is difficult, there is little of it...and the quality is low.” (Wade DT, Clin Rehabil 2003). The main critical issues in designing clinical trials of rehabilitation efficacy concern:

a) the management of independent variables. For instance, when measuring functional recovery after brain injury, one must bear in mind that the natural course of disease is not the only source of variance and that its effects will combine with other variables such as: the severity of neurological damage, the occurrence of comorbidities, the individual factors, and the environmental factors. A moving baseline condition, like that characterizing chronic progressive disorders, may reduce the reliability of studies that aim to describe rehabilitation outcome without considering parallel functional changes in matched controls.

b) The choice of outcome measures: it deals with the complex nature of rehabilitation process and the multifaceted consequences of patient interaction with such intervention. Independent of the target of measurement, most clinical assessment tools may be inadequate, owing to their poor relationship with patients' perceived health needs. The availability of "real world" outcome measures would help to collect valuable information on the attainment of rehabilitation goals.

This session will present techniques and strategies to make the process of collecting and reporting evidences from rehabilitation practice easier, in order to train colleagues, who are inexperienced in scholarly publishing.

SP188

REHABILITATION CARE MODELS FOR PEOPLE WITH PARKINSON'S DISEASE ACROSS EUROPE**Maria Gabriella Ceravolo**

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Parkinson's disease (PD) is the second most common neurodegenerative disorder after Alzheimer's disease occurring worldwide, and in all ethnic groups. The management of early PD involves the treatment of motor symptoms and, increasingly, non-motor symptoms. Current treatments provide adequate control of the cardinal motor features of the disease but do not modify its evolution towards increasing disability. Over the years, this relates to the emergence of other features—such as cognitive impairment, autonomic dysfunction, and disequilibrium—that reflect the extension of the pathological process in different central and peripheral neurological areas. Current recommendations for the rehabilitation management of Parkinson's Disease are based on the Dutch guidelines , better known as the KNGF Guidelines and consist of: (I) Application of cueing strategies to improve gait; (II) Application of cognitive movement strategies to improve transfers; (III) Specific exercises to improve balance; (IV) Training of joint mobility and muscle power to improve physical capacity. Duration and frequency of a course of physical therapy strongly depend on the needs and potential of the patient, and on the course of the disease. The long lasting duration of motor disability in people with PD has arisen concerns about the cost-effectiveness of rehabilitation interventions, that should be accessible to patients in any disease stage, at regular intervals, and possibly include intensive training protocols. In fact, both basic research and clinical studies suggest that high intensity (ie, high repetition, velocity, complexity) is a characteristic of exercise that may be important in promoting activity- dependent neuroplasticity of the injured brain, and improving motor performance. In spite of the growing amount of evidences of efficacy of several rehabilitation approaches, the access of people with PD to rehabilitation services is much variable across European countries and largely lower than what would be expected and recommended in the available guidelines.

SP189

STANDARDS IN PRM EDUCATION: THE UEMS - PRM BOARD CORE CURRICULUM OF KNOWLEDGE AND COMPETENCIES**Maria Gabriella Ceravolo**

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The European PRM Board aims to promote patient safety and quality of care through the development of the highest standards of medical training and health care across Europe and the harmonisation of PRM specialists' qualifications. In order to ensure that a standard level of postgraduate education is delivered across European countries, a document named "European Training requirements for PRM" has been developed, thanks to the contribution of all delegates to the UEMS PRM Board. The document has been officially approved by the UEMS Council on April 28th, 2018. The document provides information about the education and training of specialists, defining WHAT is needed to a physician to become a Specialist in PRM, discussing the standards and the duration required at a European level, and detailing the core curriculum of theoretical knowledge and main competencies, skills and attitudes. The scope and competencies of PRM specialty are described starting from its definition as the "medicine of functioning" responsible of the rehabilitative strategy to be applied together with the curative strategy for the best recovery of patients' participation; according to the complexity of the health condition, PRM also refers to prevention and maintenance, as well as to rehabilitation training for other health professionals and to management of patients and caregivers. Under the perspective of a disease-centred approach, PRM specialists must develop progressive responsibility in diagnosing, assessing, and managing people of all ages suffering from (or at risk of activity limitation / participation restriction following any disease condition .

SP190

DOUBLE CRUSH SYNDROME – ELECTRODIAGNOSTIC TESTING IN THE EVALUATION OF PERIPHERAL NERVE LESION**Marija Hrkovic**

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Introduction: Double crush syndrome (DCS) denotes compression at two or more sites along the course of the peripheral nerve, which can coexist and synergistically increase the intensity of symptoms. The failure of treatment at one site may be the result of persistent compression at another site along the peripheral nerve. The most common clinical example of the DCS is the increased incidence of carpal tunnel syndrome (CTS) in patients with cervical radiculopathy (CR). In the case of diagnostic doubt, and before treatment, especially operative, electro myo neuro graphic (EMNG) examination should be conducted.

Our study examined the clinical characteristics and EMNG findings in order to determine frequency of simultaneous presence of CTS and CR in the examined patient.

Methods: This cross-sectional study included 267 symptomatic limbs who have met the EMNG criteria for CTS and CR. Median and ulnar nerve conduction studies and needle EMG study were performed for all subjects.

Results: In our study, DCS was diagnosed in 37.83%. based on electrodiagnostic findings. Symptoms (distribution and intensity of paresthesia and pain) and clinical findings (hypoesthesia and weakness in the median distribution, the tendon reflexes, Bikele's, Tinel and Phalen test) were not specific, especially when we compared isolated CTS and CR cases to the coexisting CTS and CR. We found coexisting CTS in 47.5% of cases referred for EMNG examination with CR diagnosis. Comparing C6-C8/Th1 nerve roots, there was no significant difference in affected level.

Conclusion: Our results indicate that without comprehensive EMNG examination a large number of patients with Double crush syndrome would remain with unrecognized diagnosis, and therefore with inadequate therapy.

Keywords: Electromyoneurography, Double crush syndrome, Carpal Tunnel Syndrome, Cervical Radiculopathy

SP191

ELECTRODIAGNOSTIC ASSESSMENT OF BRACHIAL PLEXOPATHIES**Marija Hrkovic,**

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Introduction: The brachial plexus is one of the most complex structures of the peripheral nervous system, responsible for the innervation of the upper extremity. Traction is the most common cause of brachial plexopathy, although compression, ischemia, neoplasms, radiation, thoracic outlet syndrome, and neuralgic amyotrophy may all produce brachial plexus lesions. An adequately performed electrodiagnosis can differentiate brachial plexopathy from other causes of sensorimotor dysfunction in the upper extremities, identify the site and quantify the severity of the lesion.

Objective of this article is to outline various electrodiagnostic techniques used in the assessment of brachial plexopathies.

Method: Narrative review and synthesis of relevant literature sources and clinical experience.

Results: Electrodiagnostic evaluation of brachial plexopathies includes the study of multiple nerves and muscles. It combines sensory and motor nerve conduction studies (NCS) with a detailed needle electromyographic (EMG) examination, in addition to contralateral comparison studies. It must be customized for each patient, depending on the clinical findings. Whenever a plexopathy is suspected, extensive sensory NCSs are performed. Sensory nerve action potentials (SNAP) are recorded from the median nerve (index, middle fingers, and the thumb), ulnar, radial, lateral antebrachial cutaneous and medial antebrachial cutaneous nerves. Low SNAP amplitude suggests that the injury is distal to the spinal ganglion, whereas a preserved SNAP, suggests a preganglionic lesion. Motor NCSs are very helpful in assessing the extent of a brachial plexus injury. The extent of motor axon loss is reflected by a loss of the compound muscle action potential (CMAP) amplitude when recorded from a muscle innervated by the affected root. The motor domains sampled are median to abductor pollicis brevis/flexor carpi radialis, ulnar to abductor digiti minimi/flexor carpi ulnaris, radial to extensor indicis and extensor digitorum communis, musculocutaneous to biceps, axillary to deltoid, and spinal accessory to trapezius. Needle EMG examination is required to record the axon loss, its extent, and the completeness of the lesion. Needle EMG also documents the earliest sign of recovery in the form of nascent units. An adequate sampling of muscles is of the utmost importance.

Conclusion: Electrodiagnostic evaluation of the brachial plexus can be challenging even to an experienced practitioner. A well-performed and correctly-timed electrodiagnostic evaluation is extremely helpful in assessing site and severity of brachial plexopathies.

Keywords: electrodiagnosis, brachial plexopathy

SP192

THE USE OF ACTION OBSERVATION TO RECOVER MOTOR DEXTERITY IN PEOPLE WITH PARKINSON'S DISEASE**Marianna Capecci**

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Rizzolatti et al. (2001) postulate that during observation of a movement, the related action representation "resonates" (re-activates) in the motor system. This motor resonance can drive learning and the acquisition of motor skills in analogous ways as physical exercise. Action observation (AO) involve a large cortical-subcortical network that include parietal and premotor cortices (Buccino et al., 2001), inferior frontal gyrus, visual temporal (Caspers et al., 2010) and supplementaty motor areas (Hari et al.,1998), basal ganglia (Marceglia et al., 2009; Alegre et al., 2010) and cerebellum (Caligiore et al., 2014). Studies on single session experiments suggest that AO treatments (AOT) in subjects with Parkinson's Disease (PD) can facilitate the performance of spontaneous movements (Pelosin et al., 2013; Castiello et al.,2009) and that the simultaneous observation and execution of a movement can produce motor facilitation (Tremblay et al., 2008). Moreover, imitative compatibility effects did not differ between people with PD and healthy subjects, indicating intact motor resonance in the people with PD (BeK et al , 2017). AOT demonstrated to induce clinical improvements on gait at 4-week and a more lasting effect in improving motor function, gait and quality of life in PD patients relative to physical therapy alone, changing cortical plasticity (Agosta F, et al., 2017).

Hand dexterity is essential for independence in activities of daily living (ADL) and is reduced in patients with PD. Moreover, dexterity difficulties are reported as the second contributor to the impairment of PD following ambulation. It is known that writing, tying shoelaces and buttoning activities are difficult for patients with PD. Upper limb rehabilitation is a core component of physiotherapy and occupational therapy for PD (Keus et al, 2014). Nevertheless, few data about the effect of AOT on dexterity were provided. In this lecture, we present preliminary results of a randomized controlled trial on 20-session of AOT versus placebo on arm function and dexterity in 24 people with PD, showing the possibility to reduce time needed to reach outcomes and reinforce long-term rehabilitation effects by AOT.

SP193

NEW INSIGHTS IN THE MANAGEMENT OF OSTEOPOROSIS WITH BONE FORMING AGENTS: HOW TO USE THEM TO CLOSE THE OSTEOPOROSIS TREATMENT GAP**Maria Luisa Brandi**

Fondazione FIRMO and University of Florence, Florence, Italy

Current osteoporosis medications reduce fractures significantly but have rare and serious adverse effects (osteonecrosis of the jaw, atypical femoral fractures) that may limit their safety for long-term use. Insights from basic bone biology and genetic disorders have led to recent advances in therapeutics for osteoporosis. New approaches now in clinical use include the antisclerostin antibody romosozumab (ROMO), as well as the parathyroid hormone-related peptide analogabaloparatide.

ROMO was recently approved by the EMA for the treatment of osteoporosis in postmenopausal women, viceversaabaloparatide was not. ROMO works by selectively inhibiting sclerostin a glycoprotein that inhibits osteoblasts and further promotes bone resorption. Biochemical analyses of the robust phase III clinical development studies showed a significant increase in bone formation markers, that then slowly decreased within a year. This was accompanied by an initial pronounced decrease in bone resorption. This dual mechanism of action led to an increase in bone mineral density and a significant reduction in fracture risk. The most significant side effects are cardiovascular.

Combination and sequential treatments using osteoporosis medications with different mechanisms of action have also been tested with praisng results.

These novelties will be introduced and discussed during the presentation.

SP194

GENDER DIFFERENCES IN CARDIOVASCULAR REHABILITATION: WHETHER WOMEN BENEFIT EQUALLY WITH MEN?**Marina Deljanin Ilic**

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Cardiovascular rehabilitation (CVR) is an integral part of treating cardiovascular (CV) patients. It is a multifactorial process which is characterized by extensive and long-term activities that include: clinical evaluation, exercise, modification of risk factors, drug therapy, educational lectures, psychological assistance and counseling related to the profession of patients. However, less than half of CV patients are involved in CV rehabilitation programs. Studies have demonstrated a lower women's access to CVR than men, and also an important difference in their clinical profile and management. Women are significantly less directed to the CVR by physicians, and in general, 20% fewer women are enrolled in CVR than men. The reasons for this underuse of CVR in women might be linked to health system, socioeconomic and cultural status as well as patients-level factors (social supports, beliefs, family responsibilities). In fact, female patients often present a worse risk factors profile (age, diabetes and hypertension) and this is probably the reason why physicians recommend CVR more strongly in men than in women. Studies and reviews on CVR showed that programs seem to be an equally promising treatment option for both men and women in terms of improving psychological health and that women with coronary artery disease derive a greater mortality benefit from attending CVR compared to men. The results of our study performed at Institute "Niska Banja" showed that women participate in CVR program in a significantly lower percentage than men and that three weeks residential CVR program has improved exercise tolerance in both genders, which was more pronounced in women than in men.

In conclusion, despite the high number of studies on CVR benefits in female population and strong recommendations there are still gender differences in CVR enrolment. This might be explained by the higher age of female population, the higher percentage of functional dependence, socioeconomic and cultural status in women. However, these must be overcome as CVR programs are useful to improve clinical performance and functional status in men as well in women.

SP195

PELOIDS - HEALING MEDICINE THROUGH THE AGES**Marina Delic**

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The official definition of peloid is still the one proposed by the Société Internationale d'Hydrologie Médicale, and adopted during the I Ve Conférence Scientifique Internationale, held in Dax, France, in 1949: "peloids are natural products composed of a mixture of mineral water (sea water, salt lake water, and natural mineral water included), with organic or organic matter, resulting from geologic or biologic processes, or from both geologic and biologic processes, which are utilized for therapeutic purposes under the form of packs or baths". At the same meeting was adopted the Classification Hydrologique Internationale de Pélôïdes based on peloids origin, mineral water chemical nature and temperature, and maturation conditions.

ISMH medical professionals, globally study organic, therapy-grade, moor mud (sometimes called "balneo-peat"). The interest in the healing properties of the mud/peloids resulted in the growing literature about peloids analyzes, among its other characteristics, the organic residue of herbs, mosses, and grasses. The prolific and growing literature considers the high humic acid content of so-called "moor mud," its anti-inflammatory capabilities, its natural astringent properties, its detoxification uses, its value in addressing hormonal imbalances because of its rich sourcing of phyto-hormones, its post-surgery recovery use, its sports medicine applications, and many other uses.

Peloids are "living systems" in a continuous change. Their ultimate therapeutic interest results not only from the original composition of their solid and liquid phases, but also from the textural, physicochemical and biological changes which occur during maturation.

Peloids, as a natural product that contains different components in its composition, has extensive use in treatment of many diseases. Organic compounds have special significance because many of them have biological activity, wherefor they can be applied in the treatment of various diseases.

SP196

CARDIOVASCULAR AND RESISTIVE TRAINING AS IMPORTANT PART OF MS THERAPY**Martina Kóvári**

Department of Rehabilitation and Sports Medicine Teaching Hospital Motol, Charles University, 2nd Medical Faculty, Prague Czech Republic Czech Republic

Cardiovascular (endurance) and resistive training is recommended as part of treatment of patients with multiple sclerosis (MS). Many years ago, MS patients were advised not to participate in physical exercises because of fear of attack. But it is proved that exercise training is not associated with an increased risk of relapse or other adverse events (1). During the last 15 years it became clear that MS patients benefit from physical exercising. Evidence exists that endurance and resistive training or combined training is safe and can lower the risk of obesity, cardiovascular diseases, type II diabetes, osteoporosis and fatigue and that inactivity can increase loss of muscle strength. We have different guidelines and recommendations about parameters of these types of training - for example recommendation by Dalgas 2008 (2), American College for Sports Medicine modified for MS 2009 (3) or guidelines made by Committee of Canadian experts - Latimer 2013 (4). In this lecture the author will go through different guidelines, compare them and will try to find the consensus between them.

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2/ Dalgas U, Stenager E, and Ingemann-Hansen T. Multiple sclerosis and physical exercise, recommendations for the application of resistance-, endurance- and combined training. *Mult Scler* 2008, 14: 35-53

3/ Thompson WR, Gordon NF, Pescatello LS: ACSM's guidelines for Exercise, Testing and Prescription (8th edition). Lippincott Williams & Wilkins 2009, 18-39

4/ Latimer Cheung AE, Ginis M, Hicks AL, Motl RW, Pilutti LA et al: Development of Evidence-based Physical Activity Guidelines for Adults with MS. *Archives of Physical Medicine and Rehabilitation* 2013, 94: 1829-36

SP197

SPASTICITY SCALES AND THEIR IMPLEMENTATION TO CLINICAL PRACTISE**Martina Kóvári**

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The Modified Ashworth Scale (MAS) is the scale when spasticity is measured using passive fast soft-tissue stretching. MAS is worldwide well known and used scale and it is simple for clinical practice. But this scale does not differentiate between contractures and real spasticity because just one velocity is used for stretching (1). Modified Tardieu Scale (MTS) can differentiate between contractures (using slow passive stretching speed) and real spasticity (using fast passive stretching speed) (2, 3). In the past there were some studies comparing the reliability of the MTS and MAS with different results. For practicing doctors it is very important to differentiate between real spasticity, contractures, to have good knowledge of degree of paresis of spastic muscle, muscle tiredness and functionality of the tested segments in activity of daily living. Concept of Jean Michael Gracies meets all these requirements (4). In this lecture the different spasticity scales would be discussed focused on their positives and negatives.

1. Mehrholz J, Major Y, Meissner D, Sandi-Gahun S, Koch R, Pohl M: The influence of Contractures and Variation in Measurement Stretching Velocity on the Reliability of the Modified Ashworth Scale in Patients With Severe Brain Injury. *Clin. Rehabil*, 2005, 19 (1), 63-72

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4. Mehrholz J, Wagner K, Meissner D, Grundmann K, Zange Ch, Koch R, Pohl M: Reliability of the Modified Tardieu Scale and Modified Ashworth Scale in Adult Patients with Severe Brain Injury: A comparison study. 2005, *Clin Rehabil*, 19 (7), 751-759

5. Gracies JM, Bayler N, Vinti M, Alkandari S, Loche CM, Colas C: Five-step Clinical Assessment in Spastic Paresis. *Eur J Phys RehabilMed*, 2010, 46 (3), 411-421

SP198

FRAILITY, SARCOPENIA AND TYPE-2 DIABETES MELITUS: UNDERLYING MECHANISMS AND POTENTIAL PHARMACOLOGICAL INTERVENTIONS**Milena Jurisevic¹, Olivera Milovanovic¹, Radisa Pavlovic¹, Vladimir Biocanin², Dusan Djuric^{1,3}**

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Introduction: Prevalence of Diabetes Mellitus has continued to increase worldwide despite of medical efforts. Type 2 diabetes mellitus (DM2) is a chronic metabolic disease characterized particularly by hyperglycemia, as the consequence of impaired insulin secretion or action. Sarcopenia, age related loss of skeletal muscle mass and function, and DM2 often coexist.

Objective: The goal of this research was to analyze current evidences regard to mechanisms contributing to sarcopenia/frailty in older DM2 patients and provide summary insight into effects of the antidiabetic drugs on the sarcopenia/frailty.

Method: Background is grounded on the role of insulin resistance, metabolic syndrome, inflammation, increased oxidative stress in the development of DM2 associated sarcopenia/frailty based on the literature. A literature search was conducted by searching terms frailty, sarcopenia, Type 2 diabetes mellitus and antidiabetic drugs.

Results: Sarcopenia can be recognized as the consequence and cause of Type 2 diabetes mellitus. The evidence showed that insulin resistance, chronic inflammation (TNF- α , IL-1, IL-6, CRP), oxidative damage and mitochondrial dysfunction, and obesity can be associated with both Type 2 diabetes mellitus and sarcopenia. Interestingly, correlation and relationship between hyperglycemia and sarcopenia still remained unclear. Insulin therapy in older patients failed to prevent reduced synthesis of muscle protein. It has been established that sulfonylureas and glinides may act as atrophic agents. Several SGLT2 inhibitors had little or no effect on the reduction of muscle mass. Glitazones and incretins may have beneficial effect on muscle blood supply. Although the effect of metformin remains unclear, clinical study examining the effect of metformin on the development of sarcopenia in pre-diabetic elderly patients is underway.

Conclusions: Due to the fact that sarcopenia can be recognized as negative prognostic factors in the Type 2 diabetes mellitus treatment, future studies should try to overcome obstacles in sarcopenia treatment.

SP199

WHAT HAS CHANGED IN CARDIAC REHABILITATION TODAY?**Milica Lazovic**

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The implementation of the Cardiac Rehabilitation (CR) Program is probably the most effective and socially economically most cost-effective approach to reducing cardiovascular (CV) risk and promoting a "healthy" lifestyle, which in the long term reduces the morbidity, mortality and costs of treating this group of patients (Level IA recommendation).

Rehabilitation programs are based on a multidisciplinary approach to patients, with the use of exercise training (ET) that is specific and depends on the nature of the CV disease. Secondary prevention is still too poorly implemented in clinical practice, often only on selected populations and over a limited period of time. There are still many controversies about the organization of CR. We have to standardize the basic criteria for all the CR Programme in order to guarantee quality, cost-effectiveness and safety. New CR models include interventions that are based on individualized CR stratification programs to maximize clinical benefit and optimize safety.

Today, when modern cardiology is dominated by increasingly active ways of treating AMI, especially interventional cardiology, with the advancement of surgical and anesthesiological techniques during cardiac surgery, it is clear that there is a continuous trend of increasingly short hospitalization of patients during the acute phase of the disease. Such an approach often leaves little time for the implementation of comprehensive acute rehabilitation and control of risk factors. For these reasons, it is necessary to refer the patient to one of the centres for cardiac rehabilitation, which today, according to modern concepts, represents an optimal continuation of acute treatment and intensive secondary prevention.

However, it remains unclear what characteristics of ET should be fulfilled (intensity, duration, type and extent of ET, frequency ...) in order to get the best results. The approach based on the intensity-response relationship requires the individual creation of exercise programs in accordance with existing risks and limitations including: ischemia and exercise-induced arrhythmias, cardiac function after clinical surgery, limiting comorbidities (peripheral vascular disease, musculoskeletal system diseases, arthritis, osteopenia, sarcopenia ...), degree of disability, potential psychological, social and/or cultural barriers, gender and age. Modifying exercises according to comorbidities may be necessary in order to improve health outcomes and complications.

In elderly people it has been shown that rehabilitation based on ET reduces the risk of dying and AIM, and this beneficial effect increases according to the increase in the frequency of training. Individually modified exercise, adapted to existing comorbidities, leads to an improved health outcome while reducing associated comorbidities. Rehabilitation programs designed for women can increase their presence and commitment to these programs and can be superior in terms of improving physical fitness and quality of life compared to traditional rehabilitation programs.

Conclusion: All patients with CV disease (especially with coronary artery disease) who are clinically stable, regardless of gender, age and ethnicity, should be subjected to an individually tailored rehabilitation program, or physical training.

SP200

DEVELOPMENT OF BALNEOTHERAPY IN EURO-MEDITERRANEAN COUNTRIES**Milica Lazovic**

Institute for Rehabilitation, Medical Faculty University of Belgrade, Serbia

The Euro-Mediterranean Region has a long tradition when it comes of the use of healing waters and other local natural resources for healing purposes. This Region has a long tradition when it comes of the use of healing waters and other local natural resources for healing purposes. Ancient Greece and ancient Rome are known for numerous sources, many of which were close to the volcano. Hippocrates from Kos Island, the father of medicine, was the first to perform a systematic classification of water in terms of temperature, taste, density and other parameters in his work "Air, Water, Land".

Balneotherapy is a medical field based on: specific modalities based on scientific evidence; a team-orientated comprehensive approach aiming at an improvement of functioning and health; specific medical knowledge and aptitudes (including diagnostic tools, interventions); systematic use of environmental factors according to the ICF-model. Proof of efficacy in prevention, therapy and rehabilitation.

Intensive development in science and different technologies changed peoples motive for using natural healing factor, which affect on conception of changing spaes and climate locations. From former dominant medical institutions and centres so-called spaes, became places for collective holiday and recoverment in which natural healing factors are firstly using for prevent purpose.

The basis of balneology in Euro-mediterranean countries, makes use of natural healing factors that may be the spa, sea and climate. Spas and Health Resorts are integrated in the Health Care System by out-patient and in-patient treatments mainly in prevention and rehabilitation programs. Balneotherapy concept of changing bad imposed and acquired habits that endanger psychophysical balance and are the basis of the concept of "healthy life", making a broad movement of health prevention.

For the patients with chronic low back pain, patients with ankylosing spondylitis, osteoarthritis of the knees and hands, fibromyalgia, and Rheumatoid arthritis, balneotherapy plus physical therapy is more effective, compared to physical therapy alone. Mineral water or mud treatments had better and longer improvements in pain, function, quality of life, clinical parameters, and others in some rheumatologic diseases (knee and hand OA, chronic LBP, RA, and OP) compared to baseline and non-mineral similar treatments.

Conclusions: The available data suggest that Balneotherapy may be truly associated with improvement in several rheumatological diseases. However, existing research is not sufficiently strong to draw firm conclusions.

Keywords: Balneotherapy, Rehabilitation, Euro-Mediterranean Countries

SP201

INFRARED THERMOGRAPHY AS AN ADJUNCT DIAGNOSTIC AND FOLLOW UP TOOL IN PHYSICAL MEDICINE AND REHABILITATION**Milica Lazovic, Tamara Filipovic**

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Infrared Thermography (IRT) is a safe, non-invasive and precise additional diagnostic method, which, by detecting infrared rays emitted from the body surface, enables visualization and quantification of skin temperature changes caused by abnormalities in the surface blood flow of diseased areas.

Thermographic determination of regional changes in skin temperature values contributes to the diagnosis and objective assessment of diseases, which directly or indirectly affect the vascular tone of the microcirculation, which is regulated by the autonomic nervous system. Heat transfer to the skin from deep tissues is controlled by the vascular lumen, primarily the lumen of arterioles and arterovenous anastomoses, which supply blood to the venous plexus of the skin. Thus, it is possible for IRT to assess the dysfunction of the autoimmune nervous system and the vascular system.

The ability of IRT to effectively diagnose a pathological condition is defined by the degree of specific skin temperature reaction to a specific pathological process. A change in the value of the skin temperature is often the first sign of a pathological condition, so this allows the IRT to detect certain pathological conditions, before they are clinically manifested and thus fulfills the role of an early diagnostic method. IRT could be a potential new Refinement method to easily assess thermoregulation, an important metabolic parameter.

IRT provides information on neurophysiological functions, dysfunction of the vascular and musculoskeletal system, local inflammatory process, localization and degree of spread of malignant diseases. Thermographic examination of patients before and after the therapy, we obtain objective data on the effectiveness of various therapeutic procedures. These data can affect the correction of already adopted therapeutic protocols, in order to achieve a better therapeutic effect.

It should be used as a multidisciplinary assessment tool by experts from different fields. Based on the advantages of IRT as a non-invasive, non-radiating, low cost first-line detection modality, it should be applied in the field of sports medicine as a pre-scan team assessment tool. The extension of sport specific databases may further contribute to the detection of high risk athletes and help them to start early intervention.

Conclusion: IRT is used in the detection of pathological processes before they manifest clinically, localization of pathological processes not previously identified, definition of the extent of the pathological process previously diagnosed, in monitoring the course of the disease and assessing the effects of certain therapeutic procedures to select the most appropriate therapy.

9SP202

FALL AND FRACTURE PREVENTION AND GAIT TRAINING IN ACUTE REHABILITATION**Mirko Grajic^{1,2}, Emili Vasileska¹, Jelena Vukoicic¹, Vojislav Dulic²**

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Introduction. Gait and balance disorders affect 20-50% of individuals >65 yrs. Use of an assistive device for ambulation is associated with a 2.6-fold increased risk of a fall. Fear of falling can cause significant social isolation, institutionalization, and depression. Falls result in an increased incidence of disability; the presence of a disability increases fall risk. For patients in the early phase of rehabilitation after surgery, stroke or some other condition, it is vital to establish the physiological function of gait as soon as possible in accordance with the functional status, risks and possibilities. In the clinical setting, acute deconditioning refers to changes that occur within days to a few weeks of a sudden decrease in activity.

Results: Risk of fall, It depends on the general condition of the patient, his underlying disease and comorbidity, his cognitive status, neuromuscular, postural and balance control, trophic and muscular strength, proprioceptive control as well as previous functional status and ability to walk before hospitalization. Bed rest can lead to rapid deconditioning and muscle atrophy. Physical therapy can significantly improve the motor performance, a risk factor for falling. The Hendrich II Fall Risk Model (HFRM) is a scale used to evaluate the risk of patient falls. This tool was developed specifically for the risk assessment of patient falls in hospital and the scale needs only 3–5 minutes to complete. An earlier meta-analysis with meta-regression identified a focus on postural control as a crucial component of exercise to prevent falls.

Conclusion: Structured exercise interventions in acute rehabilitation is an obvious choice for fall prevention intervention because impaired muscle strength and poor postural control are known to increase the risk of falling and are amendable to change with exercise. The multiple-component programs involved exercise targeting several of the following categories: gait, balance, functional tasks, strength, flexibility and endurance.

SP203

OUR EXPERIENCE IN THE APPLICATION OF INFRARED THERMOGRAPHY IN THE DIAGNOSIS AND EVALUATION OF THE THERAPEUTIC EFFECT OF PHYSICAL AGENTS**Mirjana Kocic**

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Introduction: Chronic low back pain is a complex medical problem. The treatment should include adequately composed and conducted exercises. Many patients have fear of movement and refuse to perform any kind of exercises. Supervised and in intensity and repetition gradually added, individually designed exercise program can resolve those initial problems and have positive effect on pain reduction, increase in functionality and improvement of overall quality of life in these patients.

Objective: Evaluation of the effectiveness of the supervised individually designed exercises in the treatment of chronic low back pain.

Method: The study included 130 patients. Patients were divided in three groups. Group 1 had supervised individually designed exercises; group 2 had the same exercises program but administered without supervision or gradual increase in intensity; group 3 was a control group without prescribed exercises. Results were gathered before and after the therapy, when all of the patients completed four questionnaires: Numerical Pain Rating Scale (NPRS); WHOQOL-BREF, Oswestry Disability and Fear-Avoidance Beliefs Questionnaire.

Results: After the therapy functional improvement, as well as the improvement in overall life quality was monitored in Group 1. ODS decreased significantly from 39.80 ± 13.68 to 31.89 ± 11.57 ($p < 0.001$) and WHOQOL-BREF detected improvement in quality of life from 85.66 ± 14.55 before to 87.91 ± 13.40 after the therapy ($p < 0.001$). Fear of pain induced by physical or professional activities also decreased significantly 16 ± 34 to 13.49 ± 4.90 and 14.60 ± 11.75 to 11.66 ± 10.16 ($p < 0.001$). Results in other two groups wasn't so impressive ODS G2 (30.67 ± 18.05 before to 27.43 ± 15.83 after, $p < 0.01$), G3 (33.07 ± 13.01 before to 31.10 ± 11.73 after). WHOQOL-BREF in G2 and G3 showed no change in quality of life and FABQ monitored minimal decrease of movement Induced fear in these two control groups.

Conclusions: Supervised individually designed exercises have positive effect on pain, functionality and quality of life in patients with chronic low back pain.

SP204

INFLUENCE OF PRE-OPERATIVE PSYCHOLOGICAL FACTORS ON OUTCOMES OF TOTAL KNEE AND HIP ARTHROPLASTY DUE TO OSTEOARTHRITIS**Mirjana Kocic**

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Total knee arthroplasty (TKA) and total hip arthroplasty (THA) improve clinical and functional outcomes in most patients with end-stage osteoarthritis. However, a satisfactory outcome is not achieved in approximately 10 to 30% of patients after surgery.

Objective of this lecture is to present current knowledge related to predictive value of pre-operative psychological factors on postoperative outcomes of TKA and/or THA.

Results: A significantly larger number of studies have examined the influence of psychological factors on the outcomes of TKA than on the outcomes of THA. Numerous studies have shown that some psychological factors, whether acting individually or in association, may adversely affect the outcomes of TKA and THA.

Over the last decade, several systematic reviews have examined the influence of psychological factors on postoperative outcomes of TKA and/or THA. The reviews included heterogeneous studies with different outcomes, prognostic factors and different follow-up time, from a minimum 6 weeks to 12 months after arthroplasty. Most of the studies included in these systematic reviews did not meet the requirements for high methodological quality. One systematic review found that only preoperative pain catastrophizing and poor mental health were associated with poorer function and higher pain intensity after TKA. The other systematic reviews have shown that preoperative anxiety and depression lead to worse outcomes of TKA. Regarding association of psychological factors and THA outcomes, the results of the included studies are conflicting.

Conclusion: Higher levels of anxiety and depression were shown to be predictors of poor TKA outcomes, with the most consistent findings in the studies with the low risk of bias. Future high methodological quality studies are needed to draw firm conclusions about the influence of psychological factors on outcomes of TKA and THA.

SP205

FEASIBILITY AND EFFECTIVENESS OF PREOPERATIVE PULMONARY REHABILITATION**Natasa Mujovic**

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Due to the knowledge gained in a large number of patients worldwide, we know that the results of standard spirometry tests do not justify refusing surgical treatment. In patients with these tests, preoperative pulmonary rehabilitation (PPR) techniques in combination with destructive therapy should be performed. Over the last decade, the functional evaluation of the cardiorespiratory reserve of patients in the pre-surgical phase of lung cancer treatment has changed significantly. Not only have the limitations of ventilatory parameters changed in terms of safe resection, but methods for predicting postoperative pulmonary function and assessing operative risk have become routine. In addition, age itself is no longer a contraindication for surgical treatment. In recent years, PPR has been used as a routine part of preparation in patients with esophageal cancer.

In contrast to medication administration, functional deficits are often long-lasting and are associated with decreased survival rates, worsening symptoms, impaired quality of life, and decreased exercise capacity. Today, mortality rates in these patients are determined, not only on the basis of FEV1 scores, but also on tests showing tolerance for effort (6-minute walk test), dyspnoea symptoms (Borg Modified Scale, or Medical Research Scale (MRC)), and the nutritional status of the patient (body mass index).

The PPR program, in order to be effective and benefit from the postoperative period, should take a minimum of 5 and a maximum of 14 days in the form of 3 sessions of 45 minutes per day

PPR measures may partially amortize the expected decrease in effort tolerance after resection. In addition, symptomatic status after lung resection is successfully maintained and exacerbation of spontaneous dyspnea and stress-induced symptoms is expected.

SP206

LONG-TERM EFFECTS OF tDCS AND MOTOR TRAINING on HAND MOTOR IMPAIRMENT IN CHRONIC STROKE SURVIVORS**Nela Ilic**

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Introduction: In recent years, a growing body of evidence has been suggesting the effects of combined tDCS and motor training even in chronic stroke survivors who have hand motor impairment. The physiological substrate of this effect is considered to be the various forms of plasticity of the nervous system, above all the combination of stimulation- and practice-induced plasticity. However, the duration of beneficial therapeutic effects has not been sufficiently studied to date.

Objective: To compare the long-term effects of the successive application of anodal tDCS and motor training (MT) vs. sham tDCS and MT (control) on hand motor impairment in chronic stroke survivors.

Method: A total of 9 stroke survivors (> 9 months after stroke) was followed for a period of six months, derived from original study (RCT) which was aimed at short-term effects of anodal tDCS+MT, administered over a two-week period (10 sessions in total); anodal tDCS (2 mA) over M-1 for 20 minutes, followed by motor training for 45 min. Patients were evaluated using a modified Jebsen–Taylor Hand Function Test (mJTt), primary outcome measure, and handgrip dynamometer and upper limb Fugl–Meyer (ULFM) assessments as secondary outcomes.

Results: Comparing repeated measurements, among patients in the follow-up group, mJTt time after three months (T-3m vs. T0, decrease of 29.78 ± 19.10), as well as after six months (T-6m vs. T0, decrease of 22.43 ± 13.21) were significantly shorter compared to the initial mJTt value before treatment was started. Secondary outcome measures showed a similar trend.

Conclusions; The results of this follow-up confirmed expectations that a bi-weekly application of tDCS and motor training produces long-term effects, at least six months.

Key words: rehabilitation, transcranial direct current stimulation, occupational therapy

SP207

EXTRACORPOREAL SHOCK WAVE THERAPY: TENDINOPATHIES AND TENDON TEARS**Nikolaos Barotsis**

MSK Ultrasonographer, Research and Academic Fellow, Patras University hospital, Greece.

Extracorporeal Shock Wave Therapy (ESWT) has been extensively used to treat various musculoskeletal disorders, especially when the underlying mechanism is impaired healing. The indications of the method include tendinopathies. ESWT can be used to treat both acute and chronic conditions. It is considered a safe treatment with minor side effects, provided that the therapist is sufficiently trained and has respected the contraindications and precautions for its use. However, physicians and therapists treating patients with tendinopathies may face the dilemma to treat or to avoid treating a tendon presenting tears.

In the presentation the following issues will be addressed:

1. can a patient with tendon tears benefit from ESWT?
2. are there any complications when treating a tendinopathy associated with intra-tendinous tears?
3. what are the protocols to be followed?

Scientific evidence is relatively poor in this field. In order to achieve the best possible therapeutic outcome, it is of paramount importance to obtain an accurate diagnosis. The physical examination should ideally be complemented by imaging investigations. Musculoskeletal ultrasound presents several advantages in this regard.

ESWT is an important therapeutic tool in the treatment of patients with tendinopathy and tendon tears. The treatment protocol depends on the type of tear, its size, the secondary disorders and comorbidity. Accurate diagnosis and regular follow-up are the keys to an effective therapy.

SP208

OPTIMIZING ESWT WITH ULTRASOUND GUIDANCE.**Nikolaos Barotsis**

MSK Ultrasonographer, Research and Academic Fellow, Patras University Hospital, Greece

Guidance is mandatory for certain shock wave (SW) musculoskeletal applications, as for example the treatment of bone non-unions. Ultrasound (US) guidance is an extremely useful tool in several SW applications such as the tendinopathies and myofascial pain syndrome.

In the co-axial (inline) machines the ultrasound transducer is integrated in the shockwave (SW) generator. The concept to apply the SWs using real time imaging seems very attractive. However, the co-axial machines present certain drawbacks, among which difficulty in maneuverability, high level noise, increased cost and low-quality imaging capabilities. The indirect guidance, with a US transducer to mark the target before the application of ESWT, seems to be more advantageous.

Ultrasound imaging allows:

1. The proper patient/limb positioning so as to expose the target area in the best possible way.
2. Better understanding of pathology. Ultrasound imaging offers several diagnostic clues, allowing the therapist to optimally adapt the treatment parameters.
3. Proper timing: US imaging can effectively help to differentiate between chronic and acute phase of a musculoskeletal disorder, which is essential in the elaboration of a treatment plan.
4. Whenever pathology requires focused treatment, the use of US will ideally localize the target tissue and/or lesion.
5. US allows to accurately localize sensitive structures for a safe and efficient SW application.
6. Follow-up of the patient, especially in case of complications.

US guidance can help us to deliver an individualized SW treatment in order to minimize complications and achieve the best possible outcomes in the treatment of musculoskeletal disorders.

SP209

CREATING NEW SYSTEM OF REHABILITATION IN UKRAINE**Oleksander Vladymyrov**

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Introduction: in 2015 Ukraine was visited by Rehabilitation Advisory Team of the ISPRM with the aim to provide Technical Consultancy in order to support the development of a National Disability, Health and Rehabilitation Plan for Ukraine based on WHO GDAP Better Health for All People with Disabilities. The action plan was developed and till now is implementing in the country.

Methods: we evaluate legislative activities in Ukraine (period 2016 – 2019) on rehabilitation issues according to actions and projects recommended (<https://www.ncbi.nlm.nih.gov/pubmed/29271470>) after performing situation analysis and stakeholders dialog.

Results: during 2016-2017 new names of rehabilitation professions were included into National Classificatory of Professions: Physician of Physical and Rehabilitation Medicine (PRM), Physical Therapist (PT), Ergotherapist (ET), Assistant of Physical Therapist (APT), Assistant of Ergotherapist (AET); Directive of Cabinet of Ministers of Ukraine on Implementation of International Classification of Functioning, Disability and Health (ICF) was started the process of ICF implementation in the country; specialty “227 Physical therapy, ergotherapy” was established in knowledge area “22 Health care”. During 2018 – 2019 PRM physicians were included into Nomenclature of physician specialties (possibility of recognition of professionals inside the country); Qualification characteristics (required professional competences, educational level etc.) for PRM physician, PT, ET, APT and AET were approved; re-training of existing physicians to PRM physicians were approved by Ministry of Health of Ukraine; PT and ET specialties were fully separated and independent at Master educational level; first and second (amended) version of translation ICF in Ukrainian were developed and approved by Ministry of Health of Ukraine Order, employment positions at health care facilities were approved for all set of new rehab professions.

Conclusions: The skeleton of legislation for starting new rehabilitation system was created. Further description of rehabilitation services as well as regulatory documents for rehab professions must be created.

SP210

REQUIREMENTS FOR CLINICAL TRAINING SITES IN PHYSICAL AND REHABILITATION MEDICINE IN UKRAINE**O. Vladymyrov, N. Vladymyrova**

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Introduction. In accordance with “Conditional Recognition of Physical and Rehabilitation Medicine Curricula for Certain European Countries” adopted by the General Assembly of the Section for the Physical and Rehabilitation Medicine of the European Union of Medical Specialists (Munich, Germany, 10-11.03.2017), correspondingly to the Memorandum between the Section and the Board of Physical and Rehabilitation Medicine of the European Union of Medical Specialists and the Ministry of Health of Ukraine, signed on February 17, 2017, and on the basis of item 8 of Article 33 of the Law of Ukraine “About the Higher Education” we have proposed requirements for clinical training sites in physical and rehabilitation medicine.

Objective. To develop requirements for clinical training sites in physical and rehabilitation medicine in Ukraine.

Method. In accordance with the objectives, the placement of clinical sites in inpatient and outpatient rehabilitation departments of health care institutions, rehabilitation units of sanatoriums is proposed - regardless of ownership;

- rehabilitation assistance to patients in acute, subacute and long rehabilitation periods to be provided;

- rehabilitation services to be provided by multi-professional PRM teams consisting of: doctor, nurse, physical therapist, ergotherapist, assistant physical therapist, assistant ergotherapist, psychologist, social worker, speech and language therapists;

- the rehabilitation process should be based on the principles of the ICF to ensure the continuity of the provision of rehabilitation assistance and the rehabilitation itinerary;

- at clinical sites, the possibility (special conditions) for carrying out research work should be provided.

Results. A number of clinical sites have been set up in health care institutions of Ukraine for the training of doctors in the specialty of PRM.

Conclusions. The proposed requirements for clinical sites have been put into practice.

SP211

THE CURRICULUM AND PROGRAM OF THE COURSE OF SPECIALIZATION OF PRM DOCTORS IN UKRAINE.

O. Vladymyrov

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Introduction. In order to fulfill the order of the Ministry of Health of Ukraine No. 2332 from December 13, 2018, point 119.1, a specialization in the specialty "doctor of physical and rehabilitation medicine" was introduced into the educational system of the state, with the possibility of its acquaintance by physiotherapists, doctors of physical education, sport physicians, doctors who have completed an internship in one of the specialties of medical or pediatric specialization. Duration of specialization - 4 months.

Objective. To create a curriculum and a program of a course of specialization lasting 624 hours, which meets the European requirements of education of the PRM specialists.

Method. The program was developed according to the objectives:

Section 1. Qualification characteristics and definition of the list of professional competencies of the PRM specialist.

- 1.1. General requirements
- 1.2. List of competencies of the PRM specialist
- 1.3. The PRM specialist should know
- 1.4. The PRM specialist should be able to
- 1.5. Requirements for PRM specialist

Section 2. Requirements for the Postgraduate Professional Education Program in the specialty "PRM"

- 2.1. Curriculum
- 2.2. Requirements for the selection of personnel
- 2.3. Requirements for the educational support
- 2.4. Requirements for the material-technical support
- 2.5. Requirements for the listeners
- 2.6. Requirements for the qualification examination to the certification of the PRM specialist

Section 3. Training program of the specialization course in the specialty "PRM"References

Results. Educational program for the training of PRM physicians was established and implemented in 2019 at the Shupyk National Medical Academy of Postgraduate Education and Vinnitsa State Medical University

Conclusions. According to the developed and implemented training program, 80 doctors have been trained and received the certificate of PRM doctor".

SP212

THE IMPORTANCE OF CHOOSING THE PARAMETERS OF LASER THERAPY AND APPLICATION METHODS IN MUSCULOSKELETAL DISORDERS. HOW FAR ARE WE FROM CONSENSUS?**Olivera Ilic Stojanovic**

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Even though there are studies published during 2019, dealing with the importance of choosing laser radiation parameters, unfortunately, authors don't make a significant difference between the terms energy dose (J) and energy density (J/cm²). After many years of debate between scientists, from West to East, came to a consensus that for the effect of laser therapy is not enough to choose wavelength and energy dose of laser (J), but more relevant are power density (PD-mW/cm²) and energy density (ED-J/cm²). The energy of 2J per point can be transmitted with 2J/cm² or 30 J/cm², at the same patient on the same point, which can lead to a completely different effect. According to the last WALT (World Association of Laser Therapy) revision in 2010. dosage range recommendations of LT in musculoskeletal disorders (MSDs) were reduced. An increase in pain and/or inflammation during LT requires the reduction of location-specific dosage parameters for an additional 30-50%. In MSDs, the location of the laser probe is essential, but there was no accurate attention paid to this issue in papers methodologies. Most of the researchers from the Anglo-Saxon area state that the optimum range for PD and ED are in wide spectrum 5-30 mW/cm², and 0.01-4J/cm². It has been proved that significantly better effect is achieved by the application of daily lower doses with lower ED compared to the use of high doses, which illustrates the concept of biphasic dose-response, hormesis, and confirms the cumulative effect of photon energy.

However, recommended parameters usually are unrespected; much higher power and energy densities are applied and published studies do not indicate necessary radiation parameters or they are wrongly calculated.

Therefore, consensus on the most important parameters of LT is currently far away.

SP213

VITAMIN D STATUS AS A USEFUL TOOL FOR PATHOGENESIS AND THERAPY OF FRAILITY- TRUE OR FALSE ASSERTION FROM LITERATURE BASED EVIDENCE**Olivera Milovanovic**

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INTRODUCTION AND OBJECTIVE: Frailty, the term also known as condition of potentiating adverse events such as falls and consequently bone fracture and specific type of disability at the specific vulnerable population as it aging population. to present continuing trend of growing number of ageing population worldwide frailty is a common event in the modern medicine practice. Reducing and preventing of frailty are key postulate for medical doctor.

METHODS: Systematic search of available literature and selection of high-quality evidence was conducted in our research. Research strategy was: (("vitamin d"[MeSH Terms] OR "vitamin d"[All Fields]) AND ("frailty"[MeSH Terms] OR "frailty"[All Fields])) AND "pathogenesis"[All Fields])) AND ("therapy"[Subheading] OR "therapy"[All Fields] AND (("aging"[MeSH Terms] OR "aging"[All Fields] OR "ageing"[All Fields]) AND ("population"[MeSH Terms])).

RESULTS: Preliminary results was present through 48 research items. From this number only 18 items has special focus on frailty at aging population while rests observed some different medical point and population. Large pool of observational studies point out clear correlation between vitamin D status and muscle parametars such as contractility and strength. Anti-inflammatory role of active metabolite of vitamin D is novel explanation for their role in frailty. There is interesting observation which present research debate about if low level of vitamin D cause frailty or if frailty development cause hypovitaminosis D, up to now this question was not determinate. According to available evidence additional factor which increase probability of frailty is sarcopenia. Literature gap present insufficient data in form of clinical studies for vitamin D supplementation use at frailty prevention in contrast of number of intervention study about this supplementation effect on muscle performants and bone fractures.

CONCLUSION: Vitamin D status is a very important marker for frailty at the aged population but additional clinical research on molecular level can precise way of their role in this field.

SP214

DIFFERENCE BETWEEN SUBJECTS IN THE EARLY CHRONIC PHASE OF LOW BACK PAIN WITH AND WITHOUT NEUROPATHIC COMPONENT: AN OBSERVATIONAL CROSS-SECTIONAL STUDY**Olivera Djordjevic**

Neurorehabilitation Rehabilitation Clinic "Dr Miroslav Zotovic, Belgrade, Serbia

INTRODUCTION: Neuropathic pain in early chronic low back pain is not recognized and is undertreated.**OBJECTIVE:** To establish if there is a difference among chronic low back pain subjects with and without neuropathic pain and healthy subjects, in clinical characteristics, and the level of trunk muscle activation.**METHOD:** In this cross-sectional study, 33 subjects in the early chronic phase of low back pain and 26 healthy subjects were included. Clinical characteristics and relative thickness change of lumbar multifidus and transversal abdominal muscle, measured by ultrasound, in neuropathic, non-neuropathic chronic low back pain and healthy subjects were analyzed.**RESULTS:** Chronic low back pain subjects with neuropathic pain reported higher level of pain on Visual Analog Scale (VAS) (back pain $P=0.016$, leg pain $P=0.006$), had higher Oswestry Disability Score ($P=0.029$), had lower motor ($P=0.001$) and sensory leg scores ($P=0.000$), and decreased level of activation of transversal abdominal muscle ($P=0.000$) comparing to chronic low back pain group without neuropathic pain. Low back pain subjects with leg pain \geq five on VAS were 11.2 times more prone to develop neuropathic pain. The motor leg scores \leq 47 increases this chance 35 times. The sensory leg scores \leq 25 increases this chance 14 times. Reduced activation of transversal abdominal muscle for 40-50% increases this chance 7-24 times.**CONCLUSIONS:** Chronic low back pain subjects with neuropathic pain were more painful and disabled, had a lower motor and sensory scores, and lower relative thickness change of transversal abdominal muscle comparing to the low back pain group without neuropathic pain. Self-reported leg pain intensity of 5 or more on VAS, motor score of 47 and less, sensory scores of 25 and less, and diminished activation of transversal abdominal muscle significantly increase the chance that chronic low back pain subject has a neuropathic component of pain

SP215

STRENGTHENING PRM IN THE HEALTH CARE SYSTEMS: LESSONS FROM PRACTICE**Paolo Boldrini**

Private Practice Italian Society of Physical and Rehabilitation Medicine, Ferrara Italy

A 2-hours workshop is proposed to explore how different models and approaches to care delivery in PRM could impact -and could be influenced by - the health care system and the general level of health of a population. After an introduction on the role of rehabilitation in the health care systems, some practical experiences of the organization of rehabilitation services along the continuum of care will be presented; the last presentation will focus on some specific areas or activities in PRM practice and their impact on the healthcare system.

The workshop may be of interest to clinicians, policy makers and administrators

Chairpersons: N.Christodoulou, P.Boldrini, M.Zampolini

G.Stucki: Strengthening PRM in European Health Care Systems in response to WHO's call for action 2030

I.Treger: Addressing the issue of continuity of care: programs and algorithms for early management and appropriate transfer from acute to rehabilitation settings

D.Popa: Rehabilitation Teamwork: a European experience

A.Scheel: Implementing Quality Management for Rehabilitation at the National Level: SCI in Switzerland as a case in point

P.Cantista: Organization of a Rehabilitation Hospital: lessons from practice

G.Pestelli: Community Based Inclusive Development: a matter for low resource countries?

R.Casale: The societal burden of disabling chronic pain: a PRM perspective

M.Zampolini: Narrative medicine in PRM: impact on the organization of services

P.Boldrini: The role of Consensus Conferences in Rehabilitation and their impact on the health system: Italian experiences

SP216

REHABILITATION INTERVENTIONS IN THE PATIENT WITH OBESITY**Paolo Capodaglio**

Rehabilitation Unit, Physiotherapy and Research Laboratory i "S. Giuseppe" Hospital, Istituto Auxologico Italiano IRCCS, Oggebbioitaly

Given the rates of persons with disabilities or postacute conditions who are also obese, it appears of importance for PRM specialists to familiarize with principles in Rehabilitation of Metabolic conditions. Obesity is a chronic condition often associated with multiple comorbidities which can have disabling consequences. Most research on obesity treatment has focused on life-style modification, pharmacological treatment and on bariatric surgery. Unfortunately, being severe obesity chronic and disabling, such "weight centered" approach has excluded those patients with advanced disease stage (with established/end stage organ damage, significant/severe psychopathology and functional limitations), who are either poor candidates for surgery or in whom weight loss alone (especially in sarcopenic obesity) is unlikely to significantly reverse quality of life reduction and disability. If advanced-stage obesity represents a disabling disease in a multi dimensional perspective, therefore a multidisciplinary and integrated rehabilitative approach is required. According to current guidelines, the management of severe obesity in a rehabilitative setting should be multidisciplinary and characterized by the integration of nutritional, physical/functional rehabilitation, psycho-educational, and rehabilitative nursing interventions in relation to the clinical complexity of obesity. The intensity of the rehabilitative interventions should depend on the level of severity and comorbidities, frailty of the psychic status, degree of disability and quality of life of the patient. The rehabilitative setting must be structurally adequate to the needs of patients with excess of body mass with availability of bariatric lifting and transferring aids. The existing recommendations in Rehabilitation of patients with obesity will be revised and the current advances in guide lines development according to the GRADE method and WHO recommendations will be presented.

SP217

CORRECTION OF FIRST CERVICAL VERTEBRA (ATLAS) IN HEADACHES AND VERTIGO**Peter Dinich MD. Ms. DC., USA**

The first cervical vertebra (Atlas), together with occiput and second cervical vertebra (Axis), is located in the area of the ultimate importance for the function of the entire body. This area of the brain (pons and medulla) carries nuclei of 12 cranial nerves which controls not only sensory nerves (I – VIII cranial nerves), organ functions (through X cranial nerve – vagus), but also it controls: breathing, blood pressure and heart rate. Through Atlas is passing vertebral artery which supplies 40% of the blood supply to this area of the brain. Atlas is also in direct contact with 1st and 2nd cervical (spinal) nerves, which are giving innervation to the four muscles around the foramen magnum and muscles of the head. Subluxation of the Atlas together with occiput and Axis is creating pressure on the vertebral artery (compromise blood supply to the brain), between others the VIII cranial nerve (responsible for the vertigo) and with this create ischemia which can contribute to the headaches (migraine, tension or cluster headaches). Pressure on the 1st and 2nd cervical nerves can create spasm of the four muscles in the occipital area which contribute to so called “occipital headaches”. Subluxation of the atlas is not more than 3mm in the frontal plane (Atlas is moving up on the occiput) and 1-3 degrees of rotation around the Axis (horizontal plane). This all can be diagnosed by the X-ray of the neck (two standard films of the cervical spine) and one through the Atlas (X-ray with the open mouth). Atlas Orthogonal technique (from Dr Roy Sweat, Atlanta – USA), diagnose the subluxation of the Atlas (misalignment of Atlas -Occiput- Axis complex), using: anamneses, palpation (scanning), leg -cheq (leg length inequality) and X-ray (as a golden standard in this technique). Using the precise calculation based on the X-ray analyses and given formula we come up with resulting vector which will correct misalignment of the Atlas and “put head straight on the neck”. Using the precise calculation and percussion adjusting instrument which create gentle adjustment of the Atlas while patient is laying on the side we can correct subluxation of the upper cervical area with no force – patient head is not moved and he literally do not feel anything at all. As the Atlas is restored to normal, the body can assume its natural posture, and the distortions, along with the various symptoms, headaches and /or vertigo, may be eliminated. It is important to know that not all patients with headaches and/or vertigo have displaced Atlas. Although, there are several techniques for the adjustment of the Atlas, the correction of the Atlas because of the vital importance of this area, must be made only by license practitioner.

SP218

IMAGING MODALITIES OF OCCULT SPINAL DYSRAPHISAM IN INFANTS AND YOUNG CHILDREN: HOW,WHEN AND WHY**Polina Pavicevic**

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Occult spinal dysraphism refers to a heterogenous group of disorders in which the neural tissue lies deep to an intact skin cover, and tend to be overlooked at birth. The manifestations become apparent later in life due to either cutaneous stigmata or slowly progressing neurological signs. Imaging is essential to diagnose and characterize these lesions. The purpose of this article is to review the MR and US findings in various conditions which have been classified under occult spinal dysraphism. Advances in ultrasonography and MRI have considerably improved the diagnosis and treatment of OSD both before and after birth. Ultrasonography is the first technique in the morphological study of the neonates, and it often makes it possible to detect or suspect OSD. MRI is a complementary technique that makes it possible to clear up uncertain ultrasonographic findings and to detect associated anomalies that might go undetected at ultrasonography. The ability of MRI to detect complex anomalies that affect different organs has been widely reported, and it can be undertaken whenever OSD is suspected.

We describe the normal appearance of neonatal neural tube on US and MRI, and we discuss the most common anomalies involving the structures and the role of imaging modalities in their assessment.

SP219

ELECTRICAL STIMULATION IN PERIPHERAL NERVE LESIONS PATIENTS**Primož Novak**

Dep. for rehabilitation after polytrauma, peripheral nerve le University rehabilitation institute, Ljubljana Republic of Slovenia

In peripheral nerve lesions patients, electrical stimulation (ES) is often used to enhance the rehabilitation process and improve the outcome. A literature review on this topic is presented. Transcutaneous low frequency neuromuscular ES is used for stimulation of a) injured peripheral nerve to improve axon regeneration and/or b) denervated muscle to improve muscle performance.

a) Peripheral nerves regenerate after injury, but functional recovery is often insufficient. After injury, short-time expression of growth-associated genes appears, causing rapid upregulation of neurotrophic factors and their receptors in motoneurons and in Schwann cells. Unfortunately, this upregulation is only brief, lasting up to one month. Short time low-frequency ES of peripheral nerve increases expression of these neurotrophic factors and other growth-associated genes that promotes axon outgrowth across injury sites and consequently enhances nerve regeneration and muscle reinnervation.

b) Low-frequency ES can also be effective in direct stimulation of denervated muscle to improve muscle performance and enhance recovery after nerve injury in animal models. The mechanism is still unknown, but ES may increase axon outgrowth at the site of injury and consequently promote earlier functional reinnervation of target muscle. However, because of very high muscle cell capacitance, stronger, often unpleasant and painful stimulation is needed.

ES reduces collateral sprouting, and could consequently impair the process of reinnervation. However, an animal model study showed that the contribution of terminal sprouting to overall reinnervation is only minor and may not be so clinically important for functional outcome.

Beside positive results of studies on animal models, potential for clinical use has been demonstrated in few studies on patients with compressive neuropathy and digital nerve laceration. In addition to use in compressive neuropathies, electrical stimulation could also be useful in other demyelinating conditions such as Guillain–Barre syndrome and critical illness disease. More research is needed in this field.

SP220

THE ROLE OF PHYSICAL MEDICINE AND REHABILITATION SPECIALISTS IN THE REHABILITATION OF PARALYMPIC ATHLETES**Rade Babovic**

Spinal cord injury Clinic for rehabilitation "Dr Miroslav Zotovic", Belgrade, Serbia

In the course of their day-to-day work with patients who display various functional deficits caused by illness or injury, physical medicine and rehabilitation specialists have the resources and the know-how enabling them to contribute in the best way possible to working with Paralympic athletes.

Physical medicine and rehabilitation specialists have the most in-depth knowledge of disability issues, from the basic problems related to everyday life activities and transfers to the complications to which certain injuries can lead (bedsores, autonomic dysreflexia, bladder and bowel management issues and the like). Historically, people with spinal cord injuries have become a fundamental part of the evolution of sporting activities of persons with disabilities as well as the Paralympic movement. They play the central role in our understanding of the influence of physical activity and exercise on the lives of the disabled and provide a way of including this segment of the population into the everyday activities aimed at maintaining a healthy lifestyle and getting actively involved in sports.

A multidisciplinary approach and treatment of different pathological conditions that each in their own way make the involvement in regular sports-related activities difficult help physical medicine specialists to respond to big challenges by finding optimum solutions.

Key words: physical medicine and rehabilitation specialists, rehabilitation, Paralympic sport



SP221

THE TREATMENT GAP IN OSTEOPOROSIS: A MEDICAL AND ETHICAL CONCERN

Radmila Matijevic

Osteoporosis is characterized by reduced bone mass and strength, which increases the risk of fragility fractures, which in turn, represent the main consequence of the disease. It constitutes a major public health problem, through its association with age-related fractures, particularly of the hip, vertebrae, distal forearm, and humerus. During past decades, it has progress from being considered as an unavoidable consequence of ageing, to being acknowledged as a significant and highly treatable disease. Despite a number of advances, particularly in the diagnosis of osteoporosis, the assessment of fracture risk, the development of interventions that reduce the risk of fractures, and the production of practice guidelines, many surveys indicate that a minority of men and women at high fracture risk actually receive treatment. In the absence of implementation of an evidence-based, multidisciplinary, system-wide, global response, osteoporosis and the fragility fractures it causes will impose a catastrophic burden on our older people, their families and carers, and our health and social care systems. A few strategies could help preventing this. First, closing the secondary fracture prevention care gap by the international development of fracture liaison services to better identify patients who have had a fragility fracture. Integration of bone health and falls risk assessments into the management of individuals who take medication which have adverse effects on bone must become standard practice. Also, individuals who are diagnosed with diseases which feature osteoporosis as a common comorbidity need to receive care that will reduce their fracture risk. When the needs of these obviously high risk groups have been addressed, attention should be turn to development of cost-effective strategies to prevent the first major osteoporotic fracture by the international development of fracture liaison services to better identify patients who have had a fragility fracture. Public awareness of osteoporosis need to be increased dramatically throughout the world.

SP222

CURRENT CHALLENGES IN THE TREATMENT OF OSTEOPOROSIS - CLINICAL IMPLICATIONS**Radisa Pavlovic**

Clinical Pharmacy University of Kragujevac, Faculty of Medical Sciences, Kragujevac Serbia Serbia

Introduction: The definition of optimal treatment of osteoporosis is still controversial. Main concerns remain on how long these drugs can be used safely. Bisphosphonates have prolonged residence in the bone and persistent, but waning antiresorptive effect. The incidence of rare side effects is increasing with long-term therapy. Denosumab demonstrated a continuing increase in BMD, a low fracture incidence and low rates of bone-related adverse events. Furthermore, the impact of the treatment discontinuation on the bone marrow density and fracture risk is not clear. A similar standpoint can be applied to other groups of medications.

Objective: The primary objective was to identify inconsistencies in the treatment of osteoporosis.

Method: We have reviewed literature data on current practice in the treatment of osteoporosis.

Results: Bisphosphonates side effects are associated with treatment duration. The incidence of the osteonecrosis of the jaw is increasing with an inflection point of 4 years and atypical femoral fracture in every 5 years. Some authors suggest that a patient who has taken an oral bisphosphonate for 5 years or an intravenous therapy for 3 years should automatically stop bisphosphonate, while others do not agree. The treatment is associated with 40–70% reductions in vertebral fractures and 40–50% reductions in hip fractures while the treatment with denosumab is associated with a 68% reduction in vertebral fractures and a 40% reduction in hip fractures with an increased risk of multiple vertebral fractures after discontinuation. After 5 years of denosumab treatment, many patients are taken off the drug although denosumab treatment for up to 10 years was associated with low rates of adverse events.

Conclusions: It is more likely that side effects are more important limitations than a lack of efficacy both contributing to substantial under-treatment of patients. Future researches are needed to determine the appropriate length of administration.

SP223

AGING AND CEREBRAL PALSY**Radulovic D, Boskovic Mirjana, Ostojic S, Djuricic Z**

Special Hospital for Cerebral Palsy and Developmental Neurology, Belgrade

Advances in medical care allow individuals with long life disabilities such as cerebral palsy, to live further into adulthood than ever before.

Aging-related physiological changes occur earlier in adults with CP. The prevalence of aging-related conditions such as osteoporosis, fatigue, musculoskeletal and joint problems as well as the prevalence of chronic non-communicable disease and mental health disorder is higher and well documented in adults with CP compared with those without CP.

Physicians and care providers should be aware of all these possible complications during aging in adults with CP. Their health and social care means accessing the service, regular monitoring by multidisciplinary team, identifying the personal and physical barriers to achieve their participation, functional independence and better quality of life.

Adults with CP face many difficulties including accessing to adult health care, education, vocational training, independent living. They often have lower rates of employment or secondary education, less participation in social activities and fewer close relationships with their friends.

The lecture will be focused on common complications and comorbidities in adults with cerebral palsy. For the most part we will concentrate on osteoporosis, pain and mental health disorders. Documented recommendations for early identification and treatment of these problems will be presented. The physical fitness and exercises have been detected as common denominator in treatment and process of rehabilitation.

Considering these issues our experiences of treating adult patients in Day Hospital for cerebral palsy in Belgrade will be presented as well.

Key words: adults, cerebral palsy, osteoporosis, mental health, physical activity, pain

SP224

THE ASSESSEMENT OF THEORETICAL KNOWLEDGE THROUGH AN MCQ-BASED EXAMINATION**Rolf Frischknecht**

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The use of Multiple-Choice Questions (MCQs) is a well-established and widely used method for graduate and postgraduate medical written assessments.

MCQ examinations are considered as objective and fair as candidates are not exposed to judgement biases (gender, race, language accents, physical appearance, social class considerations etc.). They are easy to rate even with a high number of participants and easy to manage at different locations at the same time.

MCQ examinations are considered as reliable and valid for the written assessment of medical specialists if they are carefully constructed on the basis of an appropriate syllabus and using well designed MCQs. The examination must explore all fields of the specialty and the frequency distribution of the topics of the questions must respect the relative importance of the different fields of the specialty.

MCQs can test a variety of abilities from basic knowledge recall to the evaluation of complex clinical situations and complex clinical decision making. It is recommended to avoid simple knowledge recall questions and to prefer MCQs which test the candidate's ability to apply knowledge, to analyze clinical situations and take appropriate decisions in complex clinical situations. However, the making of such MCQs is time consuming and requires skilled MCQ developers.

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SP225

HOW MUCH IS ENOUGH? CURRENT RECOMMENDATIONS FOR PHYSICAL ACTIVITY FITT OR HIIT? DOES MODE OF PHYSICAL ACTIVITY MATTER?**Sanja Mazic**

Institute of Medical Physiology School of Medicine, Belgrade, Serbia

The results of many scientific studies have proven that physical activity and exercise have a positive effect on health, disease prevention and they contribute to the treatment of most chronic non-communicable diseases. That is why physical activity and exercise are considered as modern Grail for health, polypill that can prevent, cure and improve outcome of many diseases. For ease of planning exercise program, acronym FITT is used. These are initial letters from the words Frequency, Intensity, Time and Type of physical activity. Recommendations for healthy people between the age of 18 and 65 are: 150 minutes of physical activity per week, preferably five times a week, 30 minutes each, continuous activity of moderate intensity that is involving large muscle groups. Unfortunately, the prevalence of physical inactivity is higher than that of all other modifiable risk factors. The reasons for not engaging in regular physical activity are complex and numerous, but "lack of time" remains one of the most commonly cited barriers. That is one of main reasons that more time-efficient, yet equally effective exercise strategies are recently use for general population. HITT training, which is acronym for High Intensity Interval Training is used from the very beginning of 20th century in the population of runners and very often for military personnel. Main principle is alternates of brief speed and recovery intervals, where high intensity part is done at 80-95% of maximal aerobic capacity. For comparison, on a scale of 0-10, most endurance workouts are performed at exertion level of 5-6, whereas , high-intensity intervals are done at an exertion level of 7 or higher, and are typically sustained for 30 seconds to 3 minutes, although they can be as short as 8-10 seconds or as long as 5 minutes. Recovery intervals are equal to or longer than the speed intervals.

SP226

PRINCIPLES OF MAINTAINING ACUTE REHABILITATION AFTER CRITICAL DISEASE**Sanja Tomanovic Vujadinovic**

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Patients hospitalized for an acute illness or trauma are at risk of a significant loss of functioning. Especially, the risk is increased in critically ill patients and in patients with comorbidities. Critically ill patients requiring mechanical ventilation are frequently subjected to long periods of physical inactivity, leading to skeletal muscle atrophy and muscle weakness. Common to all hospitalized patients are complications like thrombosis, ulcer and hospital infection. These ICU-acquired complications are associated with longer duration of mechanical ventilation, prolonged ICU and hospital stays, and poorer functional status at hospital discharge. Similarly, there is growing evidence that continuous mandatory ventilation alters diaphragmatic structure and contractile function and promotes oxidative injury, resulting in a rapid-onset diaphragmatic atrophy and weakness, which most likely delays discontinuing mechanical ventilation. Physical rehabilitation, when started at the onset of mechanical ventilation, has been associated with shorter periods of mechanical ventilation, decreased ICU and hospital stay, and improved physical function at hospital discharge. This review summarizes the impact of both physical inactivity and mechanical ventilation on skeletal and diaphragmatic muscles structure and function. Also reviewed is the growing evidence demonstrating the feasibility and safety of early physical rehabilitation interventions for mechanically ventilated patients, as well as their benefit on patient outcomes. Key words: physical therapy; mechanical ventilation; muscle weakness; ICU

Patients hospitalized for an acute illness or trauma are at risk of a significant loss of functioning. Especially, the risk is increased in critically ill patients and in patients with comorbidities. Critically ill patients requiring mechanical ventilation are frequently subjected to long periods of physical inactivity, leading to skeletal muscle atrophy and muscle weakness. Common to all hospitalized patients are complications like thrombosis, ulcer and hospital infection. These ICU-acquired complications are associated with longer duration of mechanical ventilation, prolonged ICU and hospital stays, and poorer functional status at hospital discharge.

Similarly, there is growing evidence that continuous mandatory ventilation alters diaphragmatic structure and contractile function and promotes oxidative injury, resulting in a rapid-onset diaphragmatic atrophy and weakness, which most likely delays discontinuing mechanical ventilation. If physical rehabilitation started at the onset of mechanical ventilation, has been associated with shorter periods of mechanical ventilation, decreased ICU and hospital stay, and improved physical function at hospital discharge.

This review summarizes the impact of both physical inactivity and mechanical ventilation on skeletal and diaphragmatic muscles structure and function. Also reviewed is the growing evidence demonstrating the feasibility and safety of early physical rehabilitation interventions for mechanically ventilated patients, as well as their benefit on patient outcomes.

Key words: physical therapy; mechanical ventilation; muscle weakness; ICU\

SP227

WOMEN AND NEUROREHABILITATION**Sara Laxe**

Brain Injury Specialist, Physical Medicine & Rehabilitation, Spain

Gender perspective studies are capturing the attention of different organizations worldwide. In the field of Medicine, there has been a growing body of research in this area. On one hand there is a professional perspective that includes the study of the awareness of differences in the practice of female doctors versus male doctors: communication strategies, gender payment gap, ceiling glass in the access of leadership positions, difficulties in finding mentoring... On the other hand, the perspective of the female patients: one of the leading causes of disability in women: stroke - research has shown that women are less likely to receive rehabilitation, to access rehabilitation services later than men and have more disability than men. But also there are some conditions that can lead to a decrease of functioning: maternity or menopause, or some conditions that are typically suffered from women such as breast cancer or chronic pain. Needless is to say that still most of the pharmacological trials are developed male rat models, ignoring the hormonal variations that women face across their life span.

This session aims to bring awareness of the need of focusing in the specific needs of women in PRM, not only as patients but also as professionals, in order to provide a better, tailored care and equality.

SP228

LABS' SESSION - THE EFFECTS OF FUNCTIONAL ELECTRICAL STIMULATION CYCLING AND EXERCISE TRAINING ON FUNCTIONAL OUTCOMES IN PERSONS WITH MULTIPLE SCLEROSIS**Sindi Rodic**

Neurorehabilitation Clinic for rehabilitation "Dr Miroslav Zotovic"; School of Medicine, University, Belgrade, Serbia

Introduction: Multiple sclerosis (MS) is associated with a progressive decline in functionality. Exercise training (ET) is one approach for improving physiological deconditioning and restoring walking performance in persons with MS (pwMS). Few studies have shown beneficial effects of Functional Electric Stimulation (FES) cycling on muscular strength, spasticity, walking endurance, and speed in pwMS.

Objective: To examine the effects of combining FES Cycling and ET on strength and spasticity of stimulated muscles, speed, balance, fatigue, and depression in pwMS

Method: Fourteen patients diagnosed with MS and The Expanded Disability Status Scale (EDSS) score of 2-6.5, were consecutively admitted to inpatient rehabilitation at the Clinic for rehabilitation "dr Miroslav Zotović" in Belgrade. All patients received four weeks of daily ET in combination with FES cycling (20min). Functional outcome measures were: The Timed 25 Foot Walk (T25FW), Manual Muscle Test (MMT), Modified Ashworth Scale (MAS), Berg Balance Scale (BBS). The patient-reported outcome measures were: The Multiple Sclerosis Spasticity Scale 88 (MSSS88), Beck Depression Inventory Scale (BDI), and Fatigue Severity Scale (FSS). Data were collected before and after four weeks of treatment.

Results: The study participants included 9 men (57.1%) and 6 women (42.9%). The mean (\pm standard deviation) age of the patients was 43.36 ± 7.82 years. The median EDSS 4.5 (2.5-6.5). Disease duration the median 11.00 (3-21). After the therapy, statistically significant improvement was found in all outcome measurements: MAS ($p < 0.05$); MMT ($p < 0.05$); BI ($p = 0.04$); T25FW ($p = 0.002$); BBS ($p = 0.000$); FSS ($p = 0.003$); MSSS88 ($p = 0.009$).

Conclusions: All pwMS well-tolerated combination ET and FES cycling and encouraging improvements have shown in all measured functional outcomes



SP229

PAIN MECHANISMS AND RHEUMATOID ARTHRITIS

Snezana Tomasevic-Todorovic¹, Tijana Spasojevic¹, Enis Garipi¹, Aleksandar Knezevic¹, Ksenija Boskovic¹, Branislav Bobic²

Medical faculty, University of Novi Sad, Medical Rehabilitation Clinic, Clinical Centre of Vojvodina, Serbia¹

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Pain remains a major problem in one-third of patients with rheumatoid arthritis (RA), despite advances in treatments that suppress inflammation. Pain in RA is the result of a complex interactions of sensory, affective and cognitive processes that involve numerous abnormal cellular mechanisms at the affected joints and different levels of the nervous system involved in the pathophysiological mechanisms of the chronic pain onset. Inflammatory mediators, such as cytokines, may provoke central pain sensitization, and both local and systemic inflammation may contribute to central pain augmentation in RA. After a peripheral lesion or inflammation, the painful impulse is transmitted by neurons to the spinal cord, where microglia and then astrocytes are activated first. As a consequence they change in number and size. Finally the expression of molecules on their surface enhances and leads to an increased amount of the type of mediators they release (process known as central sensitization). After the onset of painful stimulation, microglia are activated and then secrete signaling molecules, the most important of which are TNF- α and interleukin 18 (IL-18). TNF- α causes phosphorylation of JNK (c-Jun N-terminal kinases) enzymes in astrocytes and affects the biosynthesis of proinflammatory cytokines at the transcriptional and translational levels. IL18, released by microglia, activates a specific receptor in astrocytes, which further leads to the activation of the nuclear factor κ B (transcription factor NF- κ B).

Pain processing by the central nervous system can maintain and augment RA pain and is a promising target for future treatments. Knowledge of the gene's contribution to the risk of chronic pain occurrence, as well as an inadequate response to analgesics would contribute to the planning of adequate pain therapy. A better understanding of the pathophysiological mechanisms of the onset of pain, a biomarker in RA, would open up new therapeutic options.

Key words: pain, rheumatoid arthritis, sensitization

SP230

MOTOR RECOVERY IN TBI CHILDREN - EXPERIENCE FROM CLINICAL WORK**Srbislav Stevanovic**

Child rehabilitation Clinic for rehabilitation "Miroslav Zotovic", Belgrade, Serbia

Introduction: Craniocerebral injuries of children is a significant health problem. It is shown that degree of motor recovery increase with increasing period of accident and injury, indicating that rehabilitation procedures as well as social and family environment are a more important recovery factor than the trauma itself.

Objective: the aim of this paper was to present our experience in rehabilitation of children with TBI.

Methods: motor recovery parameters were represented by the neurofunctional status and the degree of mobility. Intracranial hemorrhage, skull and skeletal bone fractures, visual disturbances, agitation and subdural or epidural hematomas were considered as complications of potentially significant influence on motor recovery. The cross-section functional evaluation was made at the reception, discharge from the first and last stationary rehabilitation.

Results: a total of 84 patients were treated for a 10 years period.. The average age of our patients was 10.5 years. The average duration of acute treatment was 5.2 months, duration of the first hospitalization in our clinic was 3.2 months, and the total time spent on stationary rehabilitation with interruptions was up to 9 years. The highest percentage of these complications was in children of age between 11 to 15.

Conclusion: our results showed a good motor recovery. Residual neuropsychological deficits still represent a reason for prolonged adaptation to everyday life activities.

Keywords: motor recovery, traumatic brain injury, children, rehabilitation

SP231

**SHORT-WAVE DIATHERMY FOR THE TREATMENT OF MUSCULOSKELETAL DISORDERS.
A PRELIMINARY REPORT****Stefano Masiero**

Rehabilitation Unit, Department of Neuroscience, General Hos University of Padova- General Hospital of Padova, Padova, Italy

Introduction: Musculoskeletal disorders are the most common cause of pain and functional limitation in the general population. Shortwave diathermy (SWD) is one of deep heat widely applied to alleviate the symptoms associated with these conditions. Different types of waves can be used in diathermy but the real efficacy in the treatment of musculoskeletal disorders has not yet been clarified.

Objective: Main aim of this observational study is to evaluate pain reduction in people with musculoskeletal disorders using continuous SWD; secondary expected outcome is the impact on quality of life.

Methods: 59 participants (average year was $54,9 \pm 8.41$ years) were enrolled. Inclusion criteria were pain lasting more than 15 days, pain Visual Analog Scale (VAS) score higher than 50/100 mm and a diagnosis of osteoarthritis, neck/back pain or tendinopathies. All participants underwent 10 sessions of percutaneous SWD, 3 times/week by ProNexibus Plus-FocusMed®. Each session lasted 20 minutes, with frequencies of 4 or 8 MHz (power 40 W and 60 Watt). All participants were blindly evaluated 1 week before (T0) and 4 weeks after last session (T1). Primary outcome was pain reduction, evaluated by Short Form McGill Pain Questionnaire, which includes VAS and the Present Pain Intensity (PPI) and use of pain medications. Secondary outcome was the improvement in social and work-related activity limitations by two items of Short Form-12.

Results: After treatment VAS and PPI improved significantly ($p < 0.01$). Regarding secondary outcomes, a significant reduction was found in limitations due to pain both in work-related activities ($P < 0.000$), and also in non-work-related activities ($p = 0.000$); use of pain medications was reduced at T1 in comparison with T0 ($p = 0.003$).

Conclusions: The results of our study confirm that SWD is effective, improves pain, function and quality of life in people with musculoskeletal disorders.

SP232

RESPONSE OF MATRIX METALLOPROTEINASE-9 TO EXERCISE IN OSTEOPOROTIC FEMALE PATIENTS AND THEIR POTENTIAL CLINICAL UTILITY**Tamara Filipovic^{1,2}, Milica Lazovic^{1,2}, Kristina Gopčević^{2,3}, Marija Hrkovic¹, Ivana Gajic¹, Ana Backovic⁴**Institute for rehabilitation Belgrade¹, School of medicine, University of Belgrade², Institute of Chemistry in Medicine³, Belgrade, Serbia, Turvallaboratory srl, Udine, Italy⁴

Aim: The aim of this study was to evaluate the effectiveness of 3 months exercise program on enzyme activity of serum matrix metalloproteinase-9 (MMP-9) and functional outcomes in postmenopausal female patients with diagnosed osteoporosis.

Methods: The eligible, consecutively recruited participants were randomly assigned in two groups by using the "numbered envelopes" method. In total, 40 patients in Exercise group (EG) had 3 months supervised exercise program, while 28 patients from control group (CG) didn't take part in any exercise program during the intervention. Gelatin zymography was used to detect enzyme activity of serum MMP-9 in both groups, while functional outcomes were determined by "Time Up and Go" test (TUG), "Sit To Stand" test (STS) and "One Leg Stance Test" (OLST), respectively. All measurements were assessed at baseline and 3 months after treatment.

Results: There was statistically significant improvement in all observed measurements in EG after three months. Significant differences between pretreatment and posttreatment enzyme activity of serum MMP-9 ($p=0.024$), as well as MMP-9% ($p\leq 0.001$) were detected in exercise group compared with those in control group (MMP-9 $p=0.309$, MMP-9%, $p=0.927$). A comparison of baseline values of MMP-9 and MMP9% between groups showed non-significant difference ($p=0.247$ and $p=0.204$). Functional outcomes measured by TUG and OLST showed significant improvement during 3 months in EG ($p<0.001$ for both). Values of STS were significantly improved during 3 months in both groups (EG: $p<0.001$, CG: $p=0.015$). Response of enzyme activity of serum MMP-9 to exercise and its change between baseline and 3 months after was in significant correlation with OLST ($r=-0.319$, $p=0.045$). In CG this correlation has not been observed.

Conclusion: 3 months exercise program, as an effective and easily performed method, improved functional status, while OLST correlated with changes in MMP-9 in postmenopausal osteoporotic Serbian women. Well designed exercise program should be incorporated in every day clinical practice, while MMP-9 can be considered as prognostic factor for evaluation of patients' response to exercise, due to correlation between change of MMP-9 and OLST.

Keywords: postmenopausal osteoporosis, exercise, matrix metalloproteinase-9, functional outcomes



SP233

STIFF KNEE AFTER ARTHROPLASTY

Tatjana Nožica-Radulovic

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Knee osteoarthritis is a clinical manifestation of degenerative joint disease. Total knee arthroplasty (TKA) is the gold standard in the treatment of knee osteoarthritis. Along with the increase in life expectancy and an aging population, there are increasing demands for this procedure. The goals of this surgical intervention and postoperative rehabilitation are aimed at controlling pain and swelling and improving functioning (range of motion- ROM). Stiff knee is defined as a knee whose ROM after TKA is $<70^\circ$. The appearance of stiff knees is influenced by the preoperative functional status of the knee, surgery procedure, condition on the soft tissues of the knee (fibrosis), as well as the psychological aspect of the patient in terms of expectations from surgery and postoperative rehabilitation. For normal walking function, 67° flexion is required, for climbing stairs 83° , for sitting on a chair without the aid of hands 93° , for tying shoelaces 106° . Riding a bicycle requires flexion of $100-110^\circ$ (90° with bicycle modification). A large number of preoperative factors (preoperative functional status, patient age, comorbidities, Body Mass Index (BMI), habits and lifestyle of the patient...) influence the outcome of surgery and rehabilitation, so the need for pre-operative patient preparation is emphasized in many studies. An imperative in post-operative rehabilitation for the prevention of stiff knee are early mobilization and patient-adjusted physical therapy using active and passive methods (CPM- Continuous Passive Movement). Even when the results obtained after surgery and rehabilitation are moderate, any degree of knee flexion obtained can make a significant improvement in the quality of life of our patients. Through a personalized approach to postoperative rehabilitation and rationalization of patient expectations, better functional outcomes and patient satisfaction can be expected.

Key words: total knee arthroplasty, stiff knee, rehabilitation.

SP234

REGENERATIVE REHABILITATION OPPORTUNITIES**Tonko Vlak, Ana Poljičanin, Boris Bečir**

Institute of physical medicine and rehabilitation with rheum Clinical Hospital Split, Split, Croatia

Today we are witnesses of rapid growth of new medical field in the treatment of musculoskeletal disorders. termed Regenerative Medicine. In order to promote tissue healing Regenerative Medicine uses unconventional methods such as blood based procedures like platelet rich plasma, stem cell and cell based or tissue engineering procedure. In this way by stimulating and supporting the body's own self-healing capacity it has the opportunity to become standard of care for numerous musculoskeletal disorders in near future. However, Regenerative Medicine, by itself may not be sufficient to ensure successful translation into improving the function, especially because regenerative procedures are still variable due to lack of standardization in product preparation, administration, and different treatment protocols. Nowadays evidence show that mechanical and electrical stimuli provided by rehabilitation procedures may enhance the functional efficacy of Regenerative Medicine technologies. Thus the new field Regenerative Rehabilitation has emerged in order to promote synergy between the fields of Regenerative Medicine and Rehabilitation Science. Prescription of common physical therapy interventions such as passive and active range of motion, joint mobilization, soft tissue mobilization, and exercise after application of regenerative medicine procedures may provide beneficial effects for tissue healing and functional restoration. Nevertheless, optimal rehabilitation protocols that will enhance tissue healing and regeneration still need to be elucidated.

SP235

ACUTE REHABILITATION OF PATIENTS WITH SEVERE TRAUMATIC BRAIN INJURY**Una Nedeljkovic**

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Traumatic brain injuries (TBI) are an important health issue related to high mortality and long term disability in domains of physical, cognitive, behavioural and emotional functioning. Severe traumatic brain injuries are defined by Glasgow Coma Score of ≤ 8 . Patients affected by severe TBI experience disorders of consciousness (DOC) that can last days or weeks or may become a chronic condition.

Rehabilitation of patients with severe brain injury with DOC is suggested to be incorporated in intensive care treatment in order to reduce negative impact of primary damage to the brain and its secondary complications and long-term intensive care unit treatment (ICU). Rehabilitation of patients with DOC in ICU includes various physiotherapeutic procedures ranging from passive range of motion exercises, positioning, sensory regulation and sensory stimulation, tonus reduction therapy, respiration therapy including assistance with weaning of respirator to mobilisation and interventions to achieve targeted motor skills. The multidisciplinary team should put an emphasis on recovery of consciousness and improving patient mobility. Occupational therapy should also be included in rehabilitation program in order to timely evaluate swallowing function and start with facio-oral therapy (Coombes retraining) which can improve swallowing frequency, reduce secretion and suctioning frequency. Neuropsychological treatment should also be implemented in order to establish and train communication with patients. After being discharged to acute rehabilitation ward, rehabilitation program can offer more possibilities for implementation of diverse treatment approaches.

The length of stay (LOS) of these patients in acute rehabilitation settings is not precisely determined. The patient medical stability and anticipated or actual recovery of consciousness should be primary drivers of LOS.

There is evidence that early structured acute neurorehabilitation lead to a better outcome (independence in daily living, returning to work) than delayed or unstructured neurorehabilitation.

SP236

THE IMPACT OF SMARTPHONE APPS IN REHABILITATION MEDICINE, A COMPREHENSIVE REVIEW AND ANALYSIS**Vera Madzarevic¹, Milica Lazovic^{2,3}, Dušan Đuric^{2,4}**

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Introduction: mHEALTH (mobile health) is a cost-effective innovation that can significantly improve patient outcomes while controlling health care costs and empowering patients. mHEALTH utilizes mobile wireless technologies for health purposes, and as such is a medical device (software as medical device). Applications paired with Wi-Fi or Bluetooth sensor systems are making its strides in portable cardiology systems. Nevertheless, there is limited information and reviews to strengthen the use of Apps in rehabilitation medicine.

Objectives: The purpose of this presentation is to provide an updated review regarding eHEALTH apps that are available in the area of rehabilitation medicine.

Method: An electronic search of publications (2018-2019) has been performed, as well as App stores (Android). Apps were searched used specific terms in rehabilitation medicine. Summary review of publications as well as products already in the market is provided.

Results: 254 apps classified as rehabilitation medicine are in Google play, and less than 10% are specific to rehabilitation. 49 apps were found under pain management, and only a few were dealing with pain management health strategies. There was limited data referring to effectiveness (RCT) or regulatory status as a medical device.

Conclusion: The challenges of mHEALTH are owning of a Smartphone and access to internet, the validation of apps as well as compliance to medical device regulations. Also, there is to be seen the impact on patient care, in which mHEALTH may complement health care but not replace it. There are few RCT that demonstrate the effectiveness of mHEALTH interventions. mHEALTH in rehabilitation medicine is focused on apps to support health, self-monitoring and well being. Further, numerous applications are being developed for cardiac rehabilitation, brain and spinal cord injury, musculoskeletal injury, and pain management with limited efficacy data.

SP237

THE IMPORTANCE OF EARLY DIAGNOSIS AND TREATMENT OF DIABETIC FOOT PROBLEMS IN THE PREVENTION OF AMPUTATIONS**Vesna Bokan Mirkovic**

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Introduction The recognition of symptoms of diabetic foot (DF) reduces the risk of developing ulceration and is key to preventing amputation. The economic costs of early screening and treatment of DF are lower than the cost of treating ulcers, re-ulcer and amputations. Outcomes have consistently been shown to be better when patients with a DF are cared for a multidisciplinary approach. The aim: to point out relevant DF examinations and the competence of PRM specialist in DF management. Methods Recommendations of The International Working Group on the Diabetic Foot (IWGDF) used in INNOVATIVE PROJECT: MENAGEMENT OF DIABETIC FOOT in Montenegro. **Results** Key activities: to organize an intermediate model of DF Centre; a PRM specialist is a coordinator of multidisciplinary team that includes a diabetologist or general physician, surgeon, podiatrist and / or nurse, orthotists, and physiotherapists. This DF Centre model requires good affiliation with the regional Clinical Center and Rehabilitation Centers. Key risk factors include: a loss of protective sensation (LOPS), peripheral artery disease (PAD) and foot deformity. The sensory neuropathy is assessed using the 5.07 monofilament (MF) exerting 10 grams of pressure on the foot to test sensation. Other tests might need to be performed if the patient can feel the MF, such as 128 Hz tuning fork (vibration sensation), neurotip (pain sensation) and temperature sense. Screening for PAD includes palpating for foot pulses, Ankle/Brachial and Toe/Brachial Index obtaining pedal Doppler arterial waveforms and blood pressure measurements. Bone/joint: check for deformities (e.g., claw or hammer toes), abnormally large bony prominences, or limited joint mobility. Based on the findings of the screening, patients can be stratified according to their risk for foot ulceration. Treatment: education, exercises, orthotic interventions, pharmacological treatment, physical modalities. Conclusion Following the principles of diagnosis and treatment of diabetic foot can help to decrease the risk of disability and foot complications.

SP238

IMPACT OF ACHILLES TENDON CHANGES ON FOOT LOAD ANALYSIS IN PEOPLE WITH DIABETES**Vesna Bokan Mirkovic**

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Introduction. Current evidence suggests that patients with diabetic neuropathy have elevated plantar pressures and occupy a longer duration of time in the stance-phase during gait. All the standard data that exists today in the field of baropodometry and examinations carried out with pressure platforms is the result of scientific research and statistics. The structural changes in the muscles and tendons caused by glycosylation lead to a decrease in their elasticity. This case series is the part of a larger trial of static, dynamic and stabilometric examination in people with diabetes.

Objective. We selected participants in the study who underwent an AT ultrasound examination, in order to show an analysis of foot load and Achilles tendon condition.

Methods. The study population was made up of seven males and one female with the mean age of 67 (range: 64–70 years) and with type 2 diabetes with an average duration of 10.28 years. The study was prepared at the Clinical Centre and the examination was carried out in Orthopaedic Company. Static and dynamic testing was done using Sensor Medica Platforms Freemed - Resistive sensors, 24 K gold coated, conductive rubber, using the FreeStepProfessional software. Alpinion E-Cube i7 portable ultrasound, PB-L3-12T, 3-12MHz Linear Transducer was used to examine the Achilles tendon

Results. Five subjects had a difference in Achilles, thickness range Left to Right 3-12mm. In most cases, the CoP line ended between the first and second toe. Higher values of maximum pressure in dynamic were observed in foot with less thickness of AT. In the gait cycle, it was observed, a shorter duration of the initial contact and increased Max Load (%) in the stance phase.

Conclusion. The data presented in this study suggest the importance of Achilles tendon examination in the analysis of foot load in people with diabetes.



SP239

REHABILITATION PROTOCOLS FOR CHILDREN WITH FUNCTIONAL VOIDING DISORDERS

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Functional urinary incontinence in children can be caused by the following syndromes: bladder and bowel dysfunction, overactive bladder, voiding postponement, dysfunctional voiding, underactive bladder, bladder outlet obstruction, stress incontinence, giggle incontinence, vaginal reflux, extraordinary daytime only urinary frequency and bladder neck dysfunction. Symptoms vary from mild daytime frequency and urgency to daytime and nighttime wetting, pelvic holding maneuvers, voiding difficulties, urinary tract infections and vesicoureteral reflux.

“Urotherapy” can be defined as a bladder re-education or rehabilitation program aiming at correction of filling and voiding difficulties. It starts with both parental and child education about the importance of regular hydration and voiding, optimal voiding regimens, constipation treatment and genital hygiene. Together with this standard treatment, in children with dysfunctional voiding the pelvic floor retraining is initiated, and it includes pelvic floor exercises and various forms of biofeedback (visual, tactile, auditory, electromyography) with the same aim in mind - to help the child establish pelvic floor awareness and control, and relearn pelvic floor muscle relaxation. As lower abdominal (transversus and obliquus internus abdominis) and pelvic floor muscles act synergistically, it is important that both are relaxed during voiding. Diaphragmatic breathing exercises serve to teach the children abdominal relaxation.

In children with overactive bladder, bladder training, strategies to suppress urgency, electrical stimulations such as anogenital, transcutaneous and percutaneous electrical nerve stimulation have been used in the treatment.

In children with bladder and bowel dysfunction, treatment of constipation significantly reduces lower urinary tract symptoms. Behavioral modifications (toilet training, proper defecation pattern) are combined with diaphragmatic breathing, pelvic floor exercises with or without biofeedback to teach children awareness, proper muscle function and relaxation during defecation. Although the mechanism of interferential current action is not completely understood, positive effects include the increase in defecation frequency, the reduction in fecal incontinence and the abdominal pain.

SP240

PRP IN KNEE OSTEOARTHRITIS**Vincent Gremeaux**

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on behalf of the GRIP (Groupe de Réflexion sur les Injections de PRP ; PRP Injection Research Group)

Purpose: In recent years, there has been a significant increase in the use of platelet-rich plasma (PRP) for the treatment of musculoskeletal diseases, especially in knee osteoarthritis (OA). The indications, results and safety recommendations of intra-articular (IA) injections of platelet-rich plasma (PRP) as symptomatic treatment for knee osteoarthritis remain debated. We thus aimed to perform a consensus work to develop guidelines for PRP injections in knee osteoarthritis according to the French-speaking countries Healthy Authority recommendations.

Methods: Fifteen physicians from 4 French-speaking countries (Europe and Canada) were selected for their expertise in PRP and osteoarthritis, to develop a step-by-step procedure aiming to reach consensus. The first step was a comprehensive literature review, conducted on Medline, combining therapeutic trials, open studies and meta-analyses. Using a modified Delphi procedure, 25 recommendations were finally retained. They were then classified as appropriate or not appropriate, with strong or relative agreement, or uncertain if a consensus was not reached, based on score and distribution.

Results: The most illustrative recommendations of the 25 were the following ones:

- Intra-articular injections of PRP in the knee are an effective symptomatic treatment for early to moderate osteoarthritis (Median = 8 [6-9] - appropriate. Relative agreement).
- A PRP treatment sequence in knee osteoarthritis may include 1 to 3 injections. (Median = 9 [7-9] - appropriate. Strong agreement).
- Leucocytes-poor PRP should be preferred in knee osteoarthritis. (Median = 8 [5-9] - appropriate. Relative agreement).
- PRP injections in the knee should be performed under ultrasound or fluoroscopic guidance. (Median = 8 [3-9] - uncertain. No consensus).
- PRP should not be mixed with an anesthetic or intra-articular corticosteroid. (Median = 9 [6-9] - appropriate. Relative agreement).

Conclusion: This set of 25 recommendations should help to harmonize and facilitate the protocols of PRP injections for knee OA, which are a rapidly expanding treatment in this condition, and provide a framework for the design of future clinical studies.

SP241

OROFACIAL CHANGES IN PATIENTS WITH SARCOPENIA AND OSTEOPOROSIS - REVIEW OF THE LITERATURE**Vladimir Biočanin**

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INTRODUCTION: Sarcopenia is an age-related loss of muscle mass and strength or physical performance. Literature review found that sarcopenia has a negative impact on oral health, causing many disturbances, but, there are still limited data on the association between oral health and sarcopenia. Osteoporosis may also cause oral health problems. Older persons with osteoporosis have more severe oral health problems.

MATERIALS: Systematic search of the literature was conducted using MEDLINE database and only high relevant articles and reviews were included in final analysis. Research terms were ((“sarcopenia”[MeSH Terms] OR „sarcopenia”[All Fields]) AND oral health ([MeSH Terms] OR oral health [All Fields])) AND „osteoporosis”[All Fields])) AND „osteoporosis” [Subheading] OR „osteoporosis”[All Fields] AND „oral manifestations”[MeSH Terms] OR „oral manifestations”[All Fields])).

RESULTS: Initial search found 202 articles with review. Final analysis included 21 articles. The relationship between oral health and sarcopenia has been studied in terms of the reduction in occlusal forces, chewing function and tongue pressure. Sarcopenia is associated with poorer quality of life and oral health status. Clinical studies showed that tongue and lip strength were significantly lower in patients with sarcopenia. Likewise, impaired dentition status was associated with sarcopenia. Sarcopenia was associated with worse recovery of physical function and dysphagia in hospitalized patients. Rehabilitation and nutrition, as well as dental and oral approaches are required in patients with sarcopenia. Osteoporosis may cause many oral problems. As a result of taking medication for treating osteoporosis, oral health status of these patients often is compromised. For example, intravenous bisphosphonates for the treatment of osteoporosis may cause osteonecrosis of the jaw. Skeletal bone mineral density is related to clinical attachment loss, bleeding, and gingivitis, which suggest that there is an association between osteoporosis and periodontal diseases. On the other hand, data from clinical studies showed similar success rate of dental implants in patients with osteoporosis and healthy individuals.

CONCLUSION: Sarcopenia and osteoporosis may cause different oral problems. There is still little data about sarcopenia and osteoporosis and their impact on oral health.

Key words: sarcopenia, osteoporosis, oral health, dysphagia

SP242

EFFECT OF LOWER LIMB STRENGTH TRAINING PROGRAM FOR IMPROVEMENT BALANCE IN PATIENTS AFTER TRAUMATIC BRAIN INJURY**Volodymyr Golyk**

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Introduction: Poor balance is a major problem of several neurological disorders, including traumatic brain injury (TBI). In standing posture patients may be prone to instability due to a combination of long latency of onset of the balance response coupled with asymmetrical stance during recovery from an unexpected linear perturbation. Survivors has a dependent on assistance. It may hinder individual performance of daily tasks and determine people's subjective well-being.

Objective: To evaluate the effect progressive resistance strength training program on changes in muscle strength lower limb strengthening designed to improve balance and walking in stroke patients.

Methods: 56 patients men in chronic period of TBI were enrolled. Patients were randomly divided into 2 groups (28 in each), control group passed exercise on balance and investigation group - exercise intervention for lower limb strengthening. Groups received their therapy three times a week for 3 months. For assessment lower limb strength and balance we used Motricity index (MI) and Berg Balance scale (BBS).

Results: 56 people before the physical therapy had the same BBS $28 \pm 2,1$ ($\pm S$) and MI $48,3 \pm 7,4$ ($\pm S$). After physical therapy, in the investigation group in BBS $44,9 \pm 1,7$ ($\pm S$) and MI $64,1 \pm 8,1$ ($\pm S$). Control group demonstrated poorer results in BBS $40,2 \pm 2,6$ ($\pm S$) and MI $52,8 \pm 7,9$ ($\pm S$), with significant differences ($p < 0,05$) between the groups. In addition, a line correlation coefficient ($r = 0,99$) between the BBS and MI in the investigation group was determined.

Conclusions: The importance of the result shows the effect progressive resistance strength training program lower limb improvement of balance and decrease risk of falling. This has a positive effect on mobility and increases the independence of people after TBI.

SP243

A NEW TRAINING PROGRAM FOR THE NETHERLANDS**Wim GM Janssen**

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The trainings board of Netherlands Society of Rehabilitation Medicine recently received approval from the Netherlands Health Ministry for their new Training Plan (named: BETER in Movement) for Rehabilitation Medicine trainees. In the years before we adopted the well-known CANMED competencies as a framework for our training activities and supervision.

Considering available assessment tools for judgement on competencies many PRM doctors felt inadequate in their judgement and phrasing of acquired level. This was also present in related medical specialties. For this reason the Dutch Federation of Medical Specialties aimed at building a new framework considering assessment and judgement of capabilities one of the core aspect of training.

The new framework is phrased EPA: Entrustable Professional Activities. These are related to activities or responsibilities that are judged by the training group to be relevant for PRM and to be entrusted to the trainee. This type of judgement closely resembles feeling (emotion) of the trust we have in the colleague that is trained to become a PRM doctor. The level and number of entrustable activities at the end of the training after 4 years must be at the basic level of a PRM doctor.

The process of analyzing our professional activities into a small number of EPA's took a process keeping in mind both the basic level and the need for specialized knowledge for the PRM doctor.

We at the end succeeded in defining the EPA's: three basic, nine augmenting and three generic ones. During the presentation this process will be introduced and explained, while still covering the comprehensive character of PRM Medicine.

Hopefully this presentation will give other training groups abroad possibilities to enhance their plans and assessment and judgement procedures.

SP244

THE UNDERGRADUATE INFORMATION OF KAM – IS IT IMPORTANT?**Zorica Brdareski**

Clinic for Physical Medicine and Rehabilitation Military Medical Academy, Belgrade, Serbia

INTRODUCTION: The implementation of the KAM method in Serbia has been regulated by law since 2007. Information about them, within the framework of undergraduate teaching, with the exception of the MF MMA, does not exist for the time being.

The AIM of this paper was to determine how much students know about acupuncture at the beginning and how much at the end of their studies and whether an informative lecture in this area can influence their attitudes.

MATERIAL: A prospective clinical survey, included 23 first year and 28 sixth year MF MMA students. The questionnaire consisted of 8 questions related to legislation, sources of information and the position on its acceptability in their future work. 1st year students completed the survey once, and 6th year students 2 times - before and after the lecture about the KAM. The responses of students 1st and 6th before the informative lecture were compared, as well as those of 6th students before and after the lecture. The chi square test were used in statistical processing, significance level: $p < 0.05$.

RESULTS: Statistical significance ($p < 0.05$) between the groups was recorded in most questions except in terms of their knowledge of the law and the desire for broader education. The responses of the second group before and after the informative lecture varied significantly in terms of the source of information ($p < 0.001$), knowledge of the legislation and the presence of the method in healthcare institutions ($p < 0.05$), but not in terms of the scientific merits of the method.

CONCLUSION: An informative lecture in the field of KAM has provided better information to students regarding legislation and encouraged them to expand their knowledge of the method through the scientific literature. It was not enough to change the opinion of 25% of the listeners on the scientific merits of the method.

SP245

REHABILITATION OF PATIENTS WITH SEVERE BRAIN INJURY IN HUNGARY**Zoltan Denes**

Brain Injury Rehabilitation Unit National Institute for Medical Rehabilitation, Budapest , Hungary

Introduction: The Brain Injury Rehabilitation Unit has multi-disciplinary rehabilitation team, headed by UEMS PRM Board-certified physician. They have a postacute rehabilitation program with accreditation by UEMS PRM Board. The number of beds is 40, and 8 for the early cases, the staff is also about forty.

Objective: Introduction rehabilitation work of the unit.

Method Descriptive cohort study.

Results During 2018 year 230 patients were treated in the unit, in details: 72 patients with severe traumatic brain injury, 125 stroke patients, and other 33 patients having disability with other neurological origin (MS, GB SY, brain tumors, craniotomy etc). The average length of stay was 58 days, mortality rate 0,4 %. Bed occupancy rate in the unit was 95 %. Most of the patients were discharged to their own home after rehabilitation program (198 of 230). The Unit is specialized for rehabilitation of patients with traumatic brain injury. The data of 66 patients with severe traumatic brain injury, treated during a year: mean age: 36 (17-72) years, leading causes of TBI: 47 traffic-related incidents, mean time from the trauma till rehab admission: 48 (9-111) days, main symptoms at the time of admission: hemiparesis 34, tetraparesis: 12, PTA: 20, aphasia: 8, average length of stay: 82 (7-240) days, patients admitted in vegetative : 3, minimal responsive state: 10, unplanned transmission: 20. At the time of discharge 50 patients were independent in activities of daily living, 50 from 66 could walk and 52 were continence.

Conclusions: Rehabilitation treatment of patients with severe brain injury is suggested in specialized units, where multidisciplinary team is available for the patients with multifunctional problems.



SP246

Frailty syndrome and patients with cardiovascular Disease

Marta Supervia Pola,

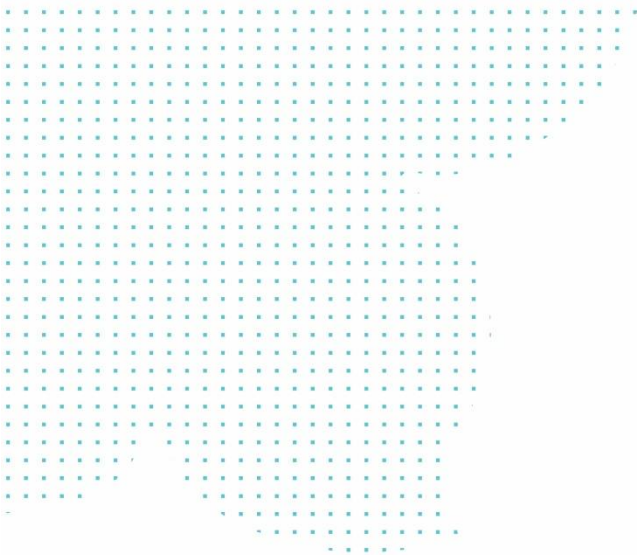
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Frailty is a syndrome characterised by a vulnerability status associated with declining function of multiple physiological systems and loss of physiological reserves.

Frailty correlates to medical outcomes in the rehabilitation patients, and has been shown to have prognostic value for patients in different clinical settings, such as in patients with coronary artery disease, cancer and so on.

The prevalence, clinical and prognostic relevance of frailty in a rehabilitation setting has not yet been well characterised, despite the increasing frequency of patients in rehabilitation.

Tailored rehabilitative interventions for these patients are needed.



ORAL PRESENTATIONS



OP101

EVALUATION THE PREVALENCE OF CARPAL TUNNEL SYNDROME IN PREGNANT WOMEN IN GORGAN**Afrooz Arefi**

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Introduction: Carpal tunnel syndrome is one of the main causes of pain, numbness and hand dysfunction due to median nerve entrapment in carpal tunnel groove. Pregnancy is one of the risk factors that increases the risk of carpal tunnel syndrome.

Objective: To determine the prevalence of carpal tunnel syndrome in pregnant women in Gorgan and its relationship with factors such as maternal weight, maternal age during pregnancy, number of pregnancies, gestational age.

Materials and Methods: This is a descriptive-analytic study that was performed on 979 650 pregnant women referring to pregnancy clinic of Sayyad shirazi Hospital in Gorgan from June 2016 to December 2018. For patients after an interview and exclusion criteria, a questionnaire was filled. A total of 650 patients underwent electro diagnostic study by physical and rehabilitation physician. Data was entered into SPSS software. Considering that the carpal tunnel syndrome variable is ranked, for examination we used correlation with other variables using spearman correlation coefficient. Other modules like chi 2, Mann-Whitney were also used.

Results: 95 of these patients had carpal tunnel syndrome (14.6%), 76 were mild (11.7%) and 15 were moderate (2.3%) and 4 were severe (0.6%). The study was in the age group of 15 to 44 years old, with an average age of 28 years. Their mean weight was 70 kg (between 43 and 130 kg) and the number of pregnancies was from a single to seven, with average 2.23. There was a significant relationship between carpal tunnel syndrome and multi gravidity of mother. (P-value=0.003). There was a significant relationship between the prevalence of carpal tunnel syndrome with maternal age (p-value = 0.001) and high maternal weight (p-value = 0.002). The incidence of carpal tunnel syndrome is not have significant relationship with Gestational age in this study.

Conclusion: The prevalence of carpal tunnel syndrome has a significant relationship with maternal age, multigravidas, and high maternal weight. Early diagnosis and early treatment of the patient, preventing multiple complications and heavy surgical costs and prevent patient suffering.

Key words: carpal tunnel syndrome, electro diagnostic test, pregnancy

OP102

PSOAS MUSCLE, THE PARADOXICAL CROSSROAD OF MUSCLES AND THE NERVES?**Aleksandar Vojvodic¹, Sava Stajic, Predrag Bjelogrić³, Jelena Mihailovic⁴, Slobodan Kapor⁵**

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Introduction: Relationship between muscular facilitation and neural tension as cause of pain, in the upper extremity is well known(1), but only few studies(2,3,4) examine a potentially similar interaction in anterior and posterior hip. The purpose of this study was to determine potential effect and underlying mechanism, between tightness of femoral nerve and psoas muscle on sciatic nerve and piriformis muscle using Ultrasound Elastography, as measure of tissue tightness. **Material and Methods:** Shear Wave US Elastography was performed on a group of 30 healthy patients (15 female and 15 male). Measurements of nerve/muscle connection, m.psoas/n.femoralis and m.piriformis/n.sciaticus, tightness were performed on lateral decubitus position in knee extension and knee flexion, at two time points 0 and 3 min for knee flexion and 0 min for knee extension, due to physiological position.

Results: At t=0 min, in knee extension, n.femoralis/m.psoas are relaxed (4 and 14kPa, respectively) compared to n.sciaticus /m.piriformis (54 and 28kPa, respectively). At this point inverse tightness correlation was observed with statistically significant difference (p

Conclusions: The findings of this study suggest that increasing n.femoralis/m.psoas tension we may indeed affect gluteal region in healthy patient population through n.sciaticus/m.piriformis. Consideration of potential bidirectionality of neural tension and muscle dysfunction should be included in future, as same as patient group with pathology in that region.

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OP103

THE TIMED UP AND GO TEST IN GERIATRIC ORTHOPEDIC REHABILITATION AFTER FRACTURE OF HIP**Aleksandra Plavsic**

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Introduction: Among the older population hip fractures still represent one of the most important causes of morbidity. The goal of hip fracture treatment is directed to prevent progression of disability and to a restoration of pre-fracture function.

Aim: To determine the relationship between type of hip surgery after fracture and Timed "Up and Go" (TUG) Test in the elderly.

Method: An open, prospective, randomized clinical study included 20 patients after Fracture of Hip and were divided into two groups : First group – 10 patients after THR or HEMIARTHROPLASTY average age 76.0 ± 6.8 years and Second group – 10 patients average age 79.0 ± 9.8 years after internal fixation with PFN, TARGON, DHS. The both groups were treated five times weekly during two weeks with physical therapy including strength training and without strength training. The primary outcome measure was The Timed up and Go Test with the walker . Secondary outcome measure was: intensity of pain, measured by Visual Analog Scale of Pain . Subjects were evaluated 7 days after surgery and 21 days after surgery (after 2 weeks physiotherapy) . One way ANOVA, repeated measures ANOVA and post hoc tests and Student T test were applied for statistic analysis.

Results: 1. There were high significant improvements in the parameters of TUG inside the groups ($p=0.000<0.01$). TUG score with a walker at 21st operative day in the first group was on average 13.6 seconds faster then the TUG score in the second group ($p=0.000<0.01$);2. Pain intensity was significantly diminished in both groups at the 21st day in comparison with the 7th postoperative day. There were no significant differences between the second (VAS = 4.18 ± 1.48) and the first group (VAS= 3.59 ± 1.44) according to the daily mean pain intensity ($t = 1.25$; $df = 38$). Pain intensity on the 21st postoperative day was significantly lower in the first group (VAS = 1.65 ± 0.80) when compared with the second (VAS = 3.2 ± 1.15 ; $t = 5$; $df = 38$; $p < 0.01$)

Conclusion: The results of this study demonstrated that elderly patients after hip fracture with THR or HEMIARTHROPLASTY have better TUG score with walker after inpatient geriatric rehabilitation in comparison with the patients after internal fixation with PFN, TARGON, DHS.

OP104**ROLE AND AIMS OF EUROPEAN ROBOTIC REHABILITATION SUMMER SCHOOL -RRSS****Alessandro Giustini**

Rehabilitation San PancrazioHospital, Arco (TN), Italy

In ESPRM exist from 2018 the Scientific Robotic Committee. To promote aims of this Robotic SISC, and to promote better and better education for PRM young (and not only) colleagues sharing experiences and perspectives, connecting research purposes, was created the European Summer School in strong collaboration with UEMS and UEMS Board. Young PRM colleagues selected by UEMS Board National Responsibles can participate totally free, bringing home many relevant educational experiences in scientific and professional contents. The School is mainly practical, offering to the participants the concrete possibility to see many innovative robotic devices and directly apply rehabilitation training in some different clinical conditions.

Were yet realized 2 Edition (2017 and 2019) and we are preparing the new edition in 2021. Recently it is opened the specific WebSite to have a broad communication among any interested professional and facility: www.er2school.com

Furthermore were organized some other scientific and educational events involving groups of PRM Specialists arriving from Italy and other Countries in Europe and not only. Was too realized a participation (receiving funds from UE) in an innovative Erasmus Research Project to develop PRM and Engineer education in rehabilitation national services. So it is very important to make know (for example by a specific Workshop) this innovative activity in ESPRM Congress, mainly contacting all colleagues presenting during the Congress papers in this field to enlarge the "PRM robotic community" in Europe.

OP105

FUNCTIONAL SYMPTOMS OF PATELLA CHONDROMALACIA - A CHANGE IN GAIT BIOMECHANICS**Alena Altukhova¹, Dmitry Skvortsov², Sergey Kaurkin¹, Alexander Ahpashev¹, Nikolai Zagorodniy²**Scientific, FRCC FMBA, Moscow¹, FSBI NMITS TO them. N. N. Priorova², Russia

The functional symptoms of chondromalacia of the patella remain poorly understood.

The purpose of the study was to investigate the functional, biomechanical symptoms in patients with chondromalacia of the patella of the knee joint.

The study included 35 patients (20 women and 15 men) who were diagnosed with one side chondromalacia of the patella of the knee joint. The average age was 33.6 years. The control group included 20 healthy adults (14 men and 6 women). The biomechanics of gait was studied: walking cycle time, movement in the hip and knee joints in three mutually perpendicular planes and shock loads at the beginning of stance phase.

The temporal characteristics of the walking cycle and the magnitude of the shock loads remain normal, both on the affected and on the intact side. A decrease in the amplitude of flexion of the hip joint on the affected limb was detected compared with the control group. Reliably increased the phase of this amplitude symmetrically for both limbs. No changes in abduction-adduction and rotation movements in the hip joints were detected. The amplitudes of flexion, extension, adduction-abduction of the knee joints also do not show significant changes. Rotational movements in the knee joint are significantly reduced on the intact side. The "stair" symptom was found in 83% of patients: on two sides in 23 patients and on the one side in 6 patients.

Thus, with chondromalacia of the patella, both sides, affected and intact, are involved, which makes a compensating decrease in the load on the affected joint. The changes obtained with the kinematics of walking on a flat surface are not gross and do not lead to significant disturbances in the biomechanics of gait. The only pathognomonic functional symptom of this disease is the "stair" symptom.

OP106

LESSONS LEARNT FROM SPECIALIST TRAINING ON FUNCTIONING ASSESSMENT OF CHILDREN WITH CEREBRAL PALSY IN RUSSIA**Alexander Shoshmin^{1,2}, Kristina Rozhko^{2,3}, Yanina Besstrashnova^{2,3}, Viktoria Lorer^{2,3,4}, Inna Ishutina², Ludmila Kozhushko², Svetlana Manankova⁵**

Department of International Classifications and Systems of Russia¹, Albrecht Federal Scientific Centre of Rehabilitation of the Disabled², WHO Collaborating Centre for the Family of International Classifications in Russia³, First Pavlov State Medical University of St. Petersburg⁴, St. Petersburg, Russia, Bye University Hospital of North Norway, Tromso, Norway⁵

Introduction: The trainings for specialists were conducted within the Russian-Norwegian project "Establishment of the consultation network in framework of rehabilitation and habilitation" (B1805) in 2019.

Objective: The objective was to create new competence in functioning assessment of children with cerebral palsy (CP), applying the Core Sets of the International Classification of Functioning, Disability and Health (ICF) and multidisciplinary approach. The target group consisted of specialists from regions in the North-West of Russia who was responsible for rehabilitation and habilitation of children with CP at centres of social rehabilitation, education and healthcare organisations.

Method: In 2018, the research to standardize disability assessments and individual programs for rehabilitation and habilitation for disabled children and youth with CP was completed in Russia. The findings were summarized as the guidelines on using the given ICF Core Sets, which formed the content of the trainings. Through the geographical locations of trainees, it was feasible to use distance trainings via a platform for videoconferencing. An electronic questionnaire helped to collect feedback from the specialists. It contained questions about quality and quantity of the content, priorities of training topics, technical problems and access to videoconferencing, quality of video and sound, topics of further education.

Results: Experience of conducting face-to-face trainings enabled to transform them into the distance form quickly. Educational materials are available at the website of the consultation network on rehabilitation and habilitation. Videorecords were uploaded to YouTube and ICF Education portal. Preliminary testing of connections with trainees via a platform for videoconferencing is necessary. Number of specialists who looked videorecords and/or downloaded educational materials was more than ones who participated in the distance trainings. Due to horizontal and vertical professional cooperation information about the trainings was **disseminated widely**.

Conclusions: Feedback analysis from the trainees is essential for planning specialist trainings both from IT and topics.

OP107

THE IMPORTANCE OF SPEECH AND LANGUAGE THERAPIST IN THE PROCESS OF EARLY INTERVENTION**Amela Mujanic**

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Man did not become a social being because he socialized in childhood, but was born a prosocial being. Communication and speech-language development is a complex process that begins with the birth of a child and takes place in a well-defined order. The early interaction of the child and the parents and the early experiences that the child acquires affect the overall development of the child.

The European Association on Early Intervention Network (Early aid-EAEI) defines early intervention “through all forms of child-centered incentive and parent-centered counseling, applied through the direct and immediate consequences of a defined developmental condition, and includes the child and his or her parents, family and the wider environment”(Guralnick, 2005). Early intervention is based on the realization that the first years of life have a long-term effect on a child's development.

The role of speech therapists in early intervention is therapeutic and advisory. Speech-language difficulties represent one high risk factor for the development of psychiatric problems (Beichtman et al. 1986), problems at school, affect achievement within cognitive capacities (Tomblin et al. 1992), problems with self-esteem and social skills. All the above points to the importance of timely recognition of difficulties and involvement in speech therapy. Adequate ways of stimulating speech and language development can prevent the aforementioned risk factors. Many experts emphasize the importance of play in terms of therapeutic procedure and application in early intervention programs and the positive impact on speech-language and socio-cognitive development of children with disabilities (Lewis Boucher, Lupton, & Watson, 2010).

OP108

RELATIONSHIP BETWEEN EXPOSURE TO ENDOGENOUS ESTROGENS AND SKELETAL FRAGILITY IN BOSNIAN POSTMENOPAUSAL WOMEN**Amila Kapetanovic**

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Introduction: The estrogen deficiency after menopause leads to accelerated degradation of bone tissue. Various factors can contribute to decrease bone tissue strength and the consequent appearance of fragility fracture in postmenopausal women.

Objective: The objective of this study was to examine relationship between exposure to endogenous estrogens, measured as years of menstruation (period between menarche and menopause), and skeletal fragility in Bosnian postmenopausal women.

Method: A total of 100 women, aged between 55 and 75 years, were included in this study. The women in the study group (n=50) had fragility fracture. In the control group (n=50) were women without fragility fracture. Bone mineral density was measured using Dual Energy X-ray Absorptiometry on the lumbar spine (L2-L4) and proximal femur.

Results: There was no statistically significant difference in age between the groups. The average length of the period between menarche and menopause in women with fragility fractures (30.38 ± 4.01 years) was shorter in comparison to the average length of period between menarche and menopause in women without fragility fractures (38.10 ± 2.98 years), which was statistically significant, $p=0.0001$. In the study group, osteoporosis had 40 (80%) women, in the control group 8 (16%) women, which was statistically significant, $p=0.0001$.

Conclusions: Shorter period between menarche and menopause was predictor of fragility fracture in postmenopausal Bosnian women. In addition, shorter period between menarche and menopause correlated with low bone mineral density in this population group.

Key words:estrogens exposure, fragility fracture, postmenopausal women

OP109

MEDIA CONTENT FOR PERSONALISED REMINISCENCE THERAPY – THE SENSE-GARDEN PROJECT EXPERIENCE**Andreea Georgiana Marin¹, Ileana Ciobanu¹, Gemma Goodall², Rozeta Draghici³, Artur Serrano^{1,2}, Mihai Berteau¹**

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Introduction. Reminiscence therapy is used in people with neurocognitive disorders in order to improve mood, behaviour, compliance with care, social participation and for a better quality of life for all participants in the care process: persons with neurocognitive disorders as primary users, medical professionals, formal and informal care givers, family and relatives of the primary users.

Objective. To identify the features of the optimal triggers for personalised reminiscence therapy interventions for people with neurocognitive disorders.

Method. User centred design and development for new technology, methods and tools for reminiscence therapy and multisensory stimulation.

Results. The team presents the most important aspects of the optimal triggers representing the media content for different kinds of experiences in reminiscence therapy personalised interventions in SENSE-GARDEN.

Conclusion. In order to achieve optimal responses, reminiscence therapy interventions require certain kinds of triggers from some specific categories and presenting specific features.

Acknowledgement: This work was performed with the support of AAL Programme, co-funded by the European Commission and National Funding Authorities of Norway, Belgium, Portugal. and of the Romanian National Authority for Scientific Research, UEFISCDI, project SENSE-GARDEN AAL/Call2016/054-b/2017(<https://sense-garden.eu>) .

OP110

IMPROVING THE EFFICIENCY OF REHABILITATION OF PERSONS WITH MUSCLE ASYMMETRY BY USING A BIOFEEDBACK SYSTEM**Andrii Tsikhomskyi^{1,2}, Serhii Kolisnyk^{1,2}, Petro Kolisnyk^{1,2}, Yuliia Vitrova^{1,2}, Kostiantyn Kravtsov², Viktoriia Kolisnyk²**Department of Medical Rehabilitation, National Pirogov Memorial Medical University, Vinnytsia¹;
Center of Medical Rehabilitation and Sports Medicine², Vinnytsia, Ukraine

Introduction: Muscle asymmetry is a common phenomenon that can lead to the spinal and chest deformities, internal organs dystopia. Initially postural disorders can be underdiagnosed that results in development of severe deformities with musculoskeletal or cardio-respiratory activity limitations. Additionally to other assessment tools, biofeedback systems could be one of the accurate non-invasive methods of functional assessment of muscular asymmetry.

Objective: To compare an effect of different types of therapeutic programs on the kinesiography data and to evaluate the impact of rehabilitation program on the asymmetry using biofeedback system.

Method: The 12 weeks follow up study participated 24 volunteers 17-24 (20.38 ± 1.55) years old divided on representative 3 groups. Therapeutic exercises prescribed with using of a biofeedback system with bilateral registration of the muscles activity. Group I included patients who were practicing the individual program in gym under the supervision; group II worked at home by the individual program; group III were inactive. The muscle function assessed by the amplitude and velocity indicators, asymmetry index during exercises and their changes within three efforts, using standard statistic methods.

Results: Dynamics of the amplitude showed a significant decrease in asymmetry indices in 4.1 times ($p < 0.05$) and in the III had the tendency to increase ($p > 0.05$). The velocity and asymmetry indicators significantly decreased during the training in the gym ($p < 0.05$). The effectiveness of training in the gym exceeds home exercises (OR = 2.0 and 0.75).

Conclusions: The biofeedback system is an up-to-date method for the early functional assessment of muscular asymmetry and for the follow up control of the effectiveness of treatment and rehabilitation.

OP111

DELIRIUM RELATED RISK FACTORS AND REHABILITATION OUTCOMES AMONG ELDERLY PATIENTS HOSPITALIZED AFTER HIP FRACTURE SURGERY: HISTORICAL COHORT STUDY**Anna Balzer, Michael Brik, Rachel Dankner, Rafi Heruti**

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Background: Delirium is a neuropsychiatric syndrome characterized by acute and fluctuating impairment of cognition, reduced ability to focus and maintain attention, disorientation, slurred speech, and perceptual disturbance. Early identification of high-risk postoperative delirium is clinically important for preventing associated morbidity and mortality and improving functional outcomes.

Objectives: To trace factors associated with delirium among patients hospitalized for rehabilitation following hip-fracture surgery and to evaluate the association between delirium and rehabilitation outcomes measured via the Functional Independence Measurements (FIM) Scale.

Methods: A single-center, historical cohort study, based on medical records of all patients hospitalized at Reuth Rehabilitation hospital between 2016 and 2018. Characteristics of patients with and without delirium were compared using t-test for continuous variables, and χ^2 test for categorical variables. Adjusted linear regression was used to examine the association between delirium and rehabilitation outcomes.

Results: 44/157 (28.0%) of patients developed postoperative delirium. Patients with delirium were more likely to be older, with pre-fracture cognitive impairment or dementia, and prescribed with benzodiazepines. No statistically significant differences were observed regarding other known risk factors for delirium. Delirium was statistically significantly associated with poor functional outcomes, both on admission and discharge (without delirium: FIM adm = 71.7 ± 12.7 and FIM disch = 90.4 ± 14.5 ; with delirium: FIM adm = 62.7 ± 14.8 and FIM disch = 77.5 ± 16.7 , respectively) and required a longer period of rehabilitation (44.3 ± 18.7 vs. 37.8 ± 11.3 days, $p=0.01$). Statistically significant differences were observed regarding all Montebello Rehabilitation Factor Scores including Absolute Functional Gain, Absolute Functional Efficiency, Relative Functional Gain and Relative Functional Efficiency, for both Motor and Total FIM Scores ($p < 0.01$). In multiple regression, delirium had statistically significant associations only with Motor FIM's Absolute and Relative Functional Efficiencies scores.

Conclusion: Almost 1/3 of post-hip-fracture patients hospitalized for rehabilitation have delirium. These patients have poorer functional outcomes in spite of a longer length of hospitalization. Early identification of these patients may assist in improving their rehabilitation outcomes.

OP112

IMPROVING NEUROMUSCULAR EFFICACY BY ACTIVATING THE LOCAL STABILIZERS OF THE CERVICAL SPINE**Andrea Domján¹, Mariann Sápi², Anna Fehér-Kiss², Brigitta Mirk¹, Blanka Kasza¹, Sándor Pintér²**Physiotherapy, University of Szeged, Faculty of Health Sciences and Social Studies, University of Szeged¹, Albert Szent-Györgyi Health Centre², Szeged, Hungary

Introduction: Degenerative cervical spine diseases represent common medical problems worldwide. Symptoms of extra stress occur 28.5% on the area of the cervical spine. As a result of incorrect posture, decreased intersegmental motor control, and reduced neuromuscular efficacy leads to instability and overload on the passive anatomical structures. The focus of our study was on the activation and improvement of the longus colli and multifidus muscles.

Objective: We aimed to document that the stability of the cervical spine can be improved, and symptoms of instability can be reduced by restoring the local stabilizers' function.

Method: In our case study we present the examination and treatment of a middle-aged male patient, who had spondylosis without symptoms of radiculopathy, and a herniated disc. The pain was evaluated using the Neck Pain and Disability Index, the Oswestry Disability Index, and by examining trigger point sensitivity. Spinal structures' involvement was tested with the brachial plexus provocation test. We used ultrasound imaging with electromyography-feedback to assess selective activation of local neck stabilizer muscles. Cranio-cervical stability was measured and trained with the cranio-cervical flexion test applying a pressure biofeedback device. The 8-week training contained scapular orientation exercises along with the local stabilizers' corrected activation.

Results: Following our training patients' disability index reduced from moderate to minimal. The sensitivity of the brachial plexus decreased. Ultrasound examination of the multifidus muscles confirmed that the diameter of the local neck stabilizers increased and the muscles' stabilizing function improved after the training.

Conclusions: Our results are in agreement with relevant studies' and might confirm that restoring local stabilizers' function may be an effective therapeutic method in the prevention and treatment of the symptoms arising from cervical spine instability. This study was supported by a grant from the EU-funded Hungarian grant EFOP-3.6.1-16-2016-00008.

OP113

BEHAVIOURAL TREATMENT STRATEGIES FOR FREEZING OF GATE IN PARKINSON'S DISEASE – A QUALITATIVE REVIEW**Ana Ribeiro, Raquel Araújo, Luís Vouga, Sara Amaral, Diogo Costa, Patrícia Cruz**

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Introduction: Freezing of gate (FOG) is an axial symptom that is poorly responsive to drug and surgical therapies, comprising a major challenge in treatment.

Objectives: Reviewing the current rehabilitation strategies for freezing of gate in patients with Parkinson's disease or Parkinsonism;

Methods: A systematic search of PubMed and Trip Database with the terms: "Parkinson disease [Mesh]" AND "Gait Disorders, Neurologic"[Mesh] OR ("freezing of gait") AND ("treatment") was performed. The literature search included trials published up to the end of September 2019. Randomised controlled trials (RCT) published in the last ten years, written in English, including adult patients with Parkinson's disease or Parkinsonism and FOG who underwent non-pharmacological and non-surgical treatment strategies. The main outcomes evaluated were FOGQ scores, number and duration of FOG episodes. Qualitative synthesis was performed. Due to the studies design heterogeneity, meta-analysis was not carried out.

Results: Of the 85 records identified through database searching, 25 were selected after duplicate removal, abstract screening and full-text eligibility assessment. The majority of the trials accessed were moderate quality RCTs of insufficient size and with short-term follow-up. Most studies included patients able to walk without external assistance and with no cognitive impairments. Behavioural treatment options to add-on to a comprehensive rehabilitation program include (1) cognitive training (2) multisensory cueing (3) action observation training (4) slack-line training (6) task-specific walk training (7) aquatic obstacle training (8) dance (9) non-invasive transcranial stimulation (10) automated mechanical peripheral stimulation. No comparative studies among these strategies were found.

Conclusions: Better understanding of the pathophysiology underlying FOG and neuroplasticity basis of its treatment is imperative. Further studies with larger sample sizes and standardized protocols are needed to ascertain the benefits of behavioural strategies for FOG relief. Optimal treatment will probably require a tailored approach combining cognitive, motor, balance, external cueing and non-invasive stimulation modalities.

OP114

TACTILE PLANTAR STIMULATION IMPROVES ANTICIPATORY POSTURAL ADJUSTMENT IN OLDER ADULTS WITH DIABETIC NEUROPATHY**Anna Fehér-Kiss¹, Mariann Sápi¹, Anita Tagai², Andrea Domján²**Physiotherapy Centre, University of Szeged Albert Szent-Györgyi Health Centre¹, University of Szeged, Faculty of Health Sciences and Social Studies², Szeged, Hungary

Introduction: Previous studies have shown that normal aging and pathologies may lead to deterioration of static and dynamic balance parameters. It has been suggested that different types of skin stimulation can improve the components of postural control.

Objective: We aimed to investigate the effect of a single ten-minute manual tactile stimulation of plantar cutaneous mechanoreceptors on postural control in healthy older adults and older adults with type 2 diabetes.

Method: We enrolled twenty volunteers in two groups and tested the peripheral sensory nerve function in their feet. Vibratory thresholds were measured at the ankle and toes bilaterally using the graduated Rydel-Seiffer tuning fork. The diabetic patient's group comprised older adults with diabetic neuropathy (mean age: $64,80 \pm 7,67$ years; mean BMI: $31,50 \pm 4,80$ kg/m²), the control group consisted of 10 healthy older adults (mean age: $66,80 \pm 3,29$ years; mean BMI: $27,84 \pm 3,47$ kg/m²). The Mini-Balance Evaluation Systems Test (Mini-BESTest) was applied to measure balance performance before and after a one-time 10-minute manual stimulation. Factorial analysis of variance was used to analyze the data of the Mini-BESTest for effect of stimulation on the **components of postural control (P<0.05)**.

Results: There was a significant difference in vibration sense between the two groups. The Mini-BESTest total score and the mean score of the anticipatory postural adjustment tasks (sit to stand, rise to toes, stand on one leg) shown a significant difference between the groups before the stimulation, which difference disappeared after the intervention.

Conclusions: Our results suggest that the application of tactile plantar stimulation may compensate the loss of somatosensory information of plantar mechanoreceptors. Thus, this method may enhance anticipatory postural adjustment in older adults with diabetic neuropathy. This study was supported by a grant from the EU-funded Hungarian grant EFOP-3.6.1-16-2016-00008.

OP115

DUAL-TASK: A RESPONSE TO 21ST CENTURY DEMANDS – THE DEVELOPMENT OF AN ASSESSMENT AND INTERVENTION PROTOCOL**Ana Margarida Monteiro, Vera Pinto**

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Introduction: Modern life implies complex routines, with permanently changing stimulus and demands, compelling us to multitask. In opposition, the context of a rehabilitation unit is tendentially controlled. Thus, to fulfil cognitive and physical rehabilitation purposes of social participation, Dual-Task (DT) activities are crucial, and have been shown to improve cognitive and motor performance, including postural stability and memory.

Objective: Understand and apply DT (cognitive/motor) as a powerful tool in order to meet daily-life complexity of the patients with motor and cognitive deficits, through the construction of an assessment and intervention protocol.

Method: An experimental protocol of DT assessment and intervention was developed based on literature review and multidisciplinary pilot cases analysis.

Results: The protocol includes a baseline motor and cognitive evaluation, dual-task evaluation, and the intervention guides and principles. Initial motor and cognitive assessments enable the identification of exclusion criteria as well as the cognitive domains to work on using dual-task conditions. The cost of DT is calculated considering performance in single and dual conditions. This assessment data guides the DT intervention, as it allows the selection of specific exercises from a preset database, its intensity and complexity. Reevaluation takes place each 30 days.

Conclusions: This protocol will allow for a more systematic intervention and results assessment. Dual-task can be an effective response to the 21st century demands and, thus, the nowadays therapists should understand better its processes and advantages as an evaluation tool and, even more important, as an intervention strategy.

OP116

THE IMPACT OF CO-MORBIDITIES AND COGNITIVE CAPABILITIES ON WALKING WITH PROSTHESIS IN PATIENTS WITH LOWER LIMB LOSS**Ana Saksida, Andrej Bavec, Helena Burger**

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Introduction: Patients with lower limb loss may have up to 30 different co-morbidities. Together with cognitive capabilities co-morbidities seem to play an important role in the rehabilitation process and functioning of patients with lower limb loss.

Objective: The aim of the study was to determine the impact of co-morbidities and cognitive impairment on functional outcome defined as successful prosthesis use in patients with lower limb loss.

Method: Retrospective cohort study of patients with lower limb loss in post-acute tertiary inpatient rehabilitation setting. Functional comorbidity index (FCI) was used to record co-morbidity and Montreal Cognitive Assessment (MoCA) test was used to cover cognitive domains. Patients were divided into 2 groups depending on whether they were walking with a prosthesis at discharge. A logistic regression was performed to ascertain the effects of age, gender, level of amputation, FCI and MoCA on the likelihood that patients were able to walk with a prosthesis at discharge.

Results: 86 patients (64 male) with mean age 69.3 years (SD 13.2) were included. 44 patients had transtibial, 29 transfemoral and 13 bilateral amputation. The median (interquartile range) number of comorbidities was 3 (2;4). The logistic regression model was statistically significant, $\chi^2(6) = 38.485$, $p < 0.001$. The model explained 51.5% (Nagelkerke R Square) of the variance and correctly classified 81.4% of cases. Increasing FCI was associated with a reduction and increasing MoCA with an increase in likelihood of walking with prosthesis. Transtibial amputees were 146.9 and transfemoral 29.5 times more likely to walk with prosthesis than bilateral amputees.

Conclusions: In included patients co-morbidities decrease and good cognitive capabilities increase the ability of patients with lower limb loss to walk with prosthesis. Additionally, findings demonstrated also the association between the level of amputation and ability to walk with prosthesis.

OP117

NON-PHARMACOLOGICAL TREATMENT EFFICACY REVIEW IN ANKYLOSING SPONDYLITIS – THE USE OF PHYSICAL AGENTS AND KINESIOTHERAPY**André Santos**

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Introduction: Ankylosing spondylitis is a debilitating disease that has seen improvements in the pharmacological treatment, improving the quality of life of this specific population, nonetheless we think there is an important role for non-pharmacological treatment, specifically for the use of physical agents and kinesiotherapy.

Objective: To gather and assess the evidence for ankylosing spondylitis non-pharmacological treatment efficacy.

Methods: Search was conducted in PubMed and Cochrane for studies published in the past 10 years. A total of 50 studies were included, 37 RCT's, 10 CCT's, 1 longitudinal study, 1 retrospective cohort study and 1 prospective cohort study. Case-reports were excluded.

Results: The most studied modalities of non-pharmacological treatment are Balneotherapy (11 studies), Whole-body Cryotherapy (WBC) (7 studies), Physical Therapy (6 studies) and Exercise (14 studies). Evidence shows that these modalities are safe and effective, decreasing disease activity and pain, improving functionality perceived by patients with Ankylosing Spondylitis. In-patient rehabilitation when compared to home-based exercise and controls also showed improvement, especially when set in warmer climate. Strengthening and aerobic exercises when combined with Range-of-motion (ROM) exercises, appear to be superior to ROM alone.

Conclusions: Patients diagnosed with AS should undergo non-pharmacological treatment, like balneotherapy and WBC, along with pharmacological treatment as it is a safe measure to improve functionality and the quality of life of this population. Specific modalities used in physical therapy gathered little evidence for their use so it's not widely recommended as first-line for pain-relief in this specific population.

OP118

ROLE OF ULTRASONOGRAPHY IN MANAGEMENT OF RESIDUAL LIMB PAIN**Andrej Bavec**

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Introduction: Residual limb pain (RLP) can severely hinder rehabilitation and impair quality of life. Although musculoskeletal ultrasonography became an important component of physiatric practice, it's role in evaluation and treatment of patients with RLP remains less defined.

Objective: The aim of the literature review was to highlight the potential value of ultrasonography in the management of RLP.

Methods: Electronic databases (PubMed, Web of Science, Elsevier Science Direct) and reference lists of relevant articles were screened. The main subject heading terms selected to capture the most relevant papers on the topic were stump, amputation, amputees, residual limb, pain, ultrasound, ultrasonography. The search was limited to peer-reviewed English journals starting from the earliest papers to 1st of December 2019.

Results: 8 articles covering different ultrasonographic findings of painful residual limbs were found. Neuromas and inflammation/oedema were the most common pathologies related to RLP, found after traumatic and non-traumatic amputations. Other common findings were also infections/abscesses, bone spurs, soft tissue calcifications and heterotopic ossifications. Many patients had more than one lesion in the residual limb, but not all of them were painful. Ultrasonography can help identify painful lesions with application of transducer pressure.

16 articles describing various ultrasound guided interventional procedures in RLP were found. 12 of those were aimed at treating neuromas using different modalities. Interventions under ultrasound guidance have been proven to be more accurate than unguided ones. Additionally, there were 6 articles describing various morphologic features such as fluid collections and cartilage thickness in painless residual limbs.

Conclusions: Ultrasonography can help diagnose and guide treatment of many causes, which can influence prosthetic fitting and rehabilitation outcome. There is a need for quality research to define specific indications/conditions and to determine the most appropriate treatment of RLP.

OP119

EFFECTIVENESS OF NON-INVASIVE NEUROMODULATION IN CHILDREN WITH NEURODEVELOPMENTAL DISORDERS TO IMPROVE CONSTIPATION AND SLEEP QUALITY. A preliminary study**Aníbal Báez Suárez, Romina Pestana Miranda, David Álamo Arce, Estela Martín Castillo, Raquel Irina Medina Ramírez**

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Introduction: Children with neurodevelopmental disorders have a delay in acquiring the skills that are assumed taking into account the phases of typical psychomotor development. Added to this difficulty and main element of concern on the part of their families, there are another series of signs that appear with some frequency and that, despite being unnoticed against other major problems represent basic and fundamental factors in the correct development and performance such as constipation problems and sleep disorders

Objective: To evaluate the effectiveness and safety of the non-invasive neuromodulation device applied in people with neurodevelopmental disorders, in relation to constipation problems and in the quality of sleep.

Methods: A prospective observational study was conducted. Children with neurodevelopmental disorders were selected that met the established inclusion criteria, and to whom the non-invasive neuromodulation device (NESA XSignal) was applied, based on the use of microcurrents during 12 sessions of 60 minutes of treatment (alternate days). The type and frequency of bowel movements was evaluated as well as the hours and quality of sleep. The participants in the study continued to receive the routine of care already prescribed as usual.

Results: 20 participants with neurodevelopmental disorders were selected in our hospital to evaluate the viability of this initiative. The quality sleep results did not statistically significant change was seen, but deposition results were better. No incidence was recorded in participants derived from the use of the electrotherapy device

Conclusions: The use of non-invasive neuromodulation can improve the quality of life in children with neurodevelopmental disorders. More studies are necessary for statistically significant results.

OP120

SUPERVISED INDIVIDUALLY DESIGNED EXERCISES FOR CHRONIC LOW BACK PAIN**Anita Stankovic¹, Mirjana Kocic¹, Ivona Stankovic¹, Dragan Zlatanovic¹, Milica Lazovic², Aleksandra Krstovic¹**Clinic for Physical Medicine and Rehabilitation, Clinical Center Nis¹, Nis, Institute for Rehabilitation, Medical faculty University of Belgrade², Serbia

Introduction – Chronic low back pain is a complex medical problem. The treatment should include adequately composed and conducted exercises. Many patients have fear of movement and refuse to perform any kind of exercises. Supervised and in intensity and repetition gradually added, individually designed exercise program can resolve those initial problems and have positive effect on pain reduction, increase in functionality and improvement of overall quality of life in these patients.

Objective – Evaluation of the effectiveness of the supervised individually designed exercises in the treatment of chronic low back pain.

Method – The study included 130 patients. Patients were divided in three groups. Group 1 had supervised individually designed exercises; group 2 had the same exercises program but administered without supervision or gradual increase in intensity; group 3 was a control group without prescribed exercises. Results were gathered before and after the therapy, when all of the patients completed four questionnaires: Numerical Pain Rating Scale (NPRS); WHOQOL-BREF, Oswestry Disability and Fear-Avoidance Beliefs Questionnaire.

Results – After the therapy functional improvement, as well as the improvement in overall life quality was monitored in Group 1. ODS decreased significantly from 39.80 ± 13.68 to 31.89 ± 11.57 ($p < 0.001$) and WHOQOL-BREF detected improvement in quality of life from 85.66 ± 14.55 before to 87.91 ± 13.40 after the therapy ($p < 0.001$). Fear of pain induced by physical or professional activities also decreased significantly 16 ± 34 to 13.49 ± 4.90 and 14.60 ± 11.75 to 11.66 ± 10.16 ($p < 0.001$). Results in other two groups wasn't so impressive ODS G2 (30.67 ± 18.05 before to 27.43 ± 15.83 after, $p < 0.01$), G3 (33.07 ± 13.01 before to 31.10 ± 11.73 after). WHOQOL-BREF in G2 and G3 showed no change in quality of life and FABQ monitored minimal decrease of movement Induced fear in these two control groups.

Conclusions – Supervised individually designed exercises have positive effect on pain, functionality and quality of life in patients with chronic low back pain.

OP121

POLYMYALGIA RHEUMATICA AND CONNECTION TO POLYNEUROPATHY CASE REPORT**Anneli Teder-Braschinsky**

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Introduction: This article aims to provide a current evidence for importance of treatment and investigations in polymyalgia rheumatica.

Objectives: Polymyalgia rheumatica (PMR) is an auto-inflammatory rheumatic disease of people over 50 years, presenting with pain and stiffness in the neck, shoulder and hip girdles [1]. Annual incidence of PMR is up to 50/100,000 population over 50 yr [2]. The severity of symptoms may be surprising in older patients. Still it is a statement that that overdiagnosis of PMR may cause more problems compared to underdiagnosis. The consequences of underdiagnosis and no treatment is not very clear.

Methods: This case-report shows good results in repair of hip and knee contractures after using oral glucocorticosteroid and intensive injections of corticosteroid hormones into intraarticular space under control of ultrasound. A previously 71-years old woman have got sick in autumn 2016: was not able to move on stairs, complain stiffness. In March 2017 was hospitalised because of tetraplegia- was not even able to move to a sitting position, so stayed bed-ridden. The known comorbidities were obesity (body mass index 38 kg/m²), diabetes, hypertension and atrial fibrillation. Blood tests: ESR 78 mm/h, CRP 81 mg/l. Several axonal injury (severe neuropathy in motor, mild sensory neuropathy in hands) was found on ENMG. Tetraplegia involved legs more than hands, more proximal. There were 40 degrees contractures in hips and knees. 11 months later started with intensive injections of corticosteroid hormones into intraarticular space under control of ultrasound and oral Prednisolone in combination with physiotherapy. Contracture of the knees and hips decreased. 2,5 years later patient is walking freely, knee extension bilaterally 20-30 degrees. Hip flexural contraction 10-15 degrees. CRP 4.1 mg/L.

Conclusions: extreme joint swelling in undertreated PMR may lead to the development of mechanical nerve compression and in complication culminate like polyneuropathy with contracture of hips.

OP122

**MODIFIED CONSTRAINT-INDUCED MOVEMENT THERAPY IN CLINICAL PRACTICE -A
LARGE CLINICAL COHORT STUDY****Annika Sefastsson¹, Xiaolei Hu², Britt-Marie Ståhlacke², Ann Sörlin², Håkan Littbrand²,
Per Wester³**Institution of Social Medicine and Rehabilitation, Umeå, Stockholm¹, Dept of Social Medicine and
Rehabilitation, Umeå², Dept of Public Health and Clinical Medicine³, Sweden

Introduction: Modified Constraint-Induced Movement Therapy (mCIMT) has demonstrated evidence of benefit for the upper extremity in comparison to traditional therapies in the acute and chronic stages of stroke. Regardless of convincing evidence of the effectiveness of mCIMT in research settings, clinical implementation has so far been limited.

Objective: The overall aim of this study is to investigate whether mCIMT in an outpatient clinical setting with broader recruitment criteria compared to the research settings can still demonstrate improvements of various outcomes both in the subacute and chronic stages of stroke.

Method: The present study was a prospective cohort study with approximately 400 patients, ages 18 – 70, who suffered a stroke causing upper extremity impairment. Patients were treated at an outpatient clinic in Stockholm between 2000 and 2018. The mCIMT was used to deliver high intensity task-specific training 6 hrs/day, 5 days/week for 2 consecutive weeks. Assessments were performed before and after treatment as well as 3-6 months after treatment. Upper extremity function was evaluated by Birgitta Lindmark Motor Assessment. Grip strength was measured with GRIPPIT and dexterity was examined with a timed peg test. Health related quality of life (HRQoL) was assessed by Short Form-36.

Results: Preliminary results from 80 patients showed significant improvement on upper extremity function ($p < 0.001$) and grip strength ($p = 0.001$) for affected arm and hand. Enhancements were demonstrated on the SF-36 domains of Health, Physical Function and Vitality. The improvements were persistent at 3-6 months follow-up. The results from 400 patients will be presented at the conference.

Conclusions: The current results demonstrate preliminary positive effects of mCIMT in the outpatient clinical setting as shown in research settings in RCT studies.

OP123

WHAT IS THE Adapted Physical Activity PROGRAM THE BEST FOR PATIENTS WITH NEUROLOGICAL DISABILITY? PILOT STUDY**Antonio Ammendolia^{1,2}, Nicola Marotta¹, Andrea Demeco¹, Iliaria Pino¹, Marianna Barletta¹**Department of Medical and Surgical Sciences¹, University of Catanzaro "Magna Grecia"², Catanzaro, Italia

Introduction: Falls and fall-induced injuries are a leading cause of morbidity and mortality among older and frail neurological disability people worldwide and preventing them is an international priority. Deficits in the somatosensory and vestibular system can also contribute to falls, because they are associated with an increase in postural sway. Experimental evidences suggest that different types of exercise training in disabilities patients has the potential to favorably affect physical function and prevent worsening of the disability.

Objective: To compare the effectiveness of two specific program of adapted physical activity in patients with neurological disability in order to reduce the risk to fall and to improve the autonomy in the activities day living.

Method: 46 patients suffering with Multiple Sclerosis, Stroke and Parkinson's disease were enrolled. All participants have been submitted to clinical evaluation with: FIM, Tinetti scale, Berg Balance staircases, Time Up and Go test, 6MWT, HADS and EuroQol questionnaire. They were randomly divided into 2 groups: APA group (adapted physical exercises) and APA-D group (exercises using devices). Each group participated in two 60-minutes weekly sessions for 2 months and they were tested at T0, T1 (at the end of the treatment) and after 6 months (T2).

Results: Both groups, at T1 showed an increase level of performance and health status, though the APA-D presented a more pronounced decrease in the risk of fear of fall for balance variable.

Conclusions: Results demonstrated fall risk relationship with "functional tests" currently used to measure dynamic balance and its accuracy in predicting falls in neurological patients.

OP124

THE GREEK EXPERIENCE OF DEVELOPING SIMPLE, INTUITIVE DESCRIPTIONS OF THE REHABILITATION (GENERIC-30) SET CATEGORIES**Antonios Kontaxakis¹, Maria Pyrgeli², Aggeliki Stavrianou³, Melissa Selb⁴, Aydan Oral⁵, Christina- Anastasia Rapti⁶**

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Introduction: 18 years after the launch of the International Classification of Functioning, Disability and Health (ICF), worldwide acceptance has been achieved. In order to strengthen implementation as well as increase awareness, a consensus process to create the Greek simple and intuitive translation of the Rehabilitation Set (also called Generic-30 Set) was initiated.

Objective: Development of the Greek translation of the simple and intuitive descriptions of the ICF Rehabilitation Set.

Method: Using both the Chinese and the Italian versions of the simple and intuitive descriptions of the ICF Rehabilitation Set as a starting point, a 2- stage consensus process was followed to develop the Greek version. Firstly, a proposal of the translation in Greek for each Rehabilitation Set category description was developed and in the second stage a modified version of the established consensus procedure was followed. Due to distance and cost issues, e-mail communication was used. Divided into three working groups, the participants exchanged comments and voted for or against the proposed translation in terms of simplicity for everyday use (phase 1). Afterwards the ambiguous categories were divided among the three groups, new proposals were developed and were voted on by all the groups (phase 2). For each remaining ambiguous category, each group formed a new proposal. Finally, all the participants voted for one of the three created options (phase 3).

Results: 30 participants from both urban and rural regions of Greece and comprising of different rehabilitation professions took part in this consensus process.

Conclusions: As a part of international efforts to implement the ICF, a significant number of rehabilitation facilities in Greece took part in getting familiar and taking first steps toward implementing the ICF Rehabilitation Set categories. The final Greek translation also brought together for the first time diverse rehabilitation views in Greece.

OP125

EPIDEMIOLOGICAL ANALYSIS OF PATIENTS ADMITTED TO A POST-ACUTE CARE HOSPITAL FOR REHABILITATION TREATMENT**Auxiliadora López, Lourdes González, Nerea De la Puente, Paloma Galán, Gema Flores, Carmen Sampayo**

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Introducción: The post-acute care hospitals allow rehabilitation treatment to patients who, due to their comorbidity and socio-family status, cannot perform it on an outpatient basis.**Purpose:** To analyze the epidemiological characteristics of patients admitted to a post-acute care hospital for a rehabilitation treatment.**Method:** A cross-sectional descriptive study of all patients admitted for rehabilitation in a post-acute care hospital on a day in September 2019 was carried out. The variables analyzed were: gender, age, reason for admission, comorbidity, polymedication, frailty, social risk, functional independence and ability to walk on admission.**Results:** There was 83 patients, 37 women (44.6%) and 46 men (55.4%). The age was between 53 and 97 years with a mean of 78.4 ± 10.9 years. 37.3% had a hip fracture, 26.5% a stroke, 28.9% a physical deconditioning syndrome, 6.0% a lower limb amputation, and 1.3% other diagnosis. 65 patients (78.3%) met frailty criteria (according to Fried), 85.5% was polymedicated (Bjerrum criteria), 92.8% had high comorbidity (Charlson index) and 67.5% had a social problem or high social risk (Gijon scale). The Barthel Index was between 0 and 65, with a mean of $28.4 + 12.2$. Only 13 patients (15.7%) could walk on admission.**Conclusion:** The patients who are admitted in a post-acute care hospital for a rehabilitation treatment are very complex and need this health resource to recover the maximum possible functional independence.

OP126

PREVALENCE OF FRAILTY AND ASSOCIATED RISK FACTORS AMONG SAUDI COMMUNITY-DWELLING OLDER ADULTS**Bader Alqahtani**

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Objectives: To investigate the prevalence of frailty, and associated risk factors among Saudi older adults.

Methods: A total of 486 community-dwelling older adults aged ≥ 60 years living in the Riyadh region were included in the study. This study took place from January 2018 to August 2019. Frailty prevalence was assessed with the Fried's frailty phenotype. Cognitive function was assessed by the Arabic Mini-Mental State examination. A multinomial logistic regression model was constructed to examine the association between sociodemographic characteristics and clinical risk factors and frailty.

Results: The overall prevalence of pre-frailty and frailty were 47.3% and 21.4%, respectively. Frail participants were older, were more likely to live alone, had more chronic conditions, and had lower cognitive function.

Conclusion: The prevalence of frailty the Riyadh region in Saudi Arabia was high compared to other populations. Future research should examine the consequences of frailty in this population

Key words: Frailty, Fried's frailty, pre-frail, Saudi Arabia, older adults

OP127

NEUROPROTECTIVE EFFECT OF PITAVASTATIN ON MOTOR DEFICIT AND FUNCTIONALITY INDUCED BY SCIATIC NERVE CRUCH IN THE RAT**Başak Mansız Kaplan¹, Mustafa Sırrı Kotanoğlu^{1,2}, Koray Gürsoy^{1,3}, Barış Nacir^{1,3}, Nihat Yumuşak⁴, Gökhan Koca^{1,5}**

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Introduction: It is known that statins have anti-inflammatory and anti-oxidant effects. Atorvastatin, simvastatin and lovastatin have also neuroprotective effect. In the literature, although the anti-oxidant and anti-inflammatory effects of pitavastatin have been demonstrated, there was no study that investigated the neuroprotective effects of pitavastatin. The aim of this study was to evaluate the ameliorative effect of pitavastatin in models with sciatic nerve injury.

Material and methods: Thirty winstar albino rats were divided into 3 groups. Sham group (S) did not undergo nerve damage. The control group (C) applied nerve damage but no treatment. The intervention group (P) received nerve damage and was given 2 mg / kg pitavastatin once a day for 28 days orally. Nerve crush was induced to the left sciatic nerve using forceps 5 mm above the bifurcation of the nerve. It was crushed 3 times for 10 sec and with 10 sec intervals. Before operation and at the end of the treatment, quantitative gait analysis was performed with CATWALK. Under anesthesia, sciatic nerve conduction was studied with EMG and scintigraphic evaluation was performed. At the end of the treatment, the operated nerve was examined macroscopically and microscopically.

Results: The study was completed with 10 rats in each group. Improvements of the values of sciatic nerve conduction studies such as velocity, amplitude and latency values were significantly difference between groups (pP>C). Pathological examination revealed a significant difference in total myelinated axons and mean diameter values (pP>C). According to quantitative gait analysis, individual and dynamic parameters and scintigraphic examinations showed statistical differences in pre- and post-treatment values (pP> C).

Conclusion: After nerve crush injury, pitavastatin given orally for 28 days could be effective on nerve regeneration and improvement of the motor function.

OP128

LET'S TALK ABOUT SEX – CANCER PATIENTS AND SEXUAL WELL-BEING**Bas van de Weg**

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Sexual health is commonly taken for granted as part of our everyday life. Health care providers do not often address aspects of sexuality structurally, citing lack of experience, privacy, education, and role ambiguity and embarrassment as deterrents. Conversely, most patients do not share their sexual concerns with health care providers. Cancer treatments frequently have long-term detrimental effects on sexual well-being. A 2017 review by the Dutch Federation of Cancer patients* showed that 67% of respondents (n = 2657, 56% women) reported sexual problems (table 1). Symptoms frequently persist for years and may have significant impact on quality of life. The problems are both physical, e.g. urine loss, and emotional, e.g. fear, loss of confidence and poor self-esteem.

In conclusion, sexual problems after cancer (treatment) occur alarmingly frequently. Generally speaking, the prevalence of reported emotional and physical problems is somewhat higher in women, except for urine loss and orgasm difficulties. It is important for physicians and other carers to be aware of the high prevalence of reported problems, and to act swiftly if required.

F.B. van de Weg, consultant Physical Medicine & Rehabilitation, Revant, the Netherlands

*<https://nfk.nl/media/1/180918-Rapportage-DJE-Kanker-en-Seks-2017.pdf>

OP129

TREATMENT WITH FOCAL SHOCK WAVES IN CHRONIC PLANTAR FASCIITIS**Beatriz Entrambasaguas Estepa¹, Isabel Maria Pérez Saborido¹, Lourdes Vega López², Aránzazu Vázquez Doce², Pia Spottorno Rubio²**Physical and Rehabilitation Medicine, Hospital Universitario Virgen de la Victoria Málaga, Málaga¹, Hospital Universitario La Princesa Madrid², Spain

Introduction: The alterations of the plantar fascia represent a very frequent pathology and is an important therapeutic problem. In some patients its evolution is torpid, being the cause of morbidity during months or years. A treatment proposal is the extracorporeal Focal Shock Wave (FSW) therapy, useful for chronic plantar fasciitis (CPF) refractory to conventional treatments.

Objective: To assess the results of the treatment with focal shock waves in chronic plantar fasciitis that does not improve with other conventional therapies.

Methods: A retrospective observational study done in the period of June 2016 to December 2018, in patients included in the FSW protocol in CPF, in a total of 56 patients.

Results We observed a decrease of pain, quantified through the Analogue Visual Scale (AVS) with a decrease of 3 points of the initial mean value, and AOFAS scale for hindfoot, before and after treatment, with an increase of 12 points. The degree of satisfaction through the Roles and Maudsley Scale at the end of the treatment was excellent in 40% and good in 60%. On the other hand, the thickness of the plantar fascia was reduced in 30% of patients and remained the same in 70%.

Conclusions: According to the results obtained in our study, Focal Shock Wave therapy is an effective therapeutic alternative to reduce pain and improve functional ability in chronic plantar fasciitis, being a technique well accepted by patients.

OP130

IMPACT OF COGNITIVE RESERVE ON BARTHEL INDEX AND GAIT VELOCITY**Biljana Stojanovic¹, Sindi Rodic^{1,2}, Ana Radic¹, Ana Bukva¹, DimkicTomic Tijana¹, Uros Konstantinovic³**Neurorehabilitation, Clinic for rehabilitation "Dr Miroslav Zotovic"¹, School of Medicine, University of Belgrade², Institute for medical research³, Belgrade, Serbia

Introduction: Multiple sclerosis (MS) is associated with a progressive decline in functionality. Cognitive reserve (CR) is observed to explain interindividual differences to cope with compensating for pathology. Recent studies define it as the protective influence of participating in activities of daily living throughout life, which may then guard against neurodegenerative functional decline.

Objective: To examine the correlation of the cognitive reserve and functional recovery in persons with MS (pwMS).

Method: Fourteen patients diagnosed with MS and The Expanded Disability Status Scale (EDSS) score of 2-6.5, were consecutively admitted to inpatient rehabilitation at the Clinic for rehabilitation "dr Miroslav Zotović" in Belgrade. All patients received daily exercise therapy in combination with FES cycling (20min) for four weeks. To measure CR, we used Cognitive Reserve Index Questionnaire (CRIq) with subscores of three sections: education, working activity and leisure time. CRIq scores were categorized into five ordered levels: low, medium-low, medium, medium-high, high. The Timed 25 Foot walk (T25FW) was used to quantify the mobility and function of the leg. To measure performance in activities of daily living, we used the Barthel index (BI). Data were collected before and after four weeks of treatment.

Results: The study participants included eight men (57.1%) and six women (42.9%) with ages ranged from 31 to 54 (44.36 ± 7.82) and the median EDSS 4.5 (2.5-6.5). Most of the patients 85.7% had a medium-high level of CR. The mean CRIq score of the patients was 100.57 ± 8.83 , and the mean (\pm standard deviation) of subscores were: CRI Education 98.71 ± 10.40 ; CRI Working activity 94.71 ± 4.41 ; CRI-leisure time 108.14 ± 11.09 . A statistically significant correlation was found between CRI-Education and BI ($\rho = 0.707$, $p = 0.005$) and CRIq and BI ($\rho = 0.553$, $p = 0.04$).

Conclusions: This study showed that the cognitive reserve positive correlates with activities of daily living. Besides, the persons who had a higher level of education had better functional recovery.

OP131

PHYSICAL THERAPY AND QUALITY OF LIFE IN PATIENTS WITH SURGICALLY TREATED PERTROCHANTERIC FRACTURES**Biljana Mitrevska, Valentina Koevska, Cvetanka Gerakaroska-Savevska, Marija Gocevska, Biljana Kalcovska-Ivanovska, Maja Manoleva**

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In the world, increasing incidence of hip fractures is a major challenge for the health system and society. For adults, the consequence of hip fracture can be the start of a significant decline in functioning levels.

Aims: To evaluate the effects of physical therapy and rehabilitation with magnetictherapy versus interference currents and to identify possible differences in the quality of life of patients with surgically treatedperthrochanteric fractures .

Material and methods: The study was conducted at the Institute for Physical Medicine and rehabilitation- Skopje. The research included 90 patients, divided in two groups: examined group - 45 patients, treated with kinesiotherapy and magnetictherapy, low-frequency pulse-field intensity 8mT, 25Hz, 30 minutes for 10 treatments and control group – 45 patients, treated with kinesiotherapy and interference currents, 10 treatments, for a period of 30 minutes, with constantly frequency of 100Hz. Patients were followed for one year, during which were performed three examinations, the first control on the day of discharge, than after 6 and 12 months The first and third controls complete the SF-36 Quality of Life Questionnaire.

Results: The analysis of the study and control group, after 12 months, indicated that the quality of life of patients treated with kinesiotherapy and magnetictherapy had a better quality of life compared to patients treated with kinesiotherapy and interference currents over all eight parameters of SF36 ,p

Conclusion: It can be concluded that postoperative rehabilitation of pertrochantericfractures, therapy of choice is kinesiotherapy and magnetictherapy, from which there is an improvement both in functional status, in the stimulation of osteogenesis and quality of life in adult patients.

Key words: pertrochanteric fractures, magnetictherapy, interference currents, quality of life

OP132

REHABILITATION SERVICE ASSESSMENT AND WORKFORCE CAPACITY BUILDING IN ALBANIA**Boya Nugraha¹, Klejda Tani², Christoph Gutenbrunner¹**Department of Rehabilitation Medicine, Hannover Medical School, Hannover, Germany¹, Faculty of Technical Medical Sciences, University of Medicine Tirana, Albania²

Introduction. Albania is a country situated on the Balkan Peninsula in southeastern Europe. It has Gross Domestic Products (nominal) of 13.50 billion € (total) and 4696 € (per capita). Albania has a population of 2,862,427. The prevalence in Albania is 6.2%. In light with the demographic and health conditions in the country, the need to strengthen rehabilitation in the country is unavoidable. This project aimed at analyzing the rehabilitation system in Albania with main focus on rehabilitation service provision and rehabilitation workforce capacity. This project did not aim to develop a National Strategic Plan for Rehabilitation according to the standards of World Health Organization (WHO), which need commitment from government of the country. For this purpose, a bottom-up approach was done, which was initiated by the Faculty of Technical Medical Sciences, University of Medicine Tirana, Albania in a partnership with Department of Rehabilitation Medicine, Hannover Medical School.

Methods. This study consisted of several phases. Phase 1: collecting available information by using WHO's framework. Phase 2: site visit to the hospitals and relevant rehabilitation services, including interview with relevant stakeholders. Phase 3-5: second visit, workshop with relevant stakeholders and finalizing report will be performed in the near future.

Results. The reported results on this abstract only taken from analyzing the information from phase 1 and 2. Some findings include that The Ministry of Health and Social Protection is responsible for rehabilitation in the country. However, rehabilitation is only included within mental health areas, particularly in pediatrics. No specific budget allocated for rehabilitation. There are only three different rehabilitation professions in Albania, namely physiotherapist, speech and language therapist, and psychologist. In Albania, there is no comprehensive rehabilitation services nor rehabilitation in acute care.

Conclusion. Strengthening rehabilitation medicine in Albania is needed, including rehabilitation workforces and rehabilitation service provision.

OP133

BURDEN OF LOW BACK PAIN IN CHILDREN**Branko Vujkovic¹, Mirjana Durutovic Mozetic²**PRM, FizikalCentar by SMA, PRM Department¹, General Hospital Sabac², Sabac, Serbia

Introduction: Musculoskeletal diseases are a major cause of sick leave and work disability. They are the largest single cause of work loss in Europe with significant health resource utilisation with associated direct and indirect costs of treatment for society. Musculoskeletal conditions are in the top 5 diagnostic groups in Europe in terms of health care costs. Among them, low back pain (LBP) has the biggest DALY index. The direct and indirect costs of LBP are huge, for example currently noted as over 90 billion USD annually in the USA. The cost of pediatric back pain is not limited only to the direct health-care costs related to imaging, office visits, other diagnostic tests, and treatments. The burden also arises from missed work by parents and other associated expenses.

Objective: The objective of this article was to point out the importance of adequate diagnostics and therapy of the LBP in children, economic consequences of inadequate treatment, and the importance of good data.

Method: We have searched the scientific database Pubmed with keywords: burden, low back pain, children. We analyzed relevant articles dealing with this issue.

Results: With Pubmed search we have found 49 articles dealing with this issue. We could not find articles which have the science based data about costs of LBP in children.

Conclusions: Cost of LBP in the pediatric population have not been well established in the literature. The importance of studying pediatric LBP is enormous because of gaining a better understanding of its etiology, diagnostics, effective treatment, and possible prevention.

OP134

PSYCHOMETRIC PROPERTIES OF TURKISH VERSION OF JENKINS SLEEP SCALE IN FIBROMYALGIA SYNDROME**Cagri Unal Ulutatar¹, Tugba Ozsoy Unubol²**Physical Medicine and Rehabilitation, SancaktepeSehit Prof Ilhan Varank Training and Research Hospital¹, Istanbul Sultanabdülhamid Han Training and Research Hospital², Istanbul, Turkey**Introduction:** Fibromyalgia syndrome (FMS) has adverse effects on the quality of sleep.**Objective:** The aim of this study was to investigate the validity and reliability of Jenkins Sleep Scale (JSS-TR) in Turkish FMS patients.**Method:** FMS patients who met the 2016 fibromyalgia diagnostic criteria were included in the study. Clinical and demographic data of the patients were noted. The relationship between this scale and other functional parameters such as Pittsburgh Sleep Quality Index (PSQI), European Quality of Life Scale-5 Dimensions (EQ-5D), Fatigue Severity Scale (FSS), Beck Depression Inventory (BDI) was examined. Fibromyalgia Impact Questionnaire (FIQ) was used to evaluate the functional status of the patients and the progression of the disease. Test-retest reliability was calculated by re-applying the questionnaire to patients at 2-week intervals. Duloxetine treatment was initiated in newly diagnosed patients and sensitivity to change was tested at the end of the treatment. Spearman correlation coefficient was used. $P < 0.05$ was accepted as significant.**Results:** Eighty-one FMS patients (71 females, 10 males) were included in the study. The mean age was 44.2 ± 10.7 years. The strongest correlation of JSS-TR was with another sleep questionnaire, PSQI ($\rho = 0.79$, $p < 0.0005$). The correlation with other functional parameters and FIQ was moderate. In test-retest validity, intraclass correlation coefficient was found to be 0.98 ($p < 0.0005$). Chronbach α value calculated for internal consistency was found to be 0.741.**Conclusion:** JSS-TR is a valid, simple and feasible sleep instrument that can be easily applied to FMS patients both in researches and clinical settings.

OP135

BOTULINUM TOXIN IN AMPUTEES: EFFECTS ON STUMP HYPERHIDROSIS, RESIDUAL LIMB PAIN AND PHANTOM LIMB PAIN – A REVIEW**Carolina Lourenço^{1,2}, Adriana Pascoal², José Vilaça², Inês Ferro², Filipe Morais², Jorge Laíns²**Physical and Rehabilitation Medicine¹, CMRRC - Rovisco Pais², Tocha, Portugal

Introduction: Stump hyperhidrosis is a major problem in amputees, frequently associated with skin problems, reduced prosthetic fitting and function and reduced quality of life. Residual limb pain (RLP) and phantom limb pain (PLP) are also common and interfere with functionality. Management of these conditions is challenging. Botulinum toxin has been used for hyperhidrosis and painful conditions in several locations.

Objective: The aim of this paper is to review the evidence of botulinum toxin application for stump hyperhidrosis, residual limb pain and phantom limb pain.

Method: A narrative review was conducted searching in Pubmed, Medline and Cochrane with the keywords: “botulinum toxin”, “amputee”, “hyperhidrosis”, “residual limb pain” and “phantom limb pain” or respective MESH terms.

Results: A total of 6 articles were selected: three case series, two non-randomized controlled studies (NRS) and one randomized clinical trial (RCT).

Hyperhidrosis: one case series and two NRS evaluated hyperhidrosis. In all of them hyperhidrosis was significantly reduced at 3 weeks (Charrow 2008), 3 months (Kern 2011) and 6 months (Cowan 2016).

RLP: a case series (Charrow 2008) revealed no effect on pain. Other two case series (Kern 2004 and Jin 2009) and a NRS (Kern 2011) concluded there was a reduction on RLP at 12 weeks. The RCT (Wu 2012) described reduction of RLP at 6 months in both groups: the group that received botulinum toxin and the control group (which received a combination of lidocaine and depomedrol) with no difference between them.

PLP: one case series (Jin 2009) and the RCT evaluated PLP. Jin et al reported improvement of PLP at 12 weeks. However, the RCT revealed no improvement of phantom limb pain.

Conclusion: Nowadays, hyperhidrosis, RLP and PLP constitute challenges in management of an amputee. Botulinum toxin may represent an option for hyperhidrosis and RLP but evidence is still insufficient to conclude about botulinum toxin efficacy.

OP136

THE RELATIONSHIP BETWEEN LOW BACK DISABILITY AND FIBROMYALGIA SEVERITY IN FEMALES WITH FIBROMYALGIA**Cevriye Mülkoğlu**

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Introduction-Objective: Fibromyalgia syndrome (FM) is a disorder characterized by diffuse pain, fatigue and sleep disturbances. The aim of this study was to investigate the relationship between low back pain and disability in FM and disease severity.

Methods: 40 female FM patients, diagnosed as FM according to the 2016 revised fibromyalgia criteria were included in the study. The patients had back pain at least 3 months. Patients with lumbal radicular symptoms and neurological deficit were excluded from the study. Fibromyalgia impact questionnaire (FIQ) was used to assess disease severity, Oswestry disability questionnaire (ODQ) was used to assess back disability, and Beck depression questionnaire (BDI) was used to assess psychological status. The general pain severity of the patients was evaluated with a visual analog scale (VAS) of 0-10 cm.

Results: The mean age was 44.0 ± 1.2 (32-58) years. The median VAS score was 6 (2-9). The mean score of FIQ was 56.8 ± 1.8 (27.2-73.3), of ODQ score was 29.7 ± 2.3 (12-72) and of BDI score was 19.0 ± 1.3 (4-41). A statistically significant positive correlation was found between ODQ and FIQ ($r:0.34$, $p:0.03$); ODQ and BDI ($r:0.39$, $p:0.01$). There was no correlation between VAS and ODQ ($r:0.2$, $p:0.15$).

Conclusions: Low back pain is one of the most common symptoms in FM patients. Chronic low back pain causes difficulties in daily activities and deteriorates quality of life. In this study, we investigated the effect of low back pain and disability on disease severity in patients with FM. We found a moderate significant positive correlation between back disability, FM severity and psychological status. According to our results, as back disability increases; FM severity increases and psychological status deteriorates. In FM patients, pain severity does not affect back functions.

In conclusion, we can decrease FM severity and ameliorate the psychological status of by improving back disability in FM patients.

OP137

IS ADAPTED CYCLING TRAINING ACHIEVABLE IN CHILDREN WITH CEREBRAL PALSY WITH POOR MOTOR FUNCTION?**Cloé Dussault-Picard¹, Benjamin Sinclair¹, Annie Pouliot-Laforte², Audrey Parent², Julie Lachappelle³, Laurent Ballaz¹**Sciences de l'activité physique, Centre de recherche CHU Sainte-Justine¹, Université du Québec à Montréal², École Victor-Doré³, Montréal, Canada

INTRODUCTION: In children with cerebral palsy (CP), lower muscle strength and cardiorespiratory fitness are associated with lower locomotion capacities, especially in children with poor gross motor function (GMFCS II-IV). Cycling exercise could be a promising approach to improve walking efficiency, due to its potential impact on these physiological systems. **OBJECTIVE:** The objectives of this study were (1) to assess if tricycle cycling exercise is in accordance with Verschuren's recommendations, in terms of intensity and duration, and (2) to report the physical limitations which could impact training feasibility. **METHOD:** thirteen children with spastic CP, who were able to ride a tricycle (Trivel, Montréal, Canada) were included (aged 5-11 years; GMFCS level II-IV). A 9-week training program (2 sessions/week) was implemented on stationary tricycle in a school for children with motor disabilities (Victor-Doré, Montreal, Canada). Four bouts of 5-minute exercise, with standardized encouragement, were planned for each session. Intensity and duration of exercise were evaluated during each session. Lower limb range of motion (RoM), muscle strength, and walking % reserve heart rate were assessed before training. **RESULTS:** The mean intensity and the duration while cycling were 45.2 ± 9.8 % of reserve heart rate and $18,0 \pm 2,3$ min, respectively. Children performed 12.8 ± 2.9 training sessions. Two participants were not able to achieve the targeted minimal exercise recommendations (Both with GMFCS II). Muscle strength is related to exercise duration and walking % reserve heart rate is related to exercise intensity and duration. **CONCLUSION:** The achievement of tricycle training is possible in children with poor motor function, even in those with low muscle strength but physical limitations could impact exercise performance if no consideration is taken.

OP138

FEASIBILITY AND EFFECTIVENESS OF A HOME-BASED SOMATOSENSORY TRAINING IN PATIENTS WITH CHRONIC MUSCULOSKELETAL PAIN**Christophe Demoulin^{1,2}, Caroline Steveler², Annick Timmermans², Anne-Françoise Donneau², Marc Vanderthommen², Jean-François Kaux²**Physical Medicine and Rehabilitation and Sport and Rehabil¹, CHU Liege and ULiege², Liege, Belgium

Introduction: Considering that effectiveness of somatosensory training (SST) to improve pain and function in patients with chronic musculoskeletal pain (CMP) remains controversial, further studies are needed.

Objective: The goal of this preliminary study was to investigate the effectiveness (pain relief) and the acceptability, in patients with chronic musculoskeletal pain (CMP), of a home-based SST using a smartphone (SP) game (mobile application) during which participants have to focus their attention on specific body parts.

Method: 37 patients with CMP were included in this cross-over study; the results of 30 of them could be used for analyses. Participants successively performed two two-week phases (randomized order) consisting of a control period and a training period during which patients were asked to play a SP game (demo version) every day at home. The SP was connected to 2 tactile stimulators and involved flexibly switching attention between ignoring input from painful and non-painful body parts. Participants had to complete numeric rating scales (NRS) for pain intensity before and at the end of both phases and a satisfaction questionnaire at the end of the SST.

Results: The overall results suggest that a two-week SST using a SP game is feasible in patients with CMP and is globally appreciated. However, no clinically significant reduction in pain intensity was observed at the end of the SST training.

Conclusions: Although this preliminary study suggests the feasibility and acceptability of a home-based SST training by means of a SP game which involved practicing inhibiting distracting input, no clinically significant effects were observed for pain intensity. A larger scale study with an improved version of the SP game i.e., proposing longer game sessions (as the game only lasted less than 10 minutes) with a higher level of difficulty, is therefore necessary before drawing conclusion on the (in)effectiveness of such SST.

OP139

EFFECTIVENESS OF THREE EDUCATIONAL TOOLS IN PATIENTS WITH CHRONIC LOW BACK PAIN: A RANDOMIZED CONTROLLED TRIAL**Christophe Demoulin^{1,2}, Emilie Ducourtieux², Elan Schneider Retrain³, Stéphanie Grosdent², Jean-François Kaux², Marc Vanderthommen²**Physical Medicine and Rehabilitation AND Sport and Rehabil¹, CHU Liege AND ULiege², Pain Foundation ³, Liege, Belgium

Introduction: All recent guidelines underline the fact that patient education is a key element in the management of patients with low back pain. Therefore, various educational tools have been developed.

Objective: The goal of this randomized controlled trial was to study the satisfaction of patients with non-specific chronic low back pain (NSCLBP) with regard to 3 educational tools and to investigate their effectiveness to improve pain and disability.

Method: 258 participants with NSCLBP not undergoing any treatment at the time of the study were recruited. After having filled in a battery of questionnaires (pain, disability, etc.) (Pre-test), patients were randomized into 4 groups i.e., a waiting-list group (WLG) and 3 groups receiving the following educational tools, respectively: the "Retrain Pain" website (RPG), the "Pain Fundamentals" booklet (PFG) and an original booklet specifically for patients with back pain (CHUG). One month after completing the Pre-test, participants were invited again to fill in the battery of questionnaires (Post-test); a satisfaction survey regarding the tool received was also conducted.

Results: Analysis of the pre-test results indicated low disability and no between-groups differences. 48, 40, 50 and 55 patients (randomized among the RPG, PFG, CHUG and WLG groups, respectively) completed the post-test. A few of them in each of the 3 "experimental" groups did not use the tool. Regarding the other patients, 87.4% of subjects reported that the tool they received helped them better understand their pain. The mean score given by each group regarding the tool quality (with 10/10 = exceptional tool) was 7.0 ± 1.7 , 6.9 ± 1.7 and 7.6 ± 1.1 , respectively. However, changes in pain and disability scores did not differ between the 4 groups.

Conclusions: Although most patients seem to be satisfied with the tools, their use alone does not appear to significantly change pain and disability outcomes in this study population with low disability.

OP140

TASK-RELATED CHANGES IN BRAIN ACTIVITY IN STROKE PATIENTS AS MEASURED USING FUNCTIONAL NEAR-INFRARED SPECTROSCOPY**Congcong Huo¹, Gongcheng Xu¹, Hui Xie¹, Ying Liu², Tengyu Zhang², Zengyong Li²**

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Introduction: The intensity, repetition, task-specific training and motivation have been demonstrated as the key elements for the recovery of upper extremity motor function after stroke. The upper limb rehabilitation robot can achieve goal-directed training and provide immersive interactive experience, promoting the reconstruction of upper limb function of hemiplegic patients. This study aimed to investigate the task-related changes in brain activity based the upper limb rehabilitation robot in stroke patients as measured using the functional near-infrared spectroscopy (fNIRS).

Methods: A total of seven stroke patients with right hemiplegia participated in this study. The cerebral oxygenation signals (oxygenated hemoglobin [oxy-Hb]) of bilateral prefrontal cortex (LPFC/RPFC), motor cortex (LMC/RMC), occipital lobe (LOL/ROL), and temporal lobe (LTL/RTL) were measured by multi-channel fNIRS in (1) resting state (10 min) and (2) task state, movement with the effected upper limb (20 min). The wavelet amplitude (WA) was calculated in intervals I: myogenic activity (0.052–0.145 Hz) and II: neurogenic activity (0.021–0.052 Hz) to describe the frequency-specific cortical activities.

Results: Results showed that the WA exhibited significantly higher level ($p < 0.05$) in bilateral MCs in intervals I and II under task state as compared with the resting state. Significantly increased WA in LTL ($p=0.034$) and RTL ($p=0.037$) was found in task state as compared with the resting state.

Conclusions: The significantly increased WA suggests that upper limb rehabilitation robot can induce cortical reorganization in the stroke patients. This study can serve as a basis for understanding the mechanisms of upper limb training on cortical plasticity and facilitate the application in stroke rehabilitation.

OP141

ANXIETY AND DEPRESSION IN CAREGIVERS OF STROKE PATIENTS FACING COMMUNICATION, SWALLOWING AND FUNCTIONAL DIFFICULTIES**Christina Gerasimopoulou, Dimitra Sotiropoulou, Sophia Vourli, Ioannis Tzalavras, Konstantina Papalexou, Danae Tsiamasfirou**

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Introduction: Anxiety and depression are common among caregivers of stroke patients. Furthermore, communication and swallowing difficulties following stroke, and the severity of functional disability are particularly stressful to caregivers.

Objective: This study was designed to investigate the stress and depression of caregivers of stroke patients experience.

Method: Totally, 29 family caregivers of stroke patients from a rehabilitation center were included in the study. Data were collected from questionnaires. The Perceived Stress Scale (PSS) and the Center of Epidemiologic Studies - Depression Scale (CES-D) were used to assess the level of anxiety and depression. Dysphagia assessment and the Boston Diagnostic Aphasia examination were used to determine the presence and type of swallowing and communication difficulties. Functional difficulties were assessed using the Modified Barthel Index.

Results: The mean scores of the PSS and CES-D in family caregivers were 27.21 and 16.24, respectively. Severe anxiety symptoms were found in 75.6% of the caregivers, moderate anxiety symptoms were found in 11.8% of them, and depressive symptoms were found in 47.2%. Stroke survivors' swallowing and communication difficulties were positively correlated with high scores on the PSS and CES-D caregivers questionnaires. Caregivers' anxiety and depression levels were significantly negatively correlated to their stroke survivors' Barthel scores.

Conclusions: Anxiety and depression are common in caregivers of stroke patients and closely related to communication and swallowing disorders, as well as the functional ability of the patient. In this respect, appropriate training and psychosocial support should be provided to caregivers in order to reduce their psychological burden.

OP142

EFFECTS OF RADIAL EXTRACORPOREAL SHOCK WAVE THERAPY ON HAND SPASTICITY AFTER STROKE**Cvetanka Gjerakaroska Savevska, Erieta Nikolikj Dimitrova, Biljana Mitrevska, Valentina Koevska, Marija Gocevska, Maja Manoleva**

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Introduction: Hand spasticity after a stroke disables residual hand functions, increases the difficulties of daily living activities and limits the effectiveness of rehabilitation. Radial extracorporeal shock wave therapy (RESWT) is alternative treatment for spasticity reduction.

Objective: To evaluate the effectiveness of RESWT on hand spasticity after a stroke.

Method: The study was a prospective, controlled clinical trial in which 90 patients with spastic hand post stroke were assigned to two groups. At the beginning of the research, the patients who meet the inclusion criteria were divided into two groups: an examined group that was receiving RESWT and a standard rehabilitation treatment and a control group that was receiving only a standard rehabilitation treatment. The efficiency of the treatment was estimated with: Modified Ashworth Scale (MAS), passive range of wrist motion, Disability Assessment Scale (DAS). The clinical findings were evaluated at the same time points for the patients from both groups: before the start of the rehabilitation, immediately after the end of the 2nd, 6th and 14th week since the start of the rehabilitation (i.e. for the examined group before the application of RESWT, immediately after, one and three months after the completion of the RESWT).

Results: In the examined group the results indicated a significantly lower MAS score and a significant increase in the passive range of motion of the wrist. Analysis of the results from all DAS domains indicate that in the examined group there is a significant decrease in disability in all control measurements.

Conclusions: The results of this study showed that RESWT reduced spasticity and increased the passive range of motion in a spastic hand after a stroke. RESWT leads to a reduced disability and a better quality of life in these patients. RESWT is a safe, alternative, non-invasive modality for the treatment of a spastic hand after a stroke.

OP143

GROSS MOTOR FUNCTION AND COMORBIDITIES IN CEREBRAL PALSY**Čila Deneši-Drljan^{1,2}, Aleksandra Mikov^{1,2}, Rastislava Krasnik^{1,2}, Jelena Zvekic-Svorcan^{2,3}, Snežana Tomašević-Todorovic^{2,4}, Aleksandar Knežević^{2,4}**

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Introduction- Cerebral palsy (CP) is the most common cause of childhood disability. Clinical outcomes may include impairment of gross motor function and intellectual abilities, visual impairment and epilepsy.

Objective- The aim of this study was to determine gross motor function and major comorbidities in patients with CP.

Methods- Medical records of 76 children with CP were reviewed, which included clinical characteristics of CP and associated conditions. Clinical CP type was determined according to Surveillance of Cerebral Palsy in Europe (SCPE) and topographically. Gross motor function was assessed with Gross Motor Function Classification System (GMFCS).

Results- Spastic form of CP was present in 95% cases and the most common form of CP was hemiplegia. GMFCS was distributed at Level I in 16%, Level II in 38%, Level III in 17%, Level IV in 21% and Level V in 8%. Intellectual impairment was present in 70% (20% mild form), epilepsy in 33%, visual impairment in 39% of the children. Severe mental deficit was more prevalent in children with spastic quadriplegia (21% of 27%).

Conclusion- Children with CP have a high frequency of comorbidities and motor impairments which may affect the overall quality of life. More severe level of GMFCS can be associated with larger proportion of concomitant conditions.

OP144

LOW ALANINE AMINOTRANSFERASE (ALT) BLOOD LEVELS ARE ASSOCIATED WITH HIGH 1-YEAR MORTALITY RATES IN OLDER ADULTS FOLLOWING REHABILITATION FOR HIP FRACTURE**Dan Juso**

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Background: Low Alanine Aminotransferase (ALT) blood levels prior to rehabilitation are associated with poor rehabilitation outcomes in terms of low mobility and function in older adults following hip fracture. We have hypothesized that low ALT blood levels prior to rehabilitation are also associated with 1-year mortality in this population. Methods: Included were 456 older adults (age ≥ 60 years, median age 83 years, 82.5% women) admitted for rehabilitation following hip fracture. ALT blood levels were documented between one and six months prior to rehabilitation. Excluded were patients with ALT blood levels over 40 IU/L possibly consistent with liver injury. The study group included patients with low (≤ 10 IU/L) ALT blood levels, and the control group included patients with high-normal (11-40 IU/L) ALT blood levels. The main outcome was all-cause mortality one year following rehabilitation admission. Results: The study group included 142 (31.1%) patients with low ALT blood levels, and the control group included 314 (68.9%) patients with high-normal ALT blood levels. Overall, 52 (11.4%) patients died within one year following rehabilitation admission. Compared with the control group, patients with low ALT blood levels had significantly higher 1-year mortality rates (17.6% vs. 8.6%, OR 2.27, 95%CI 1.27-4.08). Cox regression analysis showed that low ALT blood levels prior to rehabilitation were associated with 1-year mortality (HR 1.61, 95%CI 0.91-2.84) together with peripheral vascular disease (HR 2.69, 95%CI 1.08-6.68) – independent of age, gender, albumin serum levels, length of rehabilitation, and rehabilitation outcomes. Conclusions: Low ALT blood levels prior to rehabilitation are associated with 1-year mortality in older adults following hip fracture.

OP145

SYMPTOMATIC LUMBAR DISC HERNIATIONS: A COMPARISON OF OUTCOMES DEPENDING ON THE MRI FEATURES OF THE HERNIA IN PATIENTS TREATED WITH SPINAL MANIPULATIVE THERAPY**Ljiljana Krstic¹, Aleksandar Radosavljevic²**Department of Physical Medicine and Rehabilitation¹, Academy for applied studies Belgrade, Affidea Specialty Hospital in Neurology² Belgrade, Serbia

Introduction: A large percentage of acute lumbar disc herniation (LDH) patients treated with spinal manipulative therapy (SMT) reported clinically relevant improvement with no serious adverse events. Studies searching for predictors of improvement after SMT in these patients did not target initial size and type of the herniated discs.

Objective: The purpose of this study was to evaluate whether MRI features, such as type and size of disc herniation, are associated with outcomes symptomatic lumbar disc herniation patients treated with SMT.

Methods: A total of 42 patients (m:f = 36:6; mean age $29,2 \pm 8,9$ years; range 16-47 years) affected by 56 LDH (43 protrusions, 13 extrusions) were prospectively studied. All patients received three sessions of SMT during the week period. Patients' data were obtained through self-administered questionnaires, complete physical and neurological examinations, assessment of lumbar segmental mobility, MRI and electromyography examinations.

Results: Successful improvement in all clinical parameters (50% or greater reduction in disability and pain relief) was achieved in 32 (76,26%) of patients (excellent group), while 10 (23,8%) responded less favorably (satisfactory group). In the group of patients in which the clinical outcomes were more favorable prevailed protrusions (87%), in contrast to the group with unfavorable clinical outcomes in which prevailed extrusions (63,6%). The initial average value of area (P) was lesser in the excellent group ($0,47 \pm 0,26$ cm²) to the group of patients with less favorable response ($0,65 \pm 0,25$ cm²)

Conclusion: Our experience shows that the initial size and type of LDH were associated with the response to the SMT. Protrusions and lesser area of LDH are associated with favorable clinical outcomes.

OP146

CORRELATION OF BRAIN ULTRASOUND, GESTATIONAL AGE AND BAYLEY III SCALE SCORES**Danijela Vukicevic¹, Emira Švraka², Aleksandra Mikov³, Vanja Ivanovic¹, Jelena Stikovic¹**

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Introduction: Prematurity, low gestational age, intracranial hemorrhage risk, have impact on neurodevelopmental outcome. The Bayley scale of infant development III (BSID III) is most often used as an instrument for the follow up in all areas of development, habilitation treatment planning and achievement of habilitation procedures. The BSID III include: cognitive, receptive and expressive, fine and gross motor, social-emotional and adaptive behavior subscale.

Objective: The aim of this study is to correlate significance of gestational age, cranial ultrasound, and achievement on BSID III in the first and second years corrected age (CA) of prematurely born children. All children in this study were included in habilitation treatment during that period.

Method: In retrospective study, 21 children were included, 9 boys (42,9%), 12 girls (57,1%), gestational age from 24-34GW (mean 27,3GW, SD 2,5GW). From medical records the following was analyzed: gestational age, cranial ultrasound after birth, and BSID III achievement in a first two years of life corrected age. All children were tested twice.

Results: According to gestational age, 11 children (52,4%) were born before 27GW, 8 children (38,1%) from 28-31GW, 2 children (9,5%) from 32-34GW. Analysis of variance between GA and BSID III receptive language subscale in first and second years of life CA has statistical significance (low scores for CA). In the second testing, analysis of variance between cranial US and BSID III shows statistical significance in subscale of cognitive and fine motor skills (second year of life), low scores for CA. Pearson correlation of cranial ultrasound and gestational age with achievement in all BSID III subscale show statistical significance in the second testing, subscale scores lower for CA.

Conclusion: Correlation shows that a continual follow up of prematurely born children, especially those with low GA and cranial ultrasound grade III and IV, is very important concerning higher expectations on BSID III in the second year.

Key words: BSID, cranial ultrasound, GA, prematurity

OP147

THE IMPACT OF DANCE IN PARKINSON'S DISEASE**Daphne Bakalidou¹, Michail Elpidoforou², Leonidas Stefanis³**

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Introduction: Dance has been shown to confer clinical benefits in Parkinson's Disease (PD). DfPD® (Dance for Parkinson's Disease or Dance for PD®) is an integrated therapeutic dance system for PD developed in USA in 2001.

Objective: The present study aims at evaluating the effects for the first time of DfPD® on Greek's patients movement and non movement characteristics of PD.

Methods: It is a phase II prospective, non-randomized, uncontrolled open-label and non-blind pilot clinical trial. A total of 16 60-min classes of DfPD® (2/w) were applied to 16 early-stage ($\leq 2,5$ – H&Y Scale) PD patients (50% male, aged 56 ± 12) of Aiginition's Hospital Neurological Clinic for 8 weeks. We assessed balance (BBS), depression symptoms (BDI-II), quality of life (PDQ-8), cognitive functions (MoCA) and fatigue (PFS-16). The Body Mass Index (BMI) was also recorded.

Results: The application of DfPD® in Greeks with PD resulted in statistical significant improvements of balance ($5 \pm 4\%$, $p=0,003$), depression symptoms ($26 \pm 52\%$, $p=0,046$), quality of life ($29 \pm 47\%$, $p=0,020$), cognitive functions ($17 \pm 23\%$, $p=0,010$) and fatigue ($13 \pm 20\%$, $p=0,021$). Patients with the greater improvement in BMI were those who have been working ($r=-0,69$, $p=0,007$) as well as those with the greater improvement in cognitive functions ($r=-0,77$, $p=0,001$).

Conclusions: DfPD® is an effective method of non-pharmacological complementary therapeutic intervention for movement and non-movement PD symptoms.

Key Words: Dance for PD®, Dance, Non-Pharmacological Therapeutic Interventions, Parkinson's Disease, Quality of Life, Fatigue, Depression, Cognitive Functions, Balance.



OP148

AN OPTIMIZED HYBRID SSVEP + P300 BRAIN COMPUTER INTERFACE SYSTEM AND ITS APPLICATION TO COMPUTER CURSOR CONTROL

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Patients other neurological disorders like Amyotrophic Lateral Sclerosis (ALS), cerebral palsy, Parkinson's disease, epilepsy and so on makes patient bound to wheelchair and require support for day to day activities including wearing cloths, eating food and working. Electroencephalogram (EEG) based brain computer interface (BCI) systems are systems developed for assisting disable as well as healthy humans by mapping individual cortical activity into directive commands. But present BCI systems are in naïve stage, to work efficiently in real time noisy environment.

In this work, we developed robust and accurate real time hybrid SSVEP + P300 visual BCI system where user has to focus on external visual stimulus on LCD screen to generate control commands. We optimize proposed BCI system by three approaches: (1) Stimulus optimization to achieve maximal cortical response (size, frequency and color) for further use in hybrid V-BCI. (2) Incorporation of emotional facial structure in external visual stimulus instead of conventional checkerboard, RC, SC paradigms. (3) Development of sensitive adaptive algorithm to extract weak target oscillations from noisy EEG input signals immediately after stimulation onset.

Most of earlier research focused on developing new graphical user interface to control computer by disables which makes resulting system with higher cost and complexity. Here we made a computer cursor control system that can be used by both normal and disable people simultaneously so that there is no need to purchase separate designed computers for disables. Patients with neurological disorders can be capable of controlling present computer system as it is i.e. in their current status, which later control external environment such as smart homes, prosthetic arm/legs, and wheelchair and so on.

OP149

THE LONG TERM EFFECTS OF ACUPUNCTURE IN THE TREATMENT OF TRIGEMINAL NEURALGIA**Ilic Dejan, Brdareski Z, Pejovic V, Vukomanovic A. Lukovic G, Kilibarda M.**

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Introduction: Trigeminal neuralgia is the most common craniofacial pain syndrome of neuropathic origin. He is treated with pharmacotherapy, physical therapy procedures, surgically and with acupuncture.

Aim: To demonstrate the long-term effects of acupuncture in treatment of trigeminal neuralgia over a 10-year period.

Method: A prospective, observational study involving seven patients with trigeminal neuralgia. Patients were treated with acupuncture for ten days during one pain episode. A total of 49 pain episodes were treated over 10 years. Observation parameters were pain intensity and duration of pain free period. Pain intensity was measured by visual analog scale (VAS) before start, after third and 10th days of therapy. Descriptive statistics methods and ANOVA test were used in the statistical processing, significant level set up at $p \leq 0,05$.

Results: During the follow-up period, intensity of pain in the beginning of any painful episode didn't change, $VAS = 9.31 \pm 0.71$. After three and ten days of therapy, pain was significantly reduced ($VAS = 3.97 \pm 0.78$ and 0.55 ± 0.57 , respectively), Wilks lambda=0.005, $F(2,27)=2659.14$, $p < 0.0005$, eta squared=0.75. Average frequency of painful episodes relapses in the first five years was 4.9 (ranged 3 to 8) months, while in the next five years was 10.8 (6 to 14) months.

Conclusion: In our group of patients acupuncture significantly reduced the pain intensity and frequency of relapse of painful epeisodes, which contributes to a better quality of life.

OP150

CARDIAC REHABILITATION, HOW EFFECTIVE WE REALLY ARE**Dejan Spiroski**

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Background: Exercise-based rehabilitation is an important part of treatment patients following acute myocardial infarction (MI). However, data are scarce on the effects of very short-term exercise programs in patients with acute MI treated with primary percutaneous coronary intervention (pPCI).

Aim: To evaluate effect of very short-term exercise training on cardiopulmonary exercise testing (CPET) parameters in patients suffering acute MI treated with pPCI.

Methods: We studied 40 consecutive patients with MI treated with pPCI referred for rehabilitation to our institution. The study population consisted of 39 men and 1 women (age $50,60 \pm 8,40$ years, left ventricular ejection fraction $53,05 \pm 6,74$ %), who participated in 3-week clinical cardiac rehabilitation program. The program consisted of cycling for 7 times/week, and daily walking for 45 min at intensity of 70-80% of the individual maximal heart rate. All patients performed symptom-limited CPET on a bicycle ergometer with a ramp protocol of 10w/min. The CPET also performed after cardiac rehabilitation programs.

Results: After 3 weeks of exercise-based cardiac rehabilitation program improved exercise tolerance as compared to baseline (peak workload $111,50 \pm 15,07$ vs $129,00 \pm 12,77$ watts, respectively, $p < 0,001$), as well as peak respiratory exchange ratio ($1,02 \pm 0,10$ vs $1,08 \pm 0,13$, respectively, $p < 0,05$). Peak systolic blood pressure, heart rate, peak and after 1 minute of rest were also improved. Most importantly, peak VO_2 ($18,17 \pm 3,30$ vs $20,64 \pm 3,27$ ml/kg/min, respectively, $p < 0,001$), peak VCO_2 ($1,65 \pm 0,28$ vs $1,96 \pm 0,25$ ml/kg/min, respectively, $p < 0,001$), peak ventilation ($48,61 \pm 10,70$ vs $57,27 \pm 9,85$ L/min, respectively, $p < 0,001$) and peak oxygen pulse ($14,16 \pm 2,62$ vs $60,18 \pm 14,19$ ml/beat, respectively, $p < 0,05$) were also improved. No major adverse cardiac events were noted during the rehabilitation program.

Conclusion: Very short-term exercise training in patients with acute MI treated with pPCI is safe and improves functional capacity, as well as test duration, work load and heart rate response.

Key words: cardiac pulmonary exercise testing, exercise training, cardiac rehabilitation, myocardial infarction.

OP151

NEUROPATHIC PAIN IN PATIENTS WITH ROTATOR CUFF SYNDROME**Deme Ofluoglu, Emel Ece Özcan-Ekşi, Halil İbrahim Ural**

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INTRODUCTION: Shoulder pain has a lifetime prevalence varying from 6.7% to 66.7%. Rotator cuff syndrome is one of the most common causes of shoulder pain, becoming more prevalent by aging. Rotator cuff syndrome may cause either nociceptive or neuropathic pain. However, the prevalence of neuropathic pain and the factors associated with neuropathic pain were not concisely reported in patients with rotator cuff syndrome.

OBJECTIVE: To identify the prevalence of neuropathic pain and associated factors in patients with rotator cuff syndrome

METHOD: We included patients who visited our outpatient clinics with shoulder pain for longer than 1 month and diagnosed with rotator cuff syndrome. Patients who met the following criteria were excluded: Age < 20years, calcific tendinitis, endocrinologic disorders, radiculopathy, plexopathy, peripheral neuropathy, history of upper limb surgery, use of neuropathic pain medication, coronary artery disease, chronic obstructive lung disease. Patients were asked to complete the survey including Beck depression inventory (BDI), Constant, PainDetect and Leeds Assessment of Neuropathic Symptoms and Signs (LANSS).

RESULTS: We included 20 patients (female:14, male:6). Mean scores for VAS: 5.30 ± 2.58 , Constant score: 45.20 ± 10.10 , PainDetect score 9.00 ± 5.61 , LANSS: 7.90 ± 5.70 , BDI: 9.06 ± 5.28 . In our study 5% of the patients had PainDetect score >19, 20% of the patients had LANSS score >12, 65% of the patients had Constant score

CONCLUSIONS: At least 5% of patients with rotator cuff syndrome had neuropathic pain symptoms. Neuropathic pain and depression are more common in female patients. Further studies are required to understand the exact prevalence and etiology of neuropathic pain in patients with shoulder pain.

OP152

EVALUATION OF THE EFFECTIVENESS OF HYDROKINESITHERAPY IN THE RESTORATION OF STATO-DYNAMIC FUNCTIONS IN PATIENTS WITH DEGENERATIVE-DYSTROPHIC DISEASES OF THE JOINTS OF THE LOWER LIMB**Denis Bolotov**

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Introduction. In Russia, degenerative joint diseases (DDLs) are quite common and manifest as arthritis of various localization, activity and severity, accompanied by pain syndromes and contractures that reduce the quality of life of patients.

The purpose of the study was to evaluate the effectiveness of the use of a specialized aqua bike for restoring the statodynamic function in patients with DDLs.

Method. We studied 58 people aged 18 to 58 years: 32 women and 26 men, with 2 and 3 radiological stages of the disease. The examination included anthropometry, manual and muscle testing, specialized tests, the study of quality of life and instrumental methods: goniometry, algometry and ECG. All patients received vascular preparations, chondroprotectors, vitamins with minerals and, according to indications, non-steroidal anti-inflammatory drugs. Hydrokinesitherapy was carried out in the pool for three months according to the scheme 6/1 or 5/2 times a week (classes/day off), for 40-45 minutes according to our developed two-part technique. The first included a warm-up, the main part and a hitch using stretching exercises, the second - aquabike exercises. Classes were conducted under the supervision of ECG and heart rate monitoring, setting the pace corresponding to the functional capabilities of patients, musical accompaniment.

Results. The elimination of muscle atrophy and restoration of the amplitude of movements in the joints occurred much faster than in the previously tested control group of patients who received physiotherapy exercises in the gym, but not earlier than after 1 month of training. Persistent positive effect occurred at the end of 2 months. Conducting classes for 3 months ensured the onset of stable remission.

Findings. Hydrokinesitherapy with the use of an aquabike allows you to quickly restore joint function with DDLs in comparison with traditional methods. The most rapidly restored muscle function, slower proprioception.

OP153

THE ROLE OF POST-STROKE EPILEPSY IN THE FORMATION OF REHABILITATION POTENTIAL IN PATIENTS WITH STROKE**Dina Khasanova^{1,2}, Tatyana Danilova¹, Ekaterina Tokareva³, Aliya Galimova**Department of Neurology and Neurosurgery¹, Kazan State Medical University², Kazan, Tatarstan, Russia

The study aimed to investigate the burden of epileptic seizures for the rehabilitative potential in patients with post-stroke seizures.

Among 265 patients with ischemic stroke experienced epileptic seizures, two months after the onset of stroke, 52.5% of patients had no seizures (in 31% post-stroke epilepsy did not develop, in 21.5% seizures were controlled by antiepileptic drugs). Hospital Anxiety and Depression Scale, modified Rankin Scale (mRS) and health status questionnaire SF-36 were applied in 180 patients (90 with and 90 without seizures, comparable in stroke subtype, lesion lateralization, and NIHSS scores) two months after the stroke onset in a case-control design. The average SF-36 questionnaire scores were significantly higher for general health, vitality, social functioning, role emotional and mental health indicators in patients without seizures compared to patients experiencing seizures ($p < 0,01$). Significant differences in physical functioning, role-physical functioning, pain intensity in patients with and without seizures were not detected. The Anxiety subscale test revealed 0 to 7 scores in 7.1% patients with and 19.4% without seizures ($p < 0.01$), 8 to 10 scores - in 51.6% patients with and 59.7% without seizures, 11 scores or higher in 43.3% patients with and 20.9% without seizures ($p < 0,001$); the Depression subscale scores were found 0 to 7 in 7.1% patients with and 19.4% without seizures ($p < 0.01$), 8 to 10 in 57.2% subjects with and 61.2% without seizures, 11 or higher in 35.7% with seizures and 19.4% without seizures ($p < 0.01$). We observed 2 and 4 mRS scores with a statistically insignificantly different rate in patients with and without seizures (44.4% and 6.3% in patients with seizures; 51.1% and 5.8% - without seizures respectively), but a significant difference for this rate was observed in patients with 1 and 3 mRS scores (2.4% and 8.6% in patients with seizures; 49.9% and 34.5% - without seizures respectively, $p < 0.05$).

Thus, epileptic seizures reduce the rehabilitation potential and require timely, adequate treatment.

OP154

HIP OSTEOARTHRITIS ELDERLY PATIENTS – COMPLETE ASSESSMENT AND REHABILITATION**Doina Boruga¹, Diana Kamal¹, Constantin Kamal², Otilia Rogoveanu², Rodica Traistaru²**Physical Medicine and Rehabilitation, University of Medicine and Pharmacy, Craiova¹, UMF Craiova², Romania

Objectives: Chronic hip and knee pain is one of the most common symptoms in hip osteoarthritis elderly patients leading to complex disability. Various therapeutic approaches have been proposed. The aim of our study is to compare the effects of two therapeutic approaches in terms of pain, disability and self-control of the complex disorders. We take into consideration the literature data about the evidence-based primary care options for chronic lower limb pain.

Methods: 57 patients (mean age 71.79 years) with primary hip osteoarthritis, diagnosed in accordance with ACR 2012, were randomized to the two groups in accordance to the type of treatment: group 1 (43% of patients) - only rehabilitation measures and group 2 (57% of patients) - medication (Rumalaya forte, 1 tb twice a day) and the same rehabilitation program. This program was represented by 12 physiotherapy sessions (TENS, interferential current, ultrasound) and 18 aerobic training sessions (3 sessions / week). Outcome measures were VAS pain, WOMAC score and Arthritis Self-Efficacy Scale(ASES). All assessments were performed pre-post intervention and at six month follow-up.

Results: All the groups showed similar decrease in WOMAC score as well as ASES at six month follow-up and there was no significant difference between the groups. In the second group we obtained significant improvement in pain on the third assessment.

Conclusions: All of the therapeutic approaches were found to be effective in diminishing pain and disability, but Rumalaya forte with aerobic training was found to be more effective in improving pain and psychological status. Our results confirm the literature data - Boswellia derivates is an interesting therapy for the treatment of pain in elderly osteoarthritis, because it has no adverse side effects, it is low cost. Type and duration of physical training must be individualized to each patient, in accordance with disability status.

OP155

MUSCLE STRENGTH RECOVERY AFTER ACL RECONSTRUCTION IN RECREATIVES**Dragana Dragičević-Cvjetkovic**

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Introduction: One of the main goals of rehabilitation after ACL reconstruction is the complete recovery of the muscle strength of the quadriceps and hamstring muscles, which is often not achieved within the expected time.

Aim: The aim of the paper is to investigate the recovery of muscle strength in recreational athletes 9 months after LCA reconstruction.

Methods: A prospective study followed 50 patients after LCA reconstruction preoperatively and 9 months postoperatively. Patients were divided into two groups of 25 patients according to the type of applied rehabilitation protocol. Patients in group A underwent conventional rehabilitation program that included isokinetic training for 3 weeks, and patients in group B underwent only a conventional program of muscle strength exercises. Recovery of muscle strength was measured by concentric/concentric and eccentric isokinetic test of the thigh musculature preoperatively and 9 months postoperatively. The monitoring parameters were peak torque to body weight and H / Q ratio. In statistic analyses Student's t test was used ($p < 0.05$).

Results: A statistically significant improvement in muscle strength was found in recreational athletes which performed targeted isokinetic training ($p < 0.05$). Most patients in group A achieved an expected recovery of muscle strength within 9 months postoperatively as opposed to those in group B ($p < 0.05$).

Conclusion: The use of isokinetic training in recreational athletes rehabilitation after LCA reconstruction achieves better and faster recovery of muscle strength compared to the use of conventional training.

OP156

ULTRASOUND OF CNS IN PRETERM INFANTS AS A SUPPLEMENTARY METHOD FOR PREDICTION OF LATER NEUROLOGICAL DEFICIT**Dragan Zlatanovic, Hristina Čolovic, Vesna Živkovic, Mirjana Kocic, Anita Stankovic**

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Introduction: Conventional methods of neurological assessment of infants can detect nervous system damage, but also have weakness - the inability to make prediction for neurological deficits. Ultrasonography of the central nervous system (CNS) is used for finding and follow-up of brain lesions, but there is an insufficient data about using this method for early prediction of neurological abnormalities in newborns and infants. Prechtl's general movement assessment (GMs) is still the best diagnostic tool for the functional assessment of the young nervous system.

Objective: The objective was to evaluate ultrasound imaging of CNS in preterm infants as a supplementary method for prediction of neurological and functional outcome in 24 months old children.

Method: This prospective clinical study included 80 preterm infants (≤ 37 gestational weeks - GW). Ultrasonography of CNS was performed in newborns and findings were classified as: normal, hyperechoic cerebral parenchyma <14 days, hyperechoic cerebral parenchyma >14 days, intraventricular hemorrhage, periventricular leukomalacia. Neurological outcome was evaluated after detailed neurological examination in 24 months of age and classified as: normal, minimal neurological dysfunction and cerebral palsy (CP). GMs were observed in periods: within 5 days of birth, 44-46. GW, 50-54. GW. Pearsons Chi-square test is performed in statistical software SPSS ver 20.0.

Results: Ultrasonography of CNS in preterm infants can predict functional assessment of CNS ($p < 0.05$). Prechtl's method can predict it more precisely ($p > 0.001$), but during the GM evaluation within 5 days of birth, there was noted poor repertoire activity with different outcomes. In these cases, ultrasonography can predict 24 months outcome with statistical significance of $p < 0.05$.

Conclusion: Ultrasonography of CNS in preterm infants can be used as a supplementary method for early detection of infants that can develop some neurological deficit. Early detection of possibility for later neurological deficit is of crucial importance because of neurodevelopmental treatments implementation.

OP157

SECONDARY LYMPHEDEMA OF THE EXTERNAL GENITALIA AND LOWER LIMB AFTER PROSTATE CANCER TREATMENT: A CASE REPORT**Dragana Bojinovic-Rodic**

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Introduction: Secondary lymphedema of the external genitalia is an uncommon and disabling side-effect of pelvic radiation therapy for invasive prostate cancer. Therapy management of lymphedema after prostate cancer treatment remains controversial. Currently, therapeutic concepts include conservative (complex decongestive physiotherapy) and surgical therapy, but no therapy standards exist.

Case report: A 69-year-old male patient, retired musician, reported an eight-month history of gradually increasing, enlargement of the scrotum and penis, associated with pain, discomfort and difficulties in hygienic care, walking and urination in the upright position, and legs swelling associated with a feeling of heaviness after 200m walking. In the first 6 months, edema reduced spontaneously and did not cause the symptoms.

His past medical history was significant. Two years and eight months ago, he underwent transurethral resection of the prostate (histopathology- prostate adenocarcinoma, grade III), followed by hormone therapy and external radical radiation therapy.

The physical examination revealed huge penile and scrotal mass with the normal skin, non-pitting and thickened, bilateral lower extremity edema, with spider and reticular veins and eczematoid dermatitis of the pretibial region.

Ultrasound scan, computerized tomography scan and magnetic resonance imaging of the abdomen and pelvis did not show recurrence or dissemination of previous cancer.

He was treated with complex decongestive physiotherapy (CDP), which involved: skin care, manual lymph drainage (MLD) of the trunk and the lower limbs, low-strechmulti-layered compression bandaging of the limbs and the external genitalia and exercises.

After three weeks of CDP he reported reducing the symptoms, especially in the lower limbs and improving walking distance. Lymphedema of the penis and scrotum was the same as before the treatment. Lymphedema of the lower limbs was reduced 2 %.

Conclusions: Treatment of male genital lymphedema is complex and often disappointing. This paper describes the patient who was not respond to conservative therapy.

OP158

SHORT- TERM EFFECTS OF TRANSCRANIAL DIRECT-CURRENT STIMULATION ON THE COMPREHENSION OF APHATIC PATIENTS WITH SUBACUTE STROKE**Draško Prtina**

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Introduction: Aphasia after stroke is a frustrating language disorder for which specialized speech and language therapy is the most efficient treatment. Language comprehension impairment after stroke are hidden and difficult to diagnose. It is still unclear can noninvasive brain stimulation with anodal transcranial direct current stimulation (A-tDCS) improve outcomes. Method: 15 aphatic patients with subacute stroke, underwent anodal tDCS (A-tDCS, 15 min, 1.5 mA) over the left perilesional dorsolateral prefrontal cortex and standard speech and language therapy. Stimulation was done with the Soterix Medical 1 x 1 device, clinical standard in the field of non-invasive neuromodulation. Fifteen consecutive sessions (5 days per week for 3 weeks) were implemented. Logopedic evaluation was performed with subtests Oral Comprehension of Boston Diagnostic Aphasia Examination (BDAE) before and after application of tDCS. Results: The mean age of patients was 62.20 ($\pm 8,52$), 66,66% was male. Treatment began an average of 37.86 days after stroke. Ischemic stroke was present in 14 patients, hemorrhagic in 1 patient. The average success on the Oral Comprehension sub tests before and after tDCS was: Word discrimination 47.58%-66.19%, ; Body-part identification 45.64%- 65.65%; Commands 36.40%- 54.66%; Complex ideational material 33.83%- 47.16%. The correlation between the initial and final estimates on the Oral Comprehension sub test is very high, the average for the measured parameters is $r = 0.875$

Conclusion: We found a significant beneficial effect of A-tDCS in all our aphatic patients, although with some inter-individual differences.

Keywords: Stroke, comprehension, tDCS

OP159

ULTRASOUND-GUIDED HYDRODISSECTION VS MESOTHERAPY IN MUSCLE CONTRACTURES: A HEAD-TO-HEAD COMPARATIVE STUDY WITH ELASTOGRAPHY**Duarte Calado, Jorge Barbosa, Nuno Tomás, Miguel Andrade, Eduardo Gonçalves, Sérgio Pinho**

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Introduction: Muscle contracture is a frequent cause of pain and functional impairment. Mesotherapy enables the treatment of a big territory, with intradermic administration of drugs. Ultrasound-guided procedures, such as hydrodissection, enables the direct visualization of the target area and increases the accuracy of the procedure. Elastography is an ultrasound-based technique that evaluates the rigidity of tissues; semi-quantitative elastography, in addition to colour codification, establishes proportion measures and allows the follow-up of the tissue in the same area and comparison between different regions.

Objective: Determine the therapeutic and imagiological outcomes of two different techniques in patients with muscle contractures.

Method: Prospective, randomized study of patients with muscle contracture of the trapezius, rhomboid or quadratus lumborum muscle. Mesotherapy consists of 4 sessions with the administration of lidocaine (1cc2%), piroxicam (1cc20mg) and thiocolchicoside (2cc4mg), with 1 cm interval between each administration. Ultrasound guided hydrodissection is a "one-time" procedure which is administered saline solution (13cc0.9%), levobupivacaine (6cc0.5%) and methylprednisolone (1cc40mg). Three clinical and imagological evaluations are performed (before, one and three months of follow-up), with elastography and the application of the ASES and m-UCLA questionnaires for trapezius and rhomboid contractures and VAS and Oswestry scales for quadratus lumborum muscle contractures.

Results: 9 patients were included in the study. There was a statistically significant improvement in ASES, mUCLA, VAS and Oswestry scores from the baseline to the 1 and 3 months follow up ($p < 0.05$). There was also changes in the elastography evaluation of the treated area from baseline to the 3-month follow-up.

Conclusions: Mesotherapy and ultrasound guided hydrodissection are both valid treatment options for muscle contractures. Although the study is limited by the small sample, elastography appears to be a promising imaging technique for diagnosing and aiding in the treatment and follow-up of muscle contractures.

OP160

IMPROVING BALANCE AND PROPRIOCEPTION IN PATIENTS SUFFERING FROM HIP AND KNEE OSTEOARTRITIS WITH LOW BODY MASS INDEX**Dubravka Bobek^{1,2}, Luciana Mijačika^{1,2}**Department for Physical and Rehabilitation Medicine with Rheumatology¹, University Hospital Dubrava², Zagreb, Croatia

Introduction: Osteoarthritis (OA) of hip and knee are common conditions affecting older people which are associated with disability and escalating health expenditure. Knee and hip OA are known fall risk factors, but it's unclear if they together with low body mass index (BMI) additionally increases fall risk. Here, we present results of a clinical study in which a group of 50 patients suffering from hip and knee OA with low BMI and have history of falls, underwent physical therapy interventions in order to improve balance and proprioception.

Objective: The objective of the study was to evaluate the effectiveness of physical therapy interventions performed on patients suffering from hip and knee OA with low BMI on improving their balance and proprioception.

Methods: A group of 50 patients with symptomatic OA of hips and knees with low BMI underwent physical rehabilitation programme which included balance and proprioception training, walk exercises and muscle strengthening exercises. Symptomatic OA was defined as patient reported symptoms and radiographic evidence of OA in the same joint (Kellgren Lawrence Classification grade II-IV). The collected data included age, BMI, a history of prior falls, proprioception assessed by testing performed on proprioception platform, physical function assessed by short physical performance battery (SPPB) and impedance measurement. We performed a longitudinal analysis using data from 2 time points of a cohort.

Results: After the physical therapy programme most of the patients had better results in proprioception testing and SPPB testing, while the time period was too short to achieve improvement in impedance values.

Conclusion: This study revealed that body balance and the sense of proprioception can be improved in patients suffering from hip and knee OA with low BMI. By improving balance and proprioception the risk of falls in these type of patients may be reduced.

OP161

THE IMPACT OF SHOULDER PAIN ON FUNCTIONAL OUTCOME OF HEMIPLEGIC STROKE PATIENTS**Dušica Simic-Panic^{1,2}, Ksenija Boškovic^{1,2}, Snežana Tomašević-Todorovic^{1,2}, Slobodan Pantelinac^{1,2}, Aleksandar Knežević^{1,2}, Danka Petrovic²**Faculty of Medicine University of Novi Sad¹, Department of Medical Rehabilitation, Clinical Center of Vojvodina², Novi Sad, Serbia**Introduction:** Shoulder pain is a frequent complication in patients with hemiplegia after stroke.**Objective:** To analyze the impact of shoulder pain in hemiplegic stroke patients on motor function of affected upper limb and daily living activities.**Method:** Patients with hemiplegia in the initial 3-month period after stroke who went through in-hospital rehabilitation treatment were included in the study. Patient's demographic and clinical features were recorded. Pain levels at the hemiplegic shoulder were assessed by the shoulder lateral rotation range of motion measured at the point of pain (SROMP). Paretic shoulder subluxation was graded as none, minimal, or substantial. Upper extremity Fugl-Meyer Motor Assessment (FMA), Frenchay Arm Test (FAT), and Barthel Index (BI) were applied to the patients on admission, at discharge, and after 6 months of follow-up. For statistical analysis we used statistical program IBM SPSS Statistics 22.0 (Statistical Package for the Social Sciences). Results were presented using standard statistical measures of central tendency and range of results. To determine the difference between variables Chi-square analyses and t-test for independent samples were used.**Results:** At the initial evaluation 36 (45.1%) patients had shoulder pain, at discharge 20 (21.3%) had shoulder pain and at 6 months of follow-up 15 (15.3%) had shoulder pain of decreased or persistent intensity. Shoulder subluxation was present in 37.4% patients. Average values of all three scales showed significant improvement after 6 months follow up. The FMA, FAT, and BI scores both at admission, discharge and follow up showed correlation with pain levels and paretic shoulder subluxation. Correlation between shoulder subluxation and pain was not found.**Conclusions:** Shoulder pain in hemiplegic stroke patients shows strong correlation with functional outcome.

OP162

THE EFFECT OF INTERMITTENT TRACTION THERAPY ON THE PAIN IN THE PATIENTS WITH CHRONIC BACK PAIN**Edina Tanovic, Damir Celik**

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Introduction: A back pain (BP) is a health disorder of high epidemiological, medical and economic importance worldwide. In most cases, patients' back pain is relieved within two weeks. However, out of the total number patient with BP, approximately 20% suffer from continuous pain that does not respond to therapy, which is known as chronic back pain (CPB).

Objective: The aim of this study was to examine the effect of intermittent traction therapy (ITT) on the pain in patients with CBP.

Methods: A clinical prospective study was conducted and included 81 patients with CBP divided in two groups: experimental group who received ITT (n=40) and control group who received conservative physical treatment (n=41). A visual analogue scale (VAS) was used to measure participants' back pain at start and after therapy. Traction power on the BTL-16 Plus traction device started at an initial level of 15 kg and increased gradually at a certain rate of 30% of body weights.

Results: In the experimental group, 26/40 or 65.0% were females, in the control group 20/41 or 48.8% were females ($\chi^2(1) = 2.171, p = 0.141$). There was not statistically significant difference in the mean of age between experimental and control groups ($51.9 \pm 13.2y$ vs. $50.0 \pm 10.5y$; $t(79) = 0.717, p = 0.099$). In a within-group comparison, median of VAS value was significantly decreased in the both groups ($p < 0.001$). After adjustment for pre-intervention VAS value, there was not a statistically significant difference in post-intervention VAS value between the treatments, $F(2, 78) = 2.893, p = 0.093$, partial $\eta^2 = 0.036$. Females from experimental group had significantly greater decrease of VAS value compared with females from control group ($z = -2.428, p = 0.015$).

Conclusions: The intermittent traction therapy is effective treatment in patient with chronic back pain.

Key words: intermittent traction therapy, pain, visual analogue scale

OP163

THE EFFICACY AND SAFETY OF PHENOL 5% NEUROLYSIS IN PATIENTS WITH LOWER AND UPPER LIMBS SPASTICITY**Eduardo Rocha, Cyro Scala**

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Introduction: The phenol use in spasticity is a recognized treatment but used by only a few group of colleagues. The phenol cost is accessible, but its use needs experience in order to avoid adverse effects like pain, local fibrosis, loss of sensitivity.

Methodology: This study is a retrospective cohort of medical record analysis of patients treated with Phenol 5% neurolysis to lower and upper limbs spasticity from January 2017 to December 2018 in a Brazilian Public General Rehabilitation Center from all the patients that were submitted a Phenol 5% neurolysis to treat lower limbs spasticity from January 2017 to December 2017. The patients submitted to the phenol 5% injections were evaluated in relation to their spasticity by both, Asworth Modified Scale (AMS) and Range of Motion (ROM) from knee flexion/extension, hip extension/abduction, shoulder adduction/ abduction and elbow flexion/extension. All patients were inquired about side effects(including pain, local reactions and any other comorbidities) thirty days after the injection.

Results: 136 patients were treated with phenol 5% neurolysis due to lower and upper limbs spasticity. The average age was 29.8 years old, 52 were under 18, being the youngest 4 years old, and 25 were elderly. 73 patients had a cerebral palsy, 38 had a spinal cord injury and 25 a stroke. The treated muscles and nerves were sciatic motor branch nerve (n=69), obturator nerve (n=74), femoral nerve (n=6) ,psoas muscle (n=35), pectoral major muscle (20)and musculocutaneous nerve (37) Six patients reported moderate pain after the injection in the region of femoral cutaneous nerve (all of them after the obturator injection) with full resolution up to 7 days. Any other side effect were reported.

Conclusion: The study concludes that phenol injections are safe and efficient in the lower limbs spasticity treatment.

OP164

OPPORTUNITIES FOR CORE MUSCLE STRENGTH TRAINING IN PATIENTS WITH OSTEOPOROTIC VERTEBRAL FRACTURES**Ekaterina Makarova, Larisa Marchenkova, Mikhail Eryomushkin, Ekaterina Chesnikova**

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Aim: To estimate the effect of new complex physical rehabilitation program on core muscles strength in patients with osteoporotic vertebral fractures (VFs). **Materials and methods:** Study comprised of 90 osteoporotic patients aged 50-80 (65.4 ± 9.1 years) with low-traumatic VFs who were randomized as 2:1 into intervention group (group1, $n=60$) and control group (group2, $n=30$). Patients in group1 received an intensive rehabilitation course including back muscle training with mechanical loads #10; sensorimotor training on double unstable platform #10; kinesiohydrotherapy in a pool #15; physical exercises in a gym #10. Group2 was prescribed only physical exercises in a gym #15. All patients undergo tenzodynamometry on BackCheck diagnostic unit (Dr. Wolff, Germany) at baseline, at the end of rehabilitation course and a month after the rehabilitation. **Results:** After a rehabilitation course muscle strength increased significantly in trunk extensors (TE) from 15.8 ± 10.1 to 21.7 ± 13.1 kg ($p < 0.0001$), trunk flexors (TF) from 14.5 ± 9.1 to 18.9 ± 10.2 kg ($p < 0.001$), left lateral flexors (LLF) from 12.8 ± 7.2 to 17.5 ± 9.6 kg ($p < 0.01$) and right lateral flexors (RLF) from 13.2 ± 7.1 to 17.8 ± 9.2 kg ($p < 0.01$). The maximal improvement of muscle strength was registered in TF $+6.5 \pm 57.5\%$ above recommended values ($p < 0.001$). TE strength deficiency significantly decreased ($p < 0.001$), but did not reach the recommended values $-15.8 \pm 25.8\%$. After the 1-month muscle strength in all examined muscles didn't significantly diminished vs results just after rehabilitation course completion ($p > 0.05$). The strength of all the studied muscles were higher ($p < 0.01$) and the muscle deficiency was less in TE ($p < 0.05$) and TF ($p < 0.001$) in group1 vs group2 in a month of follow-up after rehabilitation course. **Conclusions:** A new complex physical rehabilitation program leads to increase of muscle strength and elimination of muscle strength deficiency in patients with osteoporotic VFs, and these effects are not attenuate for at least a month after the treatment completion.

OP165

SENSORY STIMULATION AS AN EFFECTIVE METHOD IN SPEECH REHABILITATION AFTER STROKE**Elena Berdnikovich¹, Olga Orlova², Marine Tanashyan¹**

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Introduction: Due to severe social and medical consequences stroke has the leading in place in the public health problem. Nowadays there are 450.000, strokes in Russia. According to the Registry of stroke of the Research Center of Neurology, in acute period of stroke aphasia is seen in 35,9% of cases, dysarthria is seen in 13% of cases (Ryabova, 1985). There is a need to develop a differentiated system of rehabilitation with justification of principles, areas and methods of correction and restorative influence.

Objective: To explore the features of disorders of the speech function in the acute and early recovery periods of stroke in patients with left hemispheric lesion.

Method: 138 patients were involved to the research: 108 patients were treated in-hospital in the Research Center of Neurology, Moscow, Russia, and 30 patients were referred to consulting department for out-hospital treatment. The experimental group included 108 patients in the acute phase of stroke (from 0 to 21 days) to continue rehabilitation in the early recovery period (22nd day prior to 3 months). All patients were right-handed and had either ischemic or hemorrhagic stroke in the left hemisphere. Volume, size and location of the lesion in each patient were verified using neuroimaging research methods: CT/MRI. We defined 3 groups of the leading modality of perception in each patient.

Results: Application of differentiated sensory stimulation methods considering perceptual leading modality was effective for all patients, regardless of the existing forms of aphasia.

Conclusions: The combination of different types of sensory stimulation with the dominant representational system in patients with vascular disease demonstrates the effectiveness and efficiency of the developed model of logopedic impact in the acute and early stroke recovery period.

OP166

ADULT ONSET IDIOPATHIC AMBULATORY FOCAL LOWER EXTREMITY DYSTONIA SUCCESSFULLY TREATED WITH FES.**Eleftherios Stefas, Dimitrios Tsiptsios, Vasilios Grosdoulis**

PMR, Evexia, Lakoma, Halkidiki, Greece

Introduction: Adult onset focal lower extremity dystonia is uncommon, usually non-task specific and often associated with parkinsonism, trauma or stroke. Its task specific idiopathic counterpart is even rarer and often misdiagnosed.

Objective: We present the case of a 50-year old female who for the past 2 years has been experiencing walking difficulties that were initially attributed to left knee pathology and later were thought to be psychogenic in origin. More specifically, she complained of loss of left lower limb dexterity and stiffness while walking or climbing stairs.

From a clinical standpoint, she presented with left lower limb stiffness primarily affecting proximal muscles on walking forward that was relieved while walking backwards or resting on a chair. These findings led to the clinical diagnosis of ambulatory focal lower extremity dystonia that was termed idiopathic after all symptomatic causes, such as parkinsonism or stroke, were excluded.

The mainstay in the management of focal dystonia is botulinum toxin administration. However, apart from the cost the main disadvantage of this approach is provoked muscle weakness. Due to these facts FES was tried instead.

Method: Functional electrical stimulation (FES) is a treatment that applies small electrical charges to a muscle in order to produce functional movements during the gait cycle. Research and experience have shown that treatment with FES produces a more normal walking pattern, enabling people to walk faster. FES was applied for 30 minutes with the patient walking on a treadmill with a stable velocity.

Results: Significant improvement was evident. The patient was able to walk with an acceptable gait pattern while she was using the FES device. She was able to maintain the improvement even after the interruption of FES but the result was declining by the hour.

Conclusion: Adult onset ambulatory idiopathic focal lower extremity dystonia is a rare neurological entity. We propose FES as an effective, low cost approach that lacks side effects.

OP167

CLINICAL EFFECTS OF LOW POWER LASER AND INTERFERENT CURRENTS IN PAIN TREATMENT OF OSTEOARTRITIS OF THE KNEE**Elmina Mulic Hadžiavdic, Asmir Konjic, Maida Zonic-Imamovic, Šahza Kikanovic, Emir Halilbegovic**

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Introduction: The knee joint is often affected by osteoarthritis. Pain is the leading symptom in the advanced stage. There are limitations of movement, reduction of functionality, thickening of the joint-deformities and instability. In the treatment of pain in the osteoarthritis of the knee (OAK), a special place belongs to the low-power laser (LPL) and interferent currents (IFC) due to their analgesic and anti-inflammatory activity.

The aim was to compare the clinical effects of treatment with these two treatment programs in patients with OAK.

Methods: This prospective clinical study included 50 patients with OAK, who were classified into two groups: A group (n = 25) treated with LMS and B group (n = 25) treated with IFS. Both groups were exposed to thermotherapy and kinesiotherapy, ten treatment procedures in total. Monitoring effects of the therapy were analysed by the Womac scale for pain, stiffness and functional capacity.

Results: After both treatments (LPL and IFC), all clinical parameters tested were significantly lower than pre-treatment values. Womac for pain prior to therapy in group A was 2.82 ± 0.34 , and after therapy 1.92 ± 0.43 , and $p < 0.0001$, in group B prior to therapy it measured 2.82 ± 0.58 , after therapy 2.02 ± 0.67 , $p < 0.0001$. Womac for stiffness in group A prior to therapy was 2.64 ± 0.53 , after therapy 1.72 ± 0.56 , $p < 0.0001$, in group B prior to therapy it measured 2.62 ± 0.64 , after therapy 1.82 ± 0.64 , $p < 0.0001$. Womac for functional capacity in group A before therapy was 2.79 ± 0.4 , after therapy 2.07 ± 0.57 , where $p < 0.0001$, in group B prior to therapy was 2.85 ± 0.78 , after therapy 2.18 ± 0.84 , and $p < 0.0001$ which is statistically significant. Comparing the two groups, it was concluded that there was no statistically significant difference.

Conclusion: Both the LPL treatment and the IFC treatment showed significant but similar clinical efficacy.

OP168

PRACTICE EFFECT OF THE MOTOR-FREE VISUAL PERCEPTION TEST-4 IN PEOPLE WITH STROKE**En-Chi Chiu¹, Wen-Chi Wu², Chiung-Xia Chou², Min-Yuan Yu²**

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Department of Rehabilitation, Chang Gung Memorial Hospital-Kaohsiung Medical Center², Taipei,
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Introduction: Visual perception impairment is one of the common perceptual deficits in people with stroke, which influences patients' daily functions and endangers their safety in everyday life. The Motor-Free Visual Perception Test-4 (MVPT-4) is a non-motor visual perceptual assessment, including five subscales (i.e., visual discrimination, figure-ground, visual memory, spatial relationships, and visual closure).

Objective: The study aimed to evaluate practice effect of the MVPT-4 over four assessments in people with stroke.

Method: Sixty participants were administered with the MVPT-4 four times in a one-week interval. Practice effect in two phases (cumulative and plateau) were evaluated. The cumulative phase was found when the mean values of post-tests were higher than those of pre-tests. Two standards were applied for indicating the plateau phase: (1) non-significant one-way repeated measures analysis of variance (ANOVA) ($\alpha=0.05$) over three successive time points (i.e., from Time 1 to Time 3 and from Time 2 to Time 4); and (2) two stable successive values of Cohen's d s (d of Time 2-3 $\leq d$ of Time 1-2 and d of Time 3-4 $\leq d$ of Time 2-3).

Results: The mean values of the overall scale and five subscales appeared increasing trends, demonstrating cumulative phases. Only the visual discrimination subscale reached a plateau phase at Time 2 with a non-significant difference from Time 2 to Time 4 and two stable successive d values. The overall scale showed a significant ANOVA from Time 1 to Time 3 and Time 2 to Time 4 ($p\leq 0.001$). The other four subscales revealed unstable d values over three successive assessments.

Conclusions: The MVPT-4 has trivial to small practice effect. Cumulative trends of the MVPT-4 were noticed, and a plateau phase was achieved in the visual discrimination subscale. The patterns of practice effect of the MVPT-4 may assist clinicians and researchers to predict and minimize the influence of practice effect.

OP169

RELIABILITY AND CONSTRUCT VALIDITY OF THE TURKISH VERSION OF THE PROSTHESIS DONNING AND DOFFING QUESTIONNAIRE FOR TRANS-TIBIAL AMPUTEES**Esra Giray¹, Arezoo Eshraghi², Hakan Gunduz¹**Department of Physical Medicine and Rehabilitation, Marmara University School of Medicine, Istanbul, Turkey¹, PROPEL lab, Holland Bloorview Kids Rehabilitation Hospital, Toronto, Canada²

Introduction: Prostheses are donned and doffed during the day and night, so it is important to measure ease of donning and doffing. Satisfaction from the prosthesis plays a crucial role in the acceptance, compliance with the prosthesis, thus regaining mobility. Depending on the type of socket and suspension system, putting on and taking off a prosthesis can be time consuming, difficult or need cognitive or hand dexterity skills. Easily donning and doffing result in a positive effect on satisfaction with a prosthesis. There is no specific questionnaire in Turkish to evaluate the donning and doffing procedures of prostheses.

Objective: The aim of this study is to investigate the reliability and construct validity of the Turkish version of the Prosthesis donning and doffing questionnaire in transtibial amputees.

Method: After translation/retranslation process, thirty individuals with transtibial amputation were recruited and Turkish version of Prosthesis Donning and Doffing Questionnaire, Satisfaction with Prosthesis Survey and Nottingham Health Profile were applied to participants and Prosthesis Donning and Doffing Questionnaire was also reassessed after three days.

Results: Test–retest reliability was very good (ICC: 0.739), indicating a low random measurement error for questionnaire. Statistically significant correlations were detected between Prosthesis Donning and Doffing Questionnaire, Satisfaction with Prosthesis Survey and Nottingham Health Profile and its subsets, showing construct validity. Different suspension types were compared in terms of the responses to questionnaire items. There was a statistically significant difference between the pin-lock and the vacuum suspension systems in terms of time for doffing the prosthesis.

Conclusions: Turkish version of Prosthesis Donning and Doffing Questionnaire is a valid and reliable tool to assess donning of doffing process of prostheses in transtibial amputees.

OP170

ACCURACY OF PHYSICAL EXAMINATION FOR LUMBOSACRAL RADICULOPATHY IN CHRONIC AND NON-CHRONIC STATE**Eun Seok Kim, Joon Shik Yoon, Ju Hyong Jeung, Hyuk Sung Choi, Jun Ho Choi**

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Introduction: Clinical neurological examination forms a vital component of the initial diagnostic work-up for patients with clinical suspicion of lumbar radiculopathy.

Objective: To investigate the diagnostic accuracy of a 2 physical examination, Bragard test and straight leg raise (SLR) test, in patient with magnetic resonance imaging (MRI) and electrodiagnostic evidence of nerve root compression in chronic and non-chronic state.

Method: The study involved 182 participants with signs and symptoms consistent with lumbosacral radiculopathy confirmed by magnetic resonance imaging (MRI) and electrodiagnostic study. Patients were evaluated from March 2015 to March 2018 in the physical medicine and rehabilitation outpatient clinic. Bragard test and straight leg raise (SLR) test were performed during the assessment of all the patients. They were divided in two groups by the symptom duration lasting more than 12 weeks in chronic group and less than 12 weeks in non-chronic group. Accuracy of clinical tests in detecting MRI and electrodiagnostic study was evaluated using sensitivity, specificity, and positive and negative likelihood ratios (LR).

Results: The diagnostic performance of clinical tests using MRI and electrodiagnostic study as reference showed rather disappointing value. The SLR test had the highest sensitivity in detecting Edx during non-chronic group was 84.1%, but specificity was 53.1% low. In patients with symptom duration of less than 12 weeks, diagnostic accuracies of both tests increased compared to the chronic state.

Conclusions: In general, individual physical test used to identify lumbar radiculopathy shows poor diagnostic accuracy. However Bragard and SLR tests are easy to perform and combination of those tests may improve diagnostic accuracy. Clinical assessments confirmed by electrodiagnostic study show higher sensitivity than MRI in general. As predicted, both physical examination revealed higher sensitivity in the non-chronic phase of disease compare to the chronic state, but there is no statistical difference in specificity.

OP171

COMPARISON OF THE EFFECT OF LIFESTYLE THERAPY ON PATIENTS WITH LYMPHEDEMA AMONG IN- AND OUTPATIENT CARE**Erzsebet Boros**

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Introduction: Obesity is a significant risk factor in the development of lymphedema, therefore, weight control is an important element of complex lymphoedema treatment. For the normalization of body weight, a so-called lifestyle therapy can be used as part of the team work. Lifestyle therapy is an organized education program for patients, in which they are familiarized with the proper exercise and effective diet.

Method: In our study, we measured the effect of lifestyle therapy on patients with lymphedema during in- and outpatient care, especially among obese patients.

A total of 82 patients were involved in the study. 76% of 51 inpatients and 58% of 31 outpatients had excess weight (BMI over 30 kg/m²), with the average age of 63 years in the first, and 59 years in the second group. The diet of inpatients was closely controlled, and they received either individual or group dietary counselling on several occasions. The outpatients received one-time group dietary counselling only, and their diet was not determined. The treatment of both groups was complemented by special movement therapy.

The weight change was monitored with a body composition measuring device (OMRON BF-511).

Results: The average weight loss was 2.7 kg for inpatients, and 0.28 kg for outpatients. The decrease in BMI was 1.01 in the inpatient group, and 0.11 in the outpatient group. The decrease of body fat was 1.1 kg in the inpatient group, while 1.5 kg in the outpatient group.

Conclusion: Our results show that even in the short term, close lifestyle control will increase the effectiveness of lymphoedema treatment. Maintaining lifestyle change in the long term can lead to further improvements in patients' condition, and therefore long-term follow-up of patients is necessary.

OP172

A.DYN.O.AN INNOVATIVE ORTHOSIS FOR IDIOPATHIC TOE WALKING TREATMENT: EFFICACY EVALUATION**Eugenio Di Stanislao¹, Valentina Camomilla², Luigi Catino², Martina Alvini¹, Giuseppe Vannozzi², Giuseppe Di Rosa³ Enrico Castelli³**

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Introduction: Many children exhibit a habitual toe walking while being able to walk with a completely physiological pattern. If no disorders involving the central or peripheral nervous systems or the musculoskeletal system are diagnosed, this type of gait is called Idiopathic Toe Walking (ITW). ITW gait is characterized by typical lower limb kinematics and kinetics deviations. The habitual walking on toes can result in muscle-tendon retraction of the plantar flexors, metatarsalgia, hyperlordosis. The classic conservative treatments include serial casting, botulinum toxin injection and use of AFO orthoses. To reduce the psychological impact of the treatment, a novel minimally invasive foot orthosis (A.Dyn.O.) has developed to reduce typical gait kinematics and kinetics abnormalities of ITW population producing an external plantar-flexor moment at the ankle. The orthosis is composed of 3 elements: a specific shoe, a custom-made foot orthosis, and a carbon fibre spring.

Objective: The aim of the work is to assess the immediate effect of the A.Dyn.O. on hip, knee and ankle kinematics and kinetics during gait.

Methods: Hip, knee and ankle sagittal kinematics and kinetics were analysed by a stereophotogrammetric system (BTS Smart DX-700, Helen-Hayes protocol) and 4 dynamometric platforms (BTS P6000). The study included 17 ITW children (4-10 years old) walking on a levelled surface in barefoot condition and with orthoses. Paired T-Student test was performed on all variables.

Results: With respect to barefoot walking, the use of A.Dyn.O. showed: the recovery of the first ankle rocker, absent in ITW patients, in terms of joint kinematic ($p < 0.013$) and kinetic ($p < 0.047$); the restore of physiological pattern in terms of sagittal hip and knee kinematics (peak-to-peak joint ROM increased by 21.6% ($p < 0.009$) and 17% ($p < 0.007$) respectively).

Conclusion: Preliminary results shows that A.Dyn.O. seems to be able to restore principal physiologic walking patterns and so reducing the risk of developing secondary musculoskeletal conditions. The same investigation protocol could be used to verify long-term results.

OP173

**COGNITIVE-MOTOR INTERFERENCE IN THE PROMOTION OF THE SPORTS GESTURE:
CONTROLLED STUDY OF THE EFFECTS OF TDCS AND COGNITIVE TRAINING****Francesco Maracci**Clinica di Neuroriabilitazione – Università politecnica dell, Azienda Ospedali Riuniti Umberto I,
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Introduction: The success in sports depends on excellence supported by different factors. There are many non-motor skills, which can contribute to success, depending on the type of sport to consider, they include cognitive abilities in visual detection and anticipation, or the capacity to predict the behavior of the opponents. Influential theories suggest that humans predict others' upcoming actions by using their own motor system as an internal forward model. However, evidence that the motor system is causally essential for predicting others' actions is meager.

Objective: Aim of our study is to control how and if the action of atDCS applied on the inferior frontal cortex, compared with a cognitive homevideo-training can bring an improvement in motor and cognitive tasks in elite volleyball athletes.

Methods: We designed a cross over study in which all the participants underwent anodic tDCS over left inferior frontal cortex, sham tDCS and a cognitive training. At first we screened the athletes with some questionnaires (behavioural tract and sleep quality) aimed at build a psychological profile. After, we assessed motor performance by evaluating the athlete performance (monitored by a scoutman) in receiving a ball shot by a machine and directing it to a precise target. Moreover, as secondary outcome, we developed a novel AP task where participants observed the initial phases of right-hand volleyball serve and had to predict the ball direction; we add Stroop and Benton Tests to evaluate visuo-spatial skills and the ability to sustain divided attention with cognitive interferences. Finally, we compared those pre-post tDCS outcomes with a pre-post cognitive treatment: an interactive daily home video training consisting of 150 consecutive short clips showing volleyball players mistakes in receiving the ball during a match.

Results: We found that both the anodic stimulation of the left IFC and video training improved motor performance as demonstrated by the significant increase in scores obtained in the scoutman's evaluation during motor task; we found also an improving in Action Prediction Task (accuracy of the answers and reaction time), and in Stroop and Benton Test performance, after both tDCS and cognitive home training. We also found a correlation between some behavioural profiles and the outcome improvement after the different treatments.

Conclusions: These findings support predictive coding theories of action perception and have implications for enhancement of AP abilities, furthermore it highlights the importance of the interference between cognitive functions and motor performance. These results open new options and solution for athletes' motor trainings.

OP174

ELECTROENCEPHALOGRAPHIC MARKERS TOWARD THE OPTIMIZATION OF ACTION OBSERVATION TREATMENT IN STROKE PATIENTS**Francesco Infarinato^{1,2}, Marco Ottaviani², Paola Romano², Sanaz Pournajaf², Michela Goffredo², Marco Franceschini²**Rehabilitation Bioengineering Laboratory¹, IRCCS San Raffaele Pisana², Rome, Italy

Introduction: In recent years there has been much interest in the use of Action Observation Therapy (AOT) as a rehabilitation method of rehabilitation for stroke patients. The AOT, born in the field of neurophysiology, is a recent approach based on the Mirror Neuron System (MNS) and used to rebuild, despite the neurological lesions, the motor functions of subjects with limited mobility, thanks to the involvement of the brain regions that are activated during both the execution and the observation of motor actions.

Objective: The aims of the work are providing a self-learning model, able to classify the most suitable patients to AOT and detecting the best stimuli that enhance brain's response by platform based on Electroencephalographic features.

Method: Twenty subject, 10 subject with no neurological disorder and 10 stroke patients, were enrolled for a single-day EEG recording protocol divided into three parts: six minutes resting state EEG recording; 15 min AOT simulation that includes up to 40 video for different kinds of human actions and control actions; 18 min AOT stimulation made by human subject. The Recording was previously pre-processed, artifacts removed, filtered and bad-channels detected before the analysis. The algorithm includes ERD/ERS analysis, features extractions, time-frequency analysis, statistics tests and machine learning platform.

Results: Considering the features extracted with an approach based on time and spectral parameters, the paired t-test revealed statistically significant (p

Conclusions: The results showed how patients reacts at AOT stimuli and which are the most effective stimuli to enhance cortical activity on MNS.

OP175

EFFICACY OF SEAS THERAPY IN ACTIVE SELF-CORRECTION OF PATIENTS WITH AIS**Gabriela Mirkovic, Samra Pjanic, Djurdjica Stevanovic - Papic**

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SEAS (the acronym for "Scientific Exercise Approach to Scoliosis") is based on a specific active self-correction technique performed without external aid, and incorporated in functional exercises. Self-correction is composed of movements performed in all spatial planes – coronal, sagittal, horizontal – in an overall vertical anti-gravitational direction.

AIM To analyse active self-correction in frontal plane by measuring coronal balance with plumb line and to investigate changes in trunk rotation measured with scoliometer before and after SEAS therapy.

Methods: It is retrospective study conducted at Children's departement in Institute for physical medicine and rehabilitation „Dr Miroslav Zotovic“. There were 45 patients (8 boys and 37 girls), age 10 to 16 years with diagnosis of idiopathic adolescent scoliosis where SEAS therapy was applied. Average Cobb angle in primary curve was 17,4 degrees. Skeletal maturity was measured with Risser's sign from 0 to 3.

Training of patients lasted for 5 days. Measurements were made before and after 20 days after the treatment.

Results: The results of our study showed statistically significant difference between measurement before and after the treatment. Mean value of coronal balance before the treatment was 13,84 mm and after the treatment 4,18 mm ($p < 0,01$). Mean value of trunk rotation before the treatment was $9,31^\circ$ and $7,6^\circ$ after the treatment ($p < 0,05$).

Conclusion: SEAS therapy enables active self-correction by improving balance and alignment in frontal plane and reducing trunk rotation, which positively influences trunk esthetics of the patients.

Key word: SEAS therapy, active self-correction, AIS.



OP176

A SURVEY OF POST-STROKE USERS AND THEIR CAREGIVERS ON ASSISTIVE TECHNOLOGIES

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Introduction: New assistive technologies/services can support people with disabilities to live an independent life. Therefore, it is crucial to know the acceptance of and the need for certain technical solutions/services among the end users and their caregivers.

Method: A set of questionnaires was designed to assess the opinion of the potential end users and their caregivers. Each questionnaire has three parts. The first part is a personal data sheet. The second part is an importance sheet, where one can mark the ten most important tasks to do in a daily routine. The third part is about the new technologies/services, where one can mark the already used, the available but not used, the wished to use, and the wished not to use technology/service. The authors surveyed the opinion of end users and caregivers in a stroke club in Budapest.

Results: 26 questionnaires were filled in by 20 end users (4 men, 16 women) and 6 caregivers (3 men, 3 women). The minimum/maximum/average/median age was 43/77/61,7/64,5 years in end users. Each end user suffered from stroke or central neurological disease and the caregivers are those who help them in everyday routine. The 10 most important abilities were marked on a 0-3 scale: using toilet (55/78), bathing/showering (50/78), dressing and undressing (48/78). In the new technologies sheet net banking was marked six times more than "already using" while both weather forecast/alarming and web-shopping got five marks. The most selected technology from "the wished to use" category was the "help" button (7), "from whom can I ask help" database (7), video showing physical exercises (7).

Conclusions: Using a questionnaire is beneficial for analysing the main needs in great numbers of users and caregivers. Our results showed that most of the asked users wished to have services by which they can reach human help.

OP177

EFFECTIVENESS OF THE LOW-FREQUENCY AND LOW-INTENSITY ELECTROSTATIC FIELD (DEEP OSCILLATION) IN THE COMPLEX REHABILITATION OF THE PATIENTS WITH KNEE OSTEOARTHRITIS**Galina Mratskova¹, Nedko Dimitrov², Alexander Dimitrov³, Damyan Petrov³**

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Background: Osteoarthritis(OA) is one of the most common musculoskeletal disorders. Functional disability worsens the quality of life. Demand for more effective and safe therapies continues.

Objectives: To evaluate the effectiveness of the complex rehabilitation, including low-frequency and low-intensity electrostatic field (Deep Oscillation-DO) combined with kinesiotherapy(KT), in patients with knee OA.

Methods: The study included 90 patients (64-women and 26-men), mean(SD) age 66.0(10.3)) with knee OA, grade 2 and 3 according to the Kellgren-Lawrence scale. Patients were randomized to Treatment group(TG;n=57): 10 sessions of DO and KT, or Control group(CG;n=33): KT and placebo treatment with DO. Assessments included the most common used tool for evaluating knee OA - WOMAC Index, measured at baseline, after treatment and at 1 and 3 months. Higher scores indicate worse outcomes.

Results:Both groups TG and CG, had similar high baseline total WOMAC score (61.5(8.2) versus 59.0(7.2), $p=0.125$) and no difference in Pain and Stiffness subscales. DO resulted in significant physical function improvement in the TG after the sessions, at 1- st and 3 months period(p

Conclusion: The complex application of Deep Oscillation and kinesiotherapy can significantly enhance functional disability reduction and pain and stiffness alleviation in patients with knee OA.

OP178

NATIONAL MODEL OF COMPREHENSIVE REHABILITATION IN RUSSIA**Gennady Ponomarenko¹, Alexander Shoshmin^{1,2}, Kristina Rozhko^{1,2}**

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Introduction: A significant number of people with disabilities in Russia needs rehabilitation and habilitation services. The Government set the task to reorganize the rehabilitation system and bring it into line with international documents. It is planned to develop national rehabilitation services in accordance with the UN and the WHO documents.

Objective: The objective of the study is to assess the structure and quality of rehabilitation services in Russia.

Method: The public health and social services system was analyzed in accordance with the biopsychosocial disability model.

Results: The country profile, health system, disability and rehabilitation, national policies, laws and responsibilities, non-governmental organizations were analyzed. The structure of rehabilitation in the regions of Russia was evaluated.

In 2019, the number of adult disabled people (upper 18 years) amounted to 11 million people, and disabled children was 677 thousand. The Ministry of Labour and Social Protection of the Russian Federation coordinates work with people with disabilities.

Within modernization, many different centres were opened to provide high-tech medical services. More than 1,200 thousand people receive high-tech assistance annually. The need for medical rehabilitation is 51% of outpatients and 21% of inpatients.

Annually, about 2.5 million people undergo a disability assessment and need for rehabilitation, and about 3.3 million individual rehabilitation and habilitation programs are developed, including all aspects of rehabilitation. More than 300 thousand people with disabilities per year receive assistive devices at the expense of the state.

Conclusions: A new national rehabilitation system is being integrated in Russia. The electronic registration of people with disabilities and their needs was established. The development of education, new professions, standardization in rehabilitation continues. It is planned to use the tools of international planning and technologies in rehabilitation, service evaluation, changes in the competence of specialists through productive cooperation with international professional communities and organizations.

OP179

MANAGEMENT PROCESS IN REHABILITATION: HIP FRACTURE.**Gema Flores, Paloma Galan, Cesar Duque, Javier Medrano, Carmen Sampayo, Carnmen Moralejo**

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Introduction: The purpose of this communication is to describe the implementation of a process management model applied to patients over 65 years of age who are admitted to a functional recovery unit.

Material and method: A description is made of how a process management model has been implemented in patients with hip fractures admitted for rehabilitation in our Hospital (long term care). First of all, we defined those responsible for leading the process, in our case the two rehabilitation doctors. Subsequently, the a representative from each group of the team were chosen, for for carrying out the work procedures, in our case two physiotherapists, a physiotherapy supervisor, an occupational therapist and a speech therapist. The activities and tasks were defined, answering in each of them the questions: who does it, when does it, where is it done and how is it done. A series of indicators were established and defined and subsequently analyzed. Medical assessment on the day of admission, beginning of treatment within 72 hours after admission, detection and treatment of dysphagia, nutritional assessment, pain assessment, walking capacity, functional independence in dayli living activities upon admission and discharge. Fall prevention program. Once the protocols have been established, the rest of the professionals involved in the treatment are announced and work begins with them. Weekly objectives evaluation meetings were held, analyzed the results and proposed improvement actions if deemed necessary.

Conclusions: Process management favors the homogenization of rehabilitative actions in patients with fractured hip fractures in order to achieve maximum functional recovery. A progressive implementation based on continuous improvement is recommended. The philosophy is summed up in planning, doing, reviewing and acting. At the moment we are in the analysis and monitoring phase of results.

OP180

WEARABLE DEVICES FOR REHABILITATION IN THERMAL SETTING - WILL THEY REALLY IMPROVE THE REHABILITATIVE INTERVENTION?**Giacomo Magro¹, Stefano Masiero^{1,2}**Department of Neuroscience, Physical Medicine and Rehabilitation University of Padova¹, General Hospital of Padova², Padova, Italy

Introduction: Wearable technologies has increasingly become part of our daily life. These devices are designed as non-obtrusive and intuitive systems able to collect data and track activities thanks to accelerometers, magnetometers and gyroscopes that can measure both biological and environmental parameters. Wearable systems make the physicians able to capture patients' activity levels and exercise compliance, facilitating the assessments of their ability to perform specific motor activities in order to propose a customize rehabilitation strategy. Personalization, immersiveness, and biofeedback are key for amplifying and accelerating any rehabilitation process, in particularly when the environment make the evaluation even more difficult, as in exercises executed under water.

Objective:The aim of this work is to provide an overview of latest wearable systems in rehabilitation, in particularly for thermal setting. We focus on current challenges and future developments for wearable devices in order to suggest if this approach could be useful for future rehabilitation intervention.

Methods: We systematically searched MEDLINE via PubMed, Cochrane Central Register of Controlled Trials, EMBASE and PEDro for articles published up to September 2019. We searched the above-mentioned literature databases using the following search terms: wearable devices, thermal environment, biofeedback in rehabilitation, waterproof sensors.

Results: The literature search identified some studies that tested and verified the feasibility of wearable technology approach for rehabilitation in thermal setting. Using these devices it could improve not only rehabilitation evaluation, as it occurs during treatment, but also a prompt and meaningful feedback to patients and their therapists.

Conclusions: A new generation of wearable sensors could allow accuracy and precision in the prescription of rehabilitative exercise, which fits in a world-wide healthcare scenario headed for new and more specific treatment. This approach permits to optimize the overall management of the patient, using individual and personalized treatment of diseases.

OP181

FEASIBILITY OF AN IPHONE-BASED APPLICATION FOR KNEE JOINT GONIOMETRY DURING GAIT IN A STROKE PATIENT**Giorgio Ferriero¹, Emilia Ambrosini², Claudia Nava³, Monica Parati³, Simona Ferrante²**

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In recent years, different smartphone apps have been validated for joint goniometry, but none for goniometric assessment of gait after stroke.

The aims of our work were to assess: 1) intra-rater reliability of an image-based goniometric app - DrGoniometer- in the measurement of the extension, flexion angles and ROM of the knee during the hemiparetic gait of a stroke patient; 2) its validity comparing to the reference method (electrogoniometer) for flexion-extension excursion measurements.

A left-hemiparetic inpatient following haemorrhagic stroke was filmed using the app while walking on a linear path. An electrogoniometer was fixed on the medial face of the affected knee in order to record the dynamic goniometry during gait. Twenty-one raters, blinded to measurements, were recruited to rate knee angle measurements from video acquired with DrGoniometer. Each rater repeated the same procedure twice, the second one at least one day after the first measure.

Results showed that flexion angle measurements are reliable (ICC_{95%}=0.66, 0.34;0.85; SEM=4°), and adequately precise (CV=14%). Extension angles measurements demonstrated moderate reliability and higher degree of variation (ICC=0.51, 0.09;0.77; SEM 4°; CV=53%). ROM values were: ICC=0.23 (-0.21;0.60); CV=20%. Accuracy of DrGoniometer compared to the electrogoniometer was 7.3±4.7°.

Results demonstrated moderate-to-good reliability concerning the maximum extension and flexion angles, while assessing ROM DrGoniometer showed poor intra-rater reliability. Flexion angle measurements seemed to be reliable according to ICC and SEM values and more precise with a limited dispersion of results DrGoniometer that revealed a good accuracy in the measurement of range of motion.

In conclusion, DrGoniometer was found to be a valid and reliable method for assessing knee angles during hemiparetic gait. Further studies are necessary to investigate inter-rater reliability and confirm our results.

OP182

EFFECTS OF UPPER LIMB ROBOTIC TREATMENT ON COGNITIVE FUNCTIONS IN SUBACUTE STROKE PATIENTS**Giulia Guardati, Valeria Cipollini, Marco Germanotta, Silvia Galeri, Serena Monteleone, Irene Aprile**

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Introduction. It is estimated that up to three quarters of stroke survivors exhibit cognitive impairment that impacts on functional recovery, quality of life, and social engagement after stroke. Moreover, the impairment of cognitive functions can negatively influence the rehabilitation outcomes. Robotics has been proposed as a viable approach for the rehabilitation of the upper limb, increasing the amount and intensity of the therapy, and standardizing the treatment, adding a complex multisensory stimulation to the patient. Robotics may promote the re-learning capacity, inducing functional or structural plasticity in brain networks that control motor and cognitive functions.

Objective. To investigate if the robotic therapy can impact on some cognitive functions that are compromised after stroke.

Method. Thirty-two patients with sub-acute stroke were enrolled in two rehabilitation centers. All patients performed a robotic treatment of the upper limb (30 sessions, 5 times a week) using a set of four robotic devices. The training included motor-cognitive exercises specifically selected to train spatial attention, vision and working memory, praxis, executive functions, and speed of processing. Furthermore, patients underwent a comprehensive rehabilitation program including individual conventional physiotherapy (6 times/week), lasting 45 minutes focused on lower limb, sitting and standing training, balance and walking. Subjects were evaluated at baseline and after the treatment. To evaluate the effects of the robotic treatment on cognitive functions, the following tests were used: 1) Digit Span; 2) Tower of London; 3) STROOP; 4) Symbol Digit Modalities Test.

Results. Statistical analysis showed that, after treatment, patients improved significantly in the Symbol Digit Modalities Test ($p < 0.05$) and in the Tower of London test ($p < 0.05$).

Conclusions. These preliminary results suggest that some cognitive functions, as processing speed of visual stimuli, planning and problem solving can improve after a robotic treatment aimed to restore upper limb motor functions in subacute stroke patients.

OP183

AN INNOVATIVE TECHNIQUE OF MANUAL THERAPY IN LOW BACK PAIN: A RANDOMIZED CONTROLLED STUDY**Giuseppe Cannata¹, Carmelo Pirri¹, Accursio Miraglia², Concetta Ljoka¹, Laura Giordani¹, Salvatore A. Cassarino¹**Physical Medicine and Rehabilitation, Tor Vergata University¹, Rome, Centro di Educazione Psicomotoria, Sciacca², Italy

Introduction: The term "low back pain" (LBP) indicates the recurrent disease that affects the lumbar spine, characterized by pain and functional limitation. The manual therapy is an important tool in its treatment. The conventional technique used by Robert Maigne is characterized by the grip with one hand behind the head and the other hand on the elbow: it ensures optimal control of the trunk by the operator at all stages of manipulation. However, this grip is judged uncomfortable by several patients, particularly women or thin patients, who complain about feelings of tension and pain at armpit under which the operator's arm passed, at costal region compressed by forearm, and at breast. For this reason, we have developed an originally modified grip, in order to ensure good control of the patient by the operator in all stages of the manipulation as well as maximum comfort of the patient.

Objective: To evaluate the effectiveness of the partially modified manipulative technique in patients with low back pain, and to compare it with the conventional technique.

Methods: Patients with LBP lasting more than 3 months were randomized into conventional technique group and innovative technique (Miraglia's technique) group. Ten sessions were performed over a six-week period. Pain (VAS) and function (Roland and Morris Disability Questionnaire) assessments were carried out before the treatment and on the sixth week of treatment.

Results: Fourteen patients were randomized into conventional (7 patients) or innovative (7 patients) technique. The innovative technique was effective on all Roland and Morris Disability Questionnaire parameters ($p=0,018$) and on VAS ($p=0,018$). There was no difference in efficacy between the two techniques (VAS $Z=0,266$; $p=0,790$; Roland Morris Questionnaire $Z=0,330$; $p=0,74$).

Conclusions: The new manipulative technique was as effective as the conventional technique on pain and function but offered a better comfort to patients.

OP184

ANALYSIS OF JOINT HYPERLAXITY IN IDIOPATHIC SCOLIOSIS COMPARED TO CONGENITAL SCOLIOSIS**Hanène Belabbassi**

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Introduction: Joint hypermobility (JH) is a common disorder in the general population of children and adolescents. In our daily practice, this condition is regularly sought and evaluated in all young patients with spinal deformity.

Objective: The purpose of this study is to compare the results of hypermobility in idiopathic and congenital scoliosis.

Method: We conducted an observational analytic study on 147 patients; we include 88 children with idiopathic scoliosis and 59 children with congenital scoliosis, aged less than 18 years old. We excluded all patients treated with conservative treatment or surgery and children with an associated condition to their congenital scoliosis. Joint hypermobility is positive when the Beighton score is ≥ 6 at age ≤ 8 years, and when this score is ≥ 4 at age > 8 years old.

Results: Mean age is 10.23 ± 4.37 , Sex-ratio (F/M) is 2.26; mean Cobb angle is $17.32^\circ \pm 3.28^\circ$. The proportions of age classes ≤ 8 , [9 -15], and ≥ 15 are respectively 28.6%, 57.8% and 13.6%. The proportions of minor scoliosis (10° - 20°) is 49.7%, moderate scoliosis (20° - 45°) is 31.3%, and severe scoliosis ($> 45^\circ$) is 19%.

The Beighton score in AIS group is 1.93 ± 2.48 and in congenital scoliosis is 3.27 ± 3.61 with significant difference. Stratifying on sex, there is a significant difference between the Beighton proportions. We notice more negative JH in girls with idiopathic scoliosis. Stratifying on Cobb angle, we found that there is a significant difference in the minor group with a more negative JH in idiopathic scoliosis.

Conclusions: Despite the bias in selection with small samples and no homogeneity between groups, there is a significant difference between the idiopathic scoliosis and congenital scoliosis when we compare the Beighton score concerning minor curves, and female sex, but not on the degree of joint hypermobility.



OP185

TURKISH ADAPTATION, VALIDITY AND RELIABILITY OF THE SUBJECTIVE INDEX OF PHYSICAL AND SOCIAL OUTCOME (SIPSO)

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Introduction:The levels of physical impairment and functional limitation in patients with stroke can affect their level of community integration. The Subjective Index of Physical and Social Outcome (SIPSO) have been reported as a valid and reliable tool for measuring the level of community integration in stroke survivors.

Objective:This study aimed to adapt the SIPSO into the Turkish language, and to test the reliability and validity of the SIPSO in stroke survivors using modern psychometric analysis (Rasch analysis).

Method:The SIPSO was translated and adapted with standardized procedures. After the translation process, the internal construct validity was assessed by Rasch analysis, reliability by internal consistency and person separation index (PSI). External construct validity was evaluated by analyzing correlation between the SIPSO and the Beck Depression Scale (BDS), Brunnstrom recovery stage, Mini Mental Test (MMT), Functional Independence Measure (FIM), Barthel Index (BI), Functional Ambulatory Scale (FAS), Rivermead Mobility Index (RMI), Stroke Impact Scale 3.0 (SIS 3.0). Test-retest reliability with intraclass correlation coefficient (ICC) and Rasch analysis.

Results:A total of 179 stroke patients (92 males; 87 females; mean age 62,54±10,31 years; range 32 to 80 years) were included. The mean disease duration was 28,78±34,31 months, range 6 to 192 months. The internal consistency of the SIPSO physical subscale showed good to excellent with Cronbach's α : 0.92, Person Separation Index (PSI): 0.95. The internal consistency of the SIPSO social subscale showed good to excellent with Cronbach's α and PSI: 0.86). External construct validity was highly correlated with Brunnstrom recovery stage, SIS 3.0, RMI, BDS, FIM, BI, FAS ($p<0,001$).

Conclusions: The SIPSO is a valid and reliable scale for measuring participation in stroke survivors in Turkey. The physical and social subscale of SIPSO reached good fit to the Rasch model.

OP186

COMPARISON OF THE EFFECTIVENESS OF THE IFC AND TENS ELECTROTHERAPY ON FUNCTION AND PAIN IN OSTEOARTHRITIS OF THE KNEE**Helena Kolar Mitrovic**

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Introduction: Osteoarthritis is chronic and often progressive disease that decreases the quality of both the patient's and the life of the whole family. It estimates that the osteoarthritis is the eighth cause of disability in the world and that it takes 2.8% of all disabilities. Loss of work capacity and medical expenses are a great socioeconomical burden for individual, family and whole society.

Pain, contractures, deformity and limitations in everyday activities are present in large number of patients. Rehabilitation has a goal of decreasing the pain, keeping full function of joint movement and appropriate muscle power.

Objective: This study's goal is to compare efficiency of Interferential Therapy (IFC) and Transcutaneous Electrical Nerve Stimulation (TENS) on pain, joint movement, muscle strength of musculus quadriceps and knee joint functionality.

Method: Twenty patients were included in the research and randomly divided in two groups, not considering sex or age. In first group (N=10) we applied Interferential Therapy (IFC) with therapeutical exercises and in the second group (N=10) we applied Transcutaneous Electrical Nerve Stimulation (TENS) with therapeutical exercises. Level of pain, joint movement, muscle strength of musculus quadriceps and knee joint functionality were measured. To assess the pain we used VAS scale of pain, to measure joint movement we used goniometer and to measure the muscle strength of musculus quadriceps we used Manual Muscle Test. To assess knee joint functionality we used WOMAC score for knee osteoarthritis. Patients were assessed both in the beginning and in the end of the study.

Results: There was improvement in WOMAC scores and VAS scale of pain in both groups. In comparison to results of groups with independent t-test it is established that the group in which Transcutaneous Electrical Nerve Stimulation (TENS) was applied had better results in both WOMAC and VAS scale of pain than the group with Interferential Therapy (IFC) applied.

Conclusions: Both electrotherapy procedures Transcutaneous Electrical Nerve Stimulation (TENS) and Interferential Therapy (IFC) have positive effect in decreasing the pain and improving the knee functionality. In our study Transcutaneous Electrical Nerve Stimulation (TENS) had a better effect on pain and better results on WOMAC score than the Interferential Therapy (IFC).

OP187

WORK-RELATED CAPACITY ASSESSMENT AND REHABILITATION IN ESTONIA**Hille Maas, Pille-Riika Lepik**

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Introduction: Work Ability Reform on 2016 changed fundamentally work ability assessment principles in Estonia. People with long-term health conditions receive more support in employment. The need for changes based on Labour market status of population with incapacity for work. There were more than 100 000 persons with special needs, active by employment only 49 %. Fundamental change of reform was activation prerequisite for claimants, meaning that person is required to work, study or look for job. Estonian Unemployment Insurance Fund (EUIF) has functioned as workability assessment authority since 2016.

Objective: Workability assessment methodology bases on International Classification of Functioning and takes into account EUMASS recommended workability assessment core set. Person's restrictions on activity and participation arising from the state of health, and the prognosis and estimated duration of such restrictions shall be taken into account. Assessment formula consists of 7 ICF related domains.

Method: For submission of application and medical Expert decision making has been developed special digital environments. Part of decision of workability scope are suggestions about suitable working conditions, work related rehabilitation services, assistive technology equipment and environment adaptations etc.

Results: Assessment of need of vocational rehabilitation is closely related to workability assessment document. ICF based coding help rehabilitators to avoid extra assessment and gives necessary information for services selection and goal setting. The elements of work-related rehabilitation are besides basic therapeutical services for example: assessment and adaptation of the workplace, special aids and equipment, needed for performing of job, returning to work programs etc. On 2016 participated in work-related rehabilitation services 984 persons, on 2019 already 3145 persons with reduced work ability or persons who are in the risk to exit labor market.

Conclusions: Relating ICF based work ability assessment and vocational rehabilitation to each other, is effective approach for health care professionals and offers flexible and solid possibility to stay in employment.

OP188

SIMULTANEOUS ISOMETRIC FORCE AND THERMOGRAPHIC MEASUREMENTS FOR SUPPORTING DECISION-MAKING IN POST-STROKE ROBOTIC THERAPY OF PATIENTS WITH HEMIPARESIS**Ibolya Tavaszi¹, Gyorgy Herke¹, Andras Toth², Tamas Pilissy¹, Zsofia Marko², Gabor Fazekas¹**Rehabilitation Department of Hemiplegics, National Institute for Medical Rehabilitation, Budapest University of Technology and Economics ², Budapest, Hungary

Introduction: Robot-mediated therapy is widely used in post-stroke rehabilitation and the type of the robotic programme is chosen by the therapists. It would be useful if robotic system could support decision-making of the therapist by suggestions based on objective assessments.

Objective: Goal of this research is to investigate whether simultaneous isometric force/torque and thermographic measurements of dedicated assessment exercises of upper limbs can characterize shoulder condition in hemiparetic patients.

Methods: In this ongoing study the upper limb isometric force/torque and thermographic measurements of the shoulder of post-stroke subjects were collected simultaneously. Up to now 20 subjects have been involved, each subject received three sessions in three weeks. Before start of the measurement, there was a 10-minute acclimatization time while the subject was waiting in the laboratory with free shoulders. One session had two phases: one phase with paretic side, the other phase with non-paretic side. One phase consisted of the following steps: (1) initial thermographic image, (2) first isometric force measurements, (3) second thermographic image, (4) short traditional physiotherapy, (5) third thermographic image, (6) second isometric force measurements and (7) final thermographic image.

Results: Four heatmaps per measurement was taken by a VarioCAMHDx 675 thermal heat camera and we recorded 12 isometric force measurements twice per phase by the six-axis force/torque sensor built in into the Reharob Robotic Therapeutic System. Average temperature increase between the first and last thermal image of the shoulder was 0,22 °C on the paretic and 0,33 °C on the non-paretic side. As expected, isometric force measurements justified the improvements in muscle strength and the differences between the sessions of a certain subject.

Conclusion: The interim results of this ongoing work suggest that shoulder thermographic images and isometric force/torque measurements can provide further information of the state of the upper limb of hemiparetic patients.

OP189

CLINICAL EVALUATION OF A SENSORY FEEDBACK RESTORATION NEUROPROSTHESIS FOR LOWER-LIMB AMPUTEES**Igor Popovic¹, Jelena Kljajic, Marko Bumbasirevic³, Igor Simanic¹, Milutin Radotic¹**Prosthetic rehabilitation, Specialized Hospital for Rehabilitation and Orthopedic Prosthetics¹, Institute Mihajlo Pupin², Stanisa Raspopovic³, Belgrade, Serbia

Introduction: Conventional leg prostheses provide insufficient haptic feedback to the above-knee amputees. Without essential sensory information, they are unable to manipulate their movements and thus find it hard to control the position or motion of the prosthetic device. The consequences are limited mobility, increased physical and cognitive effort, low embodiment, risk of falling, and finally, in great measure, prosthesis rejection. By using direct neural stimulation, injected through Transversal Intra-neural Multichannel Electrodes (TIME) into the sciatic nerve, we developed a lower-limb prosthesis that restores the missing sensory feedback in real time.

Objective: To determine the effects of a novel type of bionic prosthesis, with the aim of restoring balance while standing and treading, increasing walking speed, reducing fall risk and, in general, improving confidence of amputees.

Method: In order to quantify the improvement in patients' balance and mobility when sensory feedback is restored, a number of tests and questionnaires have been provided to the two above-knee amputees: the Berg test, used to determine ability to safely balance during defined tasks; Emory Functional Ambulation Profile, a test that assesses the reliability and validity of walking time measurements necessary to walk in 5 different environments; the Amputee Mobility Predictor, comparing functional status of amputees, with and without sensory feedback; Community Balance and Mobility Scale (CB&M), designed with a purpose to reflect the balance and mobility skills necessary for full participation in the community.

Results: The results showed that a neuroprosthesis with sensory feedback noticeably boosted balance and mobility skills, increased self-reported confidence, and also reduced completion time for the Emory test.

Conclusions: The study showed that a lower-limb neuroprosthesis with sensory feedback shows promising results regarding the improvement of the health issues described above. The results also show that there is a potential for similar future studies.

OP190

EFFECTIVENESS OF EXTRACORPOREAL SHOCK WAVE THERAPY VERSUS ULTRASOUND THERAPY IN PATIENTS WITH CALCIFIC SUPRASPINATUS TENDINITIS**Ileana Monica Borda, Laszlo Irsay, Viorela Ciortea, Alina Ciubean, Rodica Ungur**

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Introduction: Calcific supraspinatus tendinitis is a frequent painful disorder, leading to stiffness and disability.

Objective: The purpose of this study was to compare the effectiveness of extracorporeal shock wave therapy (ESWT) versus ultrasound therapy (US) in reducing pain, increasing mobility and improving function in patients with calcific supraspinatus tendinitis.

Method: 40 patients, aged between 40 and 65 years, with calcific supraspinatus tendinitis confirmed by ultrasound examination were included in the study. The patients were randomly assigned either to ESWT Group or to US Group. ESWT Group (n=20) received 4 sessions of ESWT with 3 day-interval between sessions. US Group (n=20) received 10 sessions of US therapy, daily. Patients from both groups were also included in a physical exercise program. Patients were assessed on the first and on the last day of treatment, by Visual Analogue Scale (VAS) for pain, range of motion (ROM) for shoulder mobility, Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire, Shoulder Pain and Disability Index (SPADI).

Results: Compared to baseline, pain (VAS) decreased in both groups, but significantly more in ESWT Group than in US Group ($p<0.05$). As for shoulder mobility, ROM for abduction and flexion improved significantly better in patients with ESWT than in those with US ($p<0.05$). Also, disability (DASH, SPADI) diminished in both groups, but the functional improvement was significantly higher in ESWT Group ($p<0.05$).

Conclusions: Both ESWT and US, combined with physical exercise, have proved to be effective in reducing pain, increasing mobility and improving disability in patients with calcific supraspinatus tendinitis, but with significant advantages in favour of ESWT.

OP191

PATIENTS' NEEDS IDENTIFICATION AFTER BREAST CANCER**Jekaterina Krasovska**

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Introduction:In Latvia, breast cancer was diagnosed in 1143 cases in 2017 (SPKC, 2017). This shows the topicality of this topic. During the treatment of patients with this condition, dysfunction affecting quality of life is often detected both during and after treatment.

Aims:To explore the needs women face in the diagnosis and treatment of breast cancer using the ICF concept.

Tasks:Identify the health issues that patients face after being diagnosed and treated for breast cancer. Identify dysfunctions that affect or may affect patients after breast cancer treatment. Identify the type of support patients expect after breast cancer treatment.

Materials and methods:The type of study chosen is qualitative descriptive study. The study took place at Riga Eastern Clinical University Hospital, Latvian Oncology Center. The study selected patients according to the following criteria: women of all ages over 30; diagnosed with breast cancer and undergoing operative therapy for at least 4 days after surgery, but for up to one month. It covered demographic information, clinical information. Exclusion criteria: distant metastases, acute mental illness, insufficient knowledge of Latvian to answer interview questions.

Results and conclusion:A total of 12 women participated in the study. Based on the ICF classification, the data obtained in the study indicate that ICF body function as well as activity and participation are most affected. Five patients were affected by exercise capacity (b455) and pain (b280). More than half of the patients, 9 out of 12, were affected by emotional function (b152). Almost half of the patients - 5 women - have difficulty in performing their daily activities, have difficulty completing home steps (d640), and 4 have experienced difficulties in purchasing goods and services (d620). Five women reported difficulty coping with stress (d240). Half of the patients surveyed had difficulty returning to work (d850).

OP192

REHABILITATION INTERVENTIONS IN LONG-TERM WHEELCHAIR USERS WITH TRIGGER FINGER AFFECTING THE MIDDLE OR/AND RING FINGER**Ioannis-Alexandros Tzanos, Sofia Sivetidou, Stavroula Bakatsi, Stefania Migkou, Athanasios Sabanis, Aikaterini Kotroni**

Physical Medicine and Rehabilitation, KAT Hospital, Kifissia, Greece

Introduction: Trigger finger is the stenosing tenosynovitis due to inflammation of the synovium of the hand flexor tendons. It occurs due to the entrapment of the flexor tendons in the level of the A1 annular ligaments of the sheath. Diabetes mellitus, rheumatoid arthritis, amyloidosis, smoking and hard manual working have been identified as risk factors.

Objective: To test the effectiveness of conservative treatment of trigger finger in long-term wheelchair users.

Method: Eight outpatients (7 men and 1 woman) were examined in our department during the last 7 years. Their mean age was 52 years, they were wheelchair users for 15 to 30 years, fully independent and with no other risk factors besides overuse. They claimed for cracking at finger movement and palmar pain at the site of the metacarpophalangeal joint (median or/and ring finger). The clinical examination revealed trigger finger findings, classified as Green stage 2. Together with patients, it was decided to opt for conservative treatment, despite the literature lower success rates compared to surgery, in order to avoid hand immobilization. We injected corticosteroids into the flexors' synovium and we recommended night splint and protecting gloves for wheelchair propulsion.

Results: Five patients were relieved with the first injection and 3 with the second one. Five out the eight patients continued to implement the instructions. The 3-year follow-up revealed no relapse.

Conclusions: In patients with motor deficits, it is crucial to plan any therapeutic intervention in a manner that will not limit their functional ability and independence.

OP193

IMPACT OF POST-STROKE RECANALIZATION ON GENERAL AND UPPER LIMB FUNCTIONING: A PROSPECTIVE, OBSERVATIONAL STUDY**Joao Paulo Branco, Joao Pinheiro**

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Objective: To assess the impact of recanalization (spontaneous and therapeutic) on upper limb functioning and general patient functioning after stroke.

Methods: This is a prospective, observational study of patients hospitalized due to acute ischemic stroke in the territory of the middle cerebral artery (n=98). Patients completed a comprehensive rehabilitation program and were followed-up for 24 weeks. The impact of recanalization on patient functioning was evaluated using the modified Rankin Scale (mRS) and Stroke Upper Limb Capacity Scale (SULCS).

Results: General and upper limb functioning improved markedly in the first 3 weeks after stroke. Age, gender, and National Institutes of Health Stroke Scale (NIHSS) score at admission were associated with general and upper limb functioning at 12 weeks. Successful recanalization was associated with better functioning. Among patients who underwent therapeutic recanalization, NIHSS scores ≥ 16.5 indicate lower general functioning at 12 weeks (sensitivity=72.4%; specificity=78.6%) and NIHSS scores ≥ 13.5 indicate no hand functioning at 12 weeks (sensitivity=83.8.4%; specificity=76.5%).

Conclusions: Recanalization, either spontaneous or therapeutic, has a positive impact on patient functioning after acute ischemic stroke. Functional recovery occurs mostly within the first 12 weeks after stroke, with greater functional gains among patient with successful recanalization. Higher NIHSS scores at admission worse functional recovery.

Keywords: Stroke; Recanalization; Rehabilitation; Functioning; Upper limb; Functionality

OP194

EXERCISE GROUP THERAPY ENHANCES FUNCTION AND PROMOTES ACTIVITY/PARTICIPATION IN BREAST CANCER SURVIVORS WITH CHRONIC UPPER QUARTER DYSFUNCTION AT ANY AGE.**Ilaria Barboni, Chiara Cosoli, Fabio Tarini, Martina Micheletti, Maria Gabriella Ceravolo, Marianna Capecchi**

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Introduction. The Upper Quarter Dysfunction (UQD) occurs in more than 30% breast cancer survivors (BCS). The burden is high in social, individual, human and economic terms. We propose group therapy as a cost-effective approach to promote physical activity and treat UQD.

Objective. 1) To assess the effectiveness of group rehabilitation at improving function, activities and participation of BCS suffering from chronic UQD. 2) To study the impact of subjects' age on rehabilitation effects in the long term.

Method. A prospective study, with 3-month follow-up, involved 30 BCS suffering from UQD, without dementia or contraindications for physical activity. Age was 59.4 ± 10.5 years in the whole group; 15 women were aged 68 ± 6 y, the remaining 15 were aged 50 ± 5 y. Breast cancer stage was I, II or IIIa. Subjects were grouped in small classes, homogeneous by age and disability level, and underwent 10 one-hour sessions (2/week) of UQD treatment and aerobic training. Outcome measures (OMs) were DASH score and sub-score, McGill Pain Questionnaire, NRS of pain, shoulder ROM, change in work condition and sleep quality. They were assessed before treatment (T0), at the end (T1) and 3 months (T2) after T1.

Results. Although the younger women complained of more severe UQD and pain, all subjects improved significantly at T1, in all OMs ($p > .01$). Benefits persisted at T2 with respect to pain, shoulder flexion, DASH total score and sub-scores. Work conditions and sleep also improved in 50% women. The older women showed a worsening in shoulder ROM and DASH score at T2, while the younger ones kept improving.

Conclusions. Group rehabilitation is effective at enhancing upper limb function and social participation in BCS with UQD. Benefits persist in the long term in women younger than 60.

OP195

TECHNOLOGY FOR ASSISTING PEOPLE WITH NEUROCOGNITIVE DISORDERS IN ACTIVITIES OF DAILY LIVING – COACHMYLIFE PROJECT**Ileana Ciobanu¹, Andreea Georgiana Marin², Alina Iliescu², Laszlo Irszay³, Mihai Berteanu²**

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Introduction. Neurocognitive disorders generate important progressive disabilities. Increasing deficits in the domains of memory, focus and orientation undermine professional activities, travel capabilities, any kind of social participation and challenge performance of the activities of daily living. In order to enhance and support safe and efficient independent living at home for people with neurocognitive disorders, for as long as possible, different technological solutions have been developed.

Objective. To present a narrative review of the technology designed and developed to support people with neurocognitive disorders in activities of daily living. The aim is to identify and assess the requirements for a new approach in assistive technology for people with neurocognitive disorders.

Method. Bibliographic and webographic research.

Results. Solutions with different degrees of complexity have been adapted, designed and developed, especially lately, when awareness regarding the effects of the aging population process increases. From simple post-it reminders to smart-homes, efforts are made to provide cognitively challenged people with solutions for independent living. Most solutions consist in assistive technologies. The multidisciplinary multinational team of Active and Assisted Living CoachMyLife project develops a solution for personalized assistance but also for cognitive training in activities of daily living, for people with neurocognitive disorders.

Conclusion. In order to increase the time span of independent living, a new approach, combining cognitive assistance with cognitive training, can be applied when developing technology for people with neurocognitive disorders. The focus of developers may shift from deficits and disability to the cognitive reserve of the users, including the restant learning capacity. Adapted cognitive training for activities of daily living, applying errorless learning principles, may add its benefits to those of the assistive solutions, improving the quality of life of people with neurocognitive disorders, their families, health care providers and of the entire community.

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OP196

STUDY OF THE INCIDENCE OF REGIONAL SPASTICITY (RS) ON PATIENTS MANAGING GENERALIZED SPASTICITY (GS) WITH AN INTRATHECAL BACLOFEN PUMP (ITB)**Ioannis Drinis, Eleytherios Alexiou, Margarita-Eleni Manola, Stefanos Mpourlios, Ioannis Dionysiotis, Ioannis Iliakis, Konstantina Petropoulou**2nd Clinic/Clinic Of Rehabilitation Medicine¹, National Centre Of Rehabilitation², Athens – Greece

Introduction: The use of an intrathecal baclofen pump (ITB) for the general management of spasticity in Europe and North America is nowadays widespread. Is this enough for fulfilling the goals of rehabilitation after the reduction of spasticity?

Objective: Spasticity management in combination with botulinum toxin A (BTxA) injections and (ITB).

Method: Retrospective study of 42 patients with (ITB). A number of them were subjected at (BTxA) injections before and after the implantation of the (ITB).

Results: 42 patients were included, 37/42(88,09%) had a programmable pump and only 5/42(11,9%) had a constant-flow pump. 9/42(21,4%) had TBI, 13/42(30,95%) had MS, 6/42(14,28%) had CP, 12/42(28,57%) had SCI, 1/42(2,38%) had encephalitis and 1/42(2,38%) had stroke. The meantime from the start of the disease until the implantation of the pump was 124,8 months. 23/42(54,7%) had RS and were treated with (BTxA) with a meantime of 12,2 months between sessions. 17/23(73,91%) that were treated with (BTxA) continued sessions and after the implantation of the pump. 7/17 with TBI needed (BTxA) and 4(23,5%) continued after the (ITB). 5/17 with MS needed (BTxA) and 4(23,5%) continued after the (ITB). 4/17 with CP needed (BTxA) and all 4(23,5%) continued after the (ITB). 5/17 with SCI needed (BTxA) and 4 (23,5%) continued after the (ITB). The 1/23 with ENCEPHALITIS discontinued (BTxA) after (ITB). The 1/17(5,88%) with Stroke continued the (BTxA) after the (ITB).

Discussion & Conclusions: The management of spasticity consists a major factor for Rehabilitation. For (GS) the implantation of (ITB) is very effective and in some cases is accompanied with a (BTxA) injection. It seems that the uneven distribution of spasticity occurs at incomplete lesions of the central nervous system were they need combined therapy for (GS) and (RS).

OP197

STROKE : VIRTUAL REALITY AND ROBOTICS VERSUS CLASSIC THERAPIES**Ioan-Sorin Stratulat**

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There are new technologies such as Robotics and Prosthetics, Functional Electrical Stimulations, Brain Computer Interfaces, Virtual Reality and Autologous Stem Cells as well as brain implants.

All of this are associated with the problems of cost reduction in medical hospitals and home daily use, as well as the neuropsychological negative side effects in connection with the new using technologies. The major point for recovery is the neurovascular coupling of damage zone with normal brain zone, linked with levels of gamma-aminobutyric acid (GABA) (1). The effects of physical therapies treatment protocols depend on a possible cerebral brain mechanism of reorganization as it is presented in bilateral arm training with rhythmic auditory cueing (BATRAC) (2).

Challenges of rehabilitation technologies:

1. Rehabilitation robots. Therapists impact and cost/benefits have not yet been fulfilled.
2. FES. The complexity of the technology and the need for operative placement remains targets for the future.
3. Virtual reality systems are to be validated by new technologies (benefit/cost) (3).

As concerning brain implants and technologies that allow experience of sensation and motor activity through robotic devices, the last two years were crucial.

Autologous Stem Cells as brain implant. Recovery following stroke depends on cellular plasticity in the perilesional zone (PZ). Doublecortin (DCX), a protein mainly labeling immature neurons in neurogenic niches is also highly expressed in the vicinity of focal cortical infarcts. Notably, the number of DCX+ cells positively correlates with the recovery of functional deficits after stroke, though the nature and origin of these cells remains unclear.

Our activity is focused on using simple method of rehabilitation as is „Takizawa method (4), in association with autologous brain stem cell implants.

Our peer review for this lecture used Cochrane Data base articles and the presented results by different authors between 2010 -2019.

OP198

REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION IN THE REHABILITATION OF PARKINSON'S DISEASE PATIENTS**Irina Borodulina**

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Introduction. Parkinson's disease (PD) is the second most common neurodegenerative disorder. Medications are largely symptomatic rather than preventive and there is still no cure for this disease nowadays. Repetitive transcranial magnetic stimulation (rTMS) is considered to be an effective technic of non-medicinal treatment patients with PD.

Patients and methods. 17 patients (9 men and 8 women) with mean (range) age of 67 (38-78) years with PD were treated with rTMS. All patients signed informed consent before the treatment. The stimulation site was M1 area. Each session of 5-Hz rTMS consisted of 3600 pulses. Patients received a total of daily 10 sessions. Parts I-III and Schwab and England activities of daily life (ADL) scale of Unified Parkinson's Disease Rating Scale (UPDRS) were completed at baseline and at the end of the treatment.

Results. All patients were able to attend all sessions. No one experienced adverse events. Variables of UPDRS were checked for abnormal distribution using the Wilcoxon's matched pairs test. A p value < 0.05 was considered statistically significant. Median (25%-75%) was calculated for each variable. The UPDRS part I score reduced ($p < 0.05$) from 2 (0-3) to 0 (0-1); part II score reduced ($p < 0.05$) from 9 (5,5-12,5) to 4 (2-6,5); part III score reduced ($p < 0.05$) from 11 (7-14,5) to 6 (2-7,5); the Schwab and England ADL scale score increased ($p < 0.05$) from 80% (70-95) to 90% (85-100). Also we observed the sence of smell improving in 3 cases. Patients with urinary symptoms (imperative incontinence, n=12) didn't notice improvement.

Conclusion. These results provide preliminary evidence of the poten6al effectiveness of TMS for the treatment of PD. rTMS could be addi6onal treatment method for Parkinson's patients.

OP199

CORRECTION OF EARLY DEVIATIONS IN CHILDREN'S DEVELOPMENT BY METHODS OF PHYSICAL EDUCATION**Irina Prilepina**

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Introduction. Diseases of the musculoskeletal system make up a significant part of the pathologies of modern man, the prerequisites for the appearance of which arise in early childhood. The lack of timely prevention leads to an increase in the number of patients with scoliosis, dorsopathies and other disabling diseases. Most existing Disease Prevention Programs through the use of physical exposure methods are designed for preschool and school age children.

The goal was to develop a program to educate the motor sphere of the child from the first months of life.

Method. The program includes the experience of Russian (K.D. Hubert, L.G. Golubeva) and foreign schools in the early rehabilitation of the motor sphere, taking into account age and individual characteristics of child development, a differentiated algorithm for early diagnosis of disorders of the development of the nervous and muscular systems and the appointment of personalized complexes physical effects, including gymnastic exercises, massage techniques, specific hardening procedures (including intensive methods) and hydrokinesitherapy.

Results. The developed program distinguishes between preventive and therapeutic effects in children without damage to the musculoskeletal system (hypotrophy, rickets, motor impairment syndrome in posthypoxic encephalopathy, frequent morbidity syndrome, adaptive illness) and in children who are constantly in need of physiotherapy exercises. By conducting early diagnostics with the development of personalized algorithms for the actions of specialists (a nurse, an instructor in physical therapy, etc., including training parents) and monitoring the effectiveness of impacts, timely, rational and most effective use of rehabilitation tools is achieved.

Findings. The use of the proposed Program for the physical education of young children through screening diagnostics of early deviations of the musculoskeletal system and the use of personalized exposure algorithms helps to reduce people with disabilities in the long term.

OP200

TREATMENT OF THE REVERSE SHOULDER ARTHROPLASTY IN PATIENTS WITH TYPE-3 EXTRACAPSULAR POSTTRAUMATIC FRACTURE SEQUELAE OF THE PROXIMAL HUMERUS**Ivan Diklich**

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Introduction.Type-3 extracapsular posttraumatic sequelae of the proximal humerus fracture (EPSHF) or pseudoarthrosis of the humeral neck is complex and challenging to treat.

Objective. Aim of this study was to retrospectively analyze the outcomes following reverse shoulder arthroplasty (RSA) for the treatment of type-3 EPSHF at our Institution.

Methods. Between 2014 and 2016 we indentified 16 patients with type-3 EPSHF. Mean age was 74. Dominant shoulder in 5 cases. Average follow up was 31 month. Meantime between trauma and RSA was 19 months. The Constant score was documented.

Results.The mean Constant score increased from 11.8 to 62.5 points. All patients reported an improvement of the pain status. The average elevation increased from 40° to 110° ($p < 0.0001$) and active external rotation improved from 5° to 20°. There was one case of implant dislocation and it was operatively successfully treated by increasing the offset and tension. At the final follow up patients were either very satisfied (12) or satisfied (4).

Conclusions. Our study shows that RSA can be reliable surgical option in the treatment of the type-3 EPSHF since it can restore overhead function, performed with an acceptable intraoperative and postoperative complications rate. We are aware of the limitations of this study, such as small number of patients and retrospective review without a matched control group.

OP201

CAN EARLY ASSESSMENT OF HAND GRIP STRENGTH IN OLDER HIP FRACTURE PATIENTS PREDICT FUNCTIONAL OUTCOME?**Ivan Selakovic¹, Emilija Dubljanin-Raspopovic^{1,2}, Ljiljana Markovic-Denic^{2,3}, Marko Kadija^{2,4}, Sanja Tomanovic-Vujadinovic^{1,2}, Goran Tulic^{2,4}**

Clinic for Physical Medicine and Rehabilitation, Clinical Center of Serbia¹, Faculty of Medicine, University of Belgrade², Institute of Epidemiology³, Institute for Orthopaedic Surgery and Traumatology, Clinical Center of Serbia⁴, Belgrade, Serbia

Introduction. Decreased muscle strength is not only a risk factor for hip fracture in older patients, but plays a role in recovery of physical function. **Objective.** Our aim was to assess the role of grip strength measured early after hip fracture, and classified according to the EWGSOP2 criteria in predicting short- and long-term functional recovery. **Method.** One hundred ninety-one patients with acute hip fracture consecutively admitted to an orthopaedic hospital have been selected. A multidimensional geriatric assessment evaluating sociodemographic variables, cognitive status, functional status and quality of life prior to fracture, as well as perioperative variables were performed. Follow-ups at 3 and 6 months after surgery were carried out to evaluate functional recovery. Multivariate regression models were used to assess the predictive role of handgrip strength. **Results.** The mean age of the participants was 80.3 ±6.8 years. Thirty-five percent of our patients with clinically relevant hand grip strength weakness were significantly older, more often female, had a lower BMI, and were of worse physical health. They also had a lower cognitive level, lower Barthel index, and lower EQ5D scores before fracture. Multivariate regression analysis adjusted for age and gender revealed that hand grip weakness was an independent predictor of worse functional outcome at 3 and 6 months after hip fracture for both genders and in all age populations. **Conclusions.** Our study supports the prognostic role of hand grip strength assessed at hospital admission in patients with hip fracture. Thus, clinicians should be encouraged to include hand grip assessment in their evaluation of hip fracture patients in the acute setting in order to optimize treatment of high-risk individuals.

OP202

IMPACT OF MINDFULNESS MEDITATION AND HYDRO-AROMA THERAPY ON PARASYMPATHETIC TONE IN CHRONIC INFLAMMATORY RHEUMATIC PATIENTS AS PART OF PHYSICAL TREATMENT CONDUCTED IN INSTITUTE IGALO**Jadranka Glisic¹, Vjeroslava Slavic¹, Marija Obradovic¹, Snezana Pantovic²**Department for rheumatic patients rehabilitation, Institute "dr Simo Milosevic", Igalo¹, Faculty of Medicine, Podgorica², Montenegro

Objective: The inflammatory or immunomodulatory reflex as an integrative of the pathogenesis of chronic inflammatory rheumatic diseases (CIRD) appears to be modifiable to patients by neuromodulation. Mindfulness meditation (MM) and hydro-aroma therapy (HAT) could be significant therapeutic tool for the non-invasive neuromodulation treatment to increase parasympathetic (PSY) tone as they decreases markers of inflammation and normalize levels of stress hormones.

Coherence techniques have proven to be significant for quantification PSY tone defined as a ratio of low and high coherence levels. So, LCL/HCL ratio reflects PSY dominance with consequent control of inflammation and metabolic processes in the body.

The aim of this study is to evaluate effects of MM and HAT as the adjunct to physical treatment CIRD patients to improve glucose metabolism.

Methods: The study is part of BEPMARK project which included 44 Norwegian CIRD patients send to 4 weeks physical treatment and rehabilitation to the Institute "Dr Simo Milosevic" Igalo, Montenegro in August and September 2018. Patients are divided in 2 groups: (1) experimental (n=22) and (2) control (n=22). All the patients received standardized protocol consists of active and passive balneo-physical therapeutic procedures. But, the patients in experimental group additionally had a 2 more procedures: HAT in whirlpool bath and guided MM by Dr Joe Dispenza program five days per week.

The emWave Pro machine measured the patients' Coherence scores and Coherence ratios at the beginning and at the end of medical treatment.

Results: In control group significantly decreased LCL ($p < 0,017$), in experimental group significantly increased HCL ($p < 0,026$). LCL/HCL ratio significantly decreased only in experimental group ($p < 0,05$). Also obtained a significant positive correlation between LCL/HCL ratio and serum concentration of glycolized hemoglobin ($p < 0,056$).

Conclusion: MM and HAT could be a significant part of physical medicine and rehabilitation for the patients suffering CIRD.

OP203

GAIT TRAINING IN POST-STROKE PATIENTS: EFFECT OF PERONEAL NERVE FUNCTIONAL ELECTRICAL STIMULATION**Jakub Jeníček, Eva Konopáčová**

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Introduction: Evidence supports orthotic effect of peroneal nerve functional electrical stimulation, which includes increased gait speed, gait symmetry, stability and reduced energy cost. Further therapeutic effects in walking ability improvement resulting from neuroplastic changes are expected. Studies mostly suggest stimulation throughout all daily routine at patient's home and community, but in current clinical practice is stimulation often carried out as outpatient, short but intense training of gait at specialized medical facility. Therefore the purpose of this study was to examine, whether both approaches can be comparatively effective.

Objective: The aim of this work was to compare two different ways of applying peroneal nerve functional electrical stimulation as to their impacts on gait speed and performance in adult patients suffering from chronic stages of stroke accompanied by foot drop.

Method: An open, randomized clinical pilot study combining elements of both controlled and pragmatic experiments in comparing two different approaches to peroneal nerve functional electrical stimulation. With the first group of patients (n=14), the intervention was carried out as an outpatient intense training of gait with electrical stimulation over the period of four weeks; with the second group of patients (n=13) stimulation was applied continuously throughout all their daily routines at their homes and community over the equal period of time. Endpoints were Emory Functional Ambulation Profile for gait speed and 2 Minute Walk Test for gait performance.

Results: The four-week intervention turned out to cause no statistically significant difference in our two groups in terms of its impact on any of both monitored parameters of the gait speed and performance.

Conclusions: The pilot study suggests that both clinical approaches could have equally beneficial results with adult subjects suffering from chronic stroke accompanied by foot drop.

OP204

CORRELATION BETWEEN BODY MASS INDEX AND SCOLIOSIS IN ADOLESCENCE**Jasna Stojkovic¹, Ivana Petronic Markovic¹, Dragana Cirovic¹, Dejan Nikolic¹, Tatjana Knezevic², Dragana Dzamic²**Physical medicine and rehabilitation, Faculty of Medicine, University of Belgrade¹, University Childrens Hospital², Belgrade, Serbia,

Background: Scoliosis presents emerging problem in nowadays in adolescent period. Aside hereditary factors, sudden and intense growth along with decreased physical activity including obesity present common cause of deformity. Furthermore, along with obesity in this period of life, underweight also poses a problem.

Aim of this study is to investigate the association between body mass index and presence of scoliosis with regards to age.

Method and materials: Cross selection study included 217 participant of both genders, aged between 11 to 16 years. They were evaluated for presens of scoliosis by clinical examination and X ray with Cobbs angle grater then 10 degrees. Participants were divided in to three groups according to Body Mass Index (BMI): underweight, normal weight and overweight.

Results: Scoliosis Correlated significantly frequent in younger underweight group ($P<0.05$), while Scoliosis Correlated significantly frequent in older overweight group ($P<0.05$). Underweight group had almost twice the higher risk scoliosis development (OR-1.93) while overweight group had just bellow one and the half higher risk for scoliosis development (OR-1.38)

Conclusion: Underweight is associated usually with low muscle mass that leads to the frequent spinal deformity during intense growth adolescence thus enabling earlier expression of structural spinal deformities, while overweight adolescents where such deformity is present in later age is due to the prolonged postural dysfunction.

OP205

THE ECONOMIC BURDEN OF CHRONIC STROKE-RELATED DISORDERS IN THE BASLE AREA IN SWITZERLAND – A COST-OF-ILLNESS STUDY**Jan Taeymans¹, Eefje Luyckx¹, Slavko Rogan¹, Francesca Primani², Clare Maguire²**Berne University of Applied Sciences – Health¹, REHAB Basel², Switzerland

Introduction: Stroke prevalence in the Swiss adult population is around 134 per 10000 residents. Mean cost per acute stroke patient is about 11245 CHF. Information on the type of costs (direct, indirect) in patients with chronic stroke-related disorders (CSRD) is scarce. Prevalence of comorbidities, disability level and quality of life (QoL) in patients with CSRD in Switzerland are not well reported.

Objective: The aim of this study was to investigate direct and indirect healthcare costs, comorbidity prevalence, disability level and QoL in patients with CSRD living in the Basle area.

Method: Twenty-one patients with CSRD among patients visiting the REHAB clinic and three physiotherapy practices volunteered in this cost-of-illness (COI) study. A bottom-up prevalence approach with societal perspective was used. Healthcare costs and prevalence of comorbidities were assessed retrospectively over the last twelve weeks using self-reported questionnaires. Disability level and health utility index were evaluated using the Modified Ranking Scale and the EUROQoL-5D-5L questionnaires respectively. Consumption of healthcare services and unit prices were reported in non-aggregated form and in 2018 CHF.

Results: Patients were 56.2 ± 10.8 years of age. Average cost of CSRD from a societal perspective was 25360 CHF [95%CI: 19366 to 31353 CHF] for three months. This was higher than the average per capita healthcare cost in the general Swiss population. Indirect costs were cost drivers. Cardiovascular (43%), metabolic (52%) and mental (76%) comorbidities were prevalent. On average, patients consumed six drugs per day. Health utilities were lower than in the general Swiss population.

Conclusions: From a societal perspective, the economic burden of patients with CSRD in the Basle region is important. Indirect costs seem to be key cost drivers. Results from this COI study may be relevant as eye-opener for local decision makers while health economists can use them as input data when conducting cost-effectiveness analyses.

OP206

THE EFFICACY OF „SCHROTH METHOD OF EXERCISES“ IN THE CORRECTION OF THE SPINAL DEFORMITY IN PATIENTS WITH ADOLESCENT IDIOPATHIC SCOLIOSIS (AIS)**Jasmina Milovanovic-Arsic, Bozana Markovic, Aleksandar Jokic, Mina Jelacic, Nada Jevtic, Jasna Dzagic-Ristic**

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INTRODUCTION: “Schrothmethod” corrects the deformity, in the first place, with exercises that elongate the trunk, correct the imbalance of the body, and fill the concavities of the trunk using “rotational breathing” technique.

PURPOSE: To evaluate the efficacy of this treatment method by clinical and radiographic evaluation of patients during a six-month period.

METHOD: The study included 22 patients of both genders, aged between 10-18, with radiographically confirmed scoliosis of 10-45 degrees by Cobb`s angle, treated for the first time using the Schroth method one hour per day, under the control of physio-therapists, five days a week, for three weeks. The patients continued to perform the exercises for the next six months after which the control examination was done.

Clinical assessments at the beginning, immediately after rehabilitation and six months later included measuring the angle of trunk rotation, as a sum of three values (ATR sum) and POTSI (Posterior Trunk Symmetry index), and Cobb`s angle and Scoliosis Research Society Outcomes Questionnaire(SRS 22 scale) at the beginning and on the final examination.

RESULTS: The comparison of the ATR sum values and POTSI at the end of rehabilitation with these parameters at the beginning showed statically significant difference. The final examination after 6 months found no changes when compared to the end of rehabilitation. There were not any statistical significant differences in Cobb`s angle after period of six months, but SRS 22 testing showed the improvement in quality of life, after this period.

CONCLUSION: The efficacy of Schroth exercises method in postural correction in patients with AIS was confirmed and the biggest improvement was achieved after treatment under control of a physio- therapist. The influence on changing Cobb`s angle wasn`t found. It could be explained by a short period of following these patients, but also by the fact that kinesiotherapy has an impact primarily on the soft tissue structures.

OP207

THE INFLUENCE OF CLINICAL, DEMOGRAPHIC AND LABORATORY PARAMETERS ON THE QUALITY OF LIFE IN PATIENTS WITH RHEUMATOID ARTHRITIS**Jelena Jovanovic¹, Milica Lazovic², Vladimir Jovanovic³**

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Introduction: Rheumatoid arthritis (RA) is a chronic progressive inflammatory connective tissue disease leading to the destruction of articular and periarticular tissues, thus causing distortion and dysfunction of these tissues, and resulting in the permanent disability of the patient. Impairment of the quality of life (QoL) has been reported in RA.

Objective: The aim of this study was to estimate influence of clinical, demographic and laboratory parameters on the quality of life in patients with rheumatoid arthritis.

Methods : A total of 121 rheumatoid arthritis patients (30 males, 91 females, mean age of 59.72±10.28 years were included in the study). QoL evaluated by using Short Form Medical Outcomes Instruments: Physical component and Mental Component -SF 36. Functional disability was presented by HAQ questionnaire. Disease activity was measured by using Disease Activity Score 28 - DAS28SE .

Results: Our results show that the high disease activity $p < 0.001$, more difficult degree of HAQ functional disability $p < 0.001$, duration of the disease more than 10 years $p < 0.05$, associated comorbidities $p < 0.05$, and ACPA presence $p < 0.05$ significantly impairs both physical and mental sphere of the quality of life. Age, gender, BMI, and RF and CRP presence did not significantly influence on the quality of life.

Conclusion: High disease activity and the severity of the HAQ functional disability are the most important predictors of poor quality of life in our research. According to the WHO, the concept of (HRQoL) concerns functioning in basic key areas: physical, mental and social as well as subjective evaluation of the patient. The impact RA is substantial in both physical and mental domains, RA patients should be periodically assessed for the impact of their disease on their lives, and access to a multidisciplinary team is essential for the assessment and management of these aspects of their condition

OP208

SAGITTAL ALIGNMENT AS A PROGNOSTIC FACTOR OF STANDING BALANCE IN STROKE PATIENTS**Ji Hye Kang, Jae Min Kim**

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Introduction: Sagittal alignment is essential for maintaining standing balance. Although the stroke patients have more forward-tilted posture than healthy people, the correlation between sagittal alignment and standing balance of stroke patients has not been studied yet.

Objective: This study was made to investigate the correlation between sagittal alignment and standing balance of stroke patients.

Method: This study included 36 patients who had been hospitalized in our department. Sagittal vertical axis(SVA) and Berg balance scale (BBS), Modified Barthel index (MBI) were evaluated at admission(admSVA, admBBS, admMBI) and discharge(disSVA, disBBS, disMBI). We calculated discrepancy of scores between at admission and at discharge(Δ SVA, Δ BBS, Δ MBI). We classified patients into two groups with SVA score. The kyphotic group had longer than 30 mm of SVA and the non-kyphotic group had shorter than 30 mm of the SVA. The primary outcome was the effect of standard rehabilitation in two groups analyzed with Mann-Whitney U test. The secondary outcome was correlation effect between values of SVA, BBS and MBI analyzed with Spearman and Pearson test, regardless of the groups.

Results: There was no significant differences of BBS and MBI scores between two groups at admission and discharge. However, Δ BBS and Δ SVA showed increasing tendency in kyphotic group and Δ SVA showed significant difference(Table 1).

When each score(SVA and BBS) at admission and discharge are considered as one statistical variables, total 72 data of SVA and BBS were analyzed and showed no significant correlation(coefficient ratio= -0.153, p-value =0.200). On Pearson test, SVA values(admSVA, disSVA, Δ SVA) and clinical outcomes(Δ BBS and Δ MBI) showed no significant correlation(Table 2).

Conclusions: Though there was no significant correlation between SVA and BBS, Δ BBS and Δ SVA showed increasing tendency in the kyphotic group. Therefore, the improvement in sagittal alignment might be correlated with standing balance of the stroke patients. Considering the small number of participants, further study will be needed.

OP209

CEREBRAL PALSY: INCLUSION IN THE PORTUGUESE EDUCATION SYSTEM**João Capelo¹, Teresa Folha², Filipa Correia¹, Isabel Batalha¹**

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Introduction: Cerebral palsy (CP) is the most common cause of physical disability in early childhood. The Surveillance of Cerebral Palsy in Europe (SCPE) defines it as a group of permanent, but not unchanging, disorders of movement, posture and/or motor function, which occur due to a non-progressive interference, lesion, or abnormality of the developing/immature brain. In Portugal, children with special education needs are eligible by law to have specialized support, accordingly to their disabilities, to ensure their educational process improvement.

Objective: To study the evolution of the inclusion of children with CP in the Portuguese education system (ES).

Method: We retrospectively analyzed data from children with CP, born in 2001-2007, notified by a tertiary rehabilitation center to a national surveillance registry (PVNPC) at the age of 5-years, according to SCPE and PVNPC classification criteria and functional scales. Posteriorly, we proceeded to a cross-sectional phone survey regarding inclusion in the ES. For statistical analysis we performed Wilcoxon signed-rank tests and Spearman correlations.

Results: Of 79 cases, 42 answered our phone survey. Using a 1-5 PVNPC-scale that considered diminishing inclusion in the ES, we obtained a median value of 2.16 at 5-years-old and 2.5 at 12-18-years-old. With 34 valid pairs, we found difference ($p=0,022$) between mean ranks of inclusion and strong positive correlation for both these groups ($p<0.001$), implying that the inclusion in the ES worsens as they age.

There were strong positive correlations for inclusion in the ES at 12-18 years, BFMF, MACS, GMFCS, VIKING, cognitive level ($p<0,001$) and severe visual deficit ($p=0.027$); moderate with bilateral spastic palsy ($p=0,001$) and epilepsy ($p=0,002$); weak with visual deficit ($p=0.025$) and post-neonatal lesion ($p=0,029$).

Conclusions: These results reflect the worsening of the inclusion of CP children in the Portuguese ES as they grow older. Inferior results in functional scales are also associated with lesser inclusion.

OP210

RELATION OF PRESENCE OF COMPRESSION ON NERVOUS ROOT ON MAGNETIC RESONANCE OF LUMBOSACRAL SPINE WITH INCIDENCE OF NEUROPATHIC PAIN IN PATIENTS WITH CHRONIC LUMBOSACRAL RADICULOPATHY**Katarina Vagic¹, Biljana Stojic¹, Nemanja Damjanov^{1,2}**Physical medicine and rehabilitation, Institute of Rheumatology¹, Medical faculty university of Belgrade, Belgrade, Serbia²

INTRODUCTION: Literature data indicate that lumbosacral radiculopathy (LSR) is the most common cause of neuropathic pain (NP). The radicular pain is consequence of mechanical compression at the root of the nerve, but also inflammatory mediators have a role in the occurrence of radicular pain in patients without mechanical compression at the root of the nerve.

OBJECTIVE: To examine a correlation between findings on the MRI of LS and incidence of neuropathic pain (NP) in patients with chronic LSR.

METHODOLOGY: The cross section study included 64 patients with chronic LSR. Participants were: age from 18 to 75 years, with diagnosis of chronic LSR, without recent trauma, malignancy history and HIV infection, prolonged use of corticosteroids, immunosuppressive drugs; without large neurological deficit, polyneuropathy, absence of operative treatment of the spinal column. Patients were divided into two groups based on MRI findings. The first group were patients with verified discus hernia on the LS spine and compression to the nerve root present, and the second group consisted of patients with various degenerative changes on the LS spine and no compression at the root of the nerve. NP was examined using the Pain detect questionnaire. For the degree of significance, the level of the value $p < 0.05$ was taken.

RESULTS: 64 patients participated, with a mean age of 61.13 years ($SD \pm 6.8$) and a mean duration of radicular pain 3.5 years ($SD \pm 2.68$). 46.9% subjects had radiologically confirmed mechanical compression to the nerve root. NP was present in 32.8% of the total subjects. Regardless of the presence / absence of compression on the nerve root, the incidence of NP in both groups of subjects was similar.

Conclusions: A third of our respondents have NP. The presence of NP is not associated with the finding of MRI LS spine.

OP211**F OCCUPATIONAL THERAPISTS IN PREVOCATIONAL ASSESSMENT CENTERS IN THE CZECH REPUBLIC****Kateřina Rybářov^{1,2}, Yvona Angerov³, Jaromira Uhlirv^{1,2}, Eliřka Vaiglov^{1,2}**

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Introduction: One of the rehabilitation goals of adult people is their return to work. Employed people with disabilities can have higher quality of life because they can fulfill their needs more easily. Prevocational assessment, required by the Labor Office in the Czech Republic, is one of the ways how to help unemployed people with disabilities to find a suitable job according to their health status. This complex assessment of psycho-senzo-motor work potential is done by interprofessional rehabilitation teams including occupational therapists in 13 Czech prevocational assessment centers.

Objective: The aim of this project is to map the work of Czech occupational therapists working in prevocational assessment centers and to find out their work difficulties.

Method: 20 occupational therapists from 10 different prevocational centers were interviewed personally, via phone or e-mail in 2018/2019. Semi-structured interviews were recorded. Information about the organisation of prevocational assessments in the centers, types of usually assessed clients, administrated tests, and other details were analysed.

Results: Occupational therapists spend 8,5 hours with a client on average. They most frequently use the Isernhagen Work System (for physical capacity evaluation), model activities (for job simulation) and the Purdue Pegboard Test (for upper limb assessment). They mostly complain about time-consuming administration of used tests during prevocational assessments and final report writing (1-5 hours needed). They deal with non-existing Czech official versions of manuals of tests for upper limb assessment, including norms for the Czech population. Better cooperation with the Labor Office should be arranged.

Conclusions: Official Czech versions of standardized tests and their norms for the Czech population must be established to enhance quality and validity of prevocational assessments. Workshops for occupational therapists working in prevocational assessment centers should be organized to improve their skills and to have opportunities for experience sharing.

Key words: prevocational assessment, occupational therapists, functional assessment

OP212

THE MOJZISOVA METHOD AND VISCERAL MANIPULATION**Kludia Michalčinová**

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Mojzisova method was introduced in seventieth in Czechoslovakia by Ludmila Mojzisova. Nowadays it is mainly used to treat gynecological dysfunctions. The success rate of treatment with the Mojzisova method ranges from 35% to 75%, depending on the diagnose type.

Indications for treatment include vertebrogenic disorders, infertility, dysmenorea, dyspareunia, coccydynia, certain types of urinary retention problems and incontinence, certain types of constipation and pelvalgia. The Mojzisova method consist of the mobilisation of ribs, spinal column, sacroiliac joint and coccyx (per rectum). Coccyx mobilisation is applied simultaneously with the treatment of pelvis floor muscles. The therapy also includes a set of twelve exercises performed by patients on their own at home.

The Mojzisova method is nowadays combined with other physiotherapeutic techniques, such as the activation of deep stabilizing muscles, foot function or visceral manipulation.

Visceral manipulation was developed by a French osteopathologist and physical therapist Jean-Pierre Barral. It is a very gentle type of manual therapy that works with the structural relationships between internal organs and their connective tissues (fascia or ligaments), encouraging proper mobility, tone and motion. Soft tissues loose their mobility as a result of inflammation or traumatic injury. These problems can be intensified by repeated non-ergonomic movements, harmful environmental influences, unhealthy lifestyle, faulty posture or emotional stress. Tissues generally heal by forming adhesions or scars, which are areas where the arrangement of fibrous fibers is altered. The visceral manipulation technique works with the fascias that surround and support the internal organs. Visceral manipulation is more accurately classified as a mobilization technique because it is performed very gently and slowly (as oppossed to classical manipulation techniques).

The combination of the Mojzisova method with visceral mobilization can be used to eliminate abdominal or spinal pain, improve internal organ function and normalize tone of soft tissues.

OP213

ENHANCING INTERDISCIPLINARY TEAM (IDT) WORKING IN A NATIONAL REHABILITATION HOSPITAL DURING A TRANSITION TO A NEW HOSPITAL FACILITY: A PROJECT PLAN**Kinley Roberts**

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Introduction: Effective interdisciplinary team (IDT) working in healthcare is associated with improved patient outcomes, greater staff satisfaction and a higher quality of healthcare. In 2020, our Rehabilitation Hospital will transition to a new hospital building, a facility that supports IDT working by co-location of staff from different disciplines and shared treatment spaces. Evidence suggests that teams may become dysfunctional during such periods of change with implications for patient care.

Objectives: To explore the impact of evidence-based interventions to improve IDT working and examine the relationship between team working and impacts on staff and patients in a period of transition to a new hospital.

Methods: There will be 4 parallel workstreams with 4 different types of teams: Hospital Board, Executive management committee, Medical Board, IDTs.

With the first 3, a cooperative inquiry will be employed and with the IDTs, an Interdisciplinary Management Tool (IMT), will be implemented using an action research approach. The IMT incorporates three components: an evidence-based resource guide; a reflective implementation framework; and formative and summative evaluation components.

The IMT will be tested initially with the "pilot IDT" (this is currently underway) to test the methodology and then will spread in phases to the rest of the hospital teams. In each work stream, each intervention will last 6 months and will be evaluated over a 12-month period.

Results: Data sources will include interviews, a focus group with facilitators, questionnaires completed by team members, documentary feedback from structured team reports and Social Network Analysis. Data will be analysed qualitatively and quantitatively.

Conclusions: Given the proposed health system structural change outlined in Sláintecare, Republic of Ireland, the knowledge generated in this research will potentially assist other teams in transition.

(Sláintecare is the Irish governments ten-year programme to transform our health service)

OP214

DIMENSIONAL ACCURACY ANALYSIS OF RESTING PAN SPLINT MANUFACTURED WITH FUSED DEPOSITION MODELING 3D PRINTING TECHNOLOGY**Ko Seuk-Ki, Dong-a Kim, Won-San Seo, Gayoung Heo, Sohee Son**

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Introduction: Among diverse technological innovations with 4th industrial revolution, 3D printing technology has drawn attention in fields of materials, machinery, biotechnology, and medicine, and various attempts have been made in the ortho-prosthesis with the FDM 3D printing technologies.

However, the FDM method has problems of severe contraction and collapse without support in the process of deposition.

Objective: this study aims to examine whether the resting pan splint (RPS) produced by FDM 3D printer is manufactured within the STL modeling dimensional range.

Method: Customized RPS was manufactured by Prosthetists and Orthotists (P&O) and a 3D printing PP (Polypropylene) was produced by 3D-scanning the positive plaster model used in production. The customized and 3D-printed RPS were scanned by a 3-dimensional multi-joint scanner (Cimcore Arm) and STL modeling values were compared with the actual dimensions of the splint. Three parts of RPS including hand, wrist, forearm were measured from medial, lateral and central sides.

Result: Comparing dimensional accuracy of customized and 3D-printed RPS, no significant differences were found in measurements at all parts of hand, wrist, and forearm. Errors in the mean measurements of three parts were found to be less than 1mm.

Conclusion: Dimensional accuracy of customized RPS and 3D printed RPS were compared in this study and it is confirmed that 3D-printed products were manufactured within the margin of error when compared with STL model, which are assumed to be results of recent improvements in contraction with development of FDM technology and materials. However, further evaluations on durability, impact and usability are needed for 3D printed splints to replace the conventional splints and with these further studies, it is expected that various 3D printing technologies be used for the production of splints for the disabled.

OP215

OPPORTUNITIES OF SCHUHFRIED COMPLEX IN NEUROPSYCHOLOGICAL DIAGNOSTICS AND REHABILITATION OF PATIENTS WITH DISABILITY**Kseniia Skliannaia^{1,2}, Vladimir Bronnikov³, Olga Russkih², Kseniia Startzeva²**Medical and social rehabilitation¹, Center of Complex rehabilitation², Perm State Medical University³, Perm, Russia

Introduction: Currently, an important part of rehabilitation is restoration of affected high mental functions, and, therefore, the ability of people with disabilities to maintain social contacts, maximize the restoration and preservation of professional skills in order to return patients to society.

Objective: Evaluation of the capabilities of the SCHUHFRIED complex in the neuropsychological diagnosis and rehabilitation of people with disabilities.

Method: 70 disabled people (18 women and 52 men) took part in this study. SCHUHFRIED complex was used in the course of their rehabilitation. The initial neuropsychological diagnosis was made using the standardized screening questionnaires and scales and using the following tests of the SCHUHFRIED complex: line-tracking test, response inhibition test (INHIB), two-hand coordination test, reaction test, determination test.

Results: During the first INHIB test, 65.7% of disabled people showed impaired selectivity, attention distribution, and impaired short-term memory. Moreover, in 21.7% of patients it was possible to identify impairments, which were not determined with screening scales. The second assessment after rehabilitation course (which included SCHUHFRIED CogniPlus program) established improvement of voluntary attention, an increase in short-term memory, an improvement in visual-constructive activity, and an improvement in executive functions. Assessment with SCHUHFRIED tests showed that a full recovery of cognitive processes occurred in 20% of the patients.

Conclusions: SCHUHFRIED complex significantly complements the screening tests results and allows determining the severity of cognitive deficits more accurately, including identifying mild cognitive impairments that aren't fixed by routine psychological tests. Combination of neuropsychological tests with the assessment of the SCHUHFRIED complex clarifies not only the severity of impairment, but also the type of impairment of a certain mental function. The use of the SCHUHFRIED complex shows even the mild positive results in cognitive status during rehabilitation.

OP216

THE EVALUATION OF OSTEOPOROSIS RISK FACTORS AND ABSOLUTE FRACTURE RISK IN PATIENTS UNDERGOING REHABILITATION**Larisa Marchenkova^{1,2}, Ekaterina Makarova², Tatiana Kochemasova²**Department of somatic rehabilitation¹, National Medical Research Center of Rehabilitation and Balneology of Russian Federation², Moscow, Россия

The aim of the study was to evaluate osteoporotic fractures risk in the patients undergoing rehabilitation.

Methods. The survey was conducted by means of questionnaire of 600 patients aged >50 y.o. treating in in-patient department of rehabilitation center. Risk factors for osteoporosis were assessed by means "One-minute osteoporosis risk test" developed by the International Osteoporosis Foundation. 10-year absolute risk for osteoporotic fractures was calculated using Russian scale of FRAX® on-line calculator.

Results. Assessment of osteoporosis risk factors revealed that 58.2% of responders had no risk factors, 6.8% had one risk factor, 3.8% - two, 0.6% - three, 9.1% - four, 21.5% - five or more risk factors. 45.8% of responders had experienced non-traumatic fractures in past, and a fractures occurred during rehabilitation procedures in 4.6% of ones. High 10-year absolute fracture risk was revealed in 38% of all respondents, in particular in 45.7% of women and in 16.6% of men. The average 10-years risk for major osteoporotic fractures was 13.7% [1.6; 48] and for the hip fracture - 3.2% [0;16]. 8.6% of patients had 10-year absolute risk for major osteoporotic fractures more than 30%. 42.5% of respondents performed bone densitometry in the past. Osteoporosis was already diagnosed in 34.1% of respondents but only in 56.6% (n=127) of high fracture risk group. Among those who never undergo densitometry there were 43.1% of patients with a high fracture risk. Osteoporotic treatment received just 31.0% among osteoporotic patients and 12.4% among subjects with high fracture risk.

Conclusions. 45.7% of women and in 16.6% of men aged >50 y.o. ordinary treated in in-patient rehabilitation department had high osteoporotic fracture risk, 41.2% patients had osteoporosis risk factors and 45.8% experienced non-traumatic fractures in past. Data indicate a high probability of fractures in those patients and indicate an insufficient prescription of anti-osteoporotic medication.

OP217

WHICH DEMOGRAPHIC AND CLINICAL FACTORS COULD INFLUENCE THE FUNCTIONAL STATUS DURING AN ACUTE INTENSIVE REHABILITATION TREATMENT?**Leonardo Pellicciari, Carlo Damiani, Michela Goffredo, Sanaz Pournajaf, Marco Franceschini**

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Introduction: The functional status is an important goal of any rehabilitative program. Therefore, knowing the prognostic factors that could influence this outcome is crucial to plan an appropriate rehabilitative treatment.

Objective: To assess which functional, demographic and clinical variable presented by an orthopedic or neurological patient to his/her admission to an acute rehabilitation center could influence the level of functional status.

Method: In this retrospective study, patients were included as they met the inclusion criteria, i.e., age ≥ 18 years; time between onset of disease to rehabilitative hospitalization ≤ 60 days; length of hospitalization > 14 days and ≤ 60 days; first admission to hospital. The functional status was measured by modified Barthel Index (mBI); the admission and discharge mBI scores together with clinical and demographic variables were collected. To explore the effects of these variables on the functional status after an intensive rehabilitative treatment, a general linear model (GLM) analysis was run, considering the mBI at discharge as dependent parameter.

Results: In this study, 3,548 patient (47.5% and 52.5% with neurological and orthopedic disease, respectively) were recruited. GLM analysis reported a significant main effect of mBI score at admission ($p < .0001$), age ($p < .0001$), and time since the acute event ($p < .0001$) on mBI at discharge. Moreover, the typology of disease (neurological or orthopedic impairment) adjusted by the gender (female), by the presence of several impairment (cognitive, and behavior impairment), and by complications (behavioral, hypertension, and cardiopathy) influenced significantly the mBI score at discharge ($p < 0.05$). Finally, the typology of disease (neurological) adjusted by the urinary impairment also had an influence on the mBI score at discharge ($p < 0.01$) (R squared=0.497). No other significant interaction among the other factors was found ($p > 0.05$).

Conclusion: These prognostic factor should be considered in the assessment and planning the appropriate rehabilitative program in an acute rehabilitative centre.

OP218

OCCUPATIONAL EXPOSURE TO WHOLE-BODY VIBRATION ASSOCIATED TO THE HIGHER DEGREE OF LUMBAR DISC DEGENERATION**Lidija Stojanoska– Matjanoska¹, Irina Pavlovska², Daniela Gecevska¹, Valentina Stojanoska– Todoroska³, Cvetanka Gjerakaroska Savevska¹, Maja Manoleva¹**

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Introduction: The significance of the lumbar disc degeneration can be seen in its strong association with low back pain (LBP) syndrome. LBP is one of the leading cause of disability in the world. Occupational factors such as heavy lifting, working in bent and stooped positions, prolonged sitting and exposure to whole-body vibrations have been associated with lumbar disc herniation. Bending and rotating postures increase vibration transmission, muscles are fatigued by vibration exposure, and oxygen consumption increases. Vibrations increase pressure within the lumbar discs and herniated discs have been produced in cadaveric lumbar motion segments exposed to vibrations.

Objective: To evaluate the exposure to whole-body vibration (WBV) as a risk factor for low back pain and lumbar disc degeneration.

Method: The study was a case-control (an incidence type). It was conducted at the PHI CGH "8mi Septemvri" and the Institute for Epidemiology and Biostatistics with medical informatics in Skopje. The study population was consisted of 284 participants aged 19 to 63 years. It was divided into two groups: examined (with LBP) and control (no LBP), each consisted of 142 participants. Specialist reports of MRI scans and questionnaires designed for the needs of the research were used.

Results: Occupational exposure to WBV has a significant impact on the degree of lumbar disc degeneration ($p = 0.017$). It is a significant risk factor for LBP ($p=0,013$). The results of our study show that there are no participants exposed to WBV with a bulging disc (lowest degree of degeneration). 2.74% of the participants have a disc protrusion, 14.29% disc extrusion and 17.24% of the participants have both protrusion and extrusion on several levels of the lumbar spine.

Conclusions: Working with vibrating tools and machines is associated to higher degree of lumbar disc degeneration and it is a significant risk factor for low back pain.

OP219

THE EFFECT OF BALNEOTHERAPY ON PATIENTS WITH KNEE JOINT OSTEOARTHRITIS**Lina Varzaityte¹, Raimondas Kubilius¹, Arvydas Balcius², Egle Milinaviciene¹, Kestutis Ramanauskas²**Rehabilitation, Lithuanian University of Health Sciences, Kaunas, Limited company Medical SPA EglėsSanatorija, Eglės g. ¹ LT-66251, Druskininkai², Lithuania

Introduction: The treatment of knee joint osteoarthritis (OA) using pharmaceutical and non-pharmaceutical measures remains a topical subject. The purpose of this study is to assess the effect of natural factors (mineral water and mud) on patients with knee joint OA.

Method: 92 adult people with grade I–III knee joint OA according to the Kellgren and Lawrence scoring system participated in the study. The subjects received 10 mineral water bath or peat mud application procedures and physical therapy every other day. The control group got physical therapy every other day. The effectiveness of the treatment was assessed on the basis of anthropometric changes of data, VAS, SF–36, KOOS questionnaire indicators.

Results: Significantly greater walking speed, test of 5 sit downs/stand ups, circumference of a knee joint and calf, flexion and extension range, flexor and extensor strength after treatment lasting 1 month were obtained in the intervention group. After 1 month after treatment pain intensity scores were significantly higher in the control group. The most significant changes in SF-36 were identified after 1 month after treatment: physical activity increased and pain decreased in the intervention group. There was no significant difference between the averages of any KOOS subscale in groups. However, average percentages of symptoms, stiffness and pain in the intervention groups were significantly better and lasting 1 month.

Conclusion: In the intervention group, where natural factors were applied, after treatment and after one month after treatment anthropometric data significantly improved, pain intensity and joint stiffness decreased, physical activity increased compared to the control group. Future randomized controlled studies, involving a higher number of participants with a longer period of observation, are needed to confirm these results.

OP220

SCIENCE VISION TRAINING IMPROVES BALANCE IN SUBJECTS WITH MULTIPLE SCLEROSIS: A CONTROLLED NEUROPLASTICITY STUDY.**Lorenzo Latini¹, Elisa Andrenelli¹, Laura Piefederici², Andrea Cagno², Lorena Catena², Maria Gabriella Ceravolo¹**Medicina Sperimentale e Clinica, Università Politecnica delle Marche¹, Istituto Santo Stefano, Villa Adria², Ancona, Italy

Introduction: Balance disorders (BD) are common symptoms in people with multiple sclerosis (MS) with important limitations in ADL. Recent studies showed how balance deficits may be caused by impaired somatosensory spinal conduction and central integration. The multifactorial genesis of BD in MS suggests the importance of sensory integration approach to improve trunk control and balance.

Objective: to assess the effect of a multimodal rehabilitation treatment (Science Vision Training-S.V.T.®) on balance and gait disorders and analyse the effect in cognitive function and neuroplasticity response in patients with secondary progressive MS.

Method: parallel-group randomized controlled trial. 21 SP-MS patients consecutively referred to the "Santo Stefano" Institute of Ancona between February and September 2019, were randomly allocated into 2 groups: experimental group (SVT) underwent sensory integration training and control group (CT) underwent conventional physical therapy; both groups realized 12 sessions of 45 minutes each. The following measures were collected before (T0) and at the end of the treatment (T1): spatio-temporal parameters of gait, Berg Balance Scale (BBS), 6-minute walking test (6mwt), Timed up and go test (TUG), Multiple Sclerosis Quality of Life-54 (MSQOL-54), Beck Depression Inventory-II (BDI-II), Fatigue Severity Scale (FSS), Falls Efficacy Scale (FES), Activities Balance Confidence score (ABC score), Visual Analogue Scale (VAS) and RAO test. Moreover, neuroplasticity response was investigated applying the rapid Pair Associative Stimulation protocol (rPAS) for transcranial magnetic stimulation (TMS). Oculomotor parameters were assessed in the SVT group.

Results: at T1, SVT showed a greater improvement compared to CG for gait, balance and quality of life. A statistically significant progressive increase in MEP amplitude was observed, following the stimulation protocol, only in SVT, indicating brain plasticity recovery in patients undergoing sensory integration training.

Conclusion: in people with secondary progressive MS, SVT can be considered a valid alternative rehabilitation treatment, meeting neuroplasticity induction criteria.

OP221

THE PATHOPHYSIOLOGICAL ROLE OF THE FASCIAL SYSTEM IN POST STROKE SPASTICITY: EFFICACY OF THE UPPER LIMB MANIPULATIVE TREATMENT**Luca Latini^{1,2}, Elisa Andrenelli², Ilaria Barboni², Fabrizio Fiori³, Marianna Capecchi², Maria Gabriella Ceravolo²**Neurorehabilitation Clinic¹, Marche Polytechnic University², Santo Stefano Rehabilitation Institute³, Ancona, Italy

INTRODUCTION. Spasticity is defined as a motor disorder characterized by a pathologically increased stretch reflex. The pathophysiologic basis of spasticity is incompletely understood. Recently, the role of fascial system in the peripheral genesis of spasticity has been highlighted. Among the rehabilitation approaches, the Fascial Manipulation® technique has proved effective in treating common musculoskeletal dysfunctions. There are not many evidences about the effectiveness of Fascial Manipulation® in post-stroke spasticity.

OBJECTIVE. The primary aim was to evaluate the effect of Fascial Manipulation® treatment on spasticity and related disability. Secondary aim was to assess the effect of Fascial Manipulation® treatment on quality of life, mood and sleep disorders.

METHODS. We enrolled subjects with post stroke upper limb spasticity from February to June 2019, randomized in two groups: Fascial Manipulation® group (FM) and Sham group. At baseline we recorded: age, gender, education, cognitive status and functional activity level. Before, after treatments and at 1 month follow up we used the following measures: Modified Ashworth Scale (MAS), range of motion (ROM), motricity index (MI), Visual Analogue Scale (VAS) for pain, Patient and Clinician Global impression of Change (PGIC, CGIC), Disability of the Arm and Shoulder (DASH), Fugl-Meyer Assessment (FMA), EuroQoL 5D, Hamilton Anxiety and depression Rating Scale (HARS, HDRS), Pittsburgh Sleep Quality Index (PSQI). We evaluated electrophysiological parameters of spasticity: H/M ratio, F/M ratio at Abductor Pollicis Brevis and Abductor DigitiMinimi.

RESULTS. We studied 9 subjects, 5 of these were included in FM group. Compared with SHAM group, the FM group showed a greater improvement in the following outcome measures: MAS, ROM, MI, FMA, VAS, DASH, HDRS, HARS, EuroQoL, PSQI.

CONCLUSIONS. Fascial Manipulation® may be an effective therapeutic approach in people with post stroke spasticity.

OP222

REHABILITATION AFTER SURGICAL CARPAL TUNNEL DECOMPRESSION USING MULTIFUNCTIONAL TABLE FOR FIST TRAINING REHABILITATION**Luciana Mijačika, Dubravka Bobek, Marijana Kojundžic**

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Introduction: Surgical decompression of the carpal tunnel is performed to reduce pressure on the nerve with the aim of reducing pain and improving the sensation and function of the fist. Postoperative rehabilitation is thought to accelerate the recovery and management of pain and symptoms resulting from the surgery itself. Here, we present the results of a clinical study in which 25 patients were subjected to occupational therapy after classical postoperative programme of physical therapy and rehabilitation. The occupational therapy was performed using multifunctional table for fist training rehabilitation.

Objective: The objective of the study was to evaluate the effectiveness of occupational therapy after surgical decompression of carpal tunnel in cases where physical therapy and rehabilitation procedures (individual medical gymnastics, ultrasound therapy and electromagnetic therapy) didn't produce expected results.

Method: After postoperative physical therapy programme 25 patients were included in the study. The patients were evaluated by the specialist of physical medicine and rehabilitation. The evaluations parametres included: the range of movement of the wrist, thumb opposition, ability of performing different types of fist grips and strength of the fist grip. According to the findings, a form of occupational therapy intervention was subscribed for each patient. During the therapeutic procedures, patients performed exercises for functional fist recovery and exercises for strengthening the fiston the multifunctional table for fist training rehabilitation.

Results: After 10 days of therapy the range of motion in the wrist, the thumb opposition. the performance of different fist grip types and the strength of the fist grip were improved in all of the patients.

Conclusion: Occupational therapy intervention and the use of multifunctional table for fist training rehabilitation contributed to the recovery of the fist functions which we did not achieve to that extent by physical therapy procedures.

OP223

ASSISTED LIVING AS A NEW FORM OF A LIFESTYLE**Ludmila Kozhushko¹, Kristina Rozhko^{1,2}**

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Introduction: Currently Russia follows actively a policy regarding persons with disabilities to implement their rights and opportunities, including the right of persons with disabilities to lead an independent lifestyle and choose their own place of residence. The right that is enshrined in the United Nation Convention on the Rights of Persons with Disabilities and is guaranteed by the Constitution and the national Law.

The realization of this right for people with severe and multiple impairments is possible only in assisted living when people with disabilities can receive various services outside of stationary institutions, and at the place of residence and in their chosen communities.

Objective: The objective is to assess the accessibility of these technologies for people with disabilities.

Method: The monitoring survey was based on data provided by public authorities of all 85 regions of Russia.

Results: In 2019, technology of assisted living was introduced in 68 regions (80.0%). In 18 regions, this is only the initial stage of development, when the regulatory framework is studied, the source of funding is determined, apartments are selected, candidates are recommended. In 43 regions, where educational assisted living was introduced, the disabled are trained in self-care and independent living skills. In 47 regions, the 3rd stage is already being implemented, when the disabled live independently (individually or in small groups, receiving assistance).

Conclusions: The tendency of the active implementation of technologies of assisted living in regions of Russia is noted. The number of people with disabilities who are involved in assisted living and the number of regions that provide funding are increasing. A regulatory framework is being formed at the federal and regional levels, measures are being planned to organize various forms of assisted living.

OP224

FUNCTIONAL OUTCOME FOLLOWING ANOXIC BRAIN INJURY**Luís Carlos Sousa¹, Ana Margarida Ribeiro¹, Raquel Araújo¹, Maria João Andrade^{1,2}**

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Introduction: The improvement in resuscitation techniques, including high-quality cardiopulmonary resuscitation, has led to an increase in the number of cardiac arrest survivors. Neurological disability due to anoxic brain injury is the determinant factor for prognosis and one of the most important causes of functional impairment in this population. Estimating neurologic prognosis in comatose cardiac arrest survivors is a challenge. Current evidence points towards lower functional outcomes of these patients when compared with other etiologies of acquired brain injury. However, epidemiological and functional data regarding this population are still lacking.

Objective: To analyze demographic data, clinical data, and functional outcome of patients with anoxic brain injury following cardiac arrest.

Method: Retrospective analysis of patients admitted for an intensive rehabilitation program at a Portuguese public central hospital from 2014 to 2019. Measured variables included, when available, demographic (age at admission, gender, literacy), clinical (provenience, etiology of cardiac arrest, Glasgow Come Scale score in the first 24 hours, time from onset to rehabilitation department admission, rehabilitation length of stay, O-LOG or MMSE at admission and discharge), and functional data (admission and discharge Functional Independence Measure and Shah Modified Barthel Index, discharge destination and functional measures during follow-up in an outpatient setting). Data on type and parameters of treatment, neuropsychological evaluation and access to cognitive rehabilitation were also included when available.

Results: The study results will be published on a later date.

Conclusions: Anoxic brain injury is an important cause of lifelong disability. Characterization of functional outcome following anoxic brain injury may allow for a better understanding of the most likely cases benefitting from rehabilitation efforts. Knowledge regarding this population's demographics and possible prognostic factors may help to determine the most suitable rehabilitation strategies in each case and to delineate realistic rehabilitation goals.

OP225

CEREBRAL PALSY SURVEILLANCE PROGRAMME: WHERE DO WE STAND ON A REGIONAL LEVEL AND HOW TO DESIGN AN EFFECTIVE REHABILITATION NETWORK?**Madalena Rangel¹, Sandra Claro¹, Teresa Gaia², Teresa Folha³**

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Introduction: Despite the advances in pre-natal assessment, delivery care and widespread medical access, cerebral palsy (CP) remains the most common cause of disability in children, affecting 1 in 500 live births. In the absence of significant disease-modifying strategies, early PRM interventions are essential to guide symptom management, supportive measures and caregivers' capacitation.

Objective: This study aims to analyze the profile of children with CP, to identify the most disabling factors and to assess the healthcare/rehabilitation network.

Method: Retrospective cohort study of children (5-17years) reported to the CP surveillance programme and living until July 2019 at the study's region.

Results: Within this period, 128 children were reported, with 82% born in regional Hospitals and 3% following medically-assisted reproduction. Fifty two percent of mothers were ≥ 30 years of age and in 62% this was the first-born child. Prematurity accounted for 47% of the cases, with gestational ages between 28-31 weeks in 19% and < 28 weeks in 10%. The most common cause was hypoxic-ischemic encephalopathy and the spastic type was present in 78%. The GMFCS was level I in 33%, II in 17%, III in 8%, IV in 17% and V in 25%. Almost half presented speech difficulties and sialorrhea was difficult to manage in 15%. Low-body weight was very prevalent (20% at 3-15th percentile and 35% < 3 rd percentile), with an overall percutaneous endoscopic gastrostomy rate of 6%. Visual defects were present in 50% and hearing impairments in 8%. Integration in school was in general very high, with 84% attending regular schools, 6% at special needs facilities and 10% at home/institution only.

Conclusions: In an era of improved healthcare and increased life expectancy for CP, it is vital to identify the needs and shortages at the regional level in order to better allocate funds and human resources, providing both short and long-term solutions for children and their families.

OP226

THERAPEUTIC EDUCATION PROTOCOLS FOR PEOPLE RECOVERING FROM COVID-19: A TELE-HEALTH APPROACH**Marianna Capecci¹, Lucia Pepa¹, Martina Pigliapoco¹, Michela Coccia², Lauredana Ercolani², Michela Aringolo², Marzia Millevolte², Margherita Hibel², Anna Gastaldi², Enrica Maria Magiera², Paola Bisoglio¹, Alice Lambertucci¹, Elisa Andrenelli¹, Luca Spalazzi³, Maria Gabriella Ceravolo¹**¹Department of Experimental and Clinical Medicine, University Politecnicadelle Marche, Ancona, Italy,²Neurorehabilitation Clinic, University Hospital "AziandaOspedaliRiuniti di Ancona". Ancona, Italy,³Department of Information Engineering, University Politecnicadelle Marche, Ancona, Italy

Introduction. The current pandemic due to SARS-COV-2 is characterized by an acute respiratory syndrome (Coronavirus disease-19: Covid-19) that requires hospitalization in about 18.4% cases. According to recent scientific literature, at least half survivors shall suffer from a mild to severe deconditioning syndrome, fatigue, muscle wasting and pain, dizziness, very low tolerance to minimal efforts, depression and anxiety, when they not will suffer from post-critical neurological syndrome and peripheral neuropathies. Rehabilitation may be effective recovering from post-Covid-9 syndrome and widespread experience and expert opinions suggest to potentiate tele-health systems and home-based care services in order to improve health-care.

Objective. The study aims at verifying the feasibility and level of users' satisfaction of a tele-health service that provide therapeutic education protocols for people recovering from Covid-19.

Method. An original therapeutic education program, available for free in Italian and English language, from a web platform, using any tool (smartphone, tablet, laptop) and any operating system (android, windows, ios) was made available online since March 31, 2020 by a multidisciplinary team. It targets subjects in the recovery phase after Covid-19 and can be used remotely with the supervision of clinicians. The platform offers a selection of 28 footages displaying as many exercises for the respiratory and limb muscles, with an audio tutorial giving specific instructions on how to perform correct movements. Borg scale and Barthel dyspnea scale served as protocols safety and outcome self-monitoring systems, respectively. A customer satisfaction questionnaire gave information about platform users' demographic and clinical data, protocols safety and subjects-reported usefulness to manage fatigue and anxiety.

Results. An average of 350 accesses per day have been registered since 31 March to 31 May 2020. 43 subjects answered the users' satisfaction questionnaire: 53,5% were male, 69,8% were between 40 and 60 years old. 62,8% used platform to perform the training and 16,3% to recommend it (physiotherapists). 32,6% were people hospitalized for Covid19 and discharged at home, 11,6% were still convalescent in hospital, 27,6% have been treated at home. All people were from the center or the north of Italy and they have found the platform browsing the web (51,2%) or through scientific associations (32,6%). 78% subjects suffering from post-Covid-19 syndrome reported moderate to severe fatigue during ADLs (mean 6.5/10; Median:7; Range=1-10). The perceived improvement after the training was 6.5/10 (Median 7.5; range:1-9). About 64% suffered from moderate to severe anxiety symptoms and 54% reported a symptomatic improvement related to exercise training. The average level of customer satisfaction with respect to the project was 4.4/5 (median 5, range: 2-5). Some problems with audio emerged by the chat bot and no side effects were reported.

Conclusions. Tele-health is appreciated, safe and possibly useful to integrate rehabilitative management of subjects recovering from Covid-19. Controlled studies should be implemented to confirm these preliminary results.

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OP227

COMPARISON THE EFFECTIVENESS OF HIGH-INTENSITY LASER THERAPY AND ULTRASOUND TREATMENT IN THE PATIENT WITH CHRONIC LOW BACK PAIN**Marija Gocevska**

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Introduction: Chronic low back pain is common musculoskeletal disorder that is highly prevalent in the general population. HILT is considered to be a non-invasive and painless modality because of its high intensity and specific wavelength.

Aim: to evaluate the short-term effectiveness of high-intensity laser therapy (HILT) versus ultrasound (US) therapy in the treatment of low back pain.

Material and method: This is a prospective randomized comparative study. A total 140 patients (aged between 24 and 65 years) with low back pain were enrolled in this study. They were randomized in two groups: Group 1 (n:70) received HILT and exercise, and Group 2 (n:70) received US therapy and exercise. Both groups had 10 sessions of treatment. Numeric Pain Rating Scale, Oswestry Disability Index and Schober's test were used for assessment before, immediately after the therapy, three and six months after the completion of the physical therapy. The level of statistical significance was set as $P < 0.05$.

Results: There were no between-group differences at baseline in Numeric Pain Rating Scale, Oswestry Disability Questionnaires scores and Schober's test. At the end of the 2 weeks intervention, participants in Group-1 showed a significantly greater decrease in pain and an improvement of related disability than participants in Group-2. Statistically significant differences in pain variation, functionality and ROM were observed on the 3th and the 6th month after the treatment.

Conclusion: The results show more intensive and cumulative effect after the application of HILT in comparison to US therapy. HILT combined with exercises is safe and non-invasive treatment and can be a method of choice in the treatment of low back pain.

Keywords: low back pain, physical therapy, high-intensity laser, ultrasound therapy

OP228

VEMO: INNOVATIVE ROBOTIC TECHNOLOGY FOR EARLY MOBILISATION IN CRITICAL CARE PATIENTS**Marion Egger, Martina Steinböck, Barbara Schäpers, Friedemann Müller**

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Introduction: Prolonged immobility and bedriddenness lead to severe consequences affecting the cardiovascular system, brain function and other body systems. Early mobilization was proven to be safe and effective, as it shortens the hospital stay and improves the functional outcome. However, mobilization of severely affected patients requires a considerable amount of time and effort. The innovative robotic system VEMO® (ReactiveRobotics, Germany), developed within an interdisciplinary German Federal Ministry funded project, is meant to overcome mobilization barriers.

Objective: To evaluate safety, usability, applicability and patients' and users' therapy experiences of the newly developed VEMO in early neurorehabilitation within a feasibility study.

Method: Twelve patients (six with and six without disorders of consciousness (DOC)) will be treated 3 times by physiotherapists and 3 times by caregivers. Possible safety issues and preparation times will be documented. Users will rate therapeutic satisfaction, workload and usability assessed by QUEST (modified), NASA-TLX and SUS respectively. A user group will report about their therapy experiences and develop clinical implementation strategies. Non-DOC patients will be interviewed regarding their individual therapy experiences.

Results: By now, 3 patients received 1-3 VEMO therapies within a pilot phase. Furthermore, the first subject (m, 61 years, after cerebral tumor resection, non-DOC) completed the VEMO therapy treated by physiotherapists. No adverse events occurred. All patients enjoyed the therapy and the verticalization which includes gait-like leg movements. Therapists valued the individual robotic adaptability and the possibility to verticalize the patients without an exhausting transfer to a therapy device. Only in the beginning the preparation was considered slightly time-consuming.

Conclusions: Full data-set results will be presented at the congress. To date, mobilization with the VEMO seems feasible and promising, especially regarding the growing demand for intensive care services alongside the current shortage of therapists and nursing specialists.

OP229

LOW BACK PAIN AND DISABILITY IN ACTIVITIES OF DAILY LIVING**Marina Vukovic¹, Sonja Nejkov¹, Vesna Bokan-Mirkovic¹, Zeljana Skaric-Karanikic¹, Antonio Gavrilovski², Mirsad Muftic³**

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Introduction – Low back pain (LBP) is a common health condition and approximately, 20% of the adult population experience an episode of LBP at any given time and estimates of lifetime prevalence are around 80%. It is currently unclear how common sleep disorders are in patients with LBP.

Objective- Assess how pain intensity in patients with LBP affects on functional disability and sleep disorders, and is it related to symptoms duration.

Method –The study was performed as a cross-sectional study. Outpatients with LBP were examined. For disability evaluation we used The Oswestry Low Back Pain Disability Questionnaire (OLBPDQ), pain assessment was performed using Numeric Pain Rating Scale (NPRS 0-10). Sleep disorder was specifically evaluated by OLBPDQ as Category 0 (C0 no sleep problems), Category 1 (C1 occasionally sleep problems), Category 2 (C2 less than 6 hours sleep), Category 3 (C3 less than 4 hours sleep), Category 4 (C4 less than 2 hours sleep), category 5 (C5 pain prevents them from sleeping at all).

Results – Twenty-three patients (8 men, 15 women) mean age 54.52 ± 11.73 were included in the study. 56.52% of patients had a sleep disorder. There is a statistically significant difference in VAS values according to the categories of sleep disorders (Kruskal-Wallis= 10.893, df = 4, p=0.028). VAS values by categories (C0- 4.0, C1- 4.5, C2 7.5, C3- 8.0, C4 6.5). A statistically significant positive correlation in VAS and OLBPDQ values was found (Spearman's rank correlation coefficient 0.554 p=0.006, S= 903.45). No significant correlation in symptoms duration and VAS was found (S = 2023.5, p= 0.99, Spearman's rank correlation coefficient 0.0003), or between symptom duration and OLBPDQ (Spearman's rank correlation coefficient -0.297 p= 0.168, S = 2625.6).

Conclusions- The intensity of LBP significantly affects patients ability to perform activities of daily life and leads to sleep disorders.

OP230

VALIDITY AND MINIMAL CLINICALLY IMPORTANT DIFFERENCE OF THE MODIFIED FRENCHAY SCALE IN CHRONIC STROKE PATIENTS**Maria Krivošíková**

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Introduction: Modified Frenchay Scale (MFS) is recommended tool to measure grasp function in spastic paresis after stroke. Although the psychometric properties of MFS have been established, properties of the test to detect changes after interventions have not been examined yet.

Objective: The main objective of the study was to verify the validity and estimate Minimal Clinical Important Difference (MCID) of the MFS in chronic poststroke subjects undergoing intensive motor rehabilitation program.

Method: A single-center prospective observational study was conducted over a period of 16 months. Forty stroke patients with hemiparesis in chronic phase were included (26 men and 14 women). The conventional motor rehabilitation based on neurophysiological approaches was provided for the affected upper extremity (20 sessions of occupational therapy, 20 sessions of physiotherapy, 45 minutes each, 4 weeks). MFS and Score for visual evaluation of functional task of the hand (SVE) were administered at baseline and by completion of 4weeks rehabilitation program in order to validate Modified Frenchay Scale as a measure of grasp function and to establish MCID.

Results: Findings demonstrated statistically significant results and strong linear dependence between both scales. A statistically significant correlation between MFS and SVE was proved at level $\text{psp}(0,05,40) = 0,264$. MFS can better respond to changes. The estimated MCID of MFS was found to be a score of 8,55.

Conclusions: MFS was proved to be a valid method for grasp function evaluation in chronic stroke patients. These findings will assist in the interpretation of MFS in daily practice. Future studies with larger sample size are needed to refine these estimates of MCID and to estimate it for early phase of stroke recovery.

OP231

SPEECH RESTORATION IN EARLY REHABILITATION IN PATIENTS WITH CEREBRAL APOPLEXY: POSSIBILITIES OF USING A NEUROCHAT COMMUNICATION COMPLEX TO REGISTER VISUALLY EVOKED POTENTIAL P300.**Maria Khlyustova^{1,2}, Galina Ivanova², Olga Orlova², Yulia Bushkova², Boris Polyayev², Maria Bulatova²**

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Acute cerebral apoplexy accounts for 30% of cases resulting in speech disabilities as aphasia and dysarthria which are often combined with other high mental functions pathology (agnosia and apraxia). Computing technologies opened the path to improving established approaches to rehabilitation of such patients. NeuroChat technology based on a registration of visual cognitive potential p300 eliciting a short EEG response to an expected significant stimulus (Farwell et al., 1988) proved to be efficient in treating cognitively intact patients with pronounced movement disorders (Hoffmann et al., 2008). Today NeuroChat is increasingly applied to rehabilitation or training of post-stroke patients with neurodynamic disorders and speech disabilities.

Objective. To investigate possible ways of rehabilitative training of patients in early rehabilitation period by using NeuroChat communication technology to form functional basis of speech.

Methods. The study sampled 13 patients, 11 men and 2 women in early rehabilitation period. Time from onset 6 months, mean age 67±7. 3 patients suffered dextrocerebral stroke. Control group (n=13) went through a standard rehabilitation, while study group (n=13) in addition to a standard rehabilitation took 12 NeuroChat trainings.

Results point to statistically significant positive changes in speech restoration in patients with dynamic, efferent and acoustic and mnemonic aphasia. The changes involved speaking enhancement, speech act initiation improvements, auditory and verbal attention on Wassermann Scale and "neuropsychological assessment on a ten-to-one scale" by the time trainings in both groups were completed. Wassermann Scale sub-items 1, 2, 5 for SG [2,5], for CG [1,2].

Discussion: the results showed that implementation of NeuroChat allowed speeding up the restoration of speech and communication in patients with severe speech disabilities in early rehabilitation period.

OP232

CORRELATION OF THE RISK FACTORS AND GAIT VELOCITY IN SUBACUTE STROKE PATIENTS**Marica Gavrilovic¹, Stefan Rosic¹, Aleksandra Vidakovic^{1,2}, Sanja Đukic¹, Aleksandra Đukic¹, Ljubica Konstantinovic^{1,2}**Neurorehabilitation, Clinic for Rehabilitation "Dr M. Zotović", Faculty of Medicine, University of Belgrad², Belgrade, Serbia

Introduction: The risk factors contributing to stroke development are known and well researched; however, their impact on functional recovery has been less studied. Since one of the foremost factor in functional recovery assessment is gait velocity in the social environment in this study, we've tried to measure a correlation between functional recovery and known risk factors that contributed to the stroke.

Objective: To examine the correlation between the known risk factors that contributed to the stroke and gait velocity.

Materials and methods: This study included 186 patients admitted in the Clinic for rehabilitation „Dr. M. Zotović“ in Belgrade after having had an ischaemic stroke.

Inclusion criteria for patients in this study were first-ever ischaemic stroke verified by imaging techniques (MRI, CT scan) having started rehabilitation in the first six months after stroke. The most common risk factors had been included: arterial hypertension, hypercholesterolemia, diabetes mellitus, heart dysrhythmias, coronary disease, previous myocardial infarction, smoking. Gait velocity at the admission and discharge had been measured. The limit for functional gait velocity had been set at 0.8 m/s.

Results: The patients had been divided into three groups by the number of risk factors: RF1 0-1 (41 patient), RF2 with two risk factors (65 patients), RF3 with three or more risk factors (80 patients). In the RF1 group, 10.75% (20) patients had gait velocity above 0.8 m/s, while 11.29% (21) had gait velocity under the set limit. In the RF2 group, 20.97% (39 patients) had gait velocity under 0.8 m/s, and 13.98% had it above the set limit. In the third group, RF3 26.34% (49) of patients walked slower than 0.8 m/s, while 16.67% (31) walked faster than the set limit. Chi-square test value comparing gait velocity lower than 1,8 m/s in all three groups of patients is 5,99, which is lower than a borderline value (DF 2, p-value 0,05).

Conclusion: With the increase in several risk factors, there is an observable trend of an increase in number of patients with lowered gait velocities, but statistical significance had not been found.

OP233

VOLUNTARY REGULATED BREATHING PRACTICE: A SIGNIFICANT ADDITIONAL TOOL FOR ANTI-STRESS PROTOCOL IN THE INSTITUTE „DR SIMO MILOSEVIC“ IGALO, MONTENEGRO**Marina Delic, Vjeroslava Slavic, Gordana Rajovic, Danijela Randelovic**

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Background: Chronic stress triggers prolonged defense reaction of the body which can induce detrimental effects on cardiovascular health. Stress reducing programs are significant tools for ameliorate cardiovascular morbidity and mortality.

The aim of this study is presentation of anti-stress program based on voluntary regulated breathing practice.

Material and methodes: Study included 40 patients received anti-stress program, 15 days, in the Institute „Dr Simo Milosevic“ Igalo, Montenegro. They were divided into two groups: (1) 20 patients with standard protocol (outdoor morning exercise, Ai Chi in the pool, manuel massage, whirlpool, magneto therapy) and (2) 20 patients who additionally had Voluntary Regulated Breathing Practice (VRBP). At the beginning and at the end of treatment, all patients underwent a clinical examination with measurement of heart rate (HR) and blood preassure (BP). Also completed questionnaires: Brief Symptom Interventary 18 (BSI 18) and Perceived Stress Questionnaire (PSQ). Statistical processing of the obtained data was performed by SPSS v.23.

Results: Analyzed group were matched for the age and sex as well as for the HR, BP, BSI 18 and PSQ. HR and BP were decreased in both groups but not significantly. Values for BSI 18 and PSQ were decreased after standard protocol ($p<0.56$; $p<0.38$). But, patients with additional VRBP achived significant changes for BSI-18 ($p<0.02$) but not for PSQ ($p<0.71$). Comparison obtained results among groups showed significant difference only for BSI 18 ($p<0.01$) for the patients with additionally VRBP.

Conclusion: Voluntary regulated breathing practice in addition to standard anti-stress program can reduce symptoms of stress and anxiety according to our results based on the questionnaires for the meassure and quantification levels of psychological distress.

OP234

TRANSANAL IRRIGATION SYSTEM: A RETROSPECTIVE STUDY**Margarita-Eleni Manola, Ioannis Iliakis, Stefanos Mpourlios, Eleytherios Alexiou, Ioannis Dionysiotis, Evangelia Maragkoudaki, Konstantinos Athanasopoulos, Konstantina Petropoulou**

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Objective: The objective of this study is to assess the data about the transanal irrigation system used in the patients of the National Centre of Rehabilitation in Greece.

Introduction: There seems to be a gap in literature concerning the approach in neurogenic bowel dysfunction. We treat most patients with this method, which appears to have promising results, especially in patients with cauda equina syndrome.

Method: The method was applied in 95 patients with various neurological diseases. We included patients with myelopathy, Guillain Barre Syndrome, multiple sclerosis with lesions located in the spinal cord, spinal cord injury as well as traumatic brain injury. We collected and analyzed data about the patients such as age and sex. In the process of collecting information about the method we decided to assess parameters such as: compliance, time of compliance and the reasons patients stopped using the system, emerging technical problems, use by oneself or by a third party, coexistence of neurogenic bladder and use of intermittent catheterization and lastly general spasticity as a factor of difficulty. We evaluated the effectiveness of the method with the MENTOR TOOL.

Results: A sample of 95 patients was included in the study. 52.6% were male and 47.4% female. 6.3% of the patients died. 26.3% of the sample stopped using the method. 48.4% of the patients were paraplegic and 9.47% quadriplegic, 6.3% were cases of cauda equina syndrome. 7.4% had flaccid bladder. Some of the neurological diseases were multiple sclerosis (25.2%), traumatic brain injury (1.05%), Guillain Barre syndrome (1.05%) and others (1.05%).

Conclusion: Statistical analysis showed that the transanal irrigation system is a promising method for the treatment of neurogenic bowel dysfunction.

OP235

THE EFFECTS OF BALNEOTHERAPY IN PATIENT WITH ANKYLOSING SPONDYLITIS**Marija Obradovic**

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Background: Ankylosing spondylitis (AS) is an inflammatory rheumatic disease that primarily affecting the axial skeleton, causing back pain, stiffness and often peripheral arthritis. The physiotherapy, as non-pharmacological therapy, aims to prevent and retard restriction of spinal mobility and the development of disability but also to improve the symptoms of pain and stiffness.

Objective was to investigate the effect of physiotherapy as non-pharmacological therapy in patients with AS

Methods: Total of 68 patients, 77% male patients and 23% female patients, who fulfilled ACR criteria for AS were on 4 week rehabilitation and physical treatment in Institute „Dr Simo Milosevic“ Igalo. Average ages was 57 (21-79).

Applied physical therapy have entailed a combination of active (mobilising and strengthening exercise in gym and swimming pool(filled with mineral water), breathing exercises, brisk walking and interval training) and passive (peloid application and massage-manual or/and underwater) procedures. The participants were evaluated clinically before and after rehabilitation period (week 0 and 4). The treatment response were measured by ASDAS-ESR score.

Results: On the beginning of rehabilitation (0 week) we had 12,81% patient with moderate disease activity (MDA), 31,33% patient with high disease activity(HDA) and 55,86% very high disease activity (VHDA). After 4 week of physical treatments there was significantly reduction ($p < 0,001$) in the number of patients with high disease activity and very high significant improvement ($p < 0,0001$) in the number of patients with moderate disease activity (MDA= 60,09%; HDA=35,47%; VHDA=4,44%). Clinically important improvement had a 49.86% patients.

Conclusion: Applied balneotherapy procedures led to reduction of symptoms in patients with AS and improvement in general health condition. Regular implementation of this type of therapy once a year is strongly recommended.

Key words: balneotherapy, ankylosing spondylitis,

OP236

ASDAS-ESR SCORECOMPLEX PATIENT: OCCUPATIONAL THERAPY AND SOCIAL REINTEGRATION**Martina Pellegrini, Stefania Fugazzaro, Stefania Costi**

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Introduction: Better diagnoses and improved therapies have enhanced life expectancy over the last few decades, but individuals affected by pathological events can survive for years with severe disabilities that cause restrictions in activities of daily living and social life.

In the literature there were only studies that evaluated the effectiveness of occupational therapy in subjects with the same pathology. We decided, in agreement with the ICF, to conduct research on occupational therapy intervention in complex patients, that is, not joined by the disease, but by the need for treatment, due to disability resulting from a disease, to assess the effect of the treatment on the social reintegration of this population.

Objective: Primary objective: to evaluate the effect of the OT on the level of social reintegration of the complex patient with Reintegration to Normal Living Index(RNLI).

Method: This is a randomized controlled trial. The Rehabilitation Complexity Scale Extended ≥ 9 classifies the patient as a complex . The study includes a hospitalization phase and a home-based phase. Control group(CG):multiprofessional rehabilitation treatment. Intervention group(IG):CG+OT, with focus on patients needs and objectives highlighted by COPM. After discharge from hospital, the treatment continued at home.

Assessments:T0 (admission):socio-demographic data, Canadian Occupational Performance Measure, Instrumental Activity of Daily Living, Charlson Comorbidity Index, Hospital Anxiety and Depression Scale, Modified Barthel Index. T1(discharge) e T2(90 \pm 15 days after discharge):like T0+RNLI, Short-Form 12.

Results: 48 patients have been enrolled until now(24 CG and 24 IG).The IG has obtained greater gains in all assessments than the CG. Furthermore, the gain difference between the groups in RNLI is statistically significant in favor of IG. IG achieved clinically relevant improvement of COPM both in hospital and home. The results will be implemented with the new data.

Conclusions: The OT intervention can stimulate social inclusion and participation, through the improvement of patient-centered care.

OP237

NEURODYNAMIC AND MANUAL THERAPY IN POST-MASTECTOMY PAIN SYNDROME (PMPS)**Martina Micheletti, Chiara Cosoli, Ilaria Barboni, Fabio Tarini, Maria Gabriella Ceravolo, Marianna Capecci**

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Introduction: PMPS is a condition characterised by persistent pain after mastectomy or conservative breast surgery, localized on the anterior chest wall, armpit and medial region of the arm. Incidence is high and aetiology is multifactorial, with many underlying elements: a neuropathic component, a lesion of brachial plexus or intercostobrachial nerve, central hyperalgesia and bio-psycho-social factors. Pain is partially reduced by analgesics.

Objective: Aim of the study was to assess effect of neurodynamic and manual therapy on pain and function of upper limb in PMPS.

Method: A randomized controlled study was conducted. 16 women (aged 57 ± 6 years) with I, II or IIIa breast cancer stages were enrolled according to:

Inclusion criteria: suffering from PMPS, moderate upper limb pain (NRS ≥ 5), shoulder ROM reduction. Exclusion criteria: at least 4 months since radiotherapy and chemotherapy, previous shoulder surgery and severe cognitive deficit.

Primary Endpoint was pain reduction evaluated by NRS at rest and during movement and by McGill pain questionnaire for multidimensional analysis. Secondary Endpoints were: functional recovery, measured by ROM and DASH, and body image perception improvement, Body image scale. Outcomes were evaluated before (T0), after treatment (T1), and 3 months later (T2).

Subjects were randomized in two groups treated with neurodynamic (ND) and manual (MT) therapy, respectively. Groups were homogeneous by age, medical history, surgical procedure, adjuvant therapies.

Results: T1: In both groups, NRS decreased both at rest ($F=23$; $p=.0001$) and during movement ($F=12.8$; $p=.003$). McGill score decreased in ND group only ($Z=-2.0$; $p=.04$). There was an improvement of upper limb ROM ($p=.04$) and function, activities and participation measured by DASH Questionnaire ($Z=-2.9$; $p=.004$). Body image perception did not change.

T2: all T1 results were confirmed.

Conclusions: Both approaches are effective to reduce pain and improve ROM and upper limb function. ND obtains a quicker pain control. Further studies are needed to confirm these preliminary results.

OP238

DYSPHAGIA IN AMYOTROPHIC LATERAL SCLEROSYS: EARLY DETECTION AND CORRELATION WITH RESPIRATORY PARAMETERS**Martina Pigliapoco, Michela Coccia, Michela Aringolo, Elisa Baldoni, Rossella Cima, Maria Gabriella Ceravolo**

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Introduction; Dysphagia is one of the earliest symptoms of Amyotrophic Lateral Sclerosis-ALS in 30% of patients (mostly in bulbar onset disease). It is a risk factor for mortality, malnutrition, dehydration and respiratory infections. Moreover, dysphagia strongly affects quality of life of patients, negatively. On the other hand, it is now known that prompt and targeted interventions like modifying food texture, or providing enteral nutrition via PEG, have proven effective at increasing disease duration, reducing pulmonary complications and improving quality of life. At present there is no screening available for early diagnosis, that relies on clinical evaluation by trained staff (Bedside Swallow Assessment–BSA) and on instrumental assessment (FEES, VFS).

Objective: Primary aim of this study is to assess the value of a clinical sign (tongue muscle strength measured with Iowa Oral Performance Instrument-IOPI) for the screening and the severity evaluation of dysphagia; secondary aim is to correlate IOPI score with the evolution of spirometry parameters (VFC, VC and PFR).

Methods: Seventeen participants suffering from bulbar-onset ALS (age range: 41-81 years) were studied. Assessment of clinical and instrumental parameters was performed at baseline (T0) and 3 months later (T1). At each time point, the ALS-Functional rating scale (ALS-FRS), BSA, IOPI and spirometry were used for outcome assessment.

Results: A worsening of ALS-FRS, IOPI, VFC, VC and PFR scores was observed in all patients, from T0 to T1. The regression analysis showed a statistically significant correlation between IOPI score decrease (especially Maximal Tongue Strength, Endurance and Tongue Elevation Strength) and the VFC, VC and PFR evolution at T1. Also, IOPI scores were significantly related with BSA.

Conclusions: IOPI is an effective and reliable instrument for the early detection of dysphagia. Moreover, it provides indices of disease progression and respiratory parameters evolution, which make its routine use in clinical practice highly recommended.

OP239

EVALUATION OF SWALLOWING BY USING FEES (FIBEROPTIC ENDOSCOPIC EVALUATION OF SWALLOWING), IN CHILDREN WITH DYSPHAGIA, A RETROSPECTIVE CHART REVIEW**Meryem Burcu Turkoglu¹, Baha SezginEge², Duygu Durusoy², Kerem Ozturk², Hilal Nur Ficil²**Physical Medicine and Rehabilitation Department, Ege University Faculty of Medicine¹, Ege University Faculty of Medicine, Otorhinolaryngology², Izmir, Turkey

Introduction: Dysphagia is a condition that can be ignored in children. Especially in syndromic patients, swallowing should be evaluated and the conditions that may cause dysphagia should be reviewed.

Objective: To determine the etiology of dysphagia by making FEES (fiberoptic endoscopic evaluation of swallowing) in patients presenting with dysphagia and to enable proper swallowing rehabilitation.

Methods: We evaluated the swallowing functions of 116 patients (under 18 years old). The data were retrospectively obtained by scanning the patient files. The patients were evaluated by demographic data and FEES.

Results: 116 patients were included (62 male, mean age 5,72). Patients had diagnoses such as; corpus callosum agenesis, Duchenne muscular dystrophy, Pierre Robin syndrome, Down syndrome, mucopolysaccharidosis, cerebral palsy, esophageal atresia, spina bifida, spinal muscular atrophy, diaphragmatic hernia. Cerebral palsy and esophageal atresia were the most common diagnoses (38,8%). 12,1% had weight loss. 60,4% had solid, 43,1% had semi-solid, 51,7% had aqueous food dysphagia. FEES showed that 33,6% had laryngopharyngeal reflux. 12,9% had residual with 3 ml, 14,6% had residual with 5 ml, 14,6% had residual with 10 ml of water. 39,6% had residual with yogurt. 12,06% had residual with solid food. During swallowing, aspiration was observed in 2,6% with 3 ml, 0,7% with 5 ml, 3,4% with 10 ml of water. 3,4% with yogurt and 6,03% with solid food. After ingestion, 0,9% had penetration with 5 ml, 2,6% had penetration with 10 ml of water. 2,6% had penetration with yogurt. After swallowing, aspiration was observed in 0,9% with 5 ml, 0,9% with 10 ml of water, 3,4% with yogurt.

Conclusion: Dysphagia is a problem that can be seen in children but can be ignored. These patients should be referred to the swallowing laboratory which are in the tertiary care centers for detailed examination and should be allowed to start appropriate treatment.

OP240**LOWER URINARY TRACT FUNCTIONING AFTER VERTEBRAE TH12, L1 AND L2 FRACTURE****Metka Moharic, Ana Podbregar**

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Introduction: The urinary bladder and its outlet, the urethra, serve two main functions: (1) storage of urine without leakage and (2) periodic release of urine. These two functions are dependent on central as well as peripheral autonomic and somatic neural pathways. Disturbances of micturition are very common with spinal cord and cauda equina lesions which can arise after vertebrae Th12, L1 and L2 fractures. The range of bladder symptoms caused by neurologic lesions is wide and determined whether the lesion primarily affects pontine-sacral neural circuit, sacral reflex center or the sacral nerves and whether these lesions are predominantly motor or sensory or both.

Objective: The aim of the study was to find out how does lower urinary tract function in patients after vertebrae Th12, L1 and L2 fracture function.

Method: We searched a documentation for data of lower urinary tract function (clinical status, electromyography, urodynamics, management and treatment) in patients with vertebrae Th12, L1 and L2 fracture managed in our institution since 2008 to 2018.

Results: In years 2008 to 2018 74 patients (55 male) with vertebrae fracture Th12, L1 and L2 were managed. Mean age of the patients was 41.7 years (SD 17). 28 had Th12 fracture, 37 L1 fracture and 9 L2 fracture. Electromyography of pelvic floor was done in 35 patients, urodynamics in all. Electromyography showed complete/incomplete cauda equine, conus medularis or suprasacral lesions. In some patients there was combined peripheral and central neuron lesion. Urodynamics showed over, under or acontractile detrusor muscle and abnormal sensitivity.

Conclusions: After vertebra Th2, L1 and L2 fracture it is not clear what kind of lower urinary tract dysfunction will follow. There are many different outcomes and patients many times negate their problems. In the light of prevention of the late complications it is necessary to do the electromyography of pelvic floor and urodynamics.

OP241

**VIRTUAL REALITY REHABILITATION OF BALANCE AFTER TOTAL KNEE REPLACEMENT:
CLINICAL AND BIOMECHANICAL EFFECTS****Michela Goffredo, Sanaz Pournajaf, Leonardo Pellicciari, Francesco De Pisi, Carlo Damiani, Marco Franceschini**

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Introduction: Knee osteoarthritis is one of the widespread musculoskeletal conditions [Woolf & Pfleger, 2003], and usually it is solved with the Total Knee Replacement (TKR). TKR patients usually show balance and gait impairments, due to reduction of the proprioception [Clark et al., 2017], that can be recovered with physical therapy [Masaracchio et al., 2017]. Recently, Virtual Reality Rehabilitation (VRR) has been introduced for TKR patients [Goffredo et al., 2019; Blasco et al., 2019]. However, literature lacks studies on the efficacy of VRR in TKR patients considering both clinical and biomechanical outcomes.

Objective: To assess the effects of VRR balance training in TKR patients

Method: Twenty subjects were enrolled within 10 days after unilateral TKR surgery and conducted 15 sessions (5 times/week; 45 minutes) of balance training, depending on the group assignment: 10 subjects (70.8±4.02 years.) conventional therapy - Control Group (CG); 10 subjects (68.5±9.37 years) VRR on a balance board and receiving a real-time visual biofeedback with VRRS (Khymeias.r.l., IT) - Virtual Realty Group (VRG). Clinical assessment and instrumental gait and postural analysis were performed before and after treatment. Wilcoxon's test was used (p

Results: All clinical scales (10-metres walking test; Timed Up and Go TUG test - TUG; Medical Research Council scale of Quadriceps Femoris and Tibialis Anterior; Pain Visual Analogue Scale) registered statistically significant pre-post improvements. Between-group differences were found in TUG only, in favour of VRG. The gait analysis showed significant variations in the spatio-temporal parameters in the VRG only. The postural analysis registered significant between-group differences in the Centre of Pressure length, mean velocity, and anterior-posterior range.

Conclusion: The VRR improves motor skills (gait, postural control and direction shift) in TKR patients compared to conventional therapy. The results obtained with the gait and postural analysis are encouraging and suggest further investigations with larger sample size.

OP242

EVALUATION OF THE INFLUENCE ON EVERYDAY ACTIVITIES LIMITATION DUE TO HEALTH PROBLEMS ON PHYSICAL FUNCTIONING IN ELDERLY**Milena Kostadinovic¹, Dejan Nikolic^{2,3}, Sanja Tomanovic-Vujadinovic^{1,3}, Milena Santric-Milicevic^{3,4}**

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Introduction: There is increase in the population above 65 years of age worldwide. Aged population has decline in physical functioning along with increased incidence of comorbidity.

Objective: Aim of our study was to evaluate the influence of everyday activities limitation due to health problems on physical functioning.

Methodology: The study included 3540 elderly participants age above 65 years. The study followed the methodology of instruments of European Health Interview Survey wave 2 (EHIS wave 2). The two parameters that were analyzed included: flat walk task of half a kilometer as a measure of basic physical functioning and limitations in everyday activities performance due to the health problems. Flat walk task was divided into 4 categories: without disability, with mild disability, severe disability and cannot perform task. Limitations in everyday activities performance was divided into 3 categories: without limitation, with mild limitation and with severe limitation.

Results: There is significantly higher prevalence in the degree of flat walk disability (11,2%; $p < 0.001$) for elderly with severe limitation in everyday activities performance, while inverse trend was noticed for those without limitation (24%; $p < 0.001$). For elderly that cannot perform flat walk task, severe degree of limitation in everyday activities performance was around 25 times higher (7,5%) than those without limitation (0,3%).

Conclusions: Elderly with health problems are associated with decreased levels of physical functioning, with strong association between degree of limitation due to the health problems and performing flat walk task. Thus preventive measures and timely diagnosis in this population is of great importance for optimizing their maximal performance and quality of life.

OP243

EFFECTS OF SHORT-TERM EXERCISE TRAINING IN PATIENTS FOLLOWING ACUTE MYOCARDIAL INFARCTION TREATED WITH PRIMARY PERCUTANEOUS CORONARY INTERVENTION**Mojsije Andjic**

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Background: Exercise-based rehabilitation is an important part of treatment patients following acute myocardial infarction (MI). However, data are scarce on the effects of short-term exercise programs in patients with acute MI treated with primary percutaneous coronary intervention (PPCI). Aim: To evaluate the effect of short-term exercise training on cardiopulmonary exercise testing (CPET) parameters in patients suffering acute MI treated with PPCI. Study design: Observational longitudinal study. Setting: Inpatient cardiac rehabilitation . Population: Sixty consecutive patients with MI treated with PPCI referred for rehabilitation. Methods: We studied 60 consecutive patients with MI treated with PPCI referred for rehabilitation to our institution. The study population consisted of 54 men and 6 women (age 52.0 ± 8.4 years, left ventricular ejection fraction $54.1 \pm 8.1\%$), who participated in a 3-week clinical cardiac rehabilitation program. The program consisted of cycling for 7 times/week, and daily walking for 45 min at an intensity of 70-80% of the individual maximal heart rate. All patients performed symptom-limited CPET on a bicycle ergometer with a ramp protocol of We studied 60 consecutive patients with MI treated with PPCI referred for 10w/min. The CPET was also performed after cardiac rehabilitation programs. Results: After 3 weeks of exercise-based cardiac rehabilitation program improved exercise tolerance as compared to baseline (peak workload 119.28 ± 20.45 vs 104.35 ± 22.01 watts, respectively, $p < 0.001$), as well as peak respiratory exchange ratio (1.10 ± 0.14 vs 1.04 ± 0.01 , respectively, $p < 0.001$). Peak heart rate at rest, peak and after 1 minute of rest were also improved. Most importantly, peak VO_2 (19.27 ± 4.16 vs 17.27 ± 3.34 ml/kg/min, respectively, $p < 0.001$), peak VCO_2 (1.83 ± 0.38 vs 1.58 ± 0.30 , respectively, $p < 0.001$), peak ventilatory exchange (53.73 ± 12.47 vs 45.50 ± 11.32 L/min, respectively, $p < 0.001$) and peak breathing reserve (55.20 ± 12.36 vs 60.18 ± 14.19 %, respectively, $p < 0.001$) were also improved. No major adverse cardiac events were noted during the rehabilitation program. Conclusion: Our data indicate that short-term exercise training in patients with acute MI treated with PPCI is safe and improves functional capacity, as well as test duration, work load and heart rate response. Clinical rehabilitation impact: It appears that three week cardiac rehabilitation is an effective approach to improve exercise capacity in patients with acute MI treated with PPCI.

OP244

FEATURES THE PHYSICAL DEVELOPMENT LEVEL AND HUNGER DURING THE EDUCATIONAL PROCESS IN STUDENTS**Mykyta Borodin**

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Hunger - is the need of a living organism to eat and lack of substances in the blood that are necessary for the continued existence. On average, person feels hunger in 2-3 hours after eating [1, 6]. According to Zimenkova F. (2017), during training sessions the body requires more nutrients for successful learning [2, 3]. It is known that during starvation, there is a lack of serotonin, norepinephrine and β -endorphin. Serotonin is the main component of a feeling of saturation [4].

There are data on the relationship between main components of the physical and psychological development [5]. Nowadays the interconnection between physical development (PD) and the duration of the period of the adolescent's satiety in the learning process is relevant. The purpose of this work is to determine the relationship of the level of the student's physical development on the trend of increasing hunger during the learning process and in accordance with the obtained results, evaluate and develop tactics for practical use.

The material for the analysis were the results of our own observations, that had taken place in the gymnasium №47 (Ukraine, Kharkov) in 2018 - 2019. The study involved 68 school students, in the age category 7-14 years. The subjects were divided into 3 groups, considering PD level: 1st group (n = 18) - with overweight, 2nd group (n = 23) - with body mass deficit and the 3rd group (n = 27) - with average mass body. To assess the physical development was used body mass index (BMI), which was determined by the formula: $BMI = m / h^2$, where m - the body mass in (kg), h - the height in (m).

As a result of the analysis, it was determined that the subjects of the 1st group, namely 73.91% began to feel hungry in 60 minutes after the morning food intake, 21,74% - in 61-120 minutes, and only 4,35% in 121-180 minutes. As for the 2nd group, 53,57% felt hungry in 60 minutes after the start of the educational process, 32,14% in the range of 61-120 minutes, and 14,29% in 121-180 min. It should also be noted that 18,75% of schoolchildren of the 3rd group felt hunger in 60 minutes after the start of the educational process, 56,25% of this group - in 61-120 minutes, and 25% - in the range of 121-180 minutes.

This research presents analytical data that will allow to adjust the rational nutrition of students, taking into account their PD level. Observing tactical activities aimed at conducting conversations between parents and students, creating the right individual nutrition programs for students taking into account the level of their PD will help to avoid the formation of metabolic disorders and diseases of the gastrointestinal tract.

OP245

MINIMAL CLINICALLY IMPORTANT DIFFERENCE AND MINIMAL DETECTABLE CHANGE OF THE WHODAS 2.0 AMONGST PATIENTS WITH CHRONIC MUSCULOSKELETAL PAIN**Mikhail Saltychev, Niina Katajapuu, Ari Heinonen**Department of PRM, Turku University Hospital¹, Turku, University of Jyväskylä, Jyväskylä², Finland

Introduction: The WHODAS 2.0 is a generic tool to assess functioning in diverse situations. While the WHODAS 2.0 has widely been used in clinical practice and research, the interpretation of the obtained results have not been well defined.

Objective: To estimate a minimal clinically important difference (MCID) and a minimal detectable change (MDC) of the 12-item WHODAS 2.0 amongst patients with chronic musculoskeletal pain.

Method: This was a cross-sectional study of 1,988 consecutive patients with musculoskeletal pain who were seen in an outpatient Physical and Rehabilitation Medicine (PRM) clinic. A distribution-based approach was employed to estimate a MCID, a MDC, and a MDC%.

Results: The mean age of the patients was 48 years, and 65% were women. The average intensity of pain was 6/10 points and the mean WHODAS 2.0 total score was 13 (9) points. The MCID ranged between 3 and 5 points. The MDC was 9 points and MDC% was 66%.

Conclusions: Amongst patients with chronic musculoskeletal pain, the 12-item WHODAS 2.0 demonstrated high MCID and MDC questioning the reliability of the WHODAS 2.0 total score.

OP246

EFFICIENCY OF REHABILITATION IN CHILDREN'S POSTURE DISORDERS IN COMPUTER OPTICAL TOPOGRAPHY**Mikhail Tsykunov**

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Introduction: The analysis of preventive examinations results among schoolchildren over 10 years old.

Objective :Evaluate the efficiency of rehabilitation for children with posture disorders according to the data of computer optical topography (COT).

Method :The study involved 230 children aged 7 to 14 years, the average age was 10.87 ± 1.22 years including 98 boys and 132 girls. The rehabilitation program included COT study as a mandatory element before and after the rehabilitation exposures, all children underwent therapeutic gymnastics, massages and physiotherapy procedures.

Results: According to COT, statistically significant changes in posture were identified: "horizontal obliquity of pelvic girdle", "horizontal obliquity of shoulder girdle", "horizontal obliquity of shoulder blade angles", "vertical torso tilt", "pelvic girdle turn", "deviation from C7 vertical against the top of the lumbar lordose". Our study showed that as a result of rehabilitation of children with posture disorders, according to COT data, there is an improvement in the body balance in all three areas. In the frontal area the vertical distortions of the pelvic gridle, shoulder girdle, blade angles, torso tilt - have decreased. In the horizontal area the posture has improved due to the pelvic gridle turn. In the sagittal area, there was an improvement in the balance for C7 vertical deviation from the top of the lumbar lordosis. Thus, as a result of the course of rehabilitation among children with posture disorders according to COT data, there was a positive dynamics of posture indicators, probably due to changes in the functional condition of muscles, which are the main pathogenetic factor.

Conclusions: As a result of the rehabilitation activities children with posture disorders, according to the COT data, improved the balance in the frontal, horizontal and sagittal areas.

OP247

THE EFFECTS OF PAIN SCRAMBLER THERAPY ON SHOULDER PAIN IN PATIENTS WITH ROTATOR CUFF TEAR**Nam Gyulm, Seo-ra Yoon, Su-ra Ryu, Yuri Choe, Woo-yong Shin, Min-Ji An**

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Objective :The aim of this study is to investigate the effect of pain scrambler therapy on shoulder pain relief and functional improvement in patient with rotator cuff tear.

Subjects and method :This study was designed by single blind and randomized controlled study. All thirty two patients who complained with shoulder pain more than 6 months. They were diagnosed with rotator cuff tear based on MRI findings. We exclude patients who has a pacemaker or automatic defibrillator and history of myocardial ischemia within the previous 6 months.

The subjects were classified into 2 groups by randomization: Sixteen patients (Group I) was treated by conventional therapy and sham therapy. Another sixteen patients (Group II) was treated by conventional therapy and pain scrambler therapy. Conventional therapy included medication or physical modality such as hot pack and ultrasound therapy. Pain scrambler therapy was performed by Pain jammer ENS-1140 (ENS system, Bucheon, Korea) that using 4 electrode patches that attached 4cm away from the most painful areas. The subjects received the treatment once a day for 30 minutes during 10 consecutive days.

Visual analogue scale (VAS) and University of California at Los Angeles (UCLA) score were used to evaluate severity of symptoms and functions. These scales measured at baseline, after 10 sessions and 4 weeks after treatment.

Results :There are no significant differences in the baseline characteristics (Gender, Age, height, weight) and initial severity of symptoms and physical functions between two groups. Both group showed a significant pain relief and functional improvement after treatment. However, significant improvement in changes of VAS, function, pain and satisfaction categories in UCLA score were observed in the Group II at after 10 sessions and 4 weeks later.

Conclusion :In this study, Pain scrambler therapy showed a significant improvement in pain relief and functional ability in patients with rotator cuff tear. Pain scrambler therapy could be considered as a additional treatment option for chronic shoulder pain with rotator cuff tear.

OP248

DAY NEUROREHABILITATION PROGRAM WITH CONSTRAINT INDUCED MOVEMENT THERAPY (CIMT) FOR LOWER LIMB**Natalie Sebkova**

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Introduction: CIMT is one of neurorehabilitation methods aimed at reducing the learned non-use phenomenon. First described by Taub for upper extremity after stroke, this method combines forced use of the affected limb by restraining the unaffected limb and massed practice of the affected limb. While it is not possible to restrain completely the unaffected lower limb, the core principles, such as massed task practice with the impaired body part and so called "transfer package" to facilitate transfer of therapeutic gains to daily life, are perfectly applicable.

Objective :To evaluate in preliminary manner feasibility, safety and efficiency of CIMT for lower limb in patients with central hemiparesis in our Day Neurorehabilitation Program.

Method: 20 adult patients were involved. The therapy was performed as outpatient, 4 weeks, 5 days a week, 6 hours a day, from which three and a half hours were individual and group activities focusing on the affected lower limb. More time had to be spent with at home training. The activities were mainly repetitive movements of affected lower limb, functional activities from LEMAL (Lower Extremity Motor Activity Log), FES and group activities. The evaluation was done by GSSA (Global Subjective Self-Assessment), TUG (The Timed Up and Go Test), 2mWT (Two Minute Walk Test), 10mWT (Ten Minute Walk Test) and Berg Balance Scale at the beginning, at the end and one month after the program.

Results: All 20 patients finished the program, all referred subjective improvement of gait stability and endurance. There were no complications. 40% of the patients was better in all mentioned tests, 60% in only part of the tests.

Conclusions: CIMT for lower limb is a feasible, safe and effective method for improving standing and walking in people with chronic hemiparesis. We plan to use this treatment in more patients and define better the inclusion criteria.

OP249

THE ROLE OF REHABILITATION ON BODILY PAIN AND EMOTIONAL WELLBEING IN ELDERLY AFTER HIP FRACTURE**Natasa Radosavljevic¹, Dejan Nikolic², Milica Lazovic², Katarina Radosavljevic², Sofija Radosavljevic², Pavle Radovic³**

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Introduction: Pain and emotional wellbeing are important factors in overall quality of life, particularly in elderly population. Older persons with hip fracture are at greater risk for increased functional decline. Thus pain and emotional status are important factors in assessing persons functional status.

Objective: The aim of our study was to evaluate the role of rehabilitation on bodily pain and emotional wellbeing in elderly after hip fracture.

Methods: We assessed 91 patients, age above 65 years, that were referred to rehabilitation treatment after hip fracture. Bodily pain and emotional wellbeing were analyzed from SF-36 questionnaire. Separately females and males were analyzed. Participants were evaluated twice: at admission and at discharge.

Results: There were 65 females and 26 males. Bodily pain and emotional wellbeing on admission were: 34.46 ± 10.20 and 42.06 ± 10.83 for females; and 31.64 ± 14.04 and 39.35 ± 12.80 for males. Bodily pain and emotional wellbeing at discharge were: 60.65 ± 11.52 and 66.40 ± 10.04 for females; and 56.02 ± 14.77 and 61.38 ± 11.68 for males. There is statistically significant improvement both for bodily pain and emotional wellbeing for both genders ($p < 0.01$).

Conclusion: We have demonstrated positive effects of rehabilitation treatment of elderly after hip fracture regarding pain and emotional wellbeing. However, continuous rehabilitation even after discharge from rehabilitation setting is advice in order to reduce comorbidity onset and improve functional status and social inclusion into society of these persons.

OP250

THE IMPORTANCE OF REHABILITATION IN THE TREATMENT OF PERSONS WITH HEMOPHILIA AND INHIBITORS: OUR EXPERIENCES**Nevena Krstic, Tatjana Radovanovic, Sanja Tomanovic-Vujadinovic**

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INTRODUCTION: Hemophilia is a hereditary coagulation disorder characterized by a tendency to bleed. Repeated bleeding into the same joint leads to the development of arthropathy, which especially in this subgroup of people with hemophilia and inhibitors develops very early and is severe.

THE GOAL of this study was to determine the Gilbert score on certain joints and to evaluate its current functional status based on its value. Physical therapy thereafter is strictly individual and dosed, and its application delays operative treatment of severe arthropathy.

MATERIAL AND METHODES: Eleven people with hemophilia and inhibitors in the last six years have had a yearly birth at a multidisciplinary camp conducted by physiatrists and physical therapists. The rehabilitation plan included an individual kinesitherapy program.

RESULTS: In the last six years, the value of Gilbert score has progressively increased in almost all patients and in all targeted joints, especially those in which there was recurrent bleeding. In some patients, surgical treatment is considered.

CONCLUSION: Hemophilia is a progressive disease, with a tendency to develop severe disability, so with the compensation of coagulation factors, physical therapy is recognized as the primary treatment.

KEY WORDS: hemophilic arthropathy, Gilbert score, physical therapy

OP251

DIAPHRAGMATIC REHABILITATION IN GASTROESOPHAGEAL REFLUX DISEASE**Nicola Marotta, Rocco Spagnuolo, Andrea Demeco, Vanessa Fieramosca, Maria Teresa, Patrizia Doldo**

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Background: Gastroesophageal reflux disease (GORD) is one of the most common gastrointestinal disorders, and appropriate therapy still remains a challenge for gastroenterologists and general practitioners. Among non-surgical and non-pharmacological treatment modalities, neuromuscular facilitation could play a pivotal role in managing GORD symptoms.

Objective: To evaluate the effectiveness of respiratory re-education in patients with GORD in association with standard treatment with proton pump inhibitors.

Methods: Forty-four patients (50 ± 13 y and BMI 26 ± 4) were enrolled, affected by GORD and underwent esophagogastroduodenoscopy. They were randomized to standard treatment with Esomeprazole alone (group 1) or with Esomeprazole in association with exercises of neuromuscular facilitation (group 2). Applying a linear model for repeated measures, we compared GORD severity between groups using the NIH PROMIS (®) GERD scale (Disrupted Swallowing, Nausea and Vomiting, Gastroesophageal reflux); and NIH PROMIS® Global Physical Health and Global Mental Health, at baseline and after 6, 12 and 18 week of observation.

Results: After 6, 12, 18 weeks of treatment we observed a significant improvement in reflux symptoms, in group 2 compared to group 1 (50 ± 8 vs 58 ± 7 ; 45 ± 7 vs 56 ± 8 ; 44 ± 8 vs 60 ± 4 p

Conclusions: The association of standard pharmacological treatment for GORD and diaphragmatic rehabilitation allows to achieve significant benefits, in a lasting way, without side effects and reducing the pharmacological use with a consequent reduction in health expenditure.

OP252

METHODS TO REDUCE THE VARIABILITY OF THE ASSESSMENT OF SPASTICITY IN PATIENTS WITH SPINAL CORD INJURY**Nikola Babic¹, Radoje Čobeljic², Lana Popovic Maneski¹**Institute of Technical Sciences, Serbian Academy of Sciences and Arts¹, Clinic of Rehabilitation "Dr Miroslav Zorovic"², Belgrade, Serbia

Introduction. Spinal cord injuries (SCI) often cause spasticity, which decreases the quality of life of patients. Objective assessment and subjective perception of spasticity are considered to be equally important parts for initial and later treatment evaluation. The often-used scale to assess spasticity is the Modified Ashworth Scale (MAS). Instead of the MAS, one can use the pendulum test (PT) score, which gives a more precise assessment of the level and type of spasticity [1].

Objective. The case study aimed to test the methodology that is sufficiently accurate to determine the PT score during and after the therapy in an SCI spastic patient. The treatment involves intensive exercise assisted with functional electrical stimulation (FES). This objective was selected since the repeatability of the estimation of the spasticity is variable.

Method. One patient with SCI participated in the study. For the spasticity assessment, we used three methods: pendulum test score, modified Spasticity Screening Questionnaire, and MAS. On the first day of the assessment, patients were clinically assessed (MAS and PT), and they filled the Spasticity Screening Questionnaire. The MAS and PT were recorded three times (consecutive days) to minimize the variability at the beginning, after one week, two weeks, and after the therapy.

Results. The analysis of the PT score shows that the spasticity was decreased when exercising the biking assisted with the FES. The pendulum test needs to be measured at three consecutive days to minimize the variability from day to next day.

Conclusion. The case study showed that the three consecutive testings are meaningful for the accurate assessment of spasticity. This conclusion calls for more extensive clinical research to prove this initial test.

OP253

USE OF KINESIO TYPING AND TREATMENT EXERCISES FOR HEADACHE IN CHILDREN**Oksana Gorsha¹, Natalya Korolenko², Maria Shkolna³**

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Introduction. The urgency of studying aspects of the exercises and Rehabilitation medicine (ERM) effectiveness for the treatment of headache (HA) in children is conditioned by prevalence of the problem and age restrictions for drug treatment.

Object. To examine the effect of a separate and combined use of Kinesio Taping (KTP) and treatment exercises (TE) on the clinical and functional status of children with HA syndrome.

Methods. 126 children of 6–11 years were examined, 96 of them had complaints of HA for 6 to 24 months. With the exclusion of other pathology and verification of the cervical spine instability, the cervicogenic nature of the headache was established. Methods of examination: clinical, psychophysiological (level of anxiety; allocation, volume and redirecting attention; dynamic performance of the nervous system); X-ray examination of the cervical spine; ultrasonic transcranial Doppler examination of the head and neck vessels. The study was clinical, open, prospective, controlled.

Results. It was found that each of the studied methods improves the clinical condition (reduction of rate and intensity of headache: 72.2% (KTP), 63.3% (TE) and 86.7% (complex) of children did not have HA) after the treatment course, optimizes hemodynamics of vessels of the vertebral basilar basin, psychoemotional status. The best and the longest clinical-functional effect was achieved with a combined usage of KTP and TE, persisted for more than 1 month and decreased after 6 months (although remained better than before treatment (p

Conclusions. The complex usage of KTP and TE reduces the manifestation of pain, optimizes clinical and functional indicators of the nervous system, improves the psychoemotional state, improving the quality of life of children with HA. The obtained results confirm the prospect of the use of these ERM methods for the treatment of cervicogenic headache and prove a necessity for further research of their medical and prophylactic efficacy.

OP254

ICF-MODEL IN ASSESSMENT OF FUNCTIONING, GOALS SETTING AND CHOICE OF REHABILITATION**Olena Dolynna^{1,2}, Yaroslav Liskov², Serhii Kolisnyk², Roman Trygub³, Volodymyr Golyk Shupyk⁴, Petro Kolisnyk²**

Department of Medical Rehabilitation and Medical Social Expe¹, National Pirogov Memorial Medical University², Vinnytsya/Vinnitsa Regional Clinic, Military Medical Center of the Western Region³, National Medical Academy of Postgraduate Education⁴, Vinnytsya, Ukraine,

Introduction: Arterial hypertension (AH) is a risk factor for the development of disabling diseases (myocardial infarction, stroke, peripheral vascular disease, cognitive impairment and dementia), re-hospitalizations, mortality and disability. There has been a progressive increase in the number of disability-adjusted life year associated with hypertension. Participation in cardiac rehabilitation programs contributes to better control of blood pressure and other risk factors for cardiovascular disease.

Objective: To establish a functioning profile, rehabilitation goals and interventions typical for persons with hypertension.

Methods: Based on a retrospective results analysis of the rehabilitation examination, a functioning profile was created for 53 patients with hypertension. Data obtained from medical records have been converted to ICF-codes. Were used Rehabilitation and Cardiopulmonary Post-Acute Core Comprehensive Sets, categories from the whole ICF were added as needed. Was determined the structure of concomitant pathology.

Results: The impairments of structures and functions, limitation of activity and participation restriction were coded for all patients with an accuracy of at least three digits. Musculoskeletal pathology and vestibular disorders accounted for the major part in the structure of comorbid pathology of patients with hypertension. Most persons had documented disorders of the structure of the heart, blood vessels, spine; disorders functions of the heart, blood vessels, blood pressure, weight maintenance, a sensation of pain, sleep, exercise tolerance, vestibular function of balance; looking after one's health, carrying out daily routine, focusing attention. The rehabilitation goals were: increase of exercise tolerance, pain reduction, prevention of falls risk, weight control, improvement of sleep and cognitive functions. Rehabilitation interventions included: physical training (aerobic, strength, balance exercises), psychological counseling, medical interventions aimed at controlling blood pressure, lowering blood lipids, and analgesia.

Conclusions: Patients with AH have impaired functioning before secondary complications occur. Involving them in rehabilitation programs is likely to help reduce the global burden of disability.

OP255

THE EFFECT OF TROMBOSIT RICH PLASMA APPLICATION ON DEGENERATED CARTILAGE: IN VITRO EXPERIMENTAL STUDY**Omer Faruk Sendur**

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Background: Osteoarthritis is the most common problem among musculoskeletal system disorders. Platelet-rich plasma (PRP) has been suggested to be beneficial in the treatment of degenerative musculoskeletal problems. The purpose of this study is to evaluate PRP treatment efficacy on degenerated cartilage.

Objectives: In this study, we aimed to determine the efficacy of platelet-rich plasma (PRP) on mechanically damaged chondrocyte cells by using different dose, different duration of exposure and different methods of activation of platelet.

Methods: Human source chondrocytes (CHON-001 ATTC CRL-2846) were used in the study. Chondrocyte cells were produced in appropriate medium and an experimental cartilage model was created. The platelet-rich plasma was produced from platelets obtained by apheresis in the laboratory, from blood of volunteer. The platelet-rich plasma was adjusted at five different doses as $4,8 \times 10^6$, $2,4 \times 10^6$, $1,2 \times 10^6$, 6×10^5 , 3×10^5 . The first group of platelet rich plasma was left intact, the second group was detonated within seven minutes by applying ultrasound waves in water, the third group was activated with calcium chloride and the fourth group was determined as control group. Using a ten microliter pipette tip, a linear damage to the opposite side was created at the widest part of the well. Cell migration was monitored at 0-4-8-24 and 48 hours at $\times 10$ magnification by in vitro microscopy and wound healing was evaluated by photographing. Migration intervals were determined quantitatively using the program named Image J.

Results: When the rates of recovery were compared to the groups, no significant improvement was observed in the intact and detonated platelet groups at 4-8 and 24 hours compared to the control group. In the third group which was activated with calcium, no significant improvement was observed in all doses at 4 and 8 hours compared to the control group. However, at the 48th hours there was a significant improvement in the doses of $1,2 \times 10^6$, $2,4 \times 10^6$ and $4,8 \times 10^6$ compared to the control group ($p < 0.0001$). There were significant differences in intact and detonated platelets at 3×10^5 and 6×10^5 doses at 48th hours compared to control group ($p < 0.0001$). Significant improvement was observed in all groups at levels of $1,2 \times 10^6$ and above ($p < 0.0001$). When evaluated in terms of activation, there was a significant improvement in the exploded and intact groups at the 48th hour, compared to the calcium-activated group at doses of 3×10^5 and 6×10^5 ($p < 0.01$).

Conclusion: Cartilage damage is the main pathology in the pathogenesis of osteoarthritis. All doses of PRP used in the study contributed to improvement. Meanwhile, the most critical parameter for platelet migration was timing and significant improvement was started after 48 hours.

OP256

SYMPATHETIC SKIN RESPONSE AND REACTION TIMES IN CHRONIC AUTOIMMUNE THYROIDITIS; AN OVERLOOKED ELECTRODIAGNOSTIC STUDY**Oya Umit Yemisci¹, Nur Saracgil Cosar¹, Tubanur Ozturk Sisman², Selin Ozen³**

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Introduction: Chronic autoimmune thyroiditis (AIT) may result in a wide spectrum of reversible abnormalities in the neuromuscular function. Usually proximal muscle related symptoms and neuropathic findings such as mild axonal peripheral neuropathy have been reported. Sympathetic skin responses are useful in evaluating sudomotor activity of the unmyelinated sympathetic fibres of the autonomic nervous system. Neurocognitive impairment may also be a prominent feature of hypothyroidism, particularly in elderly patients. Electromyographic reaction times as a highly sensitive parameter, provides objective data concerning cognitive and motor functions.

Objective: The aim of this study was to evaluate peripheral nerve functions, sympathetic skin response and electroneuromyographic (ENMG) reaction times in euthyroid and subclinically hypothyroid patients with a diagnosis of AIT and compare to those of a control group.

Methods: Thirty-five euthyroid, 19 patients with subclinical hypothyroidism and 35 age and sex matched healthy subjects were included in the study. Motor and sensory nerve conduction studies, sympathetic skin responses recorded from hand and foot by stimulating contralateral median nerve and simple reaction times by stimulating tibial nerve and recording from extensor indicis proprius muscle were performed to all patients and control group.

Results: Reaction times were shorter in the healthy subjects compared to AIT patients. Only median nerve sensory conduction velocities of the forearm were slower in patients with AIT compared to control group ($p=0.019$). Otherwise; nerve conduction studies and sympathetic skin responses showed no significant difference between patients and control group.

Conclusions: Prolongation in the reaction times may be considered as a parameter reflecting the alterations in the cognitive functions related to the primary disease process in AIT. Combining sympathetic skin responses with more quantitative tests such as cardiovascular tests and sudomotor axon reflex testing, may allow us to determine higher rates of involvement of the autonomic nervous system in AIT.

OP257

THE KINESIO TAPING; LOCAL ANESTHETIC/STEROID INJECTION AND SPLINTING IN THE TREATMENT OF PATIENTS WITH CARPAL TUNNEL SYNDROME: A CLINICAL AND ELECTROPHYSIOLOGICAL STUDY**Pinar Borman¹, Seher Kocaoğlu², Ayhan Esmer², Eda Ozturk³, Ferda Kaygısız²**

Physical Medicine and Rehabilitation, Hacettepe University Medical Faculty¹, Ankara Education and Training Hospital, Dept of PMR², University of Hacettepe, Faculty of Medicine, Dept of Biostatistics³, Ankara, Turkey

Introduction/objective: Carpal-tunnel-syndrome (CTS) is a common-condition and current non-surgical treatment options show limited effects. The objective of this-study was to investigate the efficacy of local anesthetic (LA)/corticosteroidsteroid (CS) injection, kinesio-taping (KT) and splinting in patients with CTS with regard-to pain, disability and nerve conduction studies.

Materials and Methods: Demographic and clinical-characteristics of 60patients with CTS; including age, sex, occupation and duration of disease were recorded. Visual-analog-scale(VAS) was used to assess intensity of pain. Symptom-severity-scores (SSS) and functional-status-scores (FSS) were evaluated by Boston Questionnaire. Electrophysiologic studies comprised motor and sensory latencies and amplitudes of median-nerve. The patients were randomized into three-treatment groups receiving either KT performed three-times by-intervals of 4 days (Group 1); a-single LA/CS injection to carpal-tunnel (Group 2); or splinting alone for three-weeks (Group 3). The clinical and electrophysiologic studies were performed at baseline and at the-third week.

Results: Fifty-eight female and 2 male patients (mean age, 48.2±8.9 years; mean disease duration, 2.8+3.5 months) were included in the study. Each group comprised 20 patients. There were no differences between the groups regarding demographic variables on entry to the study. Compared to baseline; post-treatment VAS-pain and FSS scores improved significantly in the KT and splint groups at the-third-week. The improvement in pain intensity was more significant in KT group than in the splint group. According to nerve-conduction-studies, electrophysiological variables were improved in both KT and injection groups but the difference was not statistically-significant ($p>0.05$).

Conclusion: We imply that three times of KT by 4-days intervals and splinting have favorable effects on pain and functional status in the-early-period (up to one month) in patients with CTS. As the improvement in pain intensity was more significant with KT than in splinting; we suggest that KT may be an alternative non-invasive method, instead of splinting, for patients suffering from CTS in the-early-period.

OP258

RADIAL SHOCK WAVE THERAPY WITH “ INTELECT PRW LITE” FOR CALCIFYING TENDINOPATHY OF THE SHOULDER, COMPARATIVE EFFECTIVENESS WITH CONVENTIONAL PHYSICAL THERAPY**Radostina Simeonova, Zlatin Ivanov, Najden Padjev**

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Introduction: The effectiveness of radial shock wave therapy for treating chronic calcifying tendinopathy of the shoulder is still controversial concerning the doses, methods and follow up.

Objective: The purpose of the study is to reveal the criteria for effective treatment of this pathology and to compare it with the conventional physical factors used so far. These results are discussed in comparison with other authors working with this methodology.

Methods: The research has been taken on 60 people, suffering from calcifying tendinitis. A control group (CG), including 30 people, treated with basic therapy (TENS, kinesiotherapy and BPI) and an experimental group (EG), including 30 people, treated with basic therapy and RSWT. The effect of the treatment was shown by: sonographic examination before and after treatment, 1 month and 3 months later, physical tests for motor skills in shoulder region, scale of pain and the range of motion (ROM).

Results: The results have high statistical significance ($p < 0,001$) for both groups, as far as pain syndrome is concerned, the functional tests for mobility in the shoulder area and also the ROM test. The statistical difference between EG and KG ($p < 0,001$) proves that usage of RSWT reduces the pain quicker and restores mobility in the shoulder region in a shorter period than conventional physical therapy and only the patients in the EG have reduction in the parameters of the calcifications and total disappearance in the follow up.

Conclusion: Both methods have a pain reducing effect, contribute for better mobility in the treated area and also improve the quality of life of patients with calcifying tendinitis of the shoulder but RSWT with “Intellect RPW Lite” gives better results than only basic therapy in all tests and contributes to resorption of the calcification.

OP259

ACCEPTANCE OF HUMANOID ROBOTS MEASURED BY FRANKENSTEIN - SYNDROME QUESTIONNAIRE**Rastislava Krasnik^{1,2}, Aleksandra Mikov^{1,2}, Čila Demeši-Drljan², Dragana Vukliš², Jelena Zvekic-Svorcan^{2,3}, Mirjana Kolundžic⁴**

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Introduction- With the development of robotics and the advancement of technology, humanoid robots have become everything more accessible in daily work with patients in the rehabilitation process.

Objective- Determine the difference in attitude and degree of acceptance of humanoid robots among medical rehabilitation students.

Method- This prospective cross-sectional study was conducted in April 2019 among students of medical rehabilitation on the Faculty of Medicine, University of Novi Sad, Serbia. Our study included 82 students of both sexes who are accepted to participate in the study and fill the Frankenstein-Syndrome Questionnaire (FSQ). The answers of the questions are grouped into subscales (I-negative feelings towards robots; II-positive expectations towards robots; III-sociological acceptance of the robot). Using statistical package SPSS ver. 21, the difference in attitudes toward the humanoid was analyzed robots versus gender and year of the study by a two-way analysis of variance (two-way ANOVA).

Results: There were 75.6% female students in the sample. Mean sample age was 21.81 ± 2.641 years. In the total sample, 17% of students saw a humanoid robot live, 41.46% through the media alone, while 41.46% did not see a humanoid robot either live or through the media. Not statistically determined significant impact of gender and years of study on student attitudes toward using humanoid robots (subscale I: $F = 1.259$; $p = 0.295$; subscale II: $F = 1.208$; $p = 0.313$; subscale III: $F = 0.165$; $p = 0.920$).

Conclusions: It is necessary that students have more information about humanoid robots and their use in the rehabilitation process. These information could have influence in a change attitude toward the humanoid robots and their sociological acceptance.

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OP260

CORRELATION BETWEEN LOWER LIMB BONE MORPHOLOGY, FUNCTION, ACTIVITY AND PARTICIPATION IN CEREBRAL PALSY: A SYSTEMATIC REVIEW**Rodolphe Bailly¹, Anne Charlotte², Mathieu Lempereur³, Christelle Pons¹, Laetitia Houx³, Sylvain Brochard³**LaTIM UMR1101, Fondation Ildys¹, HAES CHRU Brest², Service de Médecine Physique et de Réadaptation Pédiatrique³, CHRU Brest, Brest, France

Objective:To optimize musculo-skeletal prevention and therapies, the links between lower limb bone morphology and the different components of the ICF classification needs to be quantified in individuals with Cerebral Palsy (CP). The aim of this systematic review was to report the existing evidence of correlations between lower limb bone morphology and activities and participation in ambulant individuals with CP.

Review methods:Three databases were explored (Pubmed, Scopus and Cochrane Library) before January 2019 by two independent reviewers. Studies reporting correlation between a measure of lower limb bone morphology and a measure of activity (gait, locomotor abilities...) or participation according to the ICF in individuals with ambulant cerebral palsy were included. The quality was evaluated using the Checklist for Case Series. Data regarding population, lower limb bone morphology and activity or participation outcome were extracted and synthesized by two independent reviewers.

Results:Among 1485 screened, 10 articles including 773 individuals with ambulant CP (Age: 2-35.9; 536 with bilateral CP) were finally included. There was evidence of moderate correlation between tibial torsion and foot rotation during gait (N= 342; R=0.44 to 0.54), and between femoral torsion and mean hip rotation during gait (N=88; R=0.30 to 0.44). There was evidence of low correlations between femoral torsion and foot progression angle during gait (N=347, R=0.1 to 0.35). None study reported correlations between bone morphology and activity nor participation. The great heterogeneity of the bone outcomes studied and correlations explored prevent from a pooled analysis.

Conclusion:There is evidence of low to moderate correlation between lower limb bone morphology and specific gait parameters in individuals with CP. More research is needed to establish objectively the relationship between bone morphology activities and participation. This would support more evidence-based bone-related interventions and prevention in individuals with CP.

OP261

THE OPPORTUNITIES OF PHYSICAL REHABILITATION TECHNOLOGIES WITH BIOFEEDBACK OF PARALYMPIC ATHLETES WITH SPINAL CORD INJURY**Rezeda Bodrova¹, Aygul Zakamyrdina²**Rehabilitation and Sport Medicine, Kazan State Medical Academy, Kazan¹, SMA - Branch Campus of the FSBEIFPE RMACPE MOH Russia², Republic of Tatarstan, Russian Federation

Introduction: Spinal cord injury has been a major health, social, financial and economic problem in recent decades.

Purpose: The aim of the study was to investigate the effect of physical rehabilitation technologies with biofeedback of Paralympic athletes with SCI.

Method: Patients of the main group with SCI (103 pers.) received active-passive stimulation, active mechanotherapy with the use of biofeedback controlled EMG and training walk on telescopic lift. Patients in the control group (109 pers.) received standard drug therapy, physical therapy, mechanotherapy, massage.

Results: The Asia classification method was used to quantify the degree of damage to the nervous system and structure. In addition to the trauma of the cervix found in 40,2% of patients (category B), we also detected a low level rehabilitation potential (RP) amongst these patients, 2,8% - average, at 1,4% - high. Amongst the 9,9% of patients with thoracic trauma were detected a low RP, 5,6% - average. Amongst patients with lumbar SCI were detected an average (25,15-category C) and high RP (3,8%). Performance on a scale of VFM was increased by 6,5% (before rehabilitation 118,3+4,9 points, after 128,1+4,4 points, $p<0,001$) in the main group and FIM scale by 15,3 % (54,1+6,8, after 62,4+7,7, $p<0,001$) in patients with cervical injury, VFM by 15,3% ($p<0,003$) and the FIM scale by 17,1 % ($p=0,002$) - thoracic SCI, VFM by 13,7 % in the main group ($p<0,001$) and FIM scale by 11,6% ($p<0,001$) - lumbar SCI. In the control group after rehabilitation value of these indicators is statistically significant changes were not demonstrated ($p>0,05$).

Conclusion: Thus, use of technology medical rehabilitation with biofeedback controlled of EMG increases the degree of self-service and independence in daily life in Paralympic athletes with SCI at the cervical injury in 36,4% of patients ($p<0,001$), thoracic - 55.6% ($p<0,001$) and lumbar - in 71,4% ($p<0,001$).

OP262

COMMUNITY PARTICIPATION AFTER LOWER LIMB REHABILITATION**Richard Lombard-Vance^{1,2}, Deirdre Desmond², Fiadhait O'Keeffe³, Nicola Ryall⁴, Pamela Gallagher¹**Dublin City University, Dublin, Ireland¹. Maynooth University, Maynooth, Ireland². St Vincent's University Hospital, Dublin, Ireland³. National Rehabilitation Hospital, Dublin, Ireland⁴.

Introduction: People with a physical disability often face barriers to participation, but there has been little investigation of community participation by people with lower limb amputations. In particular, participation enfranchisement (importance and meaning of participation, and control over participation) and participation engagement (activity frequency, activity importance and whether it is felt that enough of that activity is being undertaken) have yet to be assessed. Knowledge of variation in these variables over time is also lacking.

Objective: The aim of this paper is to investigate community participation (enfranchisement and engagement) in people with lower limb amputation. Method: As part of a prospective cohort study, a subset of participants with lower limb amputation completed the importance and meaning of participation, control over participation, and engagement sections of the Community Participation Indicators at six (n=40) and twelve (n=30) months post-discharge from rehabilitation.

Results: Regarding participation engagement, activities both important to people and that were most frequently 'performed enough' included: family/friend interaction and communication, household activities, and religious or spiritual activities. Activities that were both important to people and least frequently performed enough were often those that required participation outside the home and/or with persons other than close relatives, and active/sports recreation. Neither importance and meaning nor control over participation changed significantly between six and twelve months.

Conclusion: Community participation is an important and multifaceted outcome for people with lower limb amputation. Weighting frequency of activity participation by whether the person wants to participate in certain activities at each time point provides valuable information in assessing rehabilitation outcomes.

OP263

EXPERIENCE OF MEDICAL REHABILITATION AFTER HIP AND KNEE JOINT REPLACEMENT IN PALANGA REHABILITATION HOSPITAL 2009-2019 YEARS COMPARISON**Rima Juozapavičė**

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On average, 20% of all Lithuanian patients after lower limb joint replacement gets rehabilitation treatment in the Palanga rehabilitation hospital.

The service is provided in accordance with the common standards that were prepared by the specialists from Palanga rehabilitation, Klaipėda university, Šiauliai hospital.

The aim of the study: to determinate the change in joint function after replacement during patient rehabilitation 2009–2019 comparison.

Study contingents consisted of 4000 patients after hip and knee joint replacement, who have undergone rehabilitation for 18–24 days. The study consisted of 1635 man and 2365 women. The mean age of patients was 65 years. All tests: visual analogue scale VAS, functional status, flexion and extension angles, Barthel, Keithel index were done before and after rehabilitation. The results demonstrated that rehabilitation after hip and knee joint replacement is conducive to easing pain, ensures the patient's agility, ability to take care of himself, improves the quality of life.

Key words: rehabilitation, joint replacement

OP264

**IMPACT OF TAI CHI ON BALANCE, GAIT AND QUALITY OF LIFE IN PARKINSON DISEASE:
A RANDOMIZED CONTROLLED TRIAL****Salvatore Cassarino¹, Roberta Sergi¹, Antonella Peppe¹, Giuseppe Cannata¹, Ugo Nocentini², Ugo Nocentini¹**Physical Medicine and Rehabilitation, Tor Vergata University¹, Santa Lucia Hospital IRCCS Foundation², Rome, Italy

Introduction: Gait, postural, and balance disorders and difficulty in starting movements are common and disabling symptoms in Parkinson Disease (PD). The increased risk of falls and motor impairment lead to a progressive loss of autonomy, with a high clinical and social impact worsening the quality of life of patients and caregivers. Pharmacotherapy is not capable to slow down the course of disease and to avoid complications. Tai Chi (TC), an ancient Chinese martial art, well known for its physical, psychical and social benefits improving quality of life, combines deep breathing with graceful, rhythmic, and fluid movements accompanied by weight transfer from one foot to the other, maintaining a stable posture of trunk and requiring to keep the mind attentive as well as relaxed.

Methods: Patients receiving standard pharmacological therapy for at least 3 months, with evidence of gait and balance disorders unresponsive to therapy, are being recruited at the PD Department Santa Lucia Hospital IRCCS Foundation in Rome. Mini Mental Test Examination (>24/30) is used.

The patients are being randomized into two groups: group A performs 60 minutes of TC twice/weekly for 30 weeks, group B is the control group.

Following informed consent, a psychiatric- neurological evaluation is performed through clinical examination and the following validated evaluation scales:

MD-UPDRS (Movement Disorders Unified Parkinson Disease Rating Scale), Tinetti Balance Scale, GMT (Global Mobility Task), 6 minute walking test, PDQ39 (a questionnaire of quality of life in PD)

The gait of the patients is analyzed by Gait Analysis, where the optophoto-stereometric analysis of the step includes (a) the analysis of temporospatial variables, such as the speed of the step, its length and the time needed to execute it, (b) qualitative variables of the step (stance), in the oscillation of the contralateral limb (swing) and in the double support, and (c) kinematic variables such as the angles of flexion extension of the main articulation, or anteversion of the trunk. The patients are evaluated before the beginning of the TC lessons (T0), at the end (T1) and after 3 months from the end (T2).

Objective A minimum of 30 patients with a rigid akinetic form of bilateral idiopathic PD (Hoehn-Yahr score of 2-3 for at least 4 years) will be recruited. The aim of this ongoing study is to quantify the effects of TC on balance and quality of life in PD, assuming a better improvement in motor symptoms and mood than control group, with a positive impact on the autonomy and quality of life of both patients and caregivers. We will present the final results at Congress but those obtained on 10 randomly distributed patients seems promising.

OP265

REHABILITATION PROGRAMS IN PATIENTS WITH ANKYLOSING SPONDYLITIS BASED ON THE PRESENCE OF PERIPHERAL MANIFESTATIONS**Sandra Burtica¹, Antoaneta Dragoescu²**

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Objectives: Our study aimed to create personalized rehabilitation programs in patients with ankylosing spondylitis (AS), based on the presence/absence of peripheral manifestations of the disease.

Method: We analyzed a batch of 124 patients with AS according to the modified New York criteria. We divided the population into two groups: P + the patients with peripheral manifestations of arthritis or enthesitis (N=56) and P - the patients without any kind of peripheral manifestations (N=68).

Results: In the subgroup of patients P+ the mean age was 45.14 ± 14.16 years, and in the subgroup P- the mean age was 43.84 years ± 12.58 years. Gender distribution of patients in the two subgroups shows higher frequencies for patients without peripheral manifestations in both genders, respectively 55.4% in males and 52.2% in females. The highest frequencies were registered at the normal BMI of 18.5-24.9 in both sublots. The degree of activity of the disease, based on the ASDAS-CRP score, within both subgroups, revealed a majority of patients with inactive disease (≤ 1.3). Within the sublots, most patients had the BASDAI in the range 0-0.9. This shows that the majority of patients in both subgroups had a good therapeutic response to biological treatment, with symptoms such as pain and/or fatigue absent or very low in intensity.

Conclusion: Even though there were no major paraclinical differences between the patients with pure axial ankylosing spondylitis and patients with AS with peripheral manifestations, the patients with peripheral manifestations of the disease should have physical and rehabilitation programs not only aimed at the sacroiliac joints and spine, but also aimed at the peripheral joints and/or entheses where the patients also experienced symptoms.

Keywords: ankylosing spondylitis; axial disease; peripheral manifestations; BASDAI.

OP266

ULTRASOUND ASSESSMENT IN PATIENTS WITH PAINFUL HEELS**Sanja Milutinovic¹, Goran Radunovic¹, Kristina Veljkovic², Nemanja Damjanov¹**

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Introduction. The clinical finding of enthesitis has shown low sensitivity and specificity. The most used conventional radiography can detect only late signs of enthesitis. Ultrasound is a valid, reliable, non-invasive imaging technique for assessment of early and chronic signs of enthesitis.

Objective. To evaluate ultrasound findings in patients with painful heels.

Method. Consecutive 127 outpatients with painful heels were included. There were 76 patients with spondyloarthritis and 51 patients without spondyloarthritis. The increased thickness, hypoechoogenicity, enthesophyte, Power-Doppler and erosion on entheses of Achilles tendon (AT) and plantar fascia (PF) were examined bilaterally by two blinded operators.

Results. The increased thickness ($p < 0.001$), hypoechoogenicity ($p = 0.003$), erosion ($p = 0.026$) and Power-Doppler ($p = 0.005$) on AT entheses, as erosion ($p = 0.01$) and Power-Doppler ($p = 0.016$) on PF entheses were significantly more frequent in spondyloarthritis than in non-spondyloarthritis patients. Ultrasound bilateral AT enthesitis was significantly more frequent in spondyloarthritis patients than in patients without spondyloarthritis ($p = 0.002$). The presence of more than one ultrasound enthesitis signs on examined entheses in real-time were detected significantly more frequent on AT entheses in spondyloarthritis patients than in patients without spondyloarthritis ($p < 0.001$).

Conclusions. In patients with painful heels, ultrasound detected differences between patients with spondyloarthritis and patients without spondyloarthritis. The significant ultrasound differences between spondyloarthritis patients and patients without spondyloarthritis are mostly detected on Achilles tendon entheses. In order to distinguish inflammatory from non-inflammatory heel enthesitis and to apply appropriate treatment, ultrasound should be used in patients with painful heels in daily clinical practice.

OP267

FEASIBILITY INVESTIGATION OF A NOVEL EXOSKELETON-ASSISTED GAIT REHABILITATION IN STROKE PATIENTS: CLINICAL AND INSTRUMENTAL ASSESSMENTS**Sanaz Pournajaf¹, Michela Goffredo¹, Daniele Galafate¹, Leonardo Pellicciari¹, Domenica Le Pera¹, Marco Franceschini^{1,2}**Neurorehabilitation Department, IRCCS San Raffaele Pisana¹, San Raffaele University², Rome, Italy

Introduction: The recovery of walking ability is one of the main goals of post-stroke rehabilitation and high intensive, repetitive and task-oriented gait training based on the principles of motor learning and neuroplasticity phenomenon seems to be effective on movement coordination and gait improvement. Wearable powered exoskeletons allow patients with gait dysfunctions to stand and walk, having a near normal over-ground walking experience. However, exoskeleton-supported gait rehabilitation is widely studied in people with spinal cord injury.

Objective: An observational pilot study to investigate the feasibility and effects of a novel exoskeleton-assisted gait training in stroke patients.

Method: Five subacute stroke patients (>180 days from the first-ever acute event) were recruited, and trained for 12 overground exoskeleton-assisted sessions (5 times/week; 45 minutes; IndegoParker, USA). Clinical assessments (Modified Ashworth Scale-MAS; Motricity Index-MI; Trunk Control Test-TCT; Functional Ambulation Classification-FAC; 10 meters walking test-10mwt; 6 minute walking test-6mwt; Walking Handicap Scale-WHS; Time Up and Go-TUG) were administered at the beginning (T1) and the end (T2) of the training period. The primary outcome was the distance performed during the 6mwt. Gait analysis was performed at T1 and T2 considering spatio-temporal parameters, gait profile score, gait variable score, and gait deviation index to assess instrumentally the gait performance. Wilcoxon's test ($p < 0.05$) was used to detect significant pre-post changes.

Results: All clinical scales registered statistically significant pre-post improvements. The gait analysis revealed significant variation in the spatio-temporal parameters.

Conclusions: Indego is a highly customizable device, simple to use, and its application does not require a long setting procedure for the clinic specialists. Our results are encouraging in terms of gait pattern improvement and endurance. It may lead clinicians to plan a novel tailored robotic gait rehabilitation strategy after stroke. RCTs on large samples and also by EEG are needed to better understand the phenomenon and confirm these findings.

OP268

REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION IN TREATMENT OF DYSPHAGIA ON POST-STROKE INDIVIDUALS – A LITERATURE REVIEW OF THE LAST 10 YEARS**Sérgio Pinho¹, Nuno Tomás¹, Miguel Andrade¹, Eduardo Gonçalves¹, Duarte Calado¹, Suzana Gouveia¹**Physical and Rehabilitation, P&RM Department, Centro Hospitalar de Lisboa Ocidental¹, LisbonPortugal

INTRODUCTION: Dysphagia is a frequent complication of stroke which produce severe clinical outcomes that profoundly affect quality of life. There are noninvasive interventions applied in rehabilitation of dysphagia, such as rTMS (repetitive transcranial magnetic stimulation), a neuromodulatory technique that enables direct reconstruction of certain brain pathways promoting cortico-subcortical neuroplasticity and, consequently, swallowing.

OBJECTIVE: Review the literature associated with application of rTMS in treatment of dysphagia. It is intended to determine the parameters of frequency, period of stimulation, duration of protocols and brain areas stimulated and evaluate the effectiveness of this treatment.

METHOD: Pubmed Scientific Database was used with the following terms "stroke", "dysphagia", "repetitive transcranial magnetic stimulation". Original articles available in English from the last 10 years were selected.

RESULTS: Most articles used protocols lasting between 5-10 sessions in 1-2 weeks and frequencies between 1-10Hz. Cortical excitation/inhibition depends on frequency of stimulation and brain area to be stimulated. Lower stimulation (1Hz) made possible to increase cortical arousal of affected hemisphere and decreased of unaffected hemisphere, and higher stimulation (3Hz, 5Hz, and 10Hz) had discordant results. Bilateral cortical 10Hz stimulation in areas projected to mylohyoid muscle functionally improved short and medium term swallowing, and 5 Hz rTMS on tongue motor cortex functionally improved short term swallowing. Efficacy depends on chronicity of stroke and stimulation of individuals with a period longer than 12 months post stroke does not improve swallowing.

CONCLUSIONS: rTMS is a safe, noninvasive technique that functionally improves swallowing, with promising results in the presented studies. In 10 years, the literature directed to this area is scarce, with very small population samples. Further longitudinal studies with larger, randomized, controlled population samples are needed in the future to standardize parameters and identify rTMS as a solid neurorehabilitator treatment and a valuable and indispensable therapeutic option in the treatment of dysphagia.

OP269

THE ALGORITHM OF THERAPEUTIC EXERCISES SELECTION BY MICROCIRCULATION STUDIES**Serhii Kolisnyk¹, Petro Kolisnyk^{1,2}, Ihor Humeniuk^{1,2}, Yuliia Vitrova^{1,2}, Serafyma Shavula², Oleksandr Marchuk¹**Department of Medical Rehabilitation, National Pirogov Memorial Medical University¹, Center of Medical Rehabilitation and Sports Medicine², Vinnytsia, Ukraine

Introduction: Microcirculation provides the trophic function of the blood and tissues, co-depend on the whole-body pathology and gives important information about the condition of tissue level of the organism. Ophthalmoscopic examination of microcirculation allows evaluating the aforementioned condition. Therapeutic exercises influence the microcirculation, hemodynamics and this impact should be evaluated in rehabilitation programs.

Objective: To analyze the dynamics of ophthalmoscopic examination of conjunctival microcirculation and develop the algorithm of therapeutic exercises selection to improve microcirculation taking into account the types of cardiovascular reaction on the load.

Method: We identified three groups of exercises: dynamic without load, dynamic with load, static. 30 volunteers 15-33 (22.00 ± 2.73) years old were recruited to perform the exercises and evaluate microcirculation using a micro-ophthalmoscopic examination. Every participant performed three groups of exercises on separate days. Blood pressure, pulse, SaO₂ and microcirculation were measured before loading, immediately after and after 5 minutes. Quantitative assessment of microcirculation was performed.

Results: Dynamic exercises with additional load had a normotonic cardiovascular reaction in 73.3% of cases, and in the other two groups of exercises - in 60%. Significant improvement (OR = 2.91; OR = 4.83; $p > 0.05$) of microcirculation was observed after static and dynamic exercises with loading. Dynamic exercises without loading demonstrated maximal SaO₂ increase (OR = 3.00; $p > 0.05$).

Conclusions: The type of cardiovascular reaction to the particular type of load is a key factor of the individual choice of exercises. Dynamic exercise with additional load had a mild initial effect on microcirculation but after 5 minutes demonstrated the greatest positive impact on microcirculation (OR=4.83) and retained the longest effect. The algorithm developed by us allows to individualize approaches to the choice of load type and to identify groups of patients who need special physician's attention.

OP270

EFFECTS OF UPPER LIMB ROBOTIC TREATMENT ON COGNITIVE FUNCTIONS IN SUBACUTE STROKE PATIENTS**Silvia Galeri¹, Serena Monteleone², Irene Aprile²**Physical and rehabilitation medicine¹, IRCCS Fondazione Don Carlo Gnocchi², Milan, Italy

INTRODUCTION. Cognitive impairment contributes to disability following stroke. The Oxford Cognitive Screen (OCS) is a simple screening tool which provides a specific cognitive profile for stroke survivors. Robot mediated therapy is a innovative form of rehabilitation that enables repetitive and adaptive physical trainign and multiple studies showed its positive effects on motor recovery but only a few studies focused on its effect on cognition n post stroke survivors.

OBJECTIVE. To investigate the cognitive impairment in a sample of post stroke survivors and its correlation with the motor performance.

METHOD. thirty-two patients with subacute stroke were enrolled in two rehabilitation centers. All patients performed a robotic treatment of the upper limb (30 session, 5 times a week) and underwent a comprehensive rehabilitation including conventional physiotherapy (6 times a week).Subjects were evaluetad at baseline (T0) and after treatment (T1). To evaluate the cognitive funtionone, was used The Oxford Cognitive Screen. Barthl Index, Motricity Index and Fugl-Meyer Scake were used to evaluate the motor performance.

RESULTS. Statistical analysis showed a positive correlation ($p < 0,05$) between the numerical cognition, the attention and the three motor scales at baseline and correlation between the neglect item and the three motor scale at baseline; a positive correlation ($p < 0,05$) between language, numerical cognition and the item broken hearts (attention) at baseline and the change in the score of the Fuglmeyer from T0 to T1.

CONCLUSIONS: These preliminary results suggest that the cognitive funtion and the motor performance correlate. it coluld be interesting to explore with further studies the interaction between specific cognitive domains, as attention, and robotics.

OP271

BACK TO SPORT AFTER KNEE ACL RECONSTRUCTION: A RECONDITIONING PROTOCOL**Silvia Silvestri**

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Introduction: LCA injury is one of the most frequent in professional and non-professional sports. It is essential to set up a Rehabilitation and Reconditioning Protocol after its surgical reconstruction, designed to ensure sports patients to resume activity at the level preceding the injury, minimizing the risk of recurrence. The study was born from the collaboration between Tor Vergata University (Rome) and Hopitaux de Saint-Maurice (Paris).

Objective: The aim of our pilot study is to set up a Reconditioning Protocol to allow athletes to return to sport (RTS), reducing the risk of reinjury.

Method: Inclusive criteria: professional sports patients; primary ACL reconstruction +/- meniscus; on average, 6 months after surgery; isokinetic test at 2 different speeds ($240^{\circ}/s$ + $60^{\circ}/s$); deficit quadriceps injured limb $\geq 20\%$ VS controlateral. We enlisted 14 patients during 5 months, 9 M and 5 F, aged 16 to 38, BMI 25 ± 3.3 . The sports practiced were: soccer (4), rugby (3), volley (3), handball (2), basketball (1), ballet (1).

Reconditioning protocol lasts 5 weeks. Week 1: medical assessment, functional tests, isokinetic test, hydrotherapy, strengthening, cardiovascular training, static proprioception, horizontal jumps. Week 2: dynamic proprioception, two and one legged jumps, multidirectional dexterity, video feedback on force platform. Week 3: training on field working on speed and agility. Week 4: training on field working on sport-specific skills and back on video feedback on force platform. Week 5: medical assessments, isokinetic test, training simulation.

Results: 12 patients RTS, actually training with their teams; 2 patients still at work; 2 years of follow-up; 0 reinjuries.

Conclusions: The Reconditioning Protocol allows sports patients with ACL surgical reconstruction to RTS in safety, minimizing the reinjury risk. Step forward: add the control group of patients who have not carried out the Protocol and expand the sample.

OP272

BOTULINUM TOXIN TREATMENT OF HEMIFACIAL SPASM-CASE REPORT**Simona Ristovska, Aneta Kajstorovska**

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Introduction: We describe male patient with Hemifacial spasm on the left side. Hemifacial spasm is rare neuromuscular disease which is characterized by irregular, involuntary muscle contractions also called spasm of one side of face innervated by ipsilateral facial nerve (seventh cranial nerve).

Objective: To describe efficacy of the treatment of hemifacial spasm with Botulinum toxin and to reduce side effects.

Methods: There is no other neurological sign apart of spasm. CT scan of the brain was normal. There was no result in using baclofen for 6 months for spasticity or any other form of physical therapy and acupuncture. The patient was injected with Botulinum toxin type A in 4 divided doses into orbicularis oculi and second doses in buccolabial muscles (mentalis ,levatorlabii ,zygomaticus) After 2 weeks more toxin was injected (corrugator and platysma).

Result: Idiopathic hemifacial spasm was relieved and reduction of involuntary muscle contractions after 6 days with the maximum of result and relief of spasm after 14 days. After the 12 weeks there was again involuntary muscle contraction but the spasm was significantly reduced. There was no side effect as ptosis, temporary bruising, swelling.

Conclusion: Botulinum toxin type A is now preferred symptomatic treatment for hemifacial spasm. The negative of this therapy is repetition of the procedures every 3 to 6 months and the high cost of the toxin.

OP273

COGNITIVE BEHAVIORAL THERAPY-BASED EXERCISE FACILITATION METHOD USING THE “IKIIKI REHABILITATION NOTEBOOK” IN PATIENTS WITH INTRACTABLE CHRONIC PAIN**Shinji Kimura¹, Ryo Yamazaki¹, Hajime Ijiro², Shouhei Yamada¹**Department of Rehabilitation Medicine, Niigata University Medical and Dental Hospital¹, Niigata Rehabilitation Hospital², Niigata-shi, Japan

Objective: The purpose of this study was to analyze the effectiveness of cognitive behavioral therapy-based exercise facilitation method using the “Ikiiki Rehabilitation Notebook” in patients with intractable chronic pain.

Method: The subjects were 5 males and 12 females (19-77 years of age, mean age 49) with chronic low back, neck or lower extremity pain without specific lesions. Indications for using the notebook were as follows: 1) Numeric Rating Scale (NRS) for pain >3, and 2) the continuity of the pain >3 months. Patients were asked to write in their notebooks daily or once a week regarding their emotion, though, and exercise routine (muscle exertion, gait distance). Once every 2 weeks, the patients returned to the clinic to go over the notebook/journal. The evaluation contents were NRS, PDAS (Pain Disability Assessment Scale), HADS (Hospital Anxiety and Depression Scale), PCS (Pain Catastrophizing Scale), EQ-5D (EuroQol 5 Dimension), PSEQ (Pain Self Efficacy Questionnaire).

Results: The NRS, PDAS, PCS and EQ-5D, but not HADS and PSEQ, improved significantly 10 months after starting to use the notebook.

Conclusion: The “Rehabilitation Notebook/Journal” is a valuable tool to educate patients about the cause and treatment of pain and to actively facilitate CBT-based exercise.

OP274

LESIONS OF THE ACCESSORIUS NERVE IN EXTIRPATION OF THE LYMPHATIC GLAND OF THE NECK**Slavica Rajevic¹, Nataša Mujovic^{1,2}, Anđela Milovanovic^{1,2}, Snežana Popovac¹, Kristina Popovic¹, Sanja Tomanovic Vujadinovic^{1,2}**Clinic for physical medicine and rehabilitation, Clinical Center of Serbia¹, Faculty of medicine , University of Belgrade², Belgrade, Serbia

Introduction: Accessorius nerve is the eleventh cranial nerve whose exterior branch innervates sternocleidomastoid and trapezius muscles, but whose internal branch is added to vagus nerve. Radical neck dissection is a high risk for lesion of this nerve.

Objective: To show the risk, by three different examples of sick women patients, for lesion of accessorius nerve after the surgical intervention in the lateral neck region.

Illustration of the cases: Three sick women (at different time intervals, but in a period of a year) came to complete their medical checkup in infirmary of the clinic for physical medication and rehabilitation of the Clinical Center of Serbia with the referral diagnosis "shoulder impingement syndrome". They have already been cured in the local health centers by specific physical procedures without any improvements. When they came for their first time their main problems were: pain and impaired mobility in shoulder joint.

Objective checkup: depression of shoulder, hypotrophy trapezius muscle, limited side flexion of head in the area of lateral part of the neck, namely discrete scar line in the area of sternocleidomastoid muscle are noticed. The amplitude of movement in the shoulder joint during the abduction was limited to 90 degrees, with some, not very important, individual variations.

After the objective checkup, it is determined, by extra anamnesis, that the troubles appeared after the operation and that they were gradually getting worse.

The infective substrate was proved by patohystological examination after the extirpated lymphatic glands had been examined.

It also should be done: RTG of the specific shoulder joint with the top of the lungs and EMNG examination which, at the same time, proves the lesion of the eleventh nerve.

Conclusions: The surgical interventions in the area of the lateral part of the neck are the factor of high risk for the lesion of the eleventh cranial nerve. By detailed anamnesis, inspection, good clinical checkup supported by special diagnostic technique (EMNG), it can be found special entity of neuropathy in the pathology of the shoulder area. When we recognize the lesion of this nerve on time, the patient can be adequately treated and we can prevent further complications.

OP275

MECHANOBIOLOGY – HOW MECHANOTHERAPY PROMOTES TISSUE REPAIR IN REHABILITATION MEDICINE**Slavko Rogan, Eefje Luijckx, Jan Taeymans**

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Introduction: Soft tissue metabolism of humans is regulated by complex molecular systems. For example, mechanical overload stimulates muscle mass hypertrophy via complex molecular pathways. The conversion of a mechanical stimuli on the cell into a biochemical intracellular signal, is known as “mechanotransduction”. The latter seems to be a key factor in promoting protein synthesis in cells.

Objective: The purpose of this review was to provide an overview of the definition of mechanotransduction, and to present the current scientific evidence underpinning how mechanical load can be used therapeutically in rehabilitation medicine to promote tissue repair.

Method: This review used a systematic literature search in the Embase and PubMed databases. Two independent reviewers screened all abstracts and read all full texts from the included articles. Data extraction and extraction of the characteristics were carried out by two independent reviewers.

Results: Mechanotransduction has been defined as a process in which cells convert mechanical load into a biochemical response. Mechanotherapy describes usage of mechanical forces to promote tissue healing. Mechanotherapies in rehabilitation medicine activate specific biological responses in cells to improve healing after tissue damage in humans.

Conclusion: Physical therapists and physicians used extrinsically and intrinsically conducted mechanical stimuli to encourage responses on molecular, cellular and tissue levels. Cell membrane integrins along with mechanosensitive ion channels and additional mechanoreceptors are involved in the cellular primary transduction pathways. To stimulate mechanotransduction, mechanical forces should be applied as shear stress, tensile strain or compressive force. Soft tissue mobilization/manipulation (e.g. manual therapy, therapeutic massage), instrumented-assisted soft tissue mobilization (e.g. ultrasound, shockwave), and active mobilization (e.g. strength training) have been described as therapeutic treatments which can trigger mechanotransduction by external stimuli. Internal mechanical load is produced by a physiological reaction during endurance training, strength training or stair climbing, through an increase of heart rate or blood flow.

OP276

MECHANICAL LUMBAR SPINE TRACTION IN TREATMENT OF NONSPECIFIC ACUTE AND SUBACUTE LOW BACK PAIN**Slobodan Pantelinac, Ksenija Boskovic, Gordana Devecerski, Dusica Simic-Panic, Tijana Spasojevic, Snezana Tomasevic-Todorovic**University of Novi Sad, Faculty of Medicine¹, Medical rehabilitation Clinic², Novi Sad, Serbia

Introduction: There are different recommendations for the treatment of patients with nonspecific acute and subacute low back pain (LBP). One of the recommendations is the use of mechanical spine traction. The aim of this study was testing the therapeutic efficacy of mechanical spine traction as an additional form of therapy for patients with nonspecific acute and subacute LBP.

Material and methods: The study included 76 patients (37 men and 39 women) average age $47,57 \pm 9,42$ years, with nonspecific acute and subacute LBP. The average duration of pain was $4,3 \pm 2,1$ weeks. The examined patients were divided into two groups. First group (n=37) of patients („standard group“) received standard physical therapy (kinesiotherapy, low level magnetotherapy, ultrasound therapy and laser therapy). Second group (n=39) received mentioned standard treatment plus mechanical lumbar spine traction („traction group“). The average age and duration of pain between the groups were not significantly different. Static traction was applied for 12 minutes total (10 minutes at the desired intensity, plus 1 minute to increase and 1 minute to decrease the intensity). The intensity of the pull was 40-60% of the subject's body weight, adjusted on the subject's tolerance and symptom response. All patients received 12 physical therapy sessions over 6 weeks. The pain and its features, as well as degree of disability and the effectiveness of therapeutic procedures, were estimated by visual analog scale, Oswestry Low Back Pain Disability Questionnaire, Thomayer and Schober test, Fear avoidance beliefs questionnaire (FABQ) and Tampa scale of kinesiophobia (TSK). The assessments were made before treatment, at the end of treatment (6th week) and after 3 months.

Results: After 6 weeks of treatment all of the above mentioned tests showed a significant improvement. "Traction group" had all the results significantly better than the "standard group". After 3 months the overall results in both groups were significantly better than results before treatment, but the difference between the groups disappeared, because the results were practically equal, except FABQ and TSK results, which in "traction group" were better than in the "standard group". **Conclusions:** Mechanical spinal traction, added to standardtherapeutic procedures, may contribute to a faster recovery of the patients during the treatment of nonspecific acute and subacute low back pain, including longer and better effects on psychosocial risk factors.

OP277

CEREBRAL PALSY AND AGING. COMORBIDITIES AND ACQUIRED DISORDERS AFFECTING MOBILITY AND FUNCTION IN 49 ADULT CEREBRAL PALSY INPATIENTS.**Sofia Ferfeli^{1,2}, Evgenios Diamantidis², Anna Danopoulou²**Physical Medicine and Rehabilitation¹, Hospice for Neuro-disability- Foundation for Care of Neurological Illnesses², Athens, Greece

Introduction: Cerebral Palsy (CP) is considered as a non-progressive disorder, since the causative neurological damage does not evolve. However, its manifestations unavoidably interact with the aging process and is nowadays acknowledged as a disabling disorder that also involves aging adults.

Objective: Our objective was to record the major comorbidities acquired by our adult inpatient CP population during their long term hospitalization, as well as to document the progression of disability affecting their functional status.

Method: The recording of the demographics, length of hospitalization and the major acquired comorbidities was based on the patients' medical files and current medical and functional status. The progression of motor disability was recorded using the Gross Motor Function Classification System (GMFCS).

Results: The mean age of the 49 CP inpatient population was 58,6 years (range: 26 to 86). Among them are 31 male patients with a mean age of 56,8 years (range: 26-86) and 18 female patients with a mean age of 61,6 years (range: 40- 86). They were admitted at a mean age of 28,7 years and have been hospitalized for a mean duration of 29,5 years. The GMFCS admittance scores were I for 1 patient, II for 2, III for 7, IV for 13 and V for 26 patients. The current GMFCS scores are I for 1 patient, II for 1, III for 5, IV for 8 and V for 26 patients. Many new comorbidities were documented during their hospitalization, among which hypertension, diabetes, osteoporosis with or without fractures, osteoarthritis, digestive and endocrine disorders.

Conclusions: The aging process seems to have had a negative impact on the physical function of our CP inpatient group, as displayed by the decline in their GMFCS scores.

OP278

EARLY DYSPHAGIA AS A PROGNOSTIC FACTOR OF OUTCOME 1 YEAR AFTER STROKE**Sofia Sivetidou, Ioannis-Alexandros Tzanos, Emmanouil Damianakis, Antonios Papaspyrou, Aikaterini Kotroni**

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Background: Dysphagia is a common complication following stroke that interferes with the patient's daily living and may have effects on outcome.

Aim: To determine whether the presence of dysphagia in the first days after stroke is associated with outcome 1 year after.

Methods: During the period 2016-2018 we studied 48 stroke patients. Our sample was divided into 2 groups according to their swallowing ability. Dysphagia was assessed within the first 2 weeks and three months after stroke: 25 patients (mean age=61,3) had normal swallowing and 23 (mean age=64,2) presented with dysphagia. One year after stroke the outcome was defined by survival, place of living (nursing facility or 24h home care) and activities of daily life (ADLs) independence (with Barthel index score), by face-to-face or telephone interview.

Results: Our results indicate that one year after stroke, living in a nursing facility or with 24hours home care and low or medium Barthel index scores were more likely in those who failed the swallow test during the first 15 days and continued to have swallowing problems 3 months after stroke.

Conclusion: Our study indicates that the presence of dysphagia during the acute or subacute phase of stroke seems to be associated with poor outcome one year after the insult, regarding independence in ADLs, living conditions and survival.

OP279

HOW DOES THE DIFFERENCE IN MUSCLE CROSS-SECTIONAL AREA BETWEEN ANKLE INVERTOR AND EVERTOR AFFECT THE BIOMECHANICS OF FLAT FOOT PATIENTS ?**Soo Kyung Bok, Youngshin Song, Young Joo, So young Ahn**

Rehabilitation Medicine, Chungnam National University Hospital, Daejeon, South Korea

Objective: The aim of this study was to investigate the association among the foot posture, and foot pressure and cross-sectional area (CSA) of the ankle invertor and evetor.

Methods: 12 patient with flatfoot and 8 controls were recruited and we collected a total of 40 foot features. Measurements included resting calcaneal stance position (RCSP), arch height index (AHI), Calcaneal pitch (CP), Meary's angle (MA), CSA of the peroneus longus and brevis (PER), tibialis anterior (TA), tibialis posterior (TP) muscles were obtained using ultrasographic system (Figure 1). Questionnaire including the Foot Function Index (FFI) were performed to determine the severity of the symptoms and the location of the pain.

Results: There is a difference in the cross sectional area ratio of ankle invertor and evetor muscle between the flat foot group and the normal group. There is a positive correlation between the area of the ankle invertor and the degree of flatness.

Conclusion: In this study, we confirmed that the CSA of ankle invertor in flatfoot patients was larger than that in normal patients. In a further study, we plan to check for CSA changes after applying rigid foot orthosis. This will be a reference for the treatment of symptomatic flatfoot patients.

OP280

PHYSICAL THERAPY OF MILD AND MODERATE CARPAL TUNNEL SYNDROME: A LITERATURE REVIEW**Srboslav Radojichikj¹, Savo Trajanovikj²**PHO "Angelovski"¹, Health Canter², Skopje, Nord Macedonia

Introduction: Carpal tunnel syndrome (CTS) treatment includes surgical and physiotherapeutic conservative treatment. Despite the effectiveness of surgery in treating CTS, it is not risk-free. Physical therapy of CTS involves manual therapy techniques, neuromobilization, fascial manipulation, osteopathy and other kinds of physical therapy.

Objective: The purpose of this study was to present an overview of the effectiveness of physical therapy for the management of mild and moderate CTS.

Method: A systematic review was performed according to PRISMA criteria. Publications from Medline, PEDro, Cochrane Library, PubMed, Embase, CINAHL, and Physiotherapy Evidence Database have been analyzed. The inclusion and exclusion criteria were introduced and based on an analysis of the titles and abstracts related to effects of physical therapy on the symptoms and functional ability of patients with mild to moderate CTS.

Results: We found reasonable evidence that physical therapy efficacy in the long term remains unclear. It is worth mentioning that few articles, such as the articles of Pratelli et al. (2015) and Mordalii Bongi et al. (2013) evaluated the condition of patients several weeks after completion of therapeutic procedures. They were able to confirm that treatments in the field of manual therapy and fascial manipulation demonstrate longterm effectiveness, and the health effects achieved last long.

Conclusions: Due to the scarcity of quality evidence in the scientific literature, doubts still exist about which physical therapy is most appropriate for CTS, especially to treat CTS in the long term. The recommendation should be based on the intensity of symptoms, severity of the clinical presentation and the patient's preference. Moderate evidence was found for several physical therapy for CTS in the short term and mid term. Future studies should concentrate on long-term effects and which treatment parameters of physical therapy modalities are most effective for CTS.

OP281

COMPARISON OF INTRA-ARTICULAR INJECTIONS OF HYALURONIC ACID AND HYALURONIC ACID PLUS CORTICOSTEROIDS IN THE TREATMENT OF HIP OSTEOARTHRITIS: A PILOT STUDY**Stefano Faraci, Calogero Foti**

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Osteoarthritis with Kellgren Lawrence degree greater or equal than II

Introduction: The hip is one of the most affected joint by Osteoarthritis. Although intra-articular viscosupplementation is well established as one of the treatment, there is no global consensus on the type of drug to use.

Objective: Evaluate the therapeutic effect of intra-articular injections of hyaluronic acid (HA) in comparison to HA+corticosteroid (CS) ancillary-component for hip osteoarthritis.

Method: We recruited 12 patients, since 2014 to 2019, affected of hip osteoarthritis with Kellgren Lawrence (K-L) degree greater or equal than II. They were divided in two groups and were followed for one month after receiving intra-articular injection of HA (group 1: 5 patients) or HA+CS (group 2: 7 patients). With the visual analog pain scale (VAS) were assessed the pain at baseline (T0) and after one month (T1). We analyzed the statistical significance using T-student test and we investigated the percentage effectiveness of procedure.

Results: Average VAS score at baseline (T0) was $66,67 \pm 17,74$ and after one month was $32,08 \pm 26,91$ (test-T 0,0181), showing a good improving on symptom. We analyzed the average VAS score at baseline ($74 \pm 19,50$) and after one month ($53 \pm 22,81$), with test-T 0,0182 in the group 1, and in the group 2 (T0 $61,43 \pm 15,74$; T1 $17,14 \pm 18,90$) with test-T 0,0017. Effectiveness of therapy reached 28,38% after the HA only injections unlike 72,09% after the HA+CS injections.

Conclusion: Initial results suggest that choose HA+CS injections permit to obtain superior results in term of decrease pain in the first month after treatment and linked reducing of VAS score compared with HA only injections. Also the efficacy was clearly superior in the group 2. It was a pilot study, the data of the functional scales are omitted because they are still being processed.

OP282

THE MAGIC GLASS PROJECT: FEASIBILITY OF A TELE-REHABILITATION INTERVENTION BASED ON IMMERSIVE VIRTUAL REALITY IN CHRONIC POST-STROKE PATIENTS**Stefano Moriconi¹, Marzia Millevolte², Marianna Capecci¹, Michela Coccia², Maria Gabriella Ceravolo¹**Experimental and Clinical Medicine, University PolitecnicaDelle Marche¹, OspedaliRiunitidi Ancona, Neurorehabilitation Clinic², Ancona, Italy

Introduction: The “Magic-Glass” device is an immersive virtual reality-based integrated system, designed for home rehabilitation, as it offers upper limb training through serious games, also benefiting from the mirror therapy paradigm.

Objective: Evaluate the feasibility and acceptability of upper limb training at home for chronic stroke subjects, using this device. Secondary endpoint was to outline the functional profile of subjects who could achieve maximum benefit from such training.

Method: We enrolled stroke survivors at >2weeks of event, exhibiting a Montreal Cognitive Assessment-MoCA>20 and sufficient trunk-control to maintain independent seated position. Patients who showed any degree of motor impairment contralaterally to the hemiparetic side, severe neglect and/or apraxia, epilepsy were excluded.

Feasibility was assessed by the mean daily use (minutes), mean total utilization time at 3 and 6 months (hours); acceptability by the System Usability Scale. We also evaluated ADL-IADL independence, quality-of-life, pain and upper limb function.

Results: On 84 people screened (52 M; Age: 60,4 years \pm 10.5; Post-stroke latency: 7,7 \pm 7,6 years; Left arm affected in 47 cases), 8 subjects (3 F) were excluded (Mean SUS score 55%; MoCA

Follow-up at three and six-months shows that mean utilization time decreases during the trial from 15 to 5 minutes-per-day. Despite that, patients progressively gained confidence with the device (SUS Score increases from 80 to 87%). The only long term predictor of utilization is the Zarit score (p

Conclusions: Data suggest that “Magic Glass” system can support upper-limb training at home in chronic post-stroke patients, irrespective of the severity of disability and distance from acute event. Caregiver involvement is the main factors of patient’s adherence to treatment.

OP283

THERAPEUTIC APPLICATION OF REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION UNDER EEG CONTROL IN STROKE REHABILITATION**Stoyan Bozhinov, Plamen Bozhinov**

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Objective: To study the effect of repetitive transcranial magnetic stimulation (rTMS) on the state of the brain bioelectric activity in patients with cerebrovascular diseases in order to select an individual protocol for motor function recovery.

Methods: The study included 39 patients, 20 men and 19 women. Depending on the localization of the lesion in the hemisphere, 16 were with subcortical localization and 23 - with cortical subcortical localization. A different grade of hemiparesis was observed in all 39 patients. In 15 patients with left-sided localization, concomitant aphasia was also reported. In rTMS of the affected hemisphere, motor response was not obtained in 18 patients, suggesting a gross decrease in excitability of the cerebral motor cortex and severe functional changes in the corticospinal tract.

Results: In 8 patients rTMS was performed on primary motor cortex (M1) in the affected hemisphere with 3 Hz only. In 31 patients, bilateral rTMS of the motor cortex was performed with 3 Hz or 10 Hz on the affected and 1 Hz, 5 Hz or 10 Hz on the unaffected hemisphere. The stimulation protocol was chosen according to the patient's clinical condition and the state of brain bioelectric activity reported by routine EEG.

Conclusion: Predicting the impact of rTMS by evaluating EEG in patients with cerebrovascular diseases is crucial both for the choice of therapeutic protocol for rTMS and for the preparation of the individual complex neurorehabilitation program.

Keywords: rTMS, stroke, EEG, motor function recovery

OP284

AN EVALUATION OF GAIT PARAMETERS AFTER THE UTILIZATION OF NOVEL MULTI-PAD FUNCTIONAL ELECTRICAL STIMULATION IN STROKE PATIENTS**Suzana Dedijer Dujovic¹, Jovana Malešević^{2,3}, Olivera Đorđević^{1,4}, Aleksandra Vidaković^{1,4}, Malina Radenković¹, Ljubica Konstantinović^{1,4}**Neurorehabilitation, Clinic for rehabilitation "Dr Miroslav Zotović"¹, Tecnalia Serbia Ltd², University of Belgrade³, Faculty of Medicine, University of Belgrade⁴, Belgrade, Serbia

Introduction: Foot-drop is a common motor impairment seen among stroke patients, results in an inefficient gait pattern, and often increases the risk of falls. An active approach to the treatment of foot-drop is functional electrical stimulation (FES). However, several studies have demonstrated the disadvantages of FES associated with their application. To reduce the disadvantages of FES, we present in this study a novel FES protocol based on multi-pad electrodes for correcting foot drop.

Objective: To evaluate the efficacy of an additional novel FES system to conventional therapy in facilitating motor recovery in the lower extremities and improving walking ability after stroke.

Method: Sixteen subjects were randomly assigned to an FES group and a control group (conventional therapy). The FES was applied using a FESIA WALK system (Tecnalia R&I, Spain) during gait, for 30min per day - 5 days a week over four weeks. Main outcome measures: gait speed (10 MWT), Fugl-Meyer Assessment (FMA), Berg Balance Scale (BBS), Modified Barthel Index (MBI), and surface electromyography of m. tibialis anterior (TA).

Results: A significant increase in mean walking speed between the beginning and end of the trial was in the FES group ($p < 0.001$). Mean scores in the FES group increased from 0.25 ± 0.11 to 0.38 ± 0.15 in contrast to the control group 0.23 ± 0.10 to 0.27 ± 0.14 . The FES group showed improvement in functional independence in the activities of daily living, motor recovery, and gait performance. The EMG maps showed an improvement in the amplitude and frequency spectrum, which indicates an improvement in muscle power of TA treated with FES therapy.

Conclusion: This clinical study shows that FES therapy using a multi-pad electrode combined with conventional rehabilitation significantly increases muscle recruitment and improves recovery of functional locomotion in patients with stroke-related drop foot.

OP285

THE OUTCOME OF TREATMENT OF PATIENTS WITH ONE LEVEL LUMBAR MICRODISCECTOMY THROUGH OSWESTRY DISABILITY INDEX - THREE MONTHS FOLLOW UP**Tatjana Medic¹, Andjela Milovanovic^{1,2}, Veselin Medic³, Tatjana Radovanovic¹, Slavica Rajevic¹, Sanja Tomanovic Vujadinovic^{1,2}**

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Introduction: Almost 80% of people, at least once in life, has back pain with or without leg pain. Lumbar disc herniation is in 95% of cases cause of lumbar radiculopathy. In about 10% of these patients there are indications for surgical treatment.

Purpose: Determine the effect of one level microdiscectomy, and rehabilitation, on activities of daily living through Oswestry Disability Index.

Method: Prospective, clinical study included 50 patients with lumbar microdiscectomy, operated in Clinic for Neurosurgery. We used ODI, with the patients filled before, one month and three months after operation. All patients were included in early rehabilitation treatment of the algorithm of Clinic for PMR Clinical Center of Serbia. All 50 patients were in rehabilitation in stationar institution specializes in rehabilitation, duration of 21 days, one month after operation.

Results: 24 (48%) patients were women, and 26 (52%) were male. Average were 41,4 years old. Average ODI were 54,2% before, 28,9% one month, and 16,3% (minimum disability), three months after operation and secondary rehabilitation. There is statistically significant difference between data collected in preoperative period and on first checkup, and also between data collected on first and second checkup. 82% patients had improvement on last checkup compared to preoperative condition. In 8% patients ODI remained unchanged at the last measurement in relation to the preoperative, while in 10% noted deterioration and increase in ODI of the last measurement in relation to the preoperative condition.

Conclusion: ODI showed good recovery of patients after lumbar microdiscectomy in first three months. The main benefit of operation was the reduction of pain in most patients. Well done surgical treatment, and timely measures of early and secondary rehabilitation lead to improvement in patients after lumbar microdiscectomy three months follow up which is shown by ODI, the "gold standard" of low back functional outcome tools.

OP286

USE OF VISUAL BIOFEEDBACK IN SUBACUTE PHASE AFTER STROKE**Tereza Gueye^{1,2}, Miriama Dedkova^{1,2}, Alice Oktabcova**

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Introduction: In neurorehabilitation of the stroke survivors is currently strong tendency to use modern procedures to support brain plasticity. Therapy should contain high number of repetitions, be focused on function and be intense in experience to achieve best results. On this principles therapies with different biofeedback are based. We followed 100 patients starting therapy less than 30 days after stroke, 50 of them using instead of one conventional physiotherapy different visual biofeedback and 50 patients with conventional therapy only.

Objective of our study was to compare result of patients using therapies with visual biofeedback to those using just conventional physiotherapy in subacute phase after stroke.

Method Patients less than 30 days after stroke with arm paresis was randomised to 2 groups, each 25 patients. 1st group had conventional physiotherapy, 2nd group undergo instead of one conventional physiotherapy therapy with robotic arm Armeo spring system. Than patients less than 30 days after stroke with balance disorder was randomised to 2 groups, each 25 patients. 1st group had conventional physiotherapy, 2nd group undergo instead of one conventional physiotherapy therapy on Home Balance interactive system. Montreal Cognitive Assessment (MoCA), Functional Independence Measure (FIM), Fugl Mayer Assessment – Upper Extremity Scale (FMA-UE), Rivermead Index of Mobility (RIM) and Berg Balance Scale (BBS) were performed before and after 3 weeks of therapy with 12 therapeutic sessions.

Results There was no difference in improvement in MoCA, FIM, RIM and BBS between groups with visual biofeedback therapies and conventional therapy groups. There was significantly bigger improvement in FMA-UE for Armeo Therapy group (p -value=0,0209) than conventional therapy.

Conclusions Therapies with visual biofeedback has similar good results as a conventional therapy by stroke patients starting not more than 30 days after stroke. There was significantly better improvement in FMA-UE assessing upper extremity motor performance by patients using Armeo Spring device.

OP287

INFLUENCE OF VIRTUAL TRAINING SYSTEM “RIABLO” ON PATIENTS GAIT AFTER KNEE ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTIVE OPERATION**Tomas Gembeckas^{1,2}, Alma Kajėnienė^{1,2}, Eglė Milinavičienė^{1,3}, Simona Stakauskienė^{4,3}**

Medical Academy, Faculty of Nursing, Institute of Sports¹, Lithuanian University of Health Sciences², Rehabilitation Clinic, Medical SPA Eglės Sanatorija³, Kaunas Kolegija/ University of Applied Sciences⁴, Kaunas, Lithuania,

Introduction: Every year in Lithuania approximately 750 anterior cruciate ligament (ACL) trauma are recorded and about 500 operations are performed. “Riablo”- the new method for measuring physical exercise with wearable sensors and patented biofeedback for compensation correction.

Research aim: The aim of this study was to evaluate the influence of virtual training system “Riablo” on patients gait after knee ACL reconstructive operation.

Research methods: Seventeen participants after ACL reconstructive operation were divided into 2 groups (duration of outpatient rehabilitation – 14 days). Group 1 (n=9) performed regular physiotherapy, group 2 (n=8) performed regular physiotherapy and virtual training system “Riablo”. The gait was evaluated by computer hardware. The following gait indicators were estimated before and after the research: foot rotation asymmetry, step length asymmetry, step width.

Results: Before the research statistically significant difference between the groups in foot rotation asymmetry was not found. Foot rotation asymmetry in group 1 before the research was 3°, after research it was 3.1° (p=0.17). In group 2 foot rotation asymmetry before the research was 3.1° after the research 2.45°(p=0.03). Before the research statistically significant difference in steps length asymmetry between groups was not observed. In group 1 steps length asymmetry before the research was 3.0 cm, after research 2.0 cm (p=0.04). In group 2 steps length asymmetry before the research was 4.0 cm, after the research 1.0 cm (p=0.04). Before the research statistically significant difference in steps width between the groups was not observed. In group 1 steps width before the research was 15.0 cm, after the research 14.0 cm (p=0.34). In group 2 steps width before the research was 13.0 cm., after research 11.0 cm (p=0.01).

Conclusions: Virtual training system “Riablo” helps efficiently improve gait after the ACL reconstructive operation: decreases foot rotation asymmetry, step length and width.

OP288

ICF ACTIVITY AND PARTICIPATION CHANGES ALONG WITH BIOPSYCHOSOCIAL BACK PAIN REHABILITATION**Thomas Kienbacher¹, E. Fehrmann^{1,2}, K. Tuechler¹, P. Mair³, G Ebenbichler⁴**

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Introduction: The use of the International Classification of Functioning, Disability and Health (ICF) is recommended before and after therapeutic interventions in addition to patient reported and maximum capacity related functional outcomes.

Objective: Using a novel approach for mapping self-reported questionnaires, the most relevant activity and participation categories of the brief ICF back pain core set were predicted from patient-reported disability questionnaires before and after biopsychosocial rehabilitation.

Method: More than 1500 chronic low back pain (cLBP) patients completed the Roland Morris Disability Questionnaire, Pain Disability Index, and pain ratings and performed maximum isometric back flexion and extension strength and lumbar range of motion testing in an outpatient rehabilitation center.

Results: The patient reported disability scores together with the predicted numbers of impaired patients significantly improved in all categories by the end of rehabilitation. However, the relative changes varied because scores of the Roland Morris Disability Questionnaire and the Pain Disability Index improved differently from the impairment in the activity and participation categories.

Conclusions: Automatic prediction of impairment in activity and participation categories before and after biopsychosocial back pain rehabilitation was well feasible. The improvements mirrored those observed with the patient reported outcome scores but not all of the functional scores had a significant impact on the health categories. Additional automatic evaluation of the overall health state of cLBP patients enables individual goal setting and treatment guidance in rehabilitation without additional time burden on patients and therapists.

Key words: International classification of functioning, health status; outcome assessment; low back pain.

OP289

ARM ASSIST ROBOTIC SYSTEM FOR ARM TRAINING IN SUBACUTE STROKE PATIENTS**Tijana Dimkic Tomic¹, Andrej Savic^{2,3}, Milica Isakovic^{2,3}, Suzana Dedijer Dujovic¹,
Andjelka Pjanovic¹, Ljubica Konstantinovic^{1,4}**

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Labs' session

Introduction: Rapidly developing the field of robotics technology for the upper limb enables patients to exercise intensively and improves their functional poststroke recovery. The ArmAssist (AA) is a simple, low-cost robotic device developed for shoulder and elbow motor training that combines known benefits of task-oriented training with a large number of repetitions, greater intensity of practice, and less dependence on the therapist assistants. AA is designed to facilitate arm movements of abduction-adduction in the shoulder and flexion-extension in the elbow.

Objective: This single-blind, randomized controlled study compared the efficacy of AA robotic training added to conventional rehabilitation (Group I) against matched conventional arm training (Group II) in subacute stroke patients with moderate-to-severe upper limb impairment undergoing rehabilitation.

Method: Twenty-six hemiparetic subacute stroke patients were enrolled and randomly assigned to the Group I or Group II (n=13 each). Both groups were trained five days per week for three weeks. The primary outcome measure was the Fugl-Meyer Assessment-Upper Extremity motor score (FMA-UE). The secondary outcomes were the Wolf Motor Function Test-Functional Ability Scale (WMFT-FAS) and Barthel index (BI).

Our results showed significantly greater increases in FMA-UE motor score ($p=0.002$) and WMFT-FAS score ($p=0.025$) in Group I, after 15 sessions. There was also a significantly greater increase in FMA-UE shoulder/elbow score ($p=0.006$) and WMFT-FAS shoulder/elbow portion ($p=0.010$), in the Group I than the Group II. We found no significant differences in BI ($p=0.292$) between the two groups.

Conclusion: Arm training using the AA robotic device added to conventional rehabilitation reduce motor deficits and improved functional activities of the upper limb in subacute stroke patients.

Keywords: stroke, upper limb rehabilitation, robotic devices

OP290

THE ROLE OF STRENGTHENING AND STRETCHING EXERCISES IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS**Valentina Koevska, Biljana Mitrevska, Marija Gocevska, Biljana Kalcovska-Ivanovska, Maja Manoleva**

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Introduction: Osteoporosis is most common in post-menopausal women, due to loss of trophic support for bone tissue from sex hormones. Regular exercise in PMOs, maintains mineral bone density (BMD), improves muscle strength and coordination, reduces pain and reduces the risk of falls. All of this affects mobility and quality of life.

Objective: The role of strengthening and stretching exercises on BMD and the quality of life in women with PMO.

Methods: 90 women with PMO were treated one year and divided into three groups, the first group of 30 patients with exercise and physical pain procedures, the second group of 30 patients with exercise alone and the control group of 30 patients. All patients received osteoporosis medication.

The exercises consisted of, strengthening and stretching exercises for paravertebral, abdominal muscles and muscles of the upper and lower limb. BMD was determined by dual-energy x-ray absorptiometry, and quality of life was determined with Qualiifo-41 at baseline and after one year.

Results: The average age was 60.64 ± 6.7 , education: primary 23.9%, intermediate 48.91%, and higher 27.17%. Average BMI was insignificant in start ($p = 0.88$) and after research ($p=0.86$).

At the beginning, and at the end of follow-up, the three groups of subjects didn't have significantly different BMD at the lumbar spine ($p = 0.68$, $p = 0.72$) and at the hip ($p = 0.16$, $p = 0.06$). After one year there was a significant improvement in quality of life in the first and second groups compared to the control group ($p=0.001$).

Conclusion: Regular practice of strengthening and stretching exercises play an important role in maintaining BMD in POPs. Regularly practicing exercises significantly improves the quality of life. In the treatment of postmenopausal osteoporosis (PMO), except drug therapy, suitable program of exercise is necessary.

OP291

COMPARATIVE EFFECTIVENESS OF THREE METHODS FOR BODY COMPOSITION ASSESSMENT IN THE VERIFICATION OF MANIFESTATIONS OF SARCOPENIA IN OBESE PATIENTS**Valeria Vasileva**

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Aim of the study was to compare the effectiveness of three methods of body composition assessment such as bioimpedans analysis (BIA), air-replacement bodyplatismography (BodPod) and Dual X-ray absorptiometry Total body program (DXA Total Body) in the verification of reducing of skeletal muscle mass as sign of sarcopenic obesity in obese patients.

Material and methods: The study group included 95 patients aged 21-69 y.o. (average age 53,9±11,05 years) with BMI≥30.0 kg/m². The control group included 37 patients aged 37-69 y.o. (average age 50,73±10,6 years) of the same age without obesity with BMI 20.0-29.9 kg/m². Body composition was tested using BIA, BodPod and DXA with calculating fat, lean and skeletal muscles mass (kg) and % in all the patients.

Results: According to BIA the groups differ only in fat mass (FM) 42.75 (4.8;6.3) vs. 33.15 (28.4;35.5) kg; p=0.036 and did not differ (p>0.05) in lean (LM), skeletal muscle mass (SMM) and in % of FM and SMM. According to BodPod analyses groups differed in the FM 3.4 [36.81;69.94] vs 31.02 [23.22;38] kg, p=0.007, % FM 45.4 [42.1;53.8] vs 37.7 [28.6;41.1], p=0.003 and % LM - 54.6 [46.2;57.9] vs 62.3 [58.9;71.4], p=0.003, but had statistically equivalent values of LM 55 [49.48;67.77] vs 40.36 [33.12;49.06] kg, p=0.19. According to DXA Total Body analyses statistically significant differences (p<0.05) have been identified between the groups in FM and % FM of the hands, feet, trunk, total body (p>0.05), but not in LM and % LM (p>0.05).

Conclusions: From methods of body composition assessment, air-replacement bodyplatismography (BodPod) is the most sensitive in the verification of skeletal muscle mass reduction in obese patients. This method shows that patients with obesity have a significantly reduced muscle mass compared with normal weight or overweight subjects.

OP292

ACUPUNCTURE IN THE TREATMENT OF RESPIRATORY AND SPEECH DISORDERS AFTER THYROID SURGERY**Vesna Pejovic**

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Introduction: Speech and breathing disorders are some of the possible complications after thyroid surgery. They are caused by damage to the recurrent nerve, and usually treated with drugs and speech therapy. Our long-standing clinical practice has shown that acupuncture contributes significantly to better and faster recovery of these patients.

Objective: To demonstrate the effects of acupuncture on speech and breathing disorders after thyroid surgery through video and audio recording.

Method: Case report. A 74-year-old female patient underwent total thyroidectomy in March 2019 due to nodose struma. Speech and breathing disorders occurred after surgery. Heavy paired vocal cords were verified. The left vocal cords were stationary and the right ones with minimal fasciculation. For the first 6 weeks the patient was treated with drugs and speech therapy, without significant improvement. After 52 days of surgery, she was started with acupuncture treatment. During the first two weeks she had daily therapy. After that, she had a 3 times a week therapy, during next 5 weeks. The patient performed the speech therapy in parallel. The monitoring parameters were voice and speech quality and breathing quality through subjective assessment and video and audio recording. Examination and follow-up of vocal cords, as well as breathing quality were conducted by speech and ORL specialists.

Results: During the treatment, the patient gradually recovered. After the first series of acupuncture breathing was regulated, she did not bother and had no breathing problems. Her voice improved and on ORL examination the right vocal cord was normally mobile. After the second series of acupuncture, voice and speech were normal, both vocal cords were movable, although the left vocal cord not reaching full abduction.

Conclusion: Acupuncture could help in the treatment of patients with voice and speech disorders after thyroid surgery without a recurrent nerve section.

OP293

CORRELATION BETWEEN GAIT AND NEAR-INFRARED BRAIN EFFECTIVE CONNECTIVITY IN THE ELDERLY WITH COGNITIVE IMPAIRMENT**Ying Liu¹, Congcong Huo², Kuan Lu²**Biomechanics and rehabilitation technology, National Research Center for Rehabilitation Technical Aids¹, Beihang University², Beijing, China

Introduction: Clinical trial have demonstrated an inner connect between gait and brain cognition in the elderly. However, the correlation between abnormal gait and cognitive impairment (CI) of brain function remains unclear.

Objective : This study aims to assess the relationships between the gait and brain effective connectivity (EC) in elderly subjects with mild cognitive impairment (MCI).

Method : A total of 37 subjects (MCI group, 20 ; control group, 17) were recruited. Each subject performed a walking task (Task 01), counting-backwards-walking task (Task 02), naming-animals-walking task (Task 03), and calculating-walking task (Task 04). Gait parameters and cerebral oxygenation signal were collected simultaneously from the prefrontal cortex (LPFC/RPFC), motor cortex (LMC/RMC), and occipital lobe (LOL/ROL). The cerebral oxygenation signal was calculated in four frequency intervals: I, 0.6–2 Hz; II, 0.145–0.6 Hz; III, 0.052–0.145 Hz; and IV, 0.021–0.052 Hz.

Results: The EC of the LPFC-ROL in interval III significantly decreased in Task 03 relative to that in Task 02 ($p=0.041$) in the MCI group. The EC of ROL-LPFC in interval III significantly decreased in Task 03 relative to that in Task 02 ($p=0.043$). The step size symmetry index was negatively correlated with the EC of the RPFC-LOL in the MCI group ($R=-0.632$, $p=0.003$) whereas positively correlated with the EC of the LPFC-LOL in the HC group ($R=0.533$, $p=0.028$).

Conclusions: The present results indicated that the decrease in EC in the MCI group might lead to impaired gait symmetry.

Keywords: Mild Cognitive Impairment, Effective Connectivity, Gait symmetry

OP294

ASSESSMENT OF INFANTS USING THE ALBERTA INFANT MOTOR SCALE IN CHINA**Xuan Zhou, Qing Du**

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Introduction: The Alberta Infant Motor Scale (AIMS) is an assessment tool designed to evaluate the gross motor development. The reference values of AIMS in a cohort in Canada was determined. However, cross-cultural differences in motor performance scores of AIMS between Canadian and Brazilian children, Canadian and Dutch children have been found. The reliability and validity of AIMS in Chinese children have been reported. Whereas, the normative reference values in Chinese children has not been established.

Objective: The aim of this study was to identify normative reference values of AIMS for Chinese children.

Method: A total of 707 Chinese children (age range 0m-18m, 364 boys, 343 girls) were recruited from a birth cohort. AIMS assessments of all subjects were performed by trained professionals during 12 months. The AIMS contain 58 motor items organized in 4 subscales: prone (21 items), supine (9 items), sitting (12 items), and standing (16 items). The total raw score (0–58 points) is obtained through the sum of the subscales' scores.

Results: The mean age of all children was 7.76 ± 4.45 months. The mean total raw score of all children of 0-18 months was 29.88 ± 17.98 points (0-3 months 9.92 ± 2.43 points; 4-6 months 20.41 ± 6.67 points; 7-9 months 36.52 ± 9.59 points; 10-12 months 50.45 ± 6.06 points; 13-15 months 52.30 ± 5.47 points; 16-18 months 57.98 ± 0.13 points). Increase trend in the total raw score was showed across age groups. Compared to the Canadian children, Chinese children demonstrated significantly lower total raw scores in most age groups.

Conclusions: This study presents useful normative reference values of AIMS for Chinese children. New normative reference values of AIMS for other countries is also needed.

OP295

BONE AND MUSCLE IMPAIRMENT IN PARAPLEGIA**Yannis Dionyssiotis¹, Georgios Lyritis², Jannis Papathanasiou³, Konstantina Petropoulou¹, Christina - Anastasia Raptidi⁴, Nikolaos Groumas¹**

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Introduction: In spinal cord injured subjects the combination of osteopenia/osteoporosis and sarcopenia - known as osteosarcopenia - in lower limbs and bone mineral density is not adequately explained.

Objective: This study investigated this relationship using the current definitions of sarcopenia and osteoporosis.

Method: Thirty one complete paraplegic men, mean age 39.23±15 years (yrs.), duration of paralysis: 5.7±5 yrs. were compared with 33 similar controls. Whole body dual X-ray absorptiometry (NORLAND X-36, Wis., USA) was used for estimation of regional (lower limbs) and total body bone mineral density (BMD) (gr), lean and fat tissue mass (kg), and percent. Sarcopenia was defined by low muscle mass (skeletal muscle index, SMI), as well as by the residual method (relative appendicular skeletal mass, RASM), respectively.

Results: Between paraplegic and controls, paraplegics had lower values on RASM ($p < 0.001$), total BMD ($p < 0.001$) and SMI ($p < 0.001$) compared to controls. Individuals with sarcopenia (in both groups) had a lower total BMD score ($p = 0.05$) compared to no sarcopenic subjects.

Conclusion: There is no clear evidence if muscle impairment in SCI can be assessed with the current definitions of sarcopenia (assessment of muscle mass). The relationship between bone and muscle was consistent in able-bodied and predictably altered in those with spinal cord injury, a clinical disease affecting bone and muscle.

OP296

TRAJECTORY OF CHANGE IN THE SWALLOWING STATUS IN SPINAL MUSCULAR ATROPHY TYPE I**Young-Ah Choi¹, Hyungik Shin²**Rehabilitation Medicine, Incheon St. Mary's Hospital, Incheon¹, Seoul national university hospital², Republic of Korea

Introduction: Spinal muscular atrophy (SMA) is an autosomal recessive genetic disorder that results from homozygous deletions or mutations involving the SMN gene at locus 5q13. Although a few studies on the nutrition of patients with SMA type I have been published, there is still a lack of reports on the deterioration of swallowing function over time, making the management of these patients more challenging.

Objectives: This study aimed to elucidate the change in progressive swallowing dysfunction from birth up to 2 years of age to provide clinical insights into the management of swallowing difficulty in patients with spinal muscular atrophy (SMA) type I.

Methods: Data of 11 patients with SMA type I were retrospectively reviewed. The Neuromuscular Disease Swallowing Status Scale (NdSSS) scores and videofluoroscopic swallowing study (VFSS) were used.

Results: Swallowing function deteriorated in patients with SMA type I at approximately age 6 months. The median age at which tube feeding was initiated was 6 months (interquartile range, 3 to 7 months). The transition period in feeding route from totally oral to tube feeding varied widely among patients from 5–12 months. In four patients, aspiration was observed in VFSS, even when nutrition was provided orally. In two patients, the evidence of laryngeal aspiration was obtained via the VFSS during the very early stages of the disease at 3 and 4 months. Conversely, in one patient, total oral feeding was maintained for up to 12 months, and evidence of aspiration was not observed in the VFSS.

Conclusion: An individualized approach is essential, as the timeline of deterioration of swallowing function varies widely in patients with SMA type I.

OP297

CHANGES OF THE EXERCISE TOLERANCE IN PATIENTS WITH MYOCARDIAL INFARCTION AFTER OUTPATIENT CARDIAC REHABILITATION**Yuriy Dovgalyuk^{1,2}, Irina Mishina², Yuliya Chistyakova², Larisa Jarchenkova², Tatyana Vorobeva, Zolotareva Anna**Department of Internal Diseases¹, Ivanovo State Medical Academy², Ivanovo, Russian Federation

Purpose: to assess the exercise tolerance changes in patients with myocardial infarction (MI) after finishing outpatient cardiac rehabilitation (CR) programme in the Ivanovo State Medical Academy (ISMA) clinic.

Methods. The study included 35 patients after acute MI, 29 men and 6 women, mean age – 59.3 ± 8.5 years, who were enrolled to outpatient CR programme conducted in the ISMA clinic. All patients were underwent cardiopulmonary exercise testing (CPET) according to the recommendations of the European Society of Cardiology before and after finishing CR. The outpatient CR programme consisted of 30-min ECG-controlled sessions of aerobic exercises performed on the foot cycle ergometer (LODE, Holland) 5 times per week during 1 month. ECG monitoring in 12 leads was carried out using the software of the «Multitrener» computer complex (NeuroSoft, Russia, Ivanovo). All patients were trained at a training heart rate corresponding to the onset of the aerobic threshold (AT) determined using CPET. A biofeedback mode was used with constant heart rate and “floating” load power. Changes in peak load power, oxygen uptake at the AT (VO_{2at}) and peak oxygen uptake (VO_{2max}) before and after CR were investigated. Static processing of the obtained results was performed using the software package Statistica 6.0 using non-parametric methods. The values are presented in the form of median (Me), 25th and 75th percentiles (25; 75). The significance of differences was calculated using the Wilcoxon test. Differences between the studied parameters were considered reliable at p < 0.05.

Results. After the end of the CR, the AT occurred in patients with a higher load power (75 [64; 89] W) than before the onset of the CR (68 [55; 78] W, p < 0.05). The heart rate at the AT before CR (94 [87; 103] beats / min) was significantly (p < 0.05) lower than after CR (100 [92; 111] beats / min). The maximal work power after CR increased from 102 [83; 125] to 125 [106; 138] W (p = 0.01), and the maximum heart rate increased from 111 [101; 124] to 124 [117; 141] beats / min (p = 0.01). Gas analysis showed that cycling during 4 weeks with individually selected constant heart rate led to a statically significant increase in VO_{2at} from 12.7 [9.7; 15.2] ml/kg/min to 14.6 [12.8; 17.0] ml/kg/min (p = 0.03), and the VO_{2max} increased from 18.4 [14.5; 21.1] ml/kg/min to 21.8 [19.1; 24.1] ml/kg/ min (p = 0.01).

Conclusion. The outpatient cardiac rehabilitation programme for patients after myocardial infarction, developed in the ISMA clinic, significantly increases exercise tolerance, which results in an increase in the performed load power, peak oxygen uptake, oxygen uptake at the anaerobic threshold.

OP298

INTERRELATION OF THE ABDOMINAL MUSCLES TONE AND STOMACH SYNTHOPY**Yuliia Vitrova¹, Serhii Kolisnyk^{1,2}, Petro Kolisnyk^{1,2}, Rostyslav Kravets^{1,2}, Yaroslav Liskov^{1,2}, Olena Dolynna¹**Department of Medical Rehabilitation, National Pirogov Memorial Medical University, Vinnytsia¹,
Center of Medical Rehabilitation and Sports Medicine², Vinnytsia, Ukraine

Introduction: Visceroptosis (VP) is a pathological state due to weakness of the abdominal and pelvic muscles (APM) and can result in internal and pelvic organs dystopia. Preventive rehabilitation of VP can avoid constipation, urolithiasis, gallstones etc. One of the non-invasive screening methods is auscultofriction.

Objective: To investigate the interrelation of the APM tone and stomach syntopy, and evaluate the effect of therapeutic exercises on the APM in patients with gastroposis.

Method: The study included 60 volunteers 17-77 (28.75 ± 14.22) years old, divided into three representative groups: I - control, II – group with APM weakness, III - group with gastropoptosis. The gastropoptosis was determined by lowering of the lower border of the stomach after the intake of water (100 ml for the 5 min). Evacuation ability (EA) was evaluated by measuring the average rate of return of the lower border of the stomach to the original level. Group III patients performed twice a day exercises to strengthen the APM for 5 weeks, after which the measurements were repeated. Statistical processing was performed using standard biometric methods.

Results: weakness of the APM was found a contributing factor of gastropoptosis (OR = 16.33; CI 3.06–87.18; $p = 0.0011$). Therapeutic exercises tended to improve stomach evacuation from 5.63 ± 1.04 min. to 4.67 ± 0.81 min. ($p > 0.05$). EA in women depended from the menstrual phase: In the first phase - 5.33 ± 0.65 min., the second - 5.67 ± 0.50 min. ($p > 0.05$).

Conclusions: Auscultofriction is a non-invasive screening of VP risk. Patients with APM weakness are at risk of gastroposis (OR = 16.33; CI 3.06–87.18; $p = 0.0011$). The therapeutic exercises during 5 weeks improve the condition of the APM muscles and stomach EA.

OP299

FUNCTIONAL ASSESSMENT IN STROKE CENTERS IN CZECH REPUBLIC**Yvona Angerova^{1,2}, Vladimir Rogalewicz^{1,2}, Pavel Marsalek³, Irina Chmelova⁴, Tereza Gueye^{1,2}**

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OBJECTIVES: In 2010, a network of 45 cerebrovascular centers was established in the Czech Republic. Their integral parts are inpatient early rehabilitation units. The goal of the study was to compare functional status of patients in three different hospitals using Functional Independence Measures (FIM).

METHODS: The sample recruited in three hospitals consisted of 87 patients who met inclusion criteria and suffered from stroke diagnosed after 01 April 2017. (Prague-29, Ostrava-31, Ústí nad Labem-27). There were 49 men and 38 women, the average age 70,48 years. FIM (motor as well as cognitive part) was done at the beginning and at the end of hospitalization. We have also calculated the costs of care of each patient.

RESULTS: FIM scores at the beginning were 78,2 while at the end 90,47. Progress was done mainly in motor problems, not so much in cognition. Average length of hospitalization was 21,95 days. There were quite big differences between the hospitals. Average FIM efficiency was 0,58 in one day. It was also proved that the costs of rehabilitation treatment depend on the degree of disability of the patients. The patients were categorized into 4 disability groups in agreement with the Czech Reimbursement Decree (Decree No. 134/1998 Coll. as amended). Then the costs ranged from CZK 4,283 to CZK 6,164 as a one-day average. The main differences were in material costs and nursing costs.

CONCLUSIONS: FIM was proved to be a good instrument for functional assessment but repeated training in methodology should be done to therapists who use it. There were differences between the hospitals that should be analyzed in future.

OP300

APPLICATION OF ALGOMETRY IN PATIENTS WITH CERVICAL AND LUMBAR RADICULOPATHY**Nikola Vučinić¹, Snežana Tomašević-Todorović², Mirela Erić¹, Mirjana Savić³**¹Department of Anatomy, Faculty of Medicine, University of Novi Sad, Novi Sad, Serbia²Department of Physical Medicine and Rehabilitation, Faculty of Medicine, University of Novi Sad, Clinic for Medical Rehabilitation, Clinical Center of Vojvodina, Novi Sad, Serbia³Faculty of Medicine, University of Novi Sad, Novi Sad, Serbia

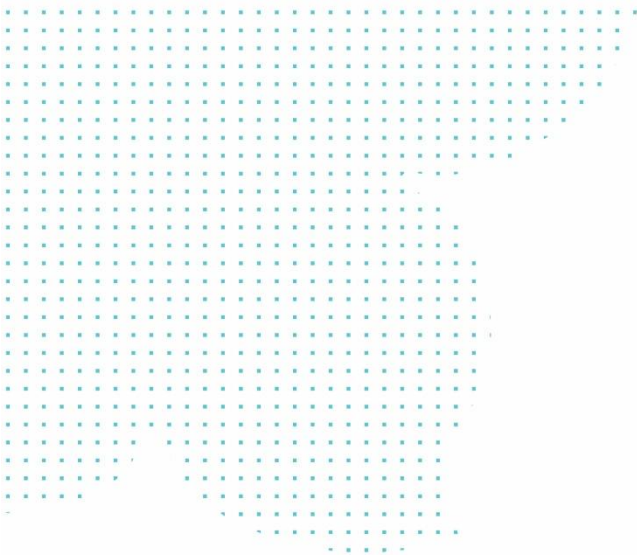
Introduction: Radiculopathy is usually accompanied by pain, with reducing the quality of life in different extent. Algometry as a highly sensitive method provides objective insight into the degree of pain, while the use of questionnaires in a simple way can estimate the characteristics of pain and the patient's biopsychosocial status.

Objective: The study was conducted in order to measure the pressure pain threshold and pressure pain tolerance threshold in patients with cervical and lumbar radiculopathy and found a possible association of pain with the biopsychosocial factors.

Method: The study examined 60 patients with cervical radiculopathy (30 men and 30 women) and 60 patients with lumbar radiculopathy (30 men and 30 women) before starting and after finishing treatment cycle. All patients were hospitalized in the Clinic for Medical Rehabilitation, Clinical Center of Vojvodina in Novi Sad, and a treatment cycle lasted an average of 14-21 days. Research was conducted using Pain Detect Test, Brief Pain Inventory, Neck Disability Index, Quebec Back Pain Disability Scale, Hospital Anxiety and Depression Scale, The Fear-Avoidance Beliefs Questionnaire and Pain Catastrophizing Scale.

Results: There was no statistically significant difference in algometric values between patients with cervical radiculopathy and patients with lumbar radiculopathy. Females have a lower pressure pain threshold and lower tolerance to pain than males. Comparing algometric values before starting and after finishing treatment cycle can be noted that the program of rehabilitation favorable influence on patients with lumbar radiculopathy, while in patients with cervical radiculopathy occurred deterioration in subjective symptoms. Biopsychosocial factors greatly affect the pain.

Conclusions: Quantification and mapping the pain by algometer and determination of biopsychosocial status through questionnaires will provide the implementation of appropriate therapy for patients, which is based on individual approach. At the same time, the applied methodology would be achieved better verification of the results in rehabilitation program.



POSTER PRESENTATIONS



P101

THE PARTICULARITIES OF THE REHABILITATION PROGRAM OF A PATIENT WITH STROKE AND NEUROPATHIC OSTEOARTHROPATHY**Adrian-Ioan Lungu**

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Introduction: Stroke is a disabling pathology worldwide with a major impact on the evolution of the patient's health and its psycho-emotional status. Generally, the most common risk factors for stroke are high blood pressure, diabetes, smoking, obesity, atrial fibrillation, of which the most modifiable is high blood pressure. Moreover, conditions such as neuropathic osteoarthropathy contribute to the disabling status of the patient.

Objectives: The superposition of some disabling pathologies over the one produced by stroke is the challenge of the patient's rehabilitation program. It is focused on improving the muscle strength, the joint mobility, reducing spasticity and on techniques of re-education of walking and social reintegration of the patient.

Methods: A 75 years old patient, known with 3rd stage high blood pressure, bilateral carotid atheroma, type II diabetes mellitus (DM) associating vascular complications (3rd stage of chronic kidney disease, repeated ischemic and lacunar strokes, sensitive axonal polyneuropathy, diabetic retinopathy), presents for clinical examination in the medical rehabilitation department, accusing motor deficiency in the right side of the body and walking disorders. The local clinical examination objects rough right central facial paresis, positive paretic tests, overall muscular hypotrophy, poor motor control on the right side, diminished tendon reflexes and hypoesthetic disorders. The patient performs the transfers, maintains the sitting position at the edge of the bed, has ataxic gait, supports on the metal frame for small distances. The patient performs imagistic investigations at the right shoulder joint, which reveals a neuropathic osteoarthropathy.

Results: The patient's evolution is a stationary one, raising the suspicion of a syringomyelia or spinal cord compression. A further spine MRI investigation should provide vital information, so the patient is recommended to perform one.

Conclusions: The presence of a disabling pathology, such as stroke, associated with different comorbidities (DM) can mask different underlying pathologies.

P102

REVIEW OF AN OFF-LABEL TREATMENT FOR ASEPTIC NONUNION FRACTURE WITH TERIPARATIDE**Adriana Pascoal, Carolina Lourenço , Pedro Sá, José Vilaça, João Constantino, Jorge Laíns**

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Introduction: Approximately 10% of bone fractures cases will have delayed repair and potential risk of progression to nonunion, leading to functional impairment. There are a few strategies proposed to improve bone healing. Considerable amount of experimental data is available about teriparatide positive effect on fracture healing. The positive effect of teriparatide on fracture healing is well-documented on animals, however there is a lack of human studies and case reports.

Objective: To review the evidence on the off-label use of teriparatide to treat delayed and nonunion fractures.

Method: Narrative literature review of the studies evaluating the effect of teriparatide in aseptic fracture nonunion treatment. It was performed through an electronic search using PUBMED/Medline/Cochrane with the keywords "fracture nonunion" and "teriparatide" or respective MESH terms. Inclusion criteria were humans with delayed or nonunion fracture and treatment with 20 µg of teriparatide per day. As exclusion criteria presence of infection, vitamin D deficiency and disturbances in the calcium-phosphate metabolism. The primary outcome was radiographic and clinical fracture union.

Results: The literature search yielded 50 results. After applying the inclusion and exclusion criteria, 1 prospective study, 4 case report and 3 case series were selected. In the prospective study, 30 of 32 patients had a definitive healing of the nonunions following treatment (duration of 4-10 weeks). In the 4 case report and 3 case series, only one patient (with Seckel syndrome) had no fracture union following treatment (duration of 3-9 months).

Conclusions: The use of teriparatide is still off-label but with promising results in challenging cases of delayed unions/nonunions. Despite that, there has not been investigated in placebo-controlled studies, so we cannot prove that spontaneous consolidation would be achieved without teriparatide. In aseptic nonunion cases after failure of the usual therapeutic options, this treatment could be considered as an alternative.

P103

SPASTICITY MANAGEMENT IN THE CHILDREN REHABILITATION CENTER**Ágnes Csohány¹, Zsuzsanna Vekerdy-Nagy², Éva Paraicz¹**Rehabilitation Department MRE Bethesda Children's Hospital, Budapest, Hungary¹,University of Debrecen Rehabilitation and Physical Medicine Department, Debrecen², MRE Bethesda Children's Hospital³

Summary: The Rehabilitation Department of Bethesda Children's Hospital is an Accredited Spasticity Center since 2014. Our aim is to summarize our experience in the field of spasticity treatment of the past few years before renewing our accreditation.

Methods: We have processed data of walk in patients between 2014 -2018, highlighting data referring to SDR (selective dorsal rhizotomy), az ITB (Intrathecal Baclofen Pump) and botulinum toxin therapy.

Results: During the given period we have supplied 613 patient with BNO referring to spasticity (G8000 G8010 G8090 G8110 G8210 G8220). 20% of our patients received special antispastic treatment. We are following 8 children with ITB; during the research period 2 intrathecal baclofen pump has been implanted. We have had 52 patients in connection with selective dorsal rhizotomy of whom 15 has had an operation and recieved rehabilitation therapy according to protocoll. In the rest of the cases other therapeutical options has been suggested. We have applied botulinum toxin therapy in 107 of cases. We do not have data regarding the orthopedical surgery and systematic drug treatment as these are indicated by other professionals.

Conclusion: At present we have all the therapeutic options available for children in our country regarding spasticity. The role of the rehab specialist is to choose the most appropriate therapeutic method involving all the team and the parents in the descision making process. This shall be based on the age of the child, the severity and localization of symphtoms and the additional losses of funtions. Therefore it is not only a one-off descision but more a question of follow up.

P104

CAN SELF RÉHABILITATION TOOL SPEED UP PROCESS OF MOTOR COMMAND RECOVERY IN THE GOLDEN PHASE POST STROKE PATIENTS : A CROSS-OVER PILOT STUDY**Aguilera David, Derobert Laurent, Laborne Pauline, Assany Celine, Gerboin Mathias, Magnin Rodolphe**

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Introduction: A golden phase of best improvement occurs in the first 6 months after stroke. Recent studies have shed light on promising recovery in motor command in post-stroke patients with spastic paresis through guided self-rehabilitation. We tested a self-rehabilitation video tool added to the conventional rehabilitation program on stroke patients hospitalized in our unit.

Objective: The main goal was to analyze the trend of motor recovery for each patient, before and after the self-rehabilitation intervention in order to see if there was a speed up in the recovery process.

Method: MMRC evaluation was used to assess motor function for each patient with upper and/or lower limb paresis both before and after the self-rehabilitation intervention. Recovery with the conventional rehabilitation program "prior" to the intervention was compared with the "post intervention" recovery measured with two distinct recovery trend timelines for each patient.

Thus, the trend of the kinetic recovery slope before and after intervention helped us determine if an acceleration occurred in the recovery process and emphasize its possible correlation with our new intervention.

Results: Ten patients participated in this study and of them eight patients' files with complete documentation were analyzed. All went through self-rehabilitation resulting in an increase in their time of exercise as well of the number of repetitions. Four of these eight patients showed a significant acceleration in their improvement trend slope. The gain of time for the patients ranged from 4 to 50 days.

Conclusion: A self-rehabilitation tool should be proposed as soon as possible to stroke patients in order to accelerate the motor recovery process.



P105

EFFECT OF RADIAL EXTRACORPOREAL SHOCKWAVE THERAPY ON CARPAL TUNNEL SYNDROME Case Report

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Introduction: Carpal tunnel syndrome (CTS) is one of the most common upper limb compression neuropathies. There is growing evidence about the effectiveness of extracorporeal shock wave therapy (ESWT) as an effective non-invasive therapeutic option.

Objectives: To study the effect of radial shock wave therapy in a patient with carpal tunnel syndrome.

Material: A female patient, 62 years with burning pain and numbness in the right thumb, index and middle fingers and radial half of the ring finger for the last 3 years. The patient was treated with NSAIDs and local corticosteroid injections with temporary effect. Positive Tinel's sign and Phalen's test. Pain and numbness in the distribution of median nerve distal to wrist. No signs of hypotrophy of the thenar muscles. BMI – 28. Nerve conduction study show increase of distal motor latencies and decrease of amplitude of the median nerve of the right hand.

Methods: Five sessions of radial ESWT (BTL 6000 SWT) were applied, once a week, intensity (1.8 Bars to 2.5 Bars), fr. 10 Hz, 2500 shots.

Outcome measures: Pain and clinical symptoms were assessed by VAS score and Boston Carpal tunnel questionnaire (BCTQ) score at baseline, after the 2nd and the 5th session. Follow-up was done on the first and third month after treatment.

Results: There was a significant improvement in terms of severity of the symptoms and functional status. VAS score – at baseline 9 mm; after the 2nd session – 5 mm, after the 5th session – 3 mm; 1 and 3 months after treatment – 2 mm. BCTQ – at baseline – 81, after the second session – 54, after the 5th session – 40; 1 and 3 months after treatment – 38 and 36.

Conclusion: This case report demonstrates that ESWT could be considered as an effective and safe non-invasive method for patients with mild to moderate carpal tunnel syndrome.

P106

MIRROR THERAPY IMPROVES HAND FUNCTION AFTER STROKE - CASE REPORT –**Aleksandra Krstovic**

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Introduction - Mirror therapy (MT) was at first applied only in the treatment of phantom pain. Later studies showed positive effects of MT on post stroke hemiplegia and CRPS. Today visual feedback is important part of neurorehabilitation protocol.

Objective – A 55-years-old male S. A. had a severe stroke followed by right side hemiplegia. He was admitted to Clinic for physical medicine and rehabilitation two and a half months after the stroke. He had minimal, initial movements in all joints of the right arm, suffered from dysesthesia and joint pain during the pasive movement. Mirror therapy was applied into his daily exercise routine. Rehabilitation lasted 4 weeks.

Method – Passive exercises were performed daily by the therapist. Patient with the therapists assistance performed assigned exercises with healthy arm, looking into the mirror, witch was placed between the arms. It seemed from his perspective as he was exercising with the impaired arm and that he had two healthy upper extremities.

Results – To follow the results Fugl Meyer Test (FMA-UE) and Ashwort Scale were used. After the therapy all the parameters improved significantly. From minimal movement in all joints to the medium grade hemiparesis. Spasticity and pain decreased. Overall functioning in daily activities was much better than before.

Conclusions – In some cases, mirror therapy can be an effective addition in post stroke rehabilitation.

P107

EFFECT OF EARLY REHABILITATION ON FUNCTIONAL INDEPENDENCE OF HOSPITALIZED GERIATRIC PATIENTS WITH CLOSTRIDIUM DIFFICILE INFECTION**Aleksandra Jovanovic-Horvat¹, Mirko Grajic¹, Sanja Tomanovic-Vujadinovic¹, Ljubica Konstantinovic²**Clinic for Physical Medicine and Rehabilitation, Clinical Centre of Serbia, Belgrade, Serbia
Clinic for rehabilitation „Dr M.Zotovic“, Belgrade

Introduction: Maintaining functionality in elderly is an important rehabilitation goal, especially in hospitalized elderly patients, although the geriatric rehabilitation research data are scarce in the literature. CDI significantly compromises the functionality of elderly and complicates the rehabilitation. CDI is among the top three hospital-acquired infections in the world, with the 2.5-fold incidence increase in the last 20 years, and the incidence is ten times higher in patients older than 65 years than in younger patients. CD is an anaerobic gram positive sporogenic bacterium responsible for the onset of colitis associated with antibiotic uptake.

Objective: To examine the effects of early rehabilitation on the functional independence of hospitalized geriatric patients with CDI.

Method: A prospective clinical study (before and after) was conducted, which included consecutive patients rehabilitated within 6 months at the infectious ward of the Clinic for Physical Medicine and Rehabilitation, KCS. A total of 67 patients were older than 65 years (34 men and 33 women) with proven CDI. All patients were treated with optimal CDI therapy as well as individual rehabilitation procedures for 3 weeks. Patients' functional independence was measured by the Barthel Index, which measures the ability to perform day-to-day activities, immediately on admission and after 3 weeks of hospitalization.

Results: Patients' functional independence as measured by the BI shows a statistically significant difference before and after the application of early rehabilitation treatment ($p = 0.0001$). In 59% of patients there was an improvement in functional independence for one category of the BI, and in 7% of patients there was an improvement in functional independence for two categories of the BI.

Conclusion: Complex early rehabilitation treatment in hospitalized settings affects the functional independence of geriatric patients with CDI, significantly improving their ability to perform day-to-day activities.

P108

QUALITY OF LIFE IN CHILDREN WITH SPINA BIFIDA AND THEIR PARENTS**Aleksandra Sekulic**

Paediatrics Rehabilitation, Rehabilitation Clinic "Dr Miroslav Zotovic", Belgrade, Serbia

INTRODUCTION: Spina bifida is a neurodevelopmental disorder that requires long-term treatment and a habilitation process. Depending on the variability of the clinical signs, the functional status and age of the patient, the habilitation process is individually determined. The complexity of this problem requires continuous evaluation and monitoring by a multidisciplinary team. Quality of life is determined by general health, both physical and emotional, and it is also determined by social factors.

OBJECTIVE: To determine the impact of spina bifida on the quality of life of patients and their families

MATERIAL: The study included 22 children (13 males and 9 females) who were hospitalized at the Rehabilitation Clinic "Dr Miroslav Zotovic" in Belgrade, up to the age of 18 years. Regarding the quality of life, a KINDL and HRQOL questionnaire was used for children and parents to determine the overall quality of life, but also the various aspects of the quality of children's life (physical well-being, emotional well-being, self-confidence, family, friends and school)

RESULTS: 16 (73%) were wheelchair depending ,while 8 (17%) walked independently or with different type of aid. All patients had bladder and bowel dysfunction, which was confirmed by urodynamic testing. Hypotonic type of neurogenic bladder damage was confirmed in 14 (63%) patients and it was the main type of damage. In 17 (77%) patients, a shunt was present. Analyzing the data in children, a much lower quality of life was observed compared to theirsiblings. Patients described motor difficulties and lack of mobility as most interfering reason in their daily activities, while with adolescent growth, neurogenic impairment of the bladder was the major problem. The parents of these children perceive the quality of life of their children as inferior to the patients themselves, and through development the parental fear for further social integration and education becomes dominant.

CONCLUSION: Spina bifida significantly affects the quality of life of both patients and their families.

P109

PREMANUAL DIAGNOSTICS IN REDEFINING THE IMPACT OF SPORT ON THE HUMAN BODY**Aleksandar Maric**

Special Hospital "Mercur", Vrnjacka Banja, Serbia

Introduction: Examining the health and predispositions of athletes, premanual diagnostics can reveal positive pathological signs even when the function seems impeccable, for reducing the level of clinical diagnosis to lowest, it finds what any other diagnostic procedures couldn't, which would certainly indicate the problems with physical functioning and ruin the integrity of the locomotive apparatus of athletes.

Objective: Through research and functional testing, the objective of this work is to point out the importance of the premanual diagnostics and all of its elements in evaluation of active athletes, also to confirm or deny, to a certain extent, stated positions on the harmfulness of sports to the human body, simultaneously comparing the results with the other researches.

Method: The research process involved 20 athletes, aged 20 to 32 years, ten male volleyball players and ten male basketball players to be exact, playing in local sports clubs, for whom, individually, a therapeutic form was created, filled with elements of premanual diagnosis. For purposes of comparison, the results of other studies were used.

Results: The average grade of postural dysfunction can be described as poor posture, with expressed frequencies of scoliosis. Changes and prominence of tissue texture, 23 active trigger points, problems in the active, passive, intersegmental and neurodynamic mobility, and positive Quadrant test of the upper cervical spine and shoulders were noticed, while the accessory mobility revealed symptoms of hyper and hypo mobility and painful sensations, mostly as a reaction to the central posteroanterior pressure.

Conclusions: Premanual diagnosis, have expressed doubts about the commonly accepted fact that sports exclusively contributes to human health, because the testing of active athletes didn't reveal any isolated cases in which sports hadn't left a negative impact, nor managed to correct them. The benefits of sport activities can be framed in tendanceof physical culture.

P110

THERAPEUTIC EFFECTS OF MEDICAMENTOUS THERAPY AND PHYSICAL PROCEDURES IN PATIENTS WITH CHRONIC PAINFUL LUMBAR SYNDROME**Aleksandar Pavlovic**

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Introduction: The main pathophysiological mechanism of chronic lumbar pain syndrome is compression with consequent inflammation. Neuromodulation processes are responsible for the chronic pain for more than 12 weeks, regardless of the initial lesion.

Objective: The aim of this study is the evaluation of the effects of the medicamentous therapy, Ibuprofen and Pregabalin, compared with the effects of the physical procedures (low-frequency pulsed electromagnetic field-LFPEMP and Interference currents (IFC), Ultrasound (US) and Diadynamic currents (DDC)), in the treatment of patients with chronic lumbar pain.

Method: This study was conducted as an experimental, randomized, controlled, open-type clinical trial. The study included 80 patients (70 females and 10 males) with chronic low back pain. All patients were divided into four groups. I (first) group of 20 persons was composed of patients treated with classical analgesics (Ibuprofen 600 mg, 3 tablets daily for a total) and Pregabalin, 150 mg daily, divided into two doses. II (second) group treated with Ibuprofen retard 800 mg, two tablets in the evening at once. III (third) group of 20 patients were treated with LFPEMP and IFC and IV (fourth) group composed of 20 patients treated with US and DDC. All treatments were completed over 10 days. As an observing parameter, a Lattinen test was used to assess pain sensitivity, before and after therapy. For statistical processing of the obtained data, was used Student's t-test.

Results: After therapy, painful sensations were reduced in all patients, but these effects were most significant in patients of group I treated with Ibuprofen and Pregabalin at a dose of 1800, and 150 mg and the II group treated with 1600 mg of Ibuprofen retard, whereas in all other groups of subjects, the therapeutic effects were statistically less significant.

Conclusions: Based on the results of this study, it can be concluded that administration of Ibuprofen and Pregabalin at a dose of 1800 and 150 mg daily, is an effective therapeutic method in the treatment of patients with chronic painful lumbar syndrome.

P111

EFFECTS OF COMBINED THERAPY WITH THE HYPERBARIC CHAMBER AND PHYSICAL THERAPY IN A PATIENT AFTER CVI – CASE REPORT**Aleksandar Jeftic**

Institute for rehabilitation, Belgrade, Serbia

Introduction: After surviving CVI, patients require years of multidisciplinary treatment and continuous physical rehabilitation in order to maintain functional status in daily activities.

Objective: The importance of physical therapy in combination with hyperbaric chamber with a patient who has had CVI.

Materials and Methods: Case report: Patient N. K. (age 64) was admitted to our institution for resuming the rehabilitation treatment after CVI that occurred in 2015. During the admission to our institution he was moving with difficulties by using medical aids or with a help of another person. Romberg was positive with opened eyes. Left-sided facialis, slower speech. Upper extremities result: left arm weakness, sinking test positive on the left side, lower coordination, on lower extremities: hypotrophy of a left leg musculature. GMS reduced in all segments. Mingazzini positive on the left. Active elevation left about 30 degrees.

During the patient's rehabilitation we have applied combined rehabilitation procedures – kinesitherapy, occupational therapy, electro therapy, speech therapist. After the check up on the seventh day of rehabilitation, a minimal progress was observed in the form of musculature strengthening, but not in movement coordination. The patient accepts a recommendation for the hyperbaric chamber, where he will have 20 treatments until the end of rehabilitation.

Results: After the stationary rehabilitation combined with hyperbaric chamber there was an improvement in speech, stability, movement coordination, muscular strength of a left arm and leg. The patient moves without aids on shorter distances.

Conclusion: By implementing the resumed stationary physical rehabilitation with combined physical procedures in synergy with the hyperbaric chamber, we successfully contribute to the functional recovery of patients after CVI.

Key words: rehabilitation, cvi, hyperbaric chamber

P112

HAND REHABILITATION AFTER AN INJURY AND FLEXOR TENDON OPERATION**Aleksandra Savic¹, Mitar Saranovic², Milena Adzic³, Ranka Vucinic⁴, Milena Saranovic¹, Ana Vukcevic⁵**

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Introduction:The hand with its anatomical elements and their roles is a unique instrument of the loco motor system. In total injuries number it is estimated that 30 percent of them are related to hand injuries.

Surgery aims to maximize the integrity of the hand and is the most important determinant of overall success in the treatment. The task of the rehabilitation is based on restoration of maximum functionality of the hand.

Objective:To indicate that a team approach is essential for the best outcome of the treatment: surgeon, physiatrist, physical therapist and patient.

Case report: A twenty-nine-year-old patient was admitted to the Orthopaedic-traumatic clinic with an injury of the left hand flexor tendon. There was set an indication for an operative treatment. Then, after the operation, an adequate dynamic four-week immobilization was placed and after its removal we applied a patient-specific rehabilitation program closely based on Kleinert's protocol for hand rehabilitation (through early controlled mobilization). The rehabilitation steps were aimed to restore the hand function with an effort to find the right measure in the Kinesiterapeutical Protocol which could promote tendon healing, improve tendon slippage, prevent tendon adhesion and ruptures as well as joint contractions. The protocol also included exercises in the scope of healthy joint movements.

Conclusion:The expert team synergy practiced through a carefully constructed protocol that was adapted to the functional status of the hand through the rehabilitation phases was the key to a good functional result.

Keywords:Hand injury, teamwork, Kleinert's rehabilitation protocol.

P113

DYNAMICS OF MUSCLES AND NERVES. PSOAS MUSCLE PARADOXICAL KEY OF THE BODY?**Aleksandar Vojvodic¹, Sava Stajic², Predrag Bjelogrić³, Jelena Mihailovic⁴, Slobodan Kapor⁵**

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Introduction: Relationship between muscular facilitation and neural tension as cause of pain, in the upper extremity is well known (1), but only few studies (2,3,4) examine a potentially similar interaction in anterior and posterior hip. The purpose of this study was to determine potential effect and underlying mechanism, between tightness of femoral nerve and psoas muscle on sciatic nerve and piriformis muscle using Ultrasound Elastography, as measure of tissue tightness.

Material and Methods: Shear Wave US Elastography was performed on a group of 30 healthy patients (15female and 15male). Measurements of nerve/muscle connection, m.psoas/n.femoralis and m.piriformis/n.schiaticus, tightness were performed on lateral decubitus position in knee extension and knee flexion, at two time points 0 and 3 min for knee flexion and 0 min for knee extension, due to physiological position.

Results: At t=0 min, in knee extension, n.femoralis/m.psoas are relaxed (4 and 14kPa, respectively) compared to n.sciaticus /m.piriformis (54 and 28kPa, respectively). At this point inverse tightness correlation was observed with statistically significant difference ($p<0.001$). At t=0 min in knee flexion, n.femoralis/m.psoas are tight (12 and 30kPa, respectively) compared to n.sciaticus/m.piriformis (5 and 12kPa, respectively, $p<0.001$) with preserved invers correlation. At t=3min tightness of n.sciaticus/m.piriformis starts to increase (22 and 28kPa), while n.femoralis/m.psoas tightness continue to increase (20 and 40kPa). Obtained high values may be a result of m.psoas spasm due to increased stimulation of the n.femoralis, which through lumbar spine nerve roots affect n.schiaticus and consequently m.piriformis spasm.

Conclusions: The findings of this study suggest that increasing n.femoralis/m.psoas tension we may indeed affect gluteal region in healthy patient population through n.sciaticus/m.piriformis. Consideration of potential bidirectionality of neural tension and muscle dysfunction should be included in future, as same as patient group with pathology in that region.

P114

USING ANIMALS CLASSIFICATION OF FUNCTIONING FOR RATS WITH EXPERIMENTAL STROKE FOR COMPARISON WITH THE LIMITATION OF FUNCTIONING IMPLEMENT ICF IN ACUTE STROKE PATIENTS**Aleksei Shmonin, Maria Maltseva, Elena Melnikova, Timur Vlasov**

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Background and aims.

Using the principles of the ICF, we have developed an animal classification of functioning, adapted for Wistar rats. In the animal classification of functioning, coding is applied as in the ICF, which allows to compare violations and limitation in rats and humans. This is necessary for translational studies in rehabilitation.

Aim: to compare the clinical manifestations in humans with acute stroke in left middle cerebral artery (LMCA) with the manifestations of the focal cerebral ischemia in rats with occlusion LMCA.

Methods. The study enrolled patients (n = 27) with acute stroke in LMCA with mRS>3 points. Patients were evaluated by a multidisciplinary team using the ICF. For stroke in rats, we used a Koizumi model of the 30-minute filament occlusion of LMCA (n = 12) and Zhao model of LMCA ligation with 40-minute two common carotid arteries occlusion (n = 12). All animals were evaluated by scales and animal classification of functioning 48 hours later after surgery.

Results. In humans, with cerebral ischemia, only 170 ICF domains were detected, which is significantly more than in rats subjected to experimental ischemia using two models - 120 and 116, respectively (p=0.0001). Using of ICF and animal classification of functioning allowed to identify limitations of functioning associated with 1. Symptoms of stroke, 2. Causes of stroke in humans, 3. Comorbidity in humans, 4. Technique of stroke modeling in rats, 5. Environmental factors and 6. Specificity of the type of organism. Using of animal classification of functioning allows to reveal more significant limitations of functioning than in scales. The Koizumi model allows demonstrate more cerebral ischemic dysfunctions than in Zhao model.

Conclusions. Animal classification of functioning allows comparing experimental models of stroke in rats and comparing limitation of functioning in humans and animals during cerebral ischemia.

P115

The prediction of alpha-training biofeedback effectiveness in stroke patients using EEG spectral analysis**Alexandra Trofimova¹, Sergey Isaychev², Galina Ivanova¹, Alexander Chernorizov²**¹ Department of medical rehabilitation of the State center of cerebrovascular pathology and stroke of the Ministry of health of the Russian Federation, Moscow, Russia²Moscow State University

Introduction: In recent times there has been a considerable improvement in psychological rehabilitation methods of stroke patients. Neurofeedback is a commonly used approach for emotional sphere rehabilitation. Usually, it is preferred to use EEG for setting correct neurofeedback attitudes.

Objective: The main aim of our study was to show that for effective neurofeedback it is necessary to consider which hemisphere is affected by stroke.

Method: The study involved 84 patients with ischemic stroke (84 men, aged 35 to 66 y.o.) with mixed anxiety and depressive disorder (F41.2 in ICD-10). Patients were divided into two groups: 42 people had stroke in the left hemisphere (LH), 42 patients - in the right hemisphere (RH), in medial cerebral artery. EEG was recorded for all patients twice, before and after neurofeedback trainings. Groups of patients did not differ significantly in age and neuropsychological tests scores. EEG power spectrum were computed and analyzed for theta (4-8Hz), alpha (8-13 Hz), beta (13-20 Hz) frequency bands.

Results: We saw a predominance of theta activity indicating inhibitory processes in the temporal, central, parietal and frontal parts of the LH in RH patients, compared with LH patients. Our results indicate the absence of a direct relationship between stroke localization and alpha activity increase. In LH patients there is a multidirectional dynamics of the beta1-rhythm power. Thus, low power are noted mainly in the central, temporal parts of LH. An increase in the beta-rhythm power indices is observed in the RH: in the anterior part and along the center line in Cz.

Conclusions. Different behavior of EEG indexes depending from the hemisphere where the stroke is should be considered when prescribing the biofeedback protocol for psychological rehabilitation of stroke patients.

P116

FINDINGS OF PLATELET-RICH PLASMA INJECTION IN PATIENTS WITH LATERAL AND MEDIAL TENDINOPHATY OF THE ELBOW REFRACTORY TO OTHER MEDICAL THERAPIES**Ana Fernandez Lopez**

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Introduction: Epicondylosis is a degenerative tendinopathy of the tendons inserted in the humerus. Platelet-rich plasma (PRP) has growth factors that may help to regenerate these tendons.

Objective: The purpose of this study is to evaluate the effectiveness of the PRP as an alternative treatment for medial or lateral epicondilopathy remaining after conservative treatments.

Method: Cuasi experimental study in infiltrated patients from July 2018 to May 2019. We obtained 21 patients between 18 and 70 years old, who had suffered from epicondilopathy for at least 6 months. They had all been previously treated with physiotherapy and/or corticosteroidal injection.

Two PRP guided injections were carried out during two successive weeks to patients that had a punctuation of 6 in the Visual Analogical Scale (VAS) and to patients that faced difficulties in carrying out daily activities, according to the Disabilities of the Arm, Shoulder and Hand scale (DASH). Additionally, all patients had degenerative signs of the tendon under ultrasound image. The follow-up took place during weeks 6 and 16, respectively, of the analyzed period.

Results: The average age of the patients was 45 years old and the average period of evolution was 18 months. Upon follow-up all patients had improved. Particularly, at first we obtained a punctuation of VAS of 7,39 that decreased to 4,06 and to 1,91 in weeks 6 and 16, respectively. Regarding DASH scale, all patients improved during the monitoring. The initial average, 50,3, decreased to 29,71 and 17 in weeks 6 and 16. As it can be seen from the data above, this study shows the statistically significant difference between the vas and DASH scale in the analyzed period.

Conclusion: Eco-guided PRP injection can be considered as a treatment for patients with epicondylosis that have not improved with other conservative therapies. This treatment could be considered as an alternative to surgery.

P117

Improvement in balance after Bobath concept in acute stroke patients, USING BERG BALANCE SCALE TEST**Ana Golez**

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Introduction: Balance and gait disorders are often present at acute stroke patients. If they are capable of walking, fear of falling sometimes prevent them to walk and stay independent in activities of daily-living. Improvement of sitting and walking balance is one of main goals of neurorehabilitation in patients after acute stroke. Bobath concept is often used in neurorehabilitation of acute stroke patients and in the literature mainly good results are presented.

Objective: The aim of the study was to find out, if ten sessions of neurorehabilitation with Bobath concept can improve balance, walking pattern, quality of live, independence in daily-life activities, and diminish fear of falling in patients after acute stroke.

Method: In years 2018 and 2019 eighteen acute stroke patients were included in the study. Before and after ten sessions of neurorehabilitation with Bobath concept patients performed Berg Balance Scale Test.

Results: Berg Balance Scale Test showed important improvement in most of patients. In the end patients could sit independently, walked or improved their gait-pattern, as well as balance, which helped them to take active part in or stay independent in their daily-life activities.

Conclusions: Neurorehabilitation with Bobath concept can help patients to improve balance, gait-pattern, quality of life, independence in activities of daily-living and diminish fear of falling.

Gait Keywords: Acute stroke, Balance, Berg Balance Scale Test, Bobath concept, Daily-living activities, Fear of Falling.

P118

MANAGEMENT OF A PATIENT WITH A POSTSTROKE ATYPICAL UPPER LIMB SPASTICITY PATTERN**Ana Sevilla Castillo, Rocio Conejero Cisneros, Isabel Perez Saborido**

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Introduction. For patients with poststroke upper limb spasticity, 5 characteristic spasticity patterns are described. Most of these patterns have adduction, internal rotation of the shoulder and elbow flexion, resulting in the difference in the position of the forearm and wrist.

Objective. Description of the management of a patient with poststroke spasticity, who presents an atypical pattern of spasticity in the upper limb, with unusual muscles involved (deltoid and supraspinatus muscle).

Method. 68 year old man with diagnosis of ischemic stroke in the left hemisphere. Presents upper limb spasticity, pain and poor body image.

Pre-treatment examination: spastic pattern of upper limb (shoulder abduction, elbow flexion, forearm pronation, wrist in neutral position). MAS (modified Ashworth scale) of 3 on shoulder and elbow, VAS (visual analog scale) 7, active range of movement (shoulder flexion 90°, Abduction 90°, elbow: flexion 90°, extension -70°).

Treatment: Physical therapy, use of splints, infiltration of Incobotulinum toxin A in Deltoids 75 IU, Supraspinatus 25 IU, Biceps brachial 75 IU, Anterior brachial 50 IU, Round pronator 25 IU.

Results. Treatment objectives: Improvement in the posture of the shoulder and elbow, pain relief and improvement in the dress.

Post-treatment examination: MAS shoulder 1, elbow +1, VAS 3, active range of movement (Shoulder : flexion 90°, abduction 90, elbow: flexion 90°, extension -30°)

Conclusions. This classification of the pattern of spasticity could be combined with other measures such as range of movement or Ashworth scale, very useful in the assessment of patients to improve the setting of the objectives and results of toxin treatment. Although very rarely we can find a pattern of atypical spasticity because unusual muscles are involve, as in our case.

P119

SUPERVISED INDIVIDUALLY DESIGNED EXERCISES FOR CHRONIC LOW BACK PAIN REHABILITATION OF CHILDREN WITH PAIN SYNDROMES**Anatoly Belyaev¹, Victoria Malchuk²**

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Introduction: Pain in newborn lowers quality of life and leads to development of chronic pain Syndrome, speech impairment, cognitive disorders, and motor disorders.

Objective: Efficacy assessment of newborn rehabilitation with implementation of somatic dysfunction (SD) correction methods.

Method: 70 children under 28 days of age were under supervision. All were applied to the hospital with complaints about possetting, anxiety, disturbing dreams, torminas and breastfeeding difficulties. 42 of boys (60.0%) and 28 of girls (40.0%) were among examined children. Pain was assessed with modified by us FLACC-SS scale.

Results: Pain syndrome was examined at 84.3% of children. The most common SDs were: occipital bone condyles compression (32.9%), jugular base of skull compression (41.7%), compression of glosso-pharyngeal, accessory, hypoglossal nerves (44.5%). All children with pain syndrome were divided into 2 groups by single blind randomization. The first group got massage and specialized gymnastics. The second group underwent rehabilitation, which includes massage, gymnastics and manual SD correction. The number of attendances was individual, depending on diagnosed dysfunctions. FLACC-SS re-assessment was carried out in a month from the start of rehabilitation. The second group of children showed no signs of pain syndrome, but moderate pain syndrome persisted in 30% children of the first group. In the second group 52.5% of cases main SDs were eliminated completely, in the first group persisted in 93.3% of children. Sleep normalization, improvement of sucking, lowering of motor anxiety, and absence of torminas were registered in the second group. In the first group majority of complaints continued to persist.

Conclusions: Inclusion of SD correction in rehabilitation of pain syndrome leads to reliable fast pain relief, which positively influences on behavior of newborn, improves their quality of life.

P120

APPLICATION OF PROPRIOCEPTIVE FOCAL VIBRATORY STIMULATION IN VEGETATIVE STATE BEDRIDDEN PATIENTS AFTER TRAUMATIC BRAIN INJURY IN INTENSIVE CARE UNIT**Andra Pintilie, Liliana Padure**

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Introduction: Traumatic Brain Injury (TBI) is defined as an alteration in brain function as a result of an external force either involving impact to the head (traumatic impact) or inertial forces (traumatic inertial).

TBI ranges from mild to severe, the last being followed by a heterogeneous group of symptoms from motor impairment to cognitive, speaking, memory, focus, behavioral alternations.

Objective: Our interest was to observe the evolution of consciousness, responsiveness and awareness in a TBI patient with vegetative state, using proprioceptive focal vibratory stimulation (PFVS).

Method: We present the case of a 15 y.o. female patient which suffered a TBI following a height fall (over 15 m) a month prior to admission to our rehabilitation department.

The physical examination discloses a vegetative state, with motor impairment to all four limbs, accompanied by high intensity spasticity and contractures, bladder and bowel incontinence, with vital signs in normal ranges.

She was prescribed a complex neurorehabilitation program, including physical therapy for maintaining and improving ROM, spasticity decrement, neurosensory stimulation and robotic controlled standing training. PFVS was applied to all four limbs, in order to stimulate proprioception, neuroplasticity, maintain and reestablish neurological gateways, for a duration of 20 minutes per day, during several hospital admissions.

Results: Although still bedridden with severe neurological impairment, an improvement in patient's vegetative state was noticed, evolving to minimal conscious state, being able to pursuit eye movements and sustain vision fixation.

Conclusions: Regarding the apparent small achievement but in reality a milestone in patient's neurological condition, PFVS is applied to each TBI patient in our neurorehabilitation unit, in order to observe and assess the consciousness' state evolution.

P121

PROPRIOCEPTIVE FUNCTIONAL VIBRATION STIMULATION AS THERAPEUTIC TOOL IN SPASTICITY MANAGEMENT OF JUMP GAIT PATTERN IN CHILDREN WITH CEREBRAL PALSY**Andra Pintilie, Liliana Padure, Corina Sporea**

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Introduction: Cerebral palsy, a neurological disorder determined by a multitude of conditions (congenital, pre/natal/postnatal causes), with a prevalence of 2-2.5/1000 births, is characterized by motor and function loss, with the most frequent motor element represented by spasticity, and last but not least, by hypotonia, and secondary gait impairment.

The purpose of our work is to follow up and assess the effects of proprioceptive functional vibratory stimulation (PFVS) on the jump gait pattern of spastic diplegic gait in children with cerebral palsy. The child with jump gait has equinus foot, genu flexum and coxa flecta, related to spasticity on the gastrocnemian and soleus, hamstrings and psoas muscles.

In order to obtain spasticity decrement on the main muscle groups involved in jump gait and improve motor control, we advance the proprioceptive functional vibratory stimulation procedure, as part of the rehabilitation program.

Design: Functional vibratory stimuli were applied using a mobile unit commercial medical device for bedridden and standing patients, on the lower limb antagonist muscles, associated with physical therapy, once a day for two weeks, in a group of 5 children with jump gait and cerebral palsy. Ashworth Modified Scale and 10 meters test were used as evaluation tools for spasticity intensity and establishing improvement or decrement of gait pattern.

Results: The obtained results show a moderate amendment in gait pattern, with slightly softening of the targeted muscles, thus improving the gait pattern, in the subjected group of patients.

Conclusions: In non-CP children gait is expected to be attained between 12 to 18 months, gait disorders being among the primary reasons for medical presentation in CP patients. In order to improve quality of life in young patients through rehabilitation procedures, by considerate attenuation of jump gait pattern, we recommend proprioceptive functional stimulation as adjuvant among other procedures.

P122

ROLE OF SPINAL DECOMPRESSION THERAPY IN PATIENT WITH DEGENERATIVE DISEASES OF LUMBAL SPINE –CASE REPORT**Aneta Kajstorovska, Simona Ristovska**

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Introduction: The most recent research trial sought to correlate clinical success with MRI evidence of disc repair as a result of such treatment and found that reduction of disc herniation ranged between 10% and 90% depending on the number of sessions performed, while disc annulus healing on a case with a young female patient with lumbal discus hernia.

Objective: By significantly reducing internal disc pressure, retraction of the herniation back into the disc and promotes intake of fluids, oxygen and other substances necessary for healing the disc stimulates repair and inhibits leakage of materials from the nucleus of the disc because its have been shown to be a predominate site of pain, so treating the disc as directly as possible makes sense. The blending of focused traction of the site, rehabilitation to the supporting structures, and overall strengthening of musculature makes the treatment unique. This therapy affects the disc as directly as possible without surgery.

Methods: Spinal decompression therapy with specific program for discus hernia, first 10 therapies every day, than pause between them for 10 days and than 10 therapies every day .

Result: By significantly reducing internal disc pressure, DTS Triton spinal traction promotes retraction of the herniation back into the disc and promotes intake of fluids, oxygen and other substances necessary for healing the disc. This activity stimulates repair and inhibits leakage of materials from the nucleus of the disc.

Conclusion: Relief of acute or chronic (long term) low back pain and /or associated leg pain or numbness, generally within 4 weeks

Successful in over 75% to 85% of patients.

Early return to work. Non-invasive and extremely safe. No injections. No knives. No patient hospitalization.

P123

PHYSIOTHERAPY AND CARDIAC RHYTHM DEVICES- TO WHOM, WHAT, WHEN?**Anikó Szegedi, Ferenc Luterán**

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Introduction:Millions of people live worldwide with cardiac rhythm devices (CRD) mostly with pacemakers. Many of them have musculoskeletal problems. The interactions between cardiac rhythm devices and physical therapy procedures using sources of possible electromagnetic interference (EMI) have been reported for decades. Fear of these potential interactions may lead to suboptimal utilization of physiotherapy treatments in CRD patients.

Methods and results:We reviewed the literature regarding the potential interactions between physiotherapy modalities and CRDs. We will briefly summarize the recommendations in commonly used physiotherapy modalities in CRD patients.

Diathermy (short wave diathermy SWD and microwave) is potentially dangerous to use in patients with CRD. The generated heat can cause burning to surrounding tissues and damage the circuitry of the pacemaker, but also the electromagnetic fields generated may directly interfere with the performance of the device.

Laser application poses no risks to the pacemaker patient.

Acupuncture may be a relatively benign treatment in CRD patients.

Ultrasound therapy could be used but the distance must be over 15 cm between the US transducer head and the implanted device to minimize mechanical damage to the internal circuitry of CRDs.

Several different types of electrical stimulation (ES) can be used to treat either motor dysfunction: functional electrical stimulation (FES), neuromuscular electric stimulation (NMES) or pain: transcutaneous electric nerve stimulation (TENS). According to a systematic review, electrical stimulation could safely be used on the lower limb.

Conclusions:Although there are no specific guidelines regarding the administration of physiotherapy modalities in CRD patients but as we reviewed the written literature, we would like to remind our colleagues that the use of most of the physiotherapy modalities in patients with CRD is considered safe.

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MIRROR THERAPY FOR SEVERE UPPER LIMB HEMIPARESIS APPLIED EARLY AFTER STROKE - CASE REPORT-**Anita Stankovic**

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Introduction - Mirror therapy was first described by Ramachandran in 1995, applying it in the treatment of phantom pain. Rizzolatti discovered mirror neurons, which combine the perception and execution of the action, presenting the connection between sensory and motor part of the brain. Visualization of healthy limb movements in the mirror helps reorganize neural receptors and re-integrate the presentation of the affected limb in the cerebral cortex, reducing the sudden conflict between motor intention, proprioception and impaired limb visualization. Visual feedback is firmly incorporated into neurorehabilitation protocol.

Objective – A 68-years-old male had a stroke followed by severe limp left side hemiplegia. He was admitted to our Clinic and began early post-stroke rehabilitation. We included mirror therapy into his daily exercise routine in order to improve and accelerate recovery. First intrahospital rehabilitation started one week after the stroke, and second one began two months later. Each lasted 3 weeks.

Method – Passive exercises were performed daily by assigned therapist and patient himself performed active exercises with healthy arm facing the mirror, placed inbetween upper extremities. Duration of exercises varied depending of the patient condition (20min).

Results – To follow the results Fugl Meyer Assessment (FMA-UE) was used. There was no statistically significant improvement in motor nor sensory function of the affected arm, after the first hospitalization. After second one, motor function improved, he regained normal sensations in affected arm and pain in his joints during the active and passive movements was decreased.

Conclusions – Implementation of mirror therapy into the neurorehabilitation protocol after severe stroke must be individually assessed and well timed. We recommend it as soon as the first, initial movements in the affected limb appear, not before.

P125

UNDERSTANDING AND PRODUCTION OF ANTONYMS IN PATIENTS WITH SPEECH PATHOLOGY AFTER A STROKE**Anja Drljic, Goran Savic, Ljiljana Rakic**

Neurorehabilitation IPRM Dr Miroslav Zotović, Banja Luka, BiH RS, Bosnia and Herzegovina

Introduction: Antonyms are words that have opposite meaning. In order to find antonym of a word is needed to know the meaning of particular word as well the word with opposite meaning. Patients with speech and language pathology (SLP) have difficulties to recognize a given word as well as to find a word with opposite meaning.

Objective: The objective is to determine level of the ability in understanding and production of matching antonyms at patients with SLP after stroke.

Methodology: The sample was 45 patients with brain damages, mostly on left brain hemisphere. To each patient were verbally offered of 20 words. The patients needed to find an antonym for each word. The maximum number of points they could score was 20.

Results: The average age of the sample was 67.15 (± 9.30). The male gender was prevalent with ratio (51.11:48.89%). Ischemic was the most common stroke (77.77% of sample). Sample includes: 39 right-sided, 4 left-sided, 1 right and left sided and 1 patient without significant body impairment. 30 Patients had SLD by type of aphasia and 15 by type of dysarthria. The average score on naming antonyms was 43.65%. Aphasia patients had average result of 19.30% and patients with dysarthria achieved an average of 92.30% ($p=0.0000$). 62.2% of patients achieved result of 50% or less. The lowest results were in group of patients with the brain lesions in temporally and frontally areas or combining these regions with adjacent regions.

Conclusion: Patients with dysarthria were more successful than patients with aphasia in finding the words of opposite meaning. Patients with temporal impairments could not understand the given words. Patients with frontal impairment understood the given words but could not produce matching words. The best results were found at patients with dysarthria, because, despite some difficulties, they were able to understand and produce the matching words.

P126

STROMAL VASCULAR FRACTION TREATMENT FOR KNEE OSTEOARTHRITIS. A CASE SERIES.**Anna Boada-Pladellorens, Merce Avellanet, Arnau Pla, Didac Haro**

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Introduction: Knee osteoarthritis (KOA) is a frequent pathology that causes pain, swelling and decreased functionality. Mesenchymal stromal cells are a type of multipotent cells which can be extracted from adipose tissue, contained in the Stromal Vascular Fraction (SVF). SVF treatments are currently the focus of research for KOA due to preclinical and clinical results: ability to relieve pain, improve functionality and potential for cartilage regeneration without safety concerns.

Objective: The aim of the study was to evaluate the efficacy of SVF treatment in terms of pain, functionality and quality of life for patients with KOA.

Method: Sixteen patients (nineteen knees) treated with autologous SVF for KOA filled in KOOS, visual analogue scale (VAS) at rest and during activity and SF-36 questionnaires both before the injection and at 6 months. SVF analysis was performed in terms of sterility, cell viability and quantity of cells. Pain was considered the primary outcome. Quality of life and functionality were considered secondary outcomes. All patients underwent MRI before the procedure to evaluate cartilage. SPSS was used to statistically compare the results.

Results: 7 women and 9 men (average age 60.8) were enrolled in the study. Sterility was found in 81,25% of the SVF samples. Saprophytic skin bacteria were found in not sterile ones. An average of 16,41% of SVF cellularity and 84% of cell viability was recorded. The mean VAS scores at rest and in activity, at baseline and 6 months after SVF treatment, were 2.72 vs 0 and 6.55 vs 2.38 respectively. Subjective and objective functional improvement was found in all but one cases.

Conclusions: Our case series confirms that SVF is an effective therapy to be considered for KOA. It improves functionality and quality of life and decreases pain. This was a preliminary study. Further results will be presented with a longer follow-up with MRI control at one year.

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BODY MASS INDEX INFLUENCE ON SUBACUTE STROKE REHABILITATION OUTCOME**Anna Millere¹, Zaiga Kalnbērza-Ribule¹, Anda Nulle²**National Rehabilitation Centre "Vaivari" National Rehabilitation centre "Vaivari", Rīga Stradiņš University¹, National Rehabilitation Centre "Vaivari"²

Introduction. Obesity is one of the greatest public health challenges - overweight affects 30-70% and obesity 10-30% of adults. Studies have shown that primary goal of stroke rehabilitation programs is to maximize long-term functional mobility and ambulation. Obesity is expected to adversely affect post-stroke functional mobility and stroke goals. The existence of the obesity paradox in patients with stroke is controversial. Therefore, it is a need to evaluate rehabilitation outcome and its association with body mass index.

Objective. To determine the association between body mass index (BMI) and rehabilitation functional outcome of inpatient post-stroke rehabilitation in Latvia.

Method. A retrospective cohort study design - medical records of stroke patients were studied according to research protocol. Patients, who were admitted in subacute rehabilitation center from 01.01.2018.-31.12.2018. and with diagnosis ICD-10 I63.3 and I61.1, were included in study and received multidisciplinary rehabilitation. The study was approved by the Ethics committee. Patients were divided into 4 groups according to BMI. Functional Improvement was measured by FIM.

Results. 296 patients were included in the study, median age 66 years. There are statistically significant differences between 4 groups according to BMI and patients age ($p=0.013$), length of stay ($p=0.008$) and rehabilitation effectiveness ($p=0.009$). The highest rehabilitation effectiveness (36.2%) was in overweight group, whereas lowest (17.8%) in underweight group.

Conclusions. Among patients admitted to sub-acute inpatient stroke rehabilitation, overweight patients had better functional outcome than in other weight categories. It could be related with so-called "obesity paradox" which proposes that an overweight or obese patient is predisposed to specific stroke types which result in less severe motor deficits and thus a lower degree of motor impairment. This is the first study about stroke and its relation with BMI in Latvia. It is essentially to continue studies in this field to improve better outcome in multidisciplinary care.

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REHABILITATION IN EUROPE'S MOST OCCIDENTAL REGION THE AZOREAN ISLANDS (PORTUGAL)**António Raposo**

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Introduction: The Azores are nine islands positioned in the middle of the Northern Atlantic Ocean, two hours by plane from Lisbon, five hours if you leave from Boston.

The Azores are an Autonomic Region of Portugal. We have a Government with a President, a Regional Legislative Assembly with fifty seven deputies. We have nineteen municipalities (City Halls), each one with a President and Councilors. The biggest island on the archipelago is S. Miguel, with approximately 130.000 inhabitants. Moreover, Mount Pico is the highest point in Portugal, with 2.351m, and is located in Pico Island. We have ports and airports in every island.

Objective: As far as health facilities go, we have three hospitals, Hospital Divino Espírito Santo, at S. Miguel Island, Hospital de Santo Espírito, at Terceira Island and Hospital da Horta, at Faial Island. There are also sixteen health centres scattered throughout the islands, and rehabilitation facilities operating on all hospitals with interventions by PRM doctors, Physiotherapists, and both Occupational and Speech Therapists. Most Health Centres have physiotherapy as a service. There are also several private practices which serve as physiotherapy centres.

Conclusions: The Azores have a good coverage on health and rehabilitation services.

More investments are required on said services to sustain and support an area with our particular geographical circumstances demands.

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THE INTERDISCIPLINARY SPASTICITY CLINIC FOCUSING IN HEREDITARY SPASTIC PARAPLEGIA: 2 CASES**Antonios Kontaxakis¹, George Strouggis², Alexandros Chados², Christos Zlatanov², George Tagaris², Christina- Anastasia Rapti²**PRM, 414 Special Diseases Military Hospital, Athens, Greece¹, "G.Gennimatas" General Hospital, Athens, Greece²

Introduction: Hereditary spastic paraplegia(HSP) is a clinical and genetical heterogeneous group of conditions with the main characteristic of spasticity and weakness of the lower limbs. Having a similar incidence with other inherited neurological diseases, and a relatively small burden on life expectancy, HSP is a significant cause of disability. Even in the most common pure form, besides spasticity, walking and balance impairments, neurogenic gastrointestinal and urological impairments can also be found, as well as sensory and cognitive ones.

Objective: Underline the need for an interdisciplinary spasticity clinic in a general hospital.

Method: 2 cases presentation

Results: Male patient, age 53, was referred from the neurology outpatient clinic to the spasticity clinic, diagnosed with hereditary spastic paraplegia 8 years ago, with walking difficulties, neurogenic bladder, neuropathic pain and fatigue. After failure of antispastic medication, an intrathecal baclofen trial was performed followed by pump implantation and a rehabilitation programme with significant improvement in walking pattern, balance and a significant improvement in his quality of life. Female patient, age 44, was similarly referred, with her diagnosis dating back 13 years ago. Difficulties dealt with were transfer and hygiene issues due to lower limbs spasticity and incontinence. Botulinum toxin injections and anticholinergics lead to a significant increase in function and quality of life while baclofen pump consideration was reinstated.

Conclusions: Despite the significant progress in identifying the genetic cause of HSP, the need for symptomatic management persists. The multiple drug interventions needed, the systematic study of interventions like botulinum toxin and baclofen pump as well as urological dysfunction and pain, can all be met in an organized interdisciplinary spasticity clinic inside a general hospital. Following the evidence-based position of UEMS-PRM for spinal cord injuries and taking into consideration the obvious similarities with HSP, the need for more equivalent structures in general hospitals is imperative.

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SPINAL CORD INJURY AND TRAUMATIC BRAIN INJURY- ARE THE BOUNDARIES BETWEEN THE TWO CONCRETE? TWO CASES**Antonios Kontaxakis¹, George Strouggis², Alexandros Chados², Savvas Melissaris², Nikolaos Georgakoulias², Christina- Anastasia Raptidi²**PRM, 414 Special Diseases Military Hospital, Athens, Greece¹, "G.Gennimatas" General Hospital, Athens, Greece²

Introduction: Both spinal cord injury (SCI) and traumatic brain injury (TBI) can be detrimental in several functional aspects. With prevalence 20-74%% and commonly overlooked (up to 60%), prompt diagnosis is important modifying prognosis, rehabilitation interventions, prevention and complications' treatment. Even common medications used in SCI can influence the disturbed cognitive function in cooccurring TBI.

Objective: To stress the importance of SCI-TBI coexistence

Method: Two common cases will be described.

Results: A female patient, age 29, after a motor vehicle accident, had loss of consciousness for an hour and subsequent GCS 15/15, no post traumatic amnesia and complete T5 paraplegia. At PRM admission, she had non-significant cognitive impairments, mild hypertonia in her lower limbs, no balance seated, being on anticoagulant and anticholinergic medications.

A male patient, age 48 after a fall from 2m high, and subsequent GCS: 10/15, post traumatic amnesia for 7 days, complete T11 paraplegia. At PRM admission, he was occasionally agitated, with attention and memory deficits, had bilateral hip heterotopic ossifications and complete flaccid paraplegia on antiepileptic, antipsychotic and antidepressive medications.

Medication modification in both increased participation in treatment, with Pittsburgh rehabilitation participation scale rising from good to excellent and from fair to very good correspondingly.

Conclusions: While the neuropsychological examination, especially in mild TBI, might not be readily available, meticulous attention to patients' acute phase history combined with neuroradiological examination up to 2-3 months after injury can provide us with evidence of brain lesions. Even in low force injuries (where TBI is most often overlooked) rehabilitation participation can be increased.

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OSTEOARTHRITIS AND DIABETES: THE CLOSED LOOP**Aneta Bajalska, Maja Manoleva, Lidija Stojanoska Matjanoska, Cvetanka Gjerakaroska Savevska, Marija Gocevska, Daniela Gecevska**

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Introduction: Osteoarthritis (OA) and diabetes mellitus (DM) are two common diseases in female patients and both share common risk factors like: age, obesity, hypertension, dyslipidemia, exercise etc. These factors alone or combined into the cluster of metabolic syndrome (Mets) contribute to the development of systemic low-grade inflammation, thus increasing the risk of both OA and DM and causing changes in joint homeostasis. Increased body weight, on the other hand, causes mechanical injury in weight bearing joints. Physical inactivity due to joint pain may contribute to the development of DM, while hyperglycemia, advanced glycosylation end products and even treatment of DM can be deleterious to cartilage homeostasis.

Objective: To determine the relationship between OA and DM in our group of patients.

Method: 142 female patients with OA, aged ≥ 40 years were recruited. Presence of DM type 2, metabolic factors and OA joint localization were observed. Body mass index (BMI) was calculated, while MetS was defined by the sum of metabolic factors ≥ 3 .

Results: From the total of 142 female patients with OA (aged ≥ 40 ys), DM was found in 43 (30.3%). In the group of patients with DM, MetS was found in 30 cases (69.8%). Overweight/obese were 40 (93%). Knee OA was present in 12 (27.9%), hand OA in 3 (7%), hip OA in 10 (23%), OA of ≥ 2 joints was present in 18 patients (42%).

Conclusions: Our findings suggest that OA may be positively associated with DM in an aging and obese female population. Still, the underlying relationship between these two diseases is yet to be understood.

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IS 90 DEGREES FLEXION AN IMPORTANT DISCHARGE CRITERION AFTER TOTAL KNEE ARTHROPLASTIES?- A SERVICE EVALUATION REPORT**Anuj Punnoose, Hannah Bebbington, Alan Norrish, Suzanna Harless**

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Introduction: Joint replacement surgeries have shown to reduce pain and disability and improve function in older people with osteoarthritis. Range of Motion (ROM) is considered as one of the key outcomes after TKA surgery. An active flexion range of 90-110 degrees is ideally required to perform functional tasks such as sitting in a chair and stair climbing, which could take up to several days to achieve. An extended hospital stay may not be feasible with the current bed pressures, cost implications and higher risk of postoperative complications within an acute environment.

Method: All patients undergoing surgery for Primary Total Knee Replacement within a six week period were included in the study. Additionally, a telephonic survey of 11 acute NHS hospital Trusts in the region was conducted to determine the discharge criteria and for benchmarking services against national standards.

Results: Out of 50 patients included for analysis, 21(42%) patients were discharged with a flexion ROM of >90 degrees (Group A), 28 patients (56%) with a flexion ROM of 70-90 degrees (Group B) and 1 patient (2%) was discharged with a flexion ROM of 70 degrees (Group A+B) achieved 90 degrees at 6 weeks. The only patient in Group C did not achieve 90 degrees and had to undergo MUA after 6 weeks. The telephonic survey carried out amongst local trusts (N=11) revealed a wide variation in discharge criteria.

Conclusion: A flexion ROM of 90 degrees is not essential for discharge as traditionally believed. A discharge ROM of >70 degrees seems appropriate and achievable. Further longer term studies are required to investigate the significance of discharge ROM on the final outcome of TKR surgeries. Studies also need to investigate the impact of different ROM on healthcare utilisation post discharge from hospitals.

P133

A CASE WHERE HETEROTOPIC OSSIFICATION (HO) APPEARS IN A PATIENT WITH 2 PREDISPOSING FACTORS. SHOULD WE BE MORE AWARE OF HO APPEARANCE?

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Introduction: The prevalence of HO in patients with stroke is almost 1.3%, with the 55- 70% being hemorrhagic and the 30% ischemic. It is, also, known that the risk of developing stroke is almost doubled among the patients with cerebral palsy (CP) CP in comparison with the general population and is five times higher if the patient is under 50 years old.

Objective: To describe a CP patient who underwent stroke and his medical condition was complicated by HO at the hip. To review the literature for such combined factors in appearance of HO.

Material and Methods: A care report of a CP patients who underwent stroke with HO complication is presented. Also a related literature search in the known databases is performed.

Results: A 35-year-old CP male was urgently admitted to the University Hospital of Ioannina, with symptoms of CNS lesion. After a month of hospitalization, the patient was transferred to the Physical Medicine and Rehabilitation clinic for physical and occupational therapy. Two weeks later limited movement was noticed and the radiological investigation revealed HO in the hip joint. In the physical examination, the range of motion (ROM) of the hip was compromised in many degrees of freedom. Treatment with indomethacin 75mg p.o. once daily and diclofenac cut. Sol. 1.5% locally was initiated. Also, physiotherapy was performed within the pain-free range of motion. After a week, the patient was discharged with the prophylactic medication of etidronate 20mg/kg p.o. for three months and the order to continue his physical therapy at home. No similar case has been mentioned in the medical literature.

Conclusion: The significant increase risk for HO development due to add-on phenomenon (old cerebral palsy lesion and current brain stroke) of central nervous system injury must be suspected by physicians and therapists in this particular subset of CNS patients

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OPTIMIZATION OF METHODS OF VOICE RESTORATION AFTER LARYNX REMOVAL AT POST-HOSPITAL STAGE**Olga Orlova², Daria Uklonskaya⁵, Dmitriy Reshetov³, Yulia Zborovskaya⁴, Arina Uklonskaya¹ (presenting author)**

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Cancer removal of larynx leads to aphonia and verbal communication disorders. Regardless of voice rehabilitation method, speech therapy is necessary to achieve high level of proficiency of sonorous speech. This process is long-time and is carried out at post-hospital stage before achieving acceptable level of social rehabilitation. Due to inaccessibility of large oncological institutions, many patients from faraway regions are limited in getting such care.

The aim of our work was to find ways of more effective voice rehabilitation after larynx removal.

We worked with 51 patients after laryngectomy. All patients at early voice rehabilitation stages underwent course of speech therapy in the hospital. 15 patients, who lived close to hospital, had possibility to continue classes with speech therapist on outpatient basis after leaving hospital. They achieved high level of voice restoration in 80% of cases. 36 patients lived in faraway regions, so they were forced to interrupt classes with speech therapist and continue voice rehabilitation after 3 months on average. In this case, time of achievement of acceptable level of social rehabilitation significantly increased, and its effectiveness fell 1,75 times. Weekly consultations at skill automation stage allowed to keep rehabilitation effectiveness nearly at same level (77,8%).

Thus, continued pedagogical support is necessary for successful restoration of verbal communication after laryngectomy. Patients should have possibility to get pedagogical help or to be under dynamic supervision for automating new skill at remote rehabilitation stages. Online-counseling or telemedicine technologies can be optimal help method for patients from faraway regions.

P135

THE ROLE OF NUTRITIONAL STATUS IN REHABILITATION CARE**Babett Tóth, Dénes Zoltán**

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Introduction: Appropriate nutrition screening, assessment, intervention and documentation got strong focus in multiple care settings among the past few years in the specialized literature, even so there is a lack of satisfying data about the dietetical aspects and the difficulties of nutritional therapy and their solutions during the rehabilitation treatment. Nowadays the prevalence of malnutrition in inpatient rehabilitation institutes occurs between 38-51%. Malnutrition and secondary sarcopenia seem to be comorbid factors that increase the number of complications during rehabilitation care. The reduction of malnutrition could cause financial concerns beside patient welfare aspects.

Objective: Institutional malnutrition risk screening was taken.

Methods: The internationally validated five step Malnutrition Screening Tool was used by the dietitians of the institute.

Results: At the time of screening 44% of patients had risk of malnutrition (N=331, average age 59 years). 19% of patients presented moderate risk and 25% of patients had high risk of malnutrition. The sample consists of 176 males and 155 females (53%/47%). The interquartile range of body mass index of the patients were between 22-29,9 kg/m² (s=6,36). The comparison of the wards showed that the Brain Injury Rehabilitation Unit has the most of patients who have risk of malnutrition (62,5%, 25 patients).

Conclusions: Assessment of the nutritional status of patients at the time of admission to the rehabilitation units is essential in order to set appropriate nutritional therapy up that supports rehabilitation treatment. Malnutrition risk screening tools are not sensitive enough for the special groups of rehabilitation patients and body mass index does not show the real malnutrition anymore. Medical body composition analysis seems to be the optimal solution for determining nutritional status before- and during rehabilitation care.

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CRITERIA OF THE PHYSICAL ACTIVITY SELECTION FOR CHILDREN WITH JUVENILE IDIOPATHIC ARTHRITIS**Beata Pietrzak¹, Gabriela Figas¹, Tomasz Adamczewski¹, Aleksandra Saryusz-Wolska¹, Aleksandra Stasiak², Jolanta Kujawa¹**¹Department of Physical and Rehabilitation Medicine, Medical University of Lodz, Lodz, Poland²Department of Cardiology and Pediatric Rheumatology, Medical University of Lodz, Lodz, Poland

Introduction: Juvenile Idiopathic Arthritis (JIA) is chronic, deteriorating disease which causes many restrictions in everyday life of affected children. There are many studies that prove physical activity to be beneficial, however effectiveness of training protocols for children with JIA brings some controversy.

Objective: The goal of the review was to determine criteria of the physical activity selection in order to improve physical capacity of children with JIA.

Method: The literature review of physical activity of children with JIA was made. The main inclusion criterion was the relevance of the studies with the PRM profession according to the judgment of two authors. 98 records, sorted by Best Match, from 1991 to 2019. At first, the selection was made according to the titles, resulting in 47 articles, and then according to the abstracts - 13 articles remain.

Results: Review of the literature had shown different activity programs of children with JIA. Protocols had differed in length (6 – 20 weeks), frequency (1 – 3 per week), duration (30 – 60 min), intensity (60-70% max HR) and had included aerobic training, resistance training, sport training, Qigong exercises and Pilates. Aerobic training had included walking, water exercises, dancing, karate cardio and jump rope exercises. Physical activity adapted to clinical state has a positive effect on the quality of life, decreasing pain, increasing range of motion and muscle strength of children with JIA.

Conclusions: Selection of exercises intensity and difficulty should be correlated with disease duration and its activity. No significant effect was reported in relation to the exercise intensity and the exercise protocol used to increase physical capacity. There is a need to continue the research in order to define the most effective rehabilitation plans for the increase of physical fitness in children with JIA, parameters determining the type of physical activity.

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PRESENTATION OF BILATERAL STUDY OF EXOSKELETON ASSISTED THERAPY COMPARED TO TRADITIONAL THERAPY IN SCI REHABILITATION**Benjamin Shenker¹, András Klauber¹, Melinda Fehér¹, Luca Tóth², Péter Maróti², Péter Cserhádi¹**¹Rehabilitation Department of Spinal Cord Injuries, National Institute of Medical Rehabilitation,²University of Pécs, Budapest, Hungary

Introduction: The epidemiological significance of traumatic spinal cord injury (sci) is a growing concern of healthcare. Every year over 250.000 people suffer from sci. Providing an adequate medical and rehabilitation response and state of the art rehabilitation modalities can help minimize the disruption to individuals with sci. Wheelchair use and immobility can often cause further complications, osteoporosis, atherosclerosis, diabetes, depression and pathological fractures. The main aim for rehabilitation is to avoid and minimize the consequences of immobilization and to gain an acceptable level of quality of life.

Objective: Exoskeletons can be of significant benefit during and after rehabilitation of complete sci. Clinical trials have shown that exoskeletons are suitable and safe for rehabilitation, ambulation and even domestic use. Positive changes registered in body composition, bone density, urogenital and gastrointestinal parameters and overall well being.

In regard to the findings above, we have set out the goal of comparing results of exoskeleton assisted rehabilitation to the results of conventional rehabilitation.

Method: According to our hypothesis we can achieve better results in spasticity, bone density, body composition, urogenital and gastrointestinal systems with new exoskeleton assisted therapy compared to traditional rehabilitation therapies. This 2 year bilateral study will take place at 2 of Hungary's leading rehabilitation centers, using identical exoskeletons for 5 sci patients at both facilities. Control group will be of 10 sci patients receiving traditional rehabilitation therapies. The protocol includes 5 days per week, 60-90 minutes daily training, set to achieve standing up, walking and sitting down independently.

Results: Data will be gathered on physiological, mental and functional parameters. Internal medicine and rehabilitation specialists, dietitians, psychologists and physiotherapists will evaluate the collected information.

Conclusions: We anticipate to verify our hypothesis and hope our findings will support the base for protocols of rehabilitation of sci patients using exoskeletons.

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EFFECTIVENESS OF SHOCKWAVE TREATMENT IN THE TREATMENT OF PLANTAR FASCIITIS IN ATHLETES: AN EXPERIMENTAL STUDY**Bernardo Moreno¹, Bruno Guimarães², Nuno Silva³, Sara Amaral⁴, Rui Vaz¹**¹Physical Medicine and Rehabilitation Department, Hospital Senhora da Oliveira, Guimarães, Portugal, ⁴Centro HospitalarUniversitário do Porto

Plantar fasciitis(PF) is characterized by inflammation of plantar fascia, and is characterized by pain in the insertion of the fascia with the calcaneus. Affects about 5%of the population, with bilateral involvement present in 20 to 30%of cases. This incidence could increase to 10-15%in athletes. Extracorporeal shockwaves treatment(ESWT) has emerged as an option for this patients.

Objective:This study aims to evaluate the effectiveness of ESW in the treatment of PF in football athletes.

Methods:The present study is an experimental prospective cohort, comprising athletes with clinical diagnosis and echographic confirmation of PF. 30 participants integrated the study. They were divided in interventional group(IG)(submitted to ESWT) and control group(submitted to conventional physiotherapy)(CG).

Patient demographics and Pain Scale for Plantar Fasciitis Pain Rating Scale(EN) and PFPS scores were collected at the pre-treatment assessment, after 4 weeks and 12 weeks of treatment.

Results:Thirty athletes(9(30%)female) were included, with a mean age of 28.5 years. Of the sample, 65% were PF of the right foot and 35% of the left foot. No differences was observed between groups at baseline regarding the EN(EN0:CG vs IG 7.5±1.6 vs:7.9±1.97 p=0.51). The mean 4-week and 12-week EN score(EN1) was significantly lower in the IG when compared to the CG(EN1:CG vs IG 4.6 ± 1.5 vs 3.1 ± 1.3 p =0.007; EN2:CGvsIG 3.2±1.2 vs 2.1±1.4 p = 0.03). No differences was observed between groups at baseline regarding the PFPS score(PFPS0:CG vs IG 68.22±17.73vs70.43±19.21p=0.74). At 4-week and 12-week, the mean PFPS mean score in the IG was lower compared to the CG(PFPS1:CG vs IG 41.34± 11.78vs28.32±17.11p=0.02; PFPS2:CG vs IG 31.89±13.45 vs 16.88±15.66 p=0.008).

Conclusions:The intervention with ESWT showed efficacy in pain control of patients with plantar fasciitis, with significant decrease of this parameter after the intervention. At the same time, there was an improvement in PFPS, reflecting improvement at pain and functional level.

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THE IMPORTANCE OF REHABILITATION TREATMENT IN WHIPLASH SYNDROME**Bernardo Moreno¹, Nuno Silva², Bruno Guimarães³, Tiago Serra⁴, Sara Amaral⁵**

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Whiplash syndrome is defined as a set of predominantly cervical musculoskeletal injuries resulting from the kinetic energy conversion of acceleration/deceleration mechanisms during hyperextension/hyperflexion of the cervical spinal cord segment. This syndrome is among the leading car crash-related injuries and its incidence has been increasing during the past decades, ranging from 16 to 200 per 100,000 population, and varying by geographical location.

Despite the large number of whiplash syndrome cases, its physiopathology is still unknown.

For its diagnosis, it will be important to value the clinical history, referring a cervical hyperflexion or hyperextension movement and the main alterations evaluated in the patients: cervical dysfunction, proprioceptive deficits, reduced cervical mobility and local or irradiated pain.

Radiography may show loss of physiological lordosis in neutral or flexion position, also known as straight sign, characteristic of this syndrome. MRI or CT help in assessing muscle chain abnormality and cervical protrusion/hernias.

After an initial resting phase, with cervical collar immobilization, NSAIDs and muscle relaxants if needed, it is important to start early (up to 2 weeks) a specific rehabilitation program with kinesiotherapy, massotherapy, proprioceptive training and muscle strengthening. Thermotherapy, electrotherapy and other physical agents can be used for better recovery.

A close follow-up during the rehabilitation phase is needed to assess the presence of red flags that make suspicion of any serious alteration requiring orientation to neurosurgery or orthopedics for evaluate the need for surgical treatment.

Most patients report improvement in symptomatology within 2 months; however, approximately 43% of cases may persist beyond one year, and about one third report persistent symptoms up to 2 years after injury with decreased quality of life and functional capacity. These patients may require longer rehabilitation treatment to minimize associated pain and functional problems.

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ATYPICAL FEMUR FRACTURE AND PROLONGED BISPHTHONATES TREATMENT**Bernardo Moreno¹, Bruno Guimarães², Nuno Silva³, Tiago Serra⁴, Sara Amaral⁵, Rui Vaz¹**

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Osteoporosis is the most common bone metabolic disease, occurring in over 200 million persons worldwide. It is characterized by reduced bone mass and deterioration of bone microarchitecture, increasing the risk of fracture.

Bisphosphonates, one of the most commonly drugs used in the treatment of osteoporosis reduce the risk of fractures in the short term, however, in the long run they may be associated with various complications such as increased risk of atypical fractures.

Although the incidence of atypical femur fractures is low, more and more studies are demonstrating the increasing association between atypical femoral fracture and prolonged use of bisphosphonates.

The diagnosis of atypical femoral fractures is not easy and the lack of consensus on the definition of diagnostic criteria is also a limitation to the diagnosis of this type of fractures.

Objective: To update the theme of the relationship between prolonged bisphosphonate treatment and the risk of atypical femoral fractures, as well as the presentation of two clinical cases.

Clinical case 1: Woman, 78-year-old, with a history of osteoporosis is undergoing with bisphosphonate treatment since 2006. In January 2017, she had left thigh trauma after falling from his own height. On the X-ray was observed a fracture of the left femoral diaphysis.

Clinical case 2: A 69-year-old woman with a history of osteoporosis who had been taking bisphosphonates for 7 years. She had a fall from her own height with trauma to her right thigh. On the X-ray it was possible to observe a fracture of the right femoral diaphysis, characteristic of atypical fracture.

Conclusion: The risk-benefit ratio of bisphosphonates use continues to give preference to its use; however, although there are no fully established indications, discontinuation is advised after 3-5 years of continuous treatment, with future reevaluation of need to reintroduce bisphosphonates after 3 years.

P141

COMPARISON OF THE EFFECTS OF SHORT WAVE DIATHERMIA, ULTRASOUND, TENS ON PAIN AND PHYSICAL FUNCTION IN KNEE OSTEOARTHRITIS**Betül Başar**

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Objective: Osteoarthritis of the knee is a common disease that causes pain, swelling, stiffness, muscle weakness, and physical dysfunction. Short Wave Diathermy (SWD), Ultrasound (US), and TENSS are commonly used physical therapy agents in the treatment. The aim of our study is to compare therapeutic effects of these physical agents in women with bilateral knee osteoarthritis.

Method: 60 patients were randomized into three groups of 20 patients each: group 1 received SWD; group 2 received US; group 3 received TENSS. These patients had stage 2 or 3 knee OA according to the Kellgren-Lawrence classification. Evaluations were made according to VAS, Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), and physical function tests at pre-treatment, post-treatment and 1st month control.

Results: There was no significant difference between the groups in terms of age, height, weight, body mass index, duration of pain, and radiological staging of OA. All three physical therapy agents were found to be effective in terms of pain and physical functions. Better results were obtained in terms of VAS and WOMAC pain values after treatment and at 1 month follow-up than before treatment. However, when the results of all three physical therapy agents were compared, TENSS was found to be more effective in terms of pain treatment. Although there was no significant difference between the groups in terms of physical functions, SWD was found to be more effective in terms of Repeated Sit to Stand Test and Twenty Meter Walk Tests, and US was more effective in terms of Straight Line Walk test.

Conclusions: Isometric and isokinetic exercise programs are important for physical functions. Therefore, it is recommended that they be administered in addition to physical therapy agents. In this study, it was observed that even if no isometric and isokinetic exercise program was applied with all three physical therapy agents, good results were achieved in terms of physical functions compared to pre-treatment. Physical therapy agents were found to be effective in terms of physical functions. In addition, TENSS was found to be more effective in the treatment of pain.

P142

THE INCIDENCE OF SCOLIOSIS IN THE POPULATION OF FEMALE STUDENT ATHLETES OF THE FACULTY OF MEDICINE UNIVERSITY OF BELGRADE**Biljana Đuric, Nikola Topalovic, Sanja Mazic, Dejan Nešic**

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Introduction: The student population in general is characterized by dominantly sedentary lifestyle, which can lead to numerous risks for the development of various deformities of the musculoskeletal system. One of the measures to prevent the onset of these deformities is to exercise regularly.

Objective: The aim of our study was to investigate the incidence of scoliosis in the population of female student athletes of the Faculty of Medicine.

Methods: Our study included 76 female athlete students (futsal, basketball, volleyball, athletics and tennis players) that participated in bi-annual preparticipational medical examination. During this examination, anthropometric parameters (body height, body mass, body mass index and % body fat) were determined, but also the existence of spinal deformity and its spatial orientation. The eventual existence of deformity was determined by a physical examination, which included an assessment of shoulder height, a comparison of the triangles of stature, and an assessment of the presence of asymmetry in the area of the spinal column and chest.

Results: The results of our study has shown that 18 out of 76 female athletes (24%) has a deformed spine by type of scoliosis, with the highest incidence within tennis players (80%) and basketball players (30%). We have also found a positive correlation between the spatial scoliosis orientation and dominate extremity ($r=0.28$; $p=0.13$) and the incidence of scoliosis and body high ($r=0.34$; $p=0.03$).

Conclusion: Although regular exercise is one of the preventive measures of musculoskeletal deformity, the specificities and repetitions of certain movements and postures during exercise may favor the development of deformities. For this reason, it is necessary to engage both sides of the body equally during exercise to prevent the development of these deformities.

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CASE REPORT: TREATMENT WITH RADIAL EXTRACORPOREAL SHOCK WAVE THERAPY (RESWT) OF A PATIENT WITH KNEE OSTEOARTHRITIS**Biljana Kalchovska Ivanovska**

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Introduction: Osteoarthritis (OA) is a long-term chronic disease characterized by the deterioration of cartilage in joints which results in bones rubbing together and creating stiffness, pain, and impaired movement. While OA is related to ageing, it is also associated with a variety of both modifiable and nonmodifiable risk factors, including: obesity, lack of exercise, genetic predisposition, bone density, occupational injury, trauma, and gender. It is characterized by pain, stiffness, crepitus, soft swelling, limited joint mobility. Treatment can be conservative including non-pharmacological and pharmacological treatments and surgical treatments. Extracorporeal shockwave therapy (ESWT) is a non-invasive treatment in which a device is used to pass acoustic shockwaves through the skin to the affected area. This results with beneficial effects such as neovascularization ingrowth, reversal of chronic inflammation, stimulation of collagen and dissolution of calcium build-up.

Objective: To evaluate the effectiveness of RESWT in female patient suffering from knee osteoarthritis.

Method: J.A. 56 years old woman came in our Institute on the recommendation the family doctor with pain, stiffness and limited movements of the right knee. Radio diagnostic procedure in addition of enlarged intercondylar eminences with asymmetry of the medial side of the femorotibial joint, as well as femoral and tibial osteophytes. Patellofemoral articular space was preserved. The treatment included RESWT application and knee strengthening exercises. It was used radial probe (type: continual; pressure: 3.0 bar; frequency 10 Hz; number of shocks: 3000), once a week, a total of 5 sessions. The pain was determined by a Visual Analogue Scale and functional ability with WOMAC before therapy and at 6th week after the start of the treatment.

Results: At the end of the patient follow-up the score on VAS was decreased and there was improvement in the WOMAC score.

Conclusions: RESWT is safe, effective and alternative treatment for knee osteoarthritis.

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THE ROLE OF ACUPUNCTURE IN TREATING CHRONIC PAIN**Biljana Marjanovic**

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Acupuncture (a branch of traditional Chinese medicine, or TCM) is a practice 3,500 years older than traditional Western medicine. It works by applying needles, heat, and pressure to specific points on the body. The theory is that invigorating these points releases or redirects the body's natural energy known as chi or *qi* because illness and pain come from blockages or imbalances of this vital life force.

According to the National Institute of Health (NIH), a number of studies suggest that acupuncture works particularly well on chronic pain such as back and neck pain; osteoarthritis/knee pain; and headache. It often reduces the incidence and severity of tension headaches and may prevent migraines. "Therefore," the NIH concludes, "acupuncture appears to be a reasonable option for people with chronic pain to consider." pain relief with acupuncture comes from inactivating the source of pain by modulating endorphin levels. These authors also reported on the benefits of acupuncture for temporomandibular joint disorder (TMD).

During 4 months have been treated 65 patients 42 women 23 men with different diagnosis of pain cervical or lumbal syndrome or epicondylitis or migrena. They had acupuncture once a week, at least 3 weeks, we have improvements at all patients, released pain or new condition without pain Patients with epicondylitis started to raise range of movements at the end of therapy got maximum range. All patients started to be relaxed, almost after first therapy.

Acupuncture is very important to release pain in therapy of pain.

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P145

PRIMARY PROSTHETIC REHABILITATION IN A PATIENT WITH BILATERAL POSTRAUMATIC TRANSFEMORAL AMPUTATION**Biljana Majstorovic**

Odjeljenje za protetičkurehabilitacijuiposttraumatskastanja, ZFMR dr Miroslav Zotovic, Banjaluka, Bosna i Hercegovina

Introduction: Etiology wise trauma remains the second biggest cause of amputations worldwide. They usually occur in younger males aged 20 – 29, although they can occur at any time in both males and females. The leading causes of traumatic amputations are accidents involving motor vehicles, work injuries, or they can happen as a result of force such as gun wounds, war injuries or after severe burns or electric shock. The loss of both lower extremities represents a challenging task in rehabilitation, especially if it happens simultaneously. People with bilateral traumatic amputations suffer tremendous physiological and psychological changes.

Objective:To demonstrate the complexity of a primary prosthetic rehabilitation in a patient with bilateral posttraumatic transfemoral amputation.

Materials and methods:The process of implementing a primary prosthetic rehabilitation program was significantly slowed down because of the delayed wound healing on the right amputation stump and frequent phantom sensations and pain. During the time period in which the right stump wound was healing, the prosthetic team started the preprosthetic preparation in order to accelerate the primary prosthetic rehabilitation. An assessment of the prosthetic potential was made before starting the process of primary prosthetic care - activity level K 0, AMP no PRO 6. The success rate of the primary prosthetic rehabilitation program was measured by mobility level (K levels, LCI score, Timed Up and Go, 2 minutes timed walk tests).

Results:All of these measurement tools showed a functionality degree in the activities of a daily life, work activities as well as advanced activities. Activity Level K 3, AMP PRO 37, stand up test and go 28 s, 2 minute walk test 76 m. LCI scale 14/2. TT 85 kg, TV 180 cm.

Conclusion:Rehabilitation of people with bilateral transfemoral amputation is one of the most difficult and complex challenges in prosthetic rehabilitation. Only a well-trained prosthetics team in collaboration with a motivated patient can lead to a successful outcome of prosthetic rehabilitation.

Keywords:posttraumatic bilateral transfemoral amputation, prosthetic rehabilitation.

P146

PRESCRIPTION OF PROSTHETIC COMPONENTS FOR PATIENTS WITH LOWER LIMB AMPUTATIONS – PROSPECT OF PROGRESS**Borka Gavrilovic, Boza Grujicic, Tatjana Blagojevic, Branislav Savic, Milutin Radotic, Mirjana Vitaz**

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Introduction: Prescription of prosthetic components for lower-limb amputees is primarily based on medical indications. Besides this, the criteria are also based on the Rulebook of the Republic health insurance fund on medical-technological devices.

Objective: This paper aimed to demonstrate the profile of components used for prosthetic fitting of lower-limb amputees: transfemoral and transtibial.

Method: The study included patients hospitalized in Specialized Hospital for Rehabilitation and Orthopedic Prosthetics, Belgrade. The retrospective design enrolled lower-limb amputees who had undergone prosthetic rehabilitation. The greatest number of patients received components after prescription according to the valid Rulebook: SACH feet, four-axis knee joints, knee units with brakes. Donation enabled fitting of one Multiflex foot and liner.

Results: Males 60%, Females 40%, Age 0-49 10%, 50-59 10%, 60-69% 40%, 70-79% 40%. Prosthetic foot SACH 95%, Multiflex 5%, Knees with brakes 77%, Four-axis knee joints 23%, Liner 5%.

Conclusion: Guidelines to prescription of more adequate components would contribute to greater compliance between the patients' needs and the Rulebook of the Republic health insurance fund. For younger patients, who are able to work and ambulate outdoors with high activity level, the use of more adequate components would enable them to walk larger distances, with less difficulty and less fatigue, as well as with better tolerance of in-socket interface pressure.

P147

ASSESSMENT OF THE EFFECT OF LOW-POWER LASER ON THE PHANTOM LIMB PAIN INTENSITY APPLIED TO ACCUPUNCTURE POINTS IN PERSONS WITH TRAUMATIC UPPER-LIMB AMPUTATIONS**Bozidar Grujicic, Borka Gavrilovic, Milka Kajganic, Slavica Stojanovic, Tatjana Blagojevic, Igor Popovic**

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Introduction: Phantom limb pain is described as projected pain in the amputated part of the limb. It affects more than 60% of amputees, and its chronic character leads to decrease of quality of life and undermines the effectiveness of the entire rehabilitation of these persons. There are several treatment options for phantom limb pain: pharmacological, surgical and non-pharmacological. Low-power laser therapy improves neuropathic and musculoskeletal pain, which is explained by "Gait control theory", release of endorphins and enkephalins and local effect.

Objective: To assess the effect of low-power laser as an additional therapy to the pharmacological one and the effect of medicamentous monotherapy (pregabalin) on the phantom pain intensity in persons with traumatic upper limb amputations.

Method: The study included 18 patients with below-elbow amputation (traumatic etiology, males aged 20-47, with phantom pain present on admission) who were hospitalized in Specialized Hospital for Rehabilitation and Orthopedic Prosthetics during 2017-2019. All patients were treated pharmacologically (pregabalin had been already introduced during the operative phase), whereby nine of them received low-power laser treatment to acupuncture points over four weeks. The pain intensity was assessed by use of visual analogous scale (VAS 0-100 m) before and after the treatment.

Results: Patients who received dual therapy had greater improvement of the average value of phantom pain intensity (VAS: 46 vs. 65) after four weeks, with faster/more efficient prosthetic rehabilitation (52 days vs. 70 days).

Conclusion: The use of low-power laser on acupuncture points can be an efficient therapeutic option for phantom pain treatment in upper-limb amputees. The results show that it is a cost-effective and easy method (especially if you want to avoid adverse effects of medicamentous therapy), which can be used as a supplement to other methods for phantom pain treatment), which also enables an appropriate early prosthetic fitting.

P148

POST-TRAUMATIC SYRINGOMYELIA – CLINICAL CASE**Bruno Guimarães¹, Bernardo Moreno², Jorge Moreira¹, Catarina Aguiar Branco¹**Physical Medicine and Rehabilitation Centro Hospitalar de Entre o Douro e Vouga, Santa Maria da Feira, Portugal¹, Hospital Senhora da Oliveira²

Introduction: Syringomyelia is characterized by the presence of abnormal fluid filled cavities(syringes) within the spinal cord, resulting in myelopathy.Syringomyelia can occur in association with Chiari type I malformation (50%), in the context of spinal cord injury (SCI), infection, arachnoiditis, or idiopathic cause.The incidence of symptomatic post-traumatic syringomyelia(PTS) varies between 1.9%-4.5% among SCI patients. PTS history can be quite variable and depends on the level of the syrinx and extent of associated spinal cord injury. The main symptoms can be unilateral and include sensory, motor and painful modifications. Autonomic dysfunction may appear at a later stage. Diagnosis should arise from clinical suspicion and Magnetic resonance imaging (MRI) is the imaging modality of choice for diagnosis and management.Treatment may be conservative, with physical rehabilitation and medical treatment associated with a vigilant attitude. In the most severe cases the treatment of choice is surgical intervention.

Clinical Case:Male patient, 23 years old, with history of AIS Paraplegia NN D4, resulting from spinal trauma 8 years ago. In the routine evaluation, the patient referred 1-year history of painful hypoesthesia at the right upper limb. At physical exam, there was a decrease in pain and heat sensitivity in the right upper limb up to level C5, with no change in tactile or proprioceptive sensitivity or new motor deficits. Physiatrist requested a MRI, that observed large hydrosyringomyelia, septate, of the bulbomedullary transition to D8, which caused spinal expansion, especially in cervical segment to D3-D4. Then he was transfer to Neurosurgery department that proposed surgery.

Conclusion:Although PTS is a relatively infrequent condition, its clinical presentation may be very variable and it can cause devastating consequences.

Physicians who follow patients with SCI should have a high grade of suspicion of PTS when new neurological changes/symptoms develop, or when sudden and progressive deterioration occurs.

P149

THE IMPACT OF ECCENTRIC STRENGTHENING PROTOCOL IN THE PERFORMANCE SOCCER PLAYERS DURING A SEASON**Bruno Guimarães¹, Bernardo Moreno², José Barreto¹, Jorge Moreira¹, Catarina Aguiar-Branco¹**¹Physical and Rehabilitation Medicine Department, Centro Hospitalar Entre o Douro e Vouga, Porto,²Physical and Rehabilitation Medicine Department, Hospital Senhora da Oliveira – Guimarães, Portugal

Introduction:Football is the most practiced sport in the world. Acute hamstring injuries are the most common, accounting for about 15-20% of injuries resulting from this sport. Muscle strengthening of these muscles as part of a rehabilitation plan has been linked to the prevention of injuries.

Objective: This study aims to verify the impact that a hamstring strengthening program on the performance of soccer players.

Material and Methods:The present study is a prospective experimental cohort, comprising 90 soccer players of both genders (16 female). Participants were divided into two groups: the intervention group, which was part of a hamstring strengthening program (HG) and the control group (CG). The strengthening protocol was based on the *Nordic hamstring exercise*, which consists of eccentric hamstring strengthening exercises. This strengthening took place over 36 sessions in the first 12 weeks of the season (each session with 3 sets of 12, 10 and 8 repetitions). The outcome reported in this presentation was hamstring isokinetic evaluation (concentric quadriceps and hamstring contraction at 180°/s, and eccentric quadriceps and hamstring contraction at 180°/s) and sprint performance (30 m).

Results:After 12 weeks, HG showed more strength in isokinetic assessment in both quadriceps and hamstring muscles (Peak Torque (Nm): 126.48±21.01 vs 134.33±19.26 p=0.0351 & 122.32±18.12 vs 130.81±16.42 p=0.0221) as well as better sprint performance (4.076±0.801 vs 4.451±0.905 p=0.0403). At the end of the season the HG keep showing better performance in isokinetic assessment, in both quadriceps and hamstring muscles (Peak Torque (Nm): 125.11±19.89 vs 132.78±18.26 p<0.001 & 119.11±17.97 vs 127.31±19.02 p=0.0384), but the spring performance didn't show significant differences (4.149±0.902 vs 4.491±1.005 p=0.0929).

Conclusion:Strengthening the hamstrings had a significant impact on performance outcomes assess. Other dimensions should be further evaluated in the future, such as the complementary assessment of training volume and load.

P150

REHABILITATION AND QUALITY OF LIFE IN TEENAGES WITH ANKLE CRPS-I**Carmen Statescu, Diana Kamal Craiova, Constantin Kamal, Otilia Rogoveanu, Rodica Traistaru**

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Background. Bimalleolar fractures is a debilitating injury, especially if the fracture is unstable. After severe trauma or lower limb injury, patients could be presented complex regional pain syndrometype I (CRPS-I) of ankle and rear foot - a condition characterized by regional pain and sensory, motor, sudomotor, vasomotor, and/or trophic findings. This is one of the devastating problems that can develop (angular problems in the extremity, limb length discrepancy in which one leg is longer than the other and fractures in the joint that could cause arthritis at a later time).

Objectives. We assessed the effects of a 8 week complex rehabilitation program (pharmacotherapy, educational sessions, multi-modal exercise training) on quality of life in teenagers with ankle CRPS-I after bimalleolar fractures.

Methods. 26 teeneges (14,5 years mean age) with ankle and foot CRPS-I after bimalleolar fractures, were randomly assigned to a rehabilitation group – RG (n=15) and a control group (only educational sessions) – CG (n=11). Clinical evaluation (VAS for pain), lab and imagistic tests (ankle – foot X-ray), HAQ score and CRPS Severity Score were performed, initial and final to all patients. Statistical analysis and correlation between data were done with the ANOVA and chi-square tests.

Results. We found a significant correlation between the mean of VAS and CRPS Severity Score in all patients. The RG teenagers were more satisfied with the overall outcome compared with PG subjects and showed clinically and statistically significant improvements in HAQ and CRPS Severity scores at 8 weeks.

Conclusions. A complex rehabilitation program of CRPS-I must included multi-modal exercise (based on the coordination aerobic and strengthening lower limb exercises) program. This aspect represents the adequate mode of physical training and is more effective in improving psychological gait. Type and duration of physical training must be individualized, in accordance with severity of ankle dysfunction after bimalleolar fractures.

P151

REHABILITATION OF POSTOPERATIVE PARAPHARYNGEAL SCHWANNOMA – A CLINICAL CASE USING THE INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH (ICF)**Catarina Reis Lima, José Brochado, Jonathan Rios**

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Introduction: A schwannoma is a usually asymptomatic benign tumour that can originate in virtually any nerve of the body. Although rare in the parapharyngeal space, when in this location it usually originates in the *vagus* nerve or sympathetic chain. Surgery is usually the treatment of choice.

The postoperative sequels may vary, often being dysphagia, dysphonia and impairment of upper limb function, due to nerve lesion. These can affect important areas of life such as feeding, communication and mobility.

Objective: The aim of this work is to show the functional consequences and subsequent incapacities of a parapharyngeal location surgery, as well as the treatments and results achieved in this case.

Method: For better structuring of the case, rehabilitation goals, and monitoring of results, we used the International Classification of Functioning, Disability and Health (ICF).

Results/Clinical Case: A 36-year-old male patient, who had recently been submitted to parapharyngealschwannoma removal, presented with dysphonia, mild dysphagia, limited active motion of the left shoulder and muscle atrophy of the left scapular area (namely trapezius, subscapular, rhomboid and sternocleidomastoid muscles). According to the activity/participation component of the ICF, this patient had moderate incapacity in communication, mild incapacity in self-care (eating), and moderate incapacity in object handling due to the muscular atrophy. He completed a rehabilitation program with Physical and Speech Therapy for approximately 10 months, achieving the defined rehabilitation goals, which included return to professional activity.

Conclusion: Schwannoma removal surgery in the parapharyngeal space can affect nervous structures that are located inside, such as the *vagus* or accessory nerves. Potential sequels of this lesions are dysphagia, dysphonia and malfunction of the scapular girdle muscles. This can have consequences in activity and participation of the patient in several areas of life. An individual interdisciplinary rehabilitation plan allows the return to daily and professional activities.

P152

TRAINING ABOVE THE ANAEROBIC THRESHOLD IN CORONARY ARTERY DISEASE (CAD) PATIENTS**Claudia Esther Villanueva Larumbe**

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Introduction: Cardiac Rehabilitation Programs (CRP) are recommended in the treatment of patients with coronary artery disease (CAD) and chronic heart failure. In most Cardiac Rehabilitation units of Spain, Cardiopulmonary exercise testing are carried out on treadmill. However most of the aerobic training sessions consist of cycling. We have developed a submaximal cycling test for identifying the anaerobic threshold (AT) and prescribing exercise intensity.

Objective: We have hypothesized that training above the AT is safe and effective for patients with CAD.

Material and Methods: Five patients suffering form CAD were recruited for the CRP of a local hospital. A maximum exercise test on treadmill, a submaximal cycling test, Rikli and Jones and Time Up And Go test were performed pre and post rehabilitation program. The cycling test was carry out as a ramp test with 2 minutes warm up at 0 W. On the basis of age, body weight and METs, the increment was chosen between 5 and 25 W.

Training was conducted over a period of 24 sessions: Aerobic (3 times/week, 40 minutes. Intensity in Bike training above AT and in Treadmill training between 70 and 85% of the maximum heart rate) and Resistance program (3 times/week, 20 minutes, 4 muscles groups. Intensity of 30-40% of 1 Repetition Maximum).

Results: The average attendance was 23 sessions, 18 of them were cycling. There was an improvement in METs at the Treadmill (9,3 pre, 10,9 post) and in Watts at the AT (23W pre, 58W post). There was also an improvement in resistance test and agility.

Conclusions: Training above AT may be safe for prescription and efficacy control of exercise training in patients with CAD. Submaximal cycling test seams sufficient for determining the AT.

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LOWER CERVICAL MYOFASCIAL TRIGGER POINT THERAPY IN A PATIENT WITH IDIOPATHIC SCOLIOSIS

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Introduction:Myofascial trigger points develop especially in the paravertebral and neck muscles, generating disabling pain in pathologies such as scoliosis, in which, besides reducing ROM, the painful secondary muscle contractures are those that urge the patient to present to the doctor.

Objective:The medical rehabilitation of the patient with myofascial trigger points and idiopathic scoliosis is focused on the painful accusations of the patient, but also improves the patients' evolution and quality of life.

Method:A 49-year-old patient, presents in the medical rehabilitation department accusing high intensity cervical and lower back pain. The clinical examination reveals kyphoscoliotic thorax, with a marked dextro-concave thoracic scoliosis, multiple trigger points in the inferior and thoracic paravertebral musculature, the left supraspinal muscle, bilateral trapezius, left head splenius. The cervical extension and laterality movements and anterior flexion of the thoracic-lumbar level are reduced. Pain irradiates on the posterior side of the right lower limb, accentuated in orthostatism and by walking on medium-long distances, sometimes accompanied by paresthesias. Thereby, the rehabilitation program focuses on the dextro-concave scoliosis and on the myofascial syndrome, the patient being recommended an X-ray of the thoracic-lumbar spine. Pain was assessed subjectively with VAS and NDI scale, and the patient's quality of life was assessed using the SF36 questionnaire.

Results:The X-ray confirmed dextro-concave thoracic scoliosis, with a Cobb angle of 30 degrees. Regarding the myofascial trigger points, the patient performs the rehabilitation program for 10 days. Improvement of spinal mobility is observed from the 4th day, and at discharge, the patient no longer presents myofascial trigger points, while also having a better psycho-emotional status, supporting the overall improvement of the symptomatology.

Conclusions:In such cases, medical rehabilitation occupies a fundamental place in the patient's life. Medical rehabilitation is essential to prevent the progression of idiopathic scoliosis, of the painful myofascial syndrome and to improve the patients' life quality.

P154

TREATMENT OF LYMPHEDEMA AS A SECONDARY COMPLICATION AFTER ERYSIPELAS IN 15 YEARS OLD BOY**Daniela Gechevska¹, Cvetanka Gjerakaroska Savevska¹, Lidija Stojanoska Matjanoska¹, Aneta Bajalska¹, Marija Gjerakaroska Radovic², Aleksandra Hadzieva Pejchikj³**¹Institute for Physical and Rehabilitation Medicine, Medical Faculty, "SsCyril and Methodius" University, Skopje, North Macedonia² PHI University clinic for state cardiac surgery, Skopje, North Macedonia³ Public health center "Zhelezara"

Introduction: Erysipel of the leg is mostly due to β -hemolytic streptococcus. Lymphedema as a secondary complication is rare condition especially in childhood

Case description: We describe the case of a 15 year-old boy with a nine months history of lymphedema, pain and reduced range of motion in the right leg. His medical history included streptococcal infection nine months ago followed by high febrility and pain, warm, swelling, induration and intensive redness on the right calf. Laboratory analysis indicated presence of streptococcal infection and phlebitis on the right calf. In the acute period he was treated with anticoagulant and antibiotic therapy, symptoms have improved. But persisted lymphedema, pain and reduced range of motion in the right leg. Arterial and venous Doppler findings indicated no compromised circulation. On physical examination: right leg voluminous overall, more pronounced on the calf and foot. Skin wppith lightly livid coloration, no temperature differences. Calf with intense induration. Active movements in the hip and knee were performed in full range, in the ankle restricted to full range due to swelling of the foot. His walk was limited and difficult. According to Cheng's Lymphedema Grading tool we assess the severity of extremity lymphedema as stage 3 from Grade 3 (swelling is irreversible and usually the limb become increasingly large. The tissue is fibrotic). Physical treatment consisted of 20 sessions of manual lymph drainage, intermittent pneumatic compression, hydro exercises, elastic compression socks.

Results: After the treatment the measurements of the affected limb showed reduced volume and circumference. According to Cheng's Lymphedema Grading tool we assess the severity of extremity lymphedema at the end of the treatment as stage 2 from Grade 3. Walking was easier and longer.

Conclusion: While there is no cure for lymphedema, lymph drainage and exercises are essential in the long lasting treatment.

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CASE REPORT OF A CHILD WITH MAJEWSKI SYNDROME - THE POSSIBILITY OF EARLY DIAGNOSIS**Danijel Mikulic¹, Valentina Matijevic², Josipa Maric Sabados², Marija Markota², Daniela Kovacic²**¹School of Medicine, University of Zagreb, Zagreb, Croatia²Sestremilosrdnice University Hospital Center

The Majewski syndrome or short rib-polydactyly syndrome (SRPS) type II is a lethal skeletal dysplasia characterized by severe IUGR (intrauterine growth restriction) and dysmorphic face, polydactyly, relatively proportionate head size at birth with later progression to microcephaly.

It's an extremely rare disease, inherited autosomal recessively and obtained by mutation of the PCNT gene on the 21q22 chromosome encoding the protein pericentrin. Pericentrin is crucial in the formation of the spindle and its mutations in the cell division / cell cycle disorder stages. The most serious comorbidity associated with MOPD II is the early onset of cerebrovascular disease, most commonly in terms of occlusive arteriopathy (Moya Moya) or cerebral aneurysms, which can compromise otherwise orderly intellectual development and, as a last resort, lead to stroke.

An 8-month-old boy with MOPD-typical phenotypic traits: intrauterine growth arrest and post-natal growth retardation, microcephaly, typical facies, maris cutis, bone dysplasia (short upper arms and forearms), and farsightedness, dentition disorders can be expected in the long run, skin pigmentation, scoliosis, joint dislocation, most commonly hips and knees, and insulin resistance.

Further multidisciplinary and multiconsular monitoring is necessary to detect in a timely manner the possible complications characteristic of MOPD II.

P156

HOW DOES POSTOPERATIVE PAIN AND HEMATOMA IN TOTAL KNEE ARTHROPLASTY PATIENTS INFLUENCE ON KNEE RANGE OF MOTION DURING INPATIENT REHABILITATION**Darija Granec¹, Domagoj Andric¹, Goran Bicanic¹, Sulaiman Al Habib², Domagoj Delimar³**

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Introduction: Total knee arthroplasty (TKA) is a well-known method for treatment of advanced knee osteoarthritis. Early postoperative rehabilitation focuses on controlling postoperative pain and improving knee function. Postoperative pain and hematoma are major limiting factors for early rehabilitation.

Objective: The aim of this study was to investigate the presence of postoperative pain and hematoma in TKA patients during four weeks of inpatient rehabilitation and to test the correlation of the pain intensity and the size of the postoperative hematoma with the active knee motion range.

Method: This prospective study included patients hospitalized because of severe knee osteoarthritis. TKAs were done by the same orthopedic surgeon. Patients were randomly selected into two groups receiving different multimodal analgesic protocols, but otherwise received the same therapeutic treatment based on hospital rehabilitation protocol. The variables on pain at rest and during activity, active knee flexion and extension and suprapatellar knee circumference were measured daily throughout the whole study period.

Results: 135 patients were included, 127 patients completed the study protocol. Daily measured pain intensity in both groups was comparable and was reduced proportionately over time. The flexion and extension after initial upward dynamics lost the achieved values at the end of the first and at the beginning of the second week, starting to rise again at the end of the second week. Pain during the first two weeks after surgery significantly affects flexion, but only after 10th day of rehabilitation. Also, findings show that postoperative hematoma progression is associated with loss of knee motion at the end of the first week of rehabilitation.

Conclusion: Pain intensity and degree of postoperative hematoma are statistically correlated to active knee flexion. Proper pain and hematoma control during the first month of rehabilitation can accelerate recovery after TKA.

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THE EFFECTS OF CRYOTHERAPY ON PAIN, QUALITY OF LIFE AND SHOULDER JOINT FUNCTION IN RHEUMATOID ARTHRITIS**Daumantas Bitinas¹, Simona Stakauskienė¹, Eglė Milinavičienė²**

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Introduction:According to the Institute of Hygiene in Lithuania joint diseases are becoming more common. That means people are becoming more afflicted by rheumatoid arthritis with every year. Cryotherapy - is one of the methods that can help reduce the pain of damaged joints, increase functional activity and improve quality of life.

Research aim:To determine the effects of cryotherapy on pain, quality of life, and shoulder joint function in individuals with rheumatoid arthritis.

Research methods:The study included 20 subjects with rheumatoid arthritis. Two groups were formed: the control group (n = 10), where only physiotherapy was applied, and the research group (n = 10), where both physiotherapy and cryotherapy were applied. Health related quality of life questionnaire (SF-36), VAS scale, shoulder range of motion, muscle strength, and pain threshold using the algorithm were evaluated in both the beginning and at the end of the study

Results:Both groups at the start had similar pain score (VAS) (around 5-6 points). At the end of the study there was a statistical reduction of pain in both groups ($p < 0,05$). Comparing the shoulder joints of both hands at the beginning and at the end of the study there were statistically significant improvement in the range of motion (flexion, extension and retraction), pain threshold and quality of life in both groups ($p < 0,05$). However, comparing the results between groups, we found statistically significant improvement in the quality of life in the research group, where cryotherapy was applied ($p < 0,05$).

Conclusions:The results showed a reduction in pain (VAS), an increase in pain threshold, an increase in shoulder flexion, extension and retraction, an increase in hand muscle strength and quality of life in both groups before and after physical therapy and cryotherapy. However, quality of life was statistically more significant in the group where cryotherapy was applied.

P158

HOME REHABILITATION TRAINING USING A RHYTHMIC AUDITORY STIMULATION DEVICE FOR PD PATIENTS**David HOFFNUNG**

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In Parkinson's Disease, we observe a reduction of gait amplitude and speed and rigidity of limbs.

These gait disorders will worsen over time and so-called axial disorders, such as freezing, will appear. Axial disorders are closely associated with an increased risk of falls, loss of autonomy and a decrease in patients' quality of life.

Rhythmic auditory stimulation is a neurological rehabilitation method establishing an artificial treatment of rhythm using close relationships between auditory and motor system. Many studies have demonstrated the effectiveness of this technique in Parkinson's disease and its benefits in improving conventional spatio-temporal walking parameters such as speed and stride length.

This study was conducted on 44 PD patients for 7 days. The WALK device use and efficacy was assessed by auto-administration of one survey at day 0 and one survey at day 7. The t-student statistical test was used in this study.

After one week of use of the WALK, we observe a significant improvement in walking and balance score (3.02 vs 2.45; p-value < 0.001), freezing of gait (2.54 vs 2.11; p-value < 0.01), and quality of life (20.09 vs 16.81 ; p-value < 0.0001). 69% of the patients declare using the WALK device more than one hour daily. 93% of subjects don't report any adverse effects. Reported adverse effects are considered mild and don't impact the patient's health in the long term (headache, fatigue, irritation)

This first one-week study highlights the positive impact of the WALK medical device regarding patients' motor skills and quality of life. This device is suitable for use in self-administration and has few side effects. Future interventional studies will determine the immediate impact of the WALK device after one-month home training.

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BEWARE FOR WHOM THE BELL TOLLS: A CROSS-SECTIONAL ANALYSIS OF PREVALENCE OF LOW BACK PAIN, NECK PAIN, DEPRESSION AND FIBROMYALGIA IN MEDICAL STUDENTS**Demet Ofluoğlu, Emel EceÖzcan-Ekşi Bahçeşehir, Şiirnaz Kükürt Bahçeşehir**

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INTRODUCTION: Low back pain (LBP) and neck pain (NP) are among the leading causes of disability (13,16). Medical students experience great deals of physical and psychological stress due to academic, and financial pressures, study problems, increasing use of computers, and long training hours in hospitals. It is essential to identify and prevent the modifiable risk factors of LBP and neck pain, and improve the quality of life for future doctors and to treat patients

OBJECTIVE: We aimed to determine the prevalence of LBP and NP in our medical students. We also aimed to identify the risk factors associated with LBP and NP in medical students.

METHOD: In this cross-sectional study, medical students were requested to complete the survey including basic evaluation, Neck Disability Index (NDI), Oswestry Disability Index (ODI) for LBP, Fibromyalgia Impact Questionnaire (FIQ), and Beck Depression Inventory (BDI). Basic evaluation included age, gender, NP, LBP, past medical history, medications, smoking, exercise, duration of sleep and daily activities.

RESULTS: In our students, 61% had both LBP and NP (female:73, male:63, mean age: 20,91±1,88 years). LBP and NP were significantly more common in female students than in male students (69.9% vs 50.8%, $p = 0.018$). We observed that 21,3% had mild, 12,5% had moderate, 3,7 % had severe depression. NDI was the highest-ranking predictive factor for NP and LBP (OR: 1,4; 95% CI: 1,2-1,7; $p < 0,001$). Other predictive factors for NP and LBP were ODI for LBP (OR: 1,2; 95% CI: 1,1-1,4; $p = 0,007$) and FIQ (OR: 0,95; 95% CI: 0,9-1,0; $p = 0,047$). Duration of daily activity was significantly shorter in medical school class 5 than that in class 1 ($p = 0,025$).

CONCLUSION: More than half of medical students have both LBP and NP. NDI was the highest-ranking predictive factor for NP and LBP followed by ODI for LBP and FIQ. Further studies are required to identify and modify the risk factors of LBP, NP, and mental stress in medical students.

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EFFECTIVENESS OF INTRAMUSCULAR BOTULIN TOXIN INJECTION IN THE SPASTIC LOWER EXTREMITIES OF CNS LESION PATIENTS USING KINETICS AND KINEMATICS GAIT ANALYSIS METHODS**Dimitrios Varvarousis, George I. Vasileiadis, Dimitrios Dimopoulos, Areti Theodorou, Ioannis Manolis, Avraam Ploumis**

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Introduction: The intramuscular injection of Botulin Toxin is one of the most efficient ways to treat localized spasticity in patients suffering from stroke, cerebral palsy, multiple sclerosis, etc. In the literature there are few published clinical trials describing the effect of Botulin injection in the mobility of these patient.

Objective: To provide evidence of the beneficial effect of Botulin toxin on characteristics of gait pattern on patients suffering from upper motor neuron lesion.

Material and methods: In order to be included in the trial, all patients must be able to walk either freely or while wearing a splint or by the use of a crutch. 20 patients with spasticity due to CNS lesion will be included in our protocol and will be treated by Botulin toxin injections in the lower extremity. All patients will be evaluated before the injection as well as 1 month after the Botulin injection on a foot pressure sensitive walkway with a power plate (Win-Track, Medicapteurs)*and by the readings of 7 inertial measurements units (Rehagait, Hasomed)* which will record spatio-temporal specific parameters during walking. The spasticity will be measured according to modified Ashworth Scale. The Paired t-test (SPSS 20) will be used for the statistical analysis.

Results: Up till now 7 out of 20 patients have completed all the measurements. The results of motion analysis and balance have ameliorated for all patients in all spatio-temporal parameters after Botulin toxin injection. Yet only in one parameter, the ground surface area occupied by the affected limb was measured to have statistically significant improvement ($p < 0,05$).

Conclusions: The gait analysis based on kinetics and kinematics is an alternative way of measurement of the effect of intramuscular injection of Botulin toxin in spastic patients suffering from CNS lesion. Moreover, it showed improvement in both motion analysis and balance parameters.



P161

INJURIES IN CROSSFIT , AN OVERVIEW

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Introduction: Crossfit is a high-intensity functional training sport , which is growing in popularity and practicing all over the world. However , since is a sport created in 2000, the scientific data regarding risk of injuries in this sport is very sparse.

Objective: The aim of this work is to analyze the findings of scientific literature related to injuries and risks of CrossFit, and comparing it to other high-intensity sports.

Methods: A Pubmed, Scielo and Trip database research performed with the key terms: “crossfit” , injuries”, “risks”, “training” “epidemiology” identified 19 articles published in the last 10 years written in English. The type of articles included systematic reviews, meta-analysis, reviews and clinical trials. Qualitative synthesis of the data was performed.

Results: We selected 19 articles after duplicate removal , abstract screening and full-text eligibility assessment , from 45 articles identified through database searching.

The most common injuries caused by Crossfit reported in studies are in the knee, lower back and shoulder.

The majority of injuries are caused by overuse .Sprais, sprains and tendinitis were the most common injury type. Very few significant differences in any of the injury outcomes were observed as a function of age, sex, competitive standard, or bodyweight class.

Conclusions: CrossFit is comparable to other high-intensity exercise sports and programmes with similar injury rates and health outcomes.

Since is a recent sport, further investigation on risk of injury and more comparative studies to other sports are needed.

P162

FACTORS INFLUENCING OUTCOMES OF REHABILITATION FOR PATIENTS WITH LOWER LIMB LOSS**Doriane Pelzer, Benoît Maertens de Noordhout, Jean-Louis Croisier, Jean-François Kaux**

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Introduction : Patients with lower limb loss will have to cope with new difficulties in their daily lives, requiring functional adaptation. However, despite an intensive multidisciplinary rehabilitation program, not all patients will present the same evolution.

Objective : Our objective was to determine whether factors such as the amputation level (AL) and the use of walking aids before the amputation influence length of stay in inpatient rehabilitation, prosthetic use and discharge destination.

Method : We retrospectively reviewed records of inpatients with lower limb amputation admitted in our rehabilitation centre between 2015 and 2018. We determined five categories of patients according to the AL (unilateral below knee amputation (BKA), unilateral above knee amputation (AKA), bilateral BKA, bilateral AKA, both AKA and BKA) and three categories according to previous walking ability (no walking ability, use of walking aids, total independence). Associations between these factors and both prosthetic use and discharge destination (home or nursing facility) were compared using chi-square test. We used Student's T test to compare length of stay for patients belonging to these different categories.

Results : 168 inpatient records were checked. Both AL and prior use of walking aids showed a significant association with prosthetic use (respectively $p < 0,0001$ and $p < 0,05$). In contrast, both AL and prior use of walking aids are independent of the discharge destination. Length of stay for patients with bilateral AKA was significantly shorter than length of stay for patients with bilateral BKA ($p < 0,05$) or with unilateral BKA or AKA ($p < 0,005$).

Conclusions : Certain factors such as the AL and the previous walking ability show association with future use of prosthesis for patients with lower limb amputation.

P163

CERVICAL SYNDROME – A DISEASE OF CIVILIZATION**Dragana Okiljevic Obradovic, Dušanka Predojevic, Nada Maric, Radmila Erceg Javor, Ivica Lalic**

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Introduction: Modern lifestyle, prolonged sitting, and reduced physical activity often result in neck pain, accompanied by headache, dizziness, tingling, or weakness of UEs. When we talk about cervical syndrome we can say that it is a "disease of civilization" since about 80% of people has pain in CVC at least once in their lifetime.

The objective: To achieve in the shortest possible time the maximum effect of pain relief and functional enabling of patients for normal life and work.

The method: 62 patients with cervical pain syndrome and cervicobrachialgia were chosen at random for observation.

Before the therapy: compulsory RTG of CVC, laboratory analysis, examinations by a neurologist, orthopedist, psychologist, EMNG in case of paresthesia and weakness of UEs, if necessary NMR of CVC.

The average age for men was 62, for women 51.

Of the total patient population, 47 were women, 15 were men.

The average VAS score on admission was 7.1.

GMS for UEs according to MMT is 3-4 on average.

Appropriate Kinesiotherapy procedures were applied, which were intensified depending on the clinical picture, regular electrotherapy with medicaments, laser, magnet, hydrotherapy.

The results: After XX days of ambulatory physiotherapy, the pain was rated 4.3 on VAS. GMS averages at grade of 4 globally. Trained to continue the learned exercises, underwent ergonomic training, and controlled after a month with medicament therapy which encompassed a wide range of medicament therapy. After three months, the average VAS was 1.9. GMS was higher according to MMT at grade 5.

Conclusion: In accordance with the Declaration of WHO, IASP and EFIC - eliminating pain is a basic human right - our obligation is to make it as safe, better and long-term as possible.

P164

THE INFLUENCE OF DOMINANCE ON SPADI AND QuickDASH SCORES IN PATIENTS WITH SHOULDER SOFT TISSUE IMPAIRMENTS**Dragan Lonzaric¹, Dragana Markovic Djordevic², Breda Jesensek Papez¹, Vida Bojnec¹**¹Institute for Physical and Rehabilitation Medicine, University Medical Center Maribor, Maribor, Slovenia²General Hospital Murska Sobota, Department for Physical and Rehabilitation Medicine, Slovenia

Introduction: QuickDASH (Disabilities of the Arm, Shoulder, and Hand – the short version) is one of the most commonly used self-assessed outcome measures for evaluation of functioning of patients with upper extremity impairments. Patients rate their ability to perform a specific task regardless of which side they use to complete the task. SPADI (Shoulder Pain and Disability Index) is a shoulder specific questionnaire used to assess subjective impairments due to shoulder problems and in contrast to QuickDASH takes the affected side into account.

Objective: To assess the influence of dominance on QuickDASH and SPADI scores with the hypothesis that SPADI scores will be more influenced by dominance than QuickDASH scores.

Methods: The prospective study included 36 subjects with shoulder soft tissue impairments (25 male) with average age 60 years (range, 39–80 years). They all completed QuickDASH and SPADI questionnaires at the first visit in the rehabilitation institute of UMC Maribor. In equal number of patients left and right side was affected (n = 18). Right hand was dominant in 35 patients, 1 patient was ambidextrous.

Results: The QuickDASH score for dominant side involvement was 60.4 (SD 20.8) and for non-dominant 52.6 (SD 24.4). The SPADI score for dominant side involvement was 70.1 (SD 19.9) and for non-dominant 66.5 (SD 24). The differences in scores between dominant and non-dominant side were not statistically significant neither for QuickDASH (p = 0.315) nor for SPADI (p = 0.613).

Conclusion: The results in our study show that there is no statistically significant difference in QuickDASH and SPADI scores regarding the involvement of dominant or non-dominant side in patients with shoulder soft tissue impairments.

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DYNAMICS OF GAIT DURING REHABILITATION AFTER TOTAL KNEE ARTHROPLASTY**Dmitry Skvortsov¹, Svetlana Koroleva²**

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Relevance. Total knee arthroplasty (TKA) – a cost-effective and reliable method of treatment of the knee osteoarthritis with the predicted increase in demand. The systems of clinical assessment of efficiency of rehabilitation not fully reflect restoration process, and the most objective is assessment of biomechanical parameters of walking.

The purpose – studying of dynamics of biomechanical parameters of walking after the TKA of concerning knee osteoarthritis.

Materials and methods. Examined 54 patients, at the age of 63.86 ± 1.69 are examined: 31 women and 23 men, in terms of 3.94 ± 1.40 months after operation of TKA in «The Ivanovo regional hospital for veterans of wars». Group of control – 47 people, at the age of 34.6 ± 8.8 : 28 women and 21 men. The research of function of walking was conducted three times – at receipt, in a week and in two weeks upon termination of a course. Registration of parameters of walking was carried out by means of the walking exercise machine with biological feedback «Stedis» of Neyrosoft (Ivanovo) to the Assessment package (N. RZN 2018/7458 of 07.08.2018). Results are processed by standard methods of medicobiological statistics at level of significance of 5%.

Results. In the early recovery period walking of patients after the TKA of knee osteoarthritis is characterized by reduction of speed, existence of symptomatology of unloading and insignificant asymmetry of indicators of function of the lower extremities in dynamics of walking. The revealed phenomenon demonstrate as positive dynamics of process of restoration in general, and normalization of temporary structure of Step cycle. It is established that the speed of walking and duration Double support did not find restoration in terms of 3 months after the TKA of knee osteoarthritis. Key parameter of biomechanical changes has nonspecific character and is connected with reduction of speed of walking. It is suggested that the main actions of physiotherapy have to be directed to increase in length of a step at control of dynamic loads. Criterion of efficiency of rehabilitation is reduction of asymmetry when walking.

Key words: rehabilitation, total knee arthroplasty (TKA), knee joint, biomechanics of walking

P166

IMPORTANCE OF PHYSICAL THERAPY IN TREATING BIRTH TRAUMA–CASE REPORT**Djordje Jevtic¹, Tatjana Jevtic², Jelena Milanovic Rakic², Katina Cvetkovic², Natasa Vlahovic²**Physical Medicine and Rehabilitation, Faculty of Medicine University of Belgrade, Serbia / Institute of Mother and Child¹, Belgrade, Serbia Institute of Mother and Child²

Introduction: Birth trauma occurs during parturition of newborns. Risk factors include large for gestational age newborns and breech presentation. Common traumas are fractures of clavicle, humerus and/or femoral bone, paralysis of brachial plexus and muscle injuries.

Objective: To disclose the importance of physical therapy in the process of treating and rehabilitating birth trauma by demonstrating case of an infant who suffered multiple birth injuries including fracture of the right humerus and left clavicle and paralysis of the left brachial plexus.

Method: Male infant P. M. was admitted to Pediatrics intensive care unit at Institute of Mother and Child four hours following birth. Vaginal delivery occurred in the 39th week of pregnancy. Birth weight was 4.2kg, birth length 56 cm and A/S 5/7. Right humerus fracture was treated using immobilization. On the 23rd day of life infant was admitted to Physiatry department to begin physical therapy of left brachial plexus paralysis. Physical exam demonstrated loss of range of motion in the left glenohumeral joint and left elbow joint with intact function of the left hand. EMNG diagnosed severe lesions of C5-C6. Physical therapy used: Kinesiotherapy, Electrotherapy, Thermotherapy and Laser therapy.

Results: P.M. is 10 months of age and has so far been hospitalized seven times. Range of motion and muscle strength improved extensively in the left arm with infant being able to lift his slightly flexed arm above his head. Crawling fully developed and there is symmetrical use of both arms while playing with toys. EMNG results improved in correspondence to the clinical findings.

Conclusions: Birth trauma can be avoided if appropriate risk factors are detected. This would prevent unnecessary pain in newborns caused by delivery complications and long lasting rehabilitation process. Paralysis of the brachial plexus requires intensive use of physical therapy and multidisciplinary approach to secure positive end results.

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SCOLIOSIS IN CHILDREN WITH CEREBRAL PALSY IN RELATION TO CEREBRAL PALSY TYPES AND GROSS MOTOR FUNCTION CLASSIFICATION SYSTEM (GMFCS)**Dobrinka Dragic¹, Samra Pjanic², Đurđica Stevanovic-Papic²**

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Introduction: Neuromuscular scoliosis is a common deformity in children with Cerebral palsy, which develops during the child's development period.

Objective: To ascertain the presence and severity of the scoliosis in children with cerebral palsy, taking into consideration the CP type and GMFCS level.

Method: 30 stationary treated children, aged 5-14, with different types of CP were analyzed. Clinical evaluation and insight in medical documentation offered the following information: CP type: 1. bilateral spastic form; 2. unilateral spastic form; 3. dyskinetic form; Cobb angle measurements: 1. the curve greater than 30°; 2. less than 30°; 3. no curve present; the GMFCS level (I-V). The scoliosis values in regard to the CP type and GMFCS level were compared. To check the statistical significances of the results, a chi-squared test was used, the level of statistical significance: $p < 0.05$.

Results: 80% of the children have scoliosis, 60 % of them have bilateral spastic form of CP, 57% of them have scoliosis with a Cobb angle less than 30 degrees. GMFCS levels and CP types are equally present. 23% of the older children have a scoliosis greater than 30°. From this group of children, 5 of them are in the GMFCS level V (17%), 6 children from this group have bilateral spastic type of CP (20%), that statistically connects the GMFCS level and CP type ($p < 0.05$) and GMFCS level with scoliosis severity ($p < 0.05$). There is no statistical correlation between scoliosis severity and CP type.

Conclusion: There is no statistically relevant relationship between scoliosis severity and CP type. Greater spine deformities can develop in all forms of CP throughout child growth, more commonly in children with a higher level of inefficiency.

Keywords: Cerebral palsy, scoliosis

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COMPLEX REHABILITATION OF THE PATIENTS WITH DUCHENNE MUSCULAR DYSTROPHY**Dóra Lámfalusi-Németh, Katalin Kántor**

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Introduction: Duchenne Muscular Dystrophy (DMD) is recessive genetic disorder linked to chromosome X which leads to gradual muscle degeneration and early loss of functionality. The prevalence of the disorder is 4,78 (95% CI 1,94–11,81)/100 000 among males, the incidence is 10,71–27,78/100 000. In Hungary it means 5-13 new patients every year estimated to the Hungarian population in 2012.¹

Objective: As a progressive neuromuscular disease it needs to be treated with multidisciplinary mentality. Due to the international initiations Neuromuscular Centre is formed in 2012 which takes place in our capital city, Budapest. Among our work we experienced that lost of family can not participate in the care provided by the centre and they have difficulties with the local rehabilitation of the child. 7 parents from 20 declared that they are not satisfied at all with the availability of the rehabilitation referring to our previous surveys.²

Method: In our child rehabilitation ward patients have possibility to attend in 2-weeks long intensive care. During the stay they attend in conventional physiotherapy, massage, hydrotherapy and creative development every day. In addition they participate in horse-riding and subaqual therapy two or three times a week. After the therapies we provide opportunities for active recreation to the families.

Conclusions: Our experiences so far point out that there is urgent need for providing more possibilities in the children's care to increase the patients' quality of life who can not reach the work of the Neuromuscular Centre. We suggest to create closer relationship with the Centre and to form more centre in the area of our country.

P169

INTERMITTENT CERVICAL TRACTION FOR CERVICAL RADICULOPATHY CAUSED BY DISC EXTRUSION - CASE REPORT**Dragana Jankovic**

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Introduction: Cervical radiculopathy is a major challenge in rehabilitation despite the numerous methods in physical therapy that have the opposite effects.

Objective: The aim of this study is to investigate the possibility of intermittent cervical spine traction in the rehabilitation of a patient with cervical radiculopathy caused by extrusion of the C5-C6 disc.

Method: A 41- years old woman with marked signs of C5-C6 level cervical radiculopathy was included in rehabilitation treatment using an intermittent cervical spine traction of the C5-C6 level with a load of 10 kg. The result of treatment was monitored by NMR cervical spine before and after therapy.

Results: After finished 10 therapeutic procedures of intermittent traction with a load of 10 kg for the cervical spine, control MR showed clinically significant improvement from the extrusion stage to the stage of minimal protrusion of intervertebral C5-C6 disc.

Conclusion: Intermittent cervical spine traction may be a method of choice for treatment and rehabilitation of patients with cervical radiculopathy.

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TOTAL ANKLE REPLACEMENT FOLLOWING POSTTRAUMATIC ANKLE ARTHRITIS: A CASE REPORT**Duarte Calado, Jorge Barbosa, Miguel Andrade, Eduardo Gonçalves, Sérgio Pinho, Cristina Ângelo**

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Introduction: Traumatic ankle fractures are increasingly common injuries which need a careful approach for proper management. The majority of ankle fractures are malleolar fractures. Bimalleolar and trimalleolar fractures are typically unstable, have a higher risk of complications and require surgical stabilization. Osteoarthritis is a possible complication of traumatic ankle fracture, and surgery is often preferred in patients who are refractory to conservative management. Total ankle arthroplasty (TAA) is an effective alternative to ankle arthrodesis in the treatment of posttraumatic ankle arthritis (PTAA).

Objective: To present a case report of a patient diagnosed with PTAA treated with TAA.

Methods: Prospective longitudinal study of a single clinical case: 51 years old female patient with PTAA refractory to conservative treatment submitted to TAA that went through a rehabilitation program. Clinical information, as well as objective evaluation of ankle pain, skin lesions, flexibility, muscle strength, proprioception, balance and gait analysis were collected before the beginning and during the rehabilitation program. The patient completed a 4 month program and a medical evaluation was performed at the end of each month. The patient did not report any other treatment.

Results: At the end of the rehabilitation program the patient significantly improved ankle function with increased flexibility, proprioception and muscle strength, as well as better balance and gait, being capable of executing all of her daily activities with total autonomy.

Conclusions: TAA is a valid surgical option in the management of PTAA. Ankle arthrodesis results in reduced mobility of the ankle joint and increased complication rates such as adjacent joint degenerative changes compared to TAA. TAA, however, allows conservation of mobility at the ankle but has been associated with higher rates of revision. The timing of rehabilitation program plays a key role in restoring ankle function in such patients.

P171

CLINICAL AND IMAGIOLOGICAL CORRELATION OF SHOULDER CALCIFYING TENDINOPATHY TREATMENT WITH ULTRASOUND GUIDED EXTRACORPOREAL FOCAL SHOCKWAVE THERAPY**Duarte Calado, Nuno Tomás, Jorge Barbosa, Miguel Andrade, Eduardo Gonçalves, SérgioPinho**

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Introduction: Focal extracorporeal shockwave therapy (fESWT) is a noninvasive treatment that has shown good results in shoulder calcifying tendinopathy (SCT). Ultrasound imaging is a portable, safe, ready available and low price exam that increases the accuracy of the treatment of several musculo-skeletal pathologies.

Objective: Investigate the relationship between clinical and imagiological changes observed after treatment of SCT with ultrasound-guided fESWT.

Method: Prospective study of patients with SCT refractory to conventional rehabilitation that underwent ultrasound-guided fESWT. A clinical evaluation was performed before, at 3 and 6 months follow-up, using the visual analogue pain scale (VAS), the American Standard Shoulder Surgeons Assessment Form (ASES) and the modified University of California Los Angeles Shoulder Rating Score (m-UCLA), and also an imagiological evaluation was performed before and at 6 months follow-up, with radiography and ultrasound. The patients underwent three ultrasound-guided fESWT sessions (900-1300 pulses/session).

Results: 14 patients were included in the study. Statistical analysis using the t-test for two paired samples showed pain improvement at 6 months follow-up (VAS = 6.6»3.2; p<0.05). There was also an increase in functionality scores at 6 months follow-up (ASES 11.2»14.9; p<0.05 and mUCLA 18»24.4; p<0.05). There was a reduction in size or number of calcifications in 77% of patients, and in the size of the biggest calcification (4.8»2.5mm; p<0.05). No statistically significant correlation was observed between the number of calcifications, their size on ultrasound and the clinical evaluation, neither in the initial assesement nor in the 6 month follow-up.

Conclusions: There was a clinical, functional and imagiological improvement with ultra-sound guided fESWT in SCT. Ultrasound evaluation appears to be more sensitive in detecting shoulder calcifications. Although the results are limited by the sample size, ultrasound and radiological imaging changes don't seem to correlate significantly neither with each other nor with the clinical findings.

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THE USE OF ICF MODEL IN THE REHABILITATION OF ADULTS WITH CEREBRAL PALSY**Dubravka Radulovic, Dusan Vukovic, Sladjana Jelic, Mirjana Senicic, Savina Koprivica**

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Changes of functional and general health status may be expected in adults with cerebral palsy during the aging process. ICF biopsychosocial model emphasizes the interplay of health and contextual factors, common activities and access to health care to optimise functioning and participation in the patient's environment.

The aim of this paper is to present our experiences in the rehabilitation of adults with cerebral palsy and the application of ICF models in our clinical practice.

Method: case report of 35 years old female with bilateral spastic CP GMFCS II without intellectual impairment. We used an existing core set of ages 14 – 18 and made an assesment sheet, a categorical profile, an evaluation report and an intervention sheet. She was team examined by physiatrist, neurologist, psychologist, orthopedist, and social worker. Improving participation and employment are global goals. The service program consist of short goals: problems with spasms and mobility, performing daily routines, sports and leisure activities. She has been involved in physical and occupational therapy with photocopier training, sports activities, art therapy, training with computer and psychological support.

Results: improvements were in motivation (b103), feeling pain (b280), managing one's own behavior(d250), movement (d460) basic and complex interpersonal interaction (d710, d720), bus transport was organised by the City Association for Cerebral Palsy to access our hospital. There is a lack of close family support (e310) and an inability to find suitable employment (d845).

Conclusion: using ICF model, health professionals can easily focus on the current patients's needs and in coordination with social service, should create the conditions for real participation of people with lifelong disabilities.



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EFFECTS OF ISOKINETIC TRAINING ON FUNCTIONAL MOTOR RECOVERY AFTER SCIATIC NERVE LESION - CASE REPORT

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Introduction: A male patient aged 24 years was admitted on rehabilitation with sciatic nerve lesion which is caused by polytrauma of pelvis. Symptoms and clinical signs were: left leg pain, limited range of motion in right ankle and bad gait control. He has spent 21 days of complex individual modified rehabilitation program with isokinetic training of hamstring muscles.

Objective: The aim of this paper was to investigate effects of isokinetic training of hamstring muscles to functional motor recovery and improvement of gait control after sciatic nerve lesion 1 year after complex polytrauma injury.

Method: Rehabilitation program included: Electrostimulation right tibial nerve, aquatic exercises, kinesiotherapy and isokinetic training of hamstring muscles once per day during 21 days. We evaluated clinical outcome of rehab by: visual analog pain scale, goniometer, static dynamometry for muscles of foot and isokinetic testing of thigh muscles on admission and discharge from rehab center.

Results: We notified significant improvement of bilateral strength of the hamstring muscles after isokinetic training from 62.9% to 21.9%. Muscles performances on discharge were less than half of expected, but the improvement has increased three times. The power of right foot flexors was improved six times, and the range of motion by 50%. Significant is left leg pain reduction and patient has achieved better gait pattern and control.

Conclusions: We concluded that isokinetic training enhance to improve muscular strength of thigh and gait pattern in patient, 1 year after sciatic nerve lesion with significant improve quality of life.

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FRACTURE OF THE FOREARMEN IN CHILDREN - REPORT OF A CASE OF REHABILITATION IN PRIBOJSKA BANJA

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Case report: Patient J.K. At the age of 12, a fifth-grade elementary school student suffered a fracture of the forearm at the school cross on May 10, 2019. Treated in the hospital for children in the General Hospital of Uzice from May 11, 2019. to 22.05.2019.

Diagnosis: Fractura radii extremitasdyistalislata. sin cum dyslocata.

On May 15, 2019, the operation Repositiochirurgica et osteophisaciolmobilisatiostadrea was performed. After a month, the fixation material was removed and the forearm caps were removed after a month and a half.

Local Status: Left wrist articulated. Postoperatively unregulated. Movements in the left wrist are limited: VF 40 DF 45 RD 25 UR 15 S 45 P 50

During 3 months, several series of physical therapies were performed: cryotherapy, IFS, kinesis and hydrokinesitherapy.

After three months, full range of motion was achieved in the left wrist.

Conclusion: The application of hydrokinesitherapy in Priboj Spa with appropriate physical procedures gives excellent results in the rehabilitation of forearm fractures in children.

Key words: PribojSpa, forearm fractures in children, hydrokinesitherapy

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THE PHANTOM PAIN TREATMENT USING INCOBOTULINUM TOXIN A - SERIES OF CASES**Eduardo Rocha, Cyro Scala**

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Introduction: Phantom limb pain is any pain phenomenon which is felt at an absent limb or a portion of the limb. Sometimes these sensations are extremely painful and disabling.

Methods: This study is a serie of 5 patients that presented upper arm phantom pain. The patients were, all of them, choosed after therapy failed. All the patients were followed for minimum 03 months in the Rehabilitation Center. They presented severe stump neuropathic pain and phantom pain almost daily.

Results/Discussion: The first patient (male, 50 years old) presented pain all over the hand, scored 86 mm in Visual Analogic Scale (VAS) at rest and 95mm during critical episodes. The second one (male, 34 years old) scored 78mm at rest and 94mm during critical episodes. The third (male, 64 years old) scored 87mm at rest and 98mm during pain crisis. The fourth(female, 31 years old) scored 85mm at rest and 90mm at crisis. The fifth (male, 62 years-old) related 81mm at rest and 92mm in the peak.All of them were included in a physiotherapy and occupational therapy program, associated to neuropathic pain drug therapy. Despite the therapies (Gabapentin, duloxetine, amitriptyline, physical therapy) applied the patients maintained the pain scores. Due to this treatment failure, another with botulinum toxin was tried owing to its analgesic effect in neuropathic pain. Intradermal incobotulinumtoxin was applied in both painful stump area and ghost pain stump trigger points. Incobotulinumtoxin was applied in 5U per point , a part every 2 cm in the surface area, in a total amount of 80U.

The patients were followed for 15 and 90 days after the procedure. The VAS results were below :Patient 1 -15 days- 32mm /90 days - 0 mm; Patient 2 - 15 days - 36mm / 90 days - 0mm; Patient 3 - 15 days -34mm / 90 days 31 mm; Patient 4 - 15 days - 40 mm/ 90 days - 44 mm; Patient 5- 15 days - 28mm / 90 days - 31 mm.

The botulinum toxin treatment decreased pain successfully improving the efficiency of the reahabilitation program and pain control. All patients decreased the neuropathic pain drugs dosis. We need further high level studies in this area to confirm these results

Conclusions: The incobotulinum toxin could be considered useful in amputee neuropathic pain and phantom pain.

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SEX GAP IN MORTALITY IN THE NETHERLANDS**Eefje Luijckx¹, Slavko Rogan², Jan Taeymans³**

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Introduction: In industrialized countries males tend to die earlier than females. The first 70 years of the twentieth century the sex gap in mortality increased. Since the 1970s this sex gap started to decline. To our knowledge there are only a few population-specific studies about the sex gap in mortality in the Netherlands.

Objective: We carried out an epidemiological study with data of the Dutch Registration Network of General Practitioners (RNH). The purpose of the study was to determine if the sex gap in all-cause mortality decreased over the past three decades in the Netherlands, if this sex gap interact with age and how to use the results for rehabilitation medicine

Methods: A Cox regression model was conducted to estimate hazard ratios (HRs) and their corresponding 95% confidence intervals (CIs). All-cause mortality risk of women was compared with all-cause mortality risk of men over 27 Years. An interaction effect of sex and age was tested.

Results: Over the last 27 years the sex gap in mortality risk still exists. Compared to women, men had a higher risk of mortality: HR, 1.5 (95% CI 2.42–5.02). No statistically significant interaction was found.

Conclusion: It appears that the sex gap in the Netherlands in mortality risk didn't decrease over the last 27 years. Due to the high smoking prevalence among Dutch men in the past and the relatively late onset of the smoking epidemic among Dutch women a greater part of the higher mortality risk of men is related to tobacco consumption.

It is important for the public health sector and sector of rehabilitation medicine to consider the sex gap in mortality. It has significant implications on clinical decision-making in rehabilitation medicine, prevention efforts, targeting risk factors and addressing social inequities in health.

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RECOVERY OF A PERSONS' MOBILITY AND INDEPENDENCE AFTER TOTAL KNEE ARTHROPLASTY DEPENDING ON GENDER, AGE, DURATION AND PATHOGENESIS OF THE DISEASE, BODY MASS INDEX AND**Eglė Milinavičienė¹, Simona Dikčiūtė¹, Simona Stakauskienė²**

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Introduction: Every year in Lithuania there is made more than 3,000 total knee arthroplasty every year. It means, that every year there is more than 3,000 patients in Lithuania, who undergo second stationary stage of rehabilitation. So it is important to know which factors have an effect on rehabilitation results. The research was made to ensure what impact on rehabilitation results has gender, age, duration and pathogenesis, body mass index and number of knee joint replaced.

Research aim: To investigate the influence of gender, age, duration and pathogenesis of the disease, body mass index, number of replaced knee joints on a persons' mobility and independence recovery.

Research methods: In the research it was analysed the medical data of the patients, who underwent second stationary stage of rehabilitation in 2017 in 3 rehabilitation centres. In this research pain intensity using visual analogue scale, modified Keitel index, Barthel index, muscle strength in the operated leg, range of motion during flexion and extension were analysed.

Results: Older people have less muscle strength alteration in the operated leg ($p < 0,05$). Shorter duration of the disease determines higher independence values. Osteoarthritis determines wider range of motion during extension alteration ($p < 0,05$). For people, who have body mass index of 30 and more, independence values are higher before and after rehabilitation, alteration is bigger too ($p < 0,05$). People, who have body mass index of 30 and more, has higher muscle strength in the operated leg after rehabilitation ($p < 0,05$). There was a bigger effect on range of motion during flexion alteration for patients after single knee joint replacement ($p < 0,05$).

Conclusions: Gender and age don't have any impact on independence recovery

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OPPORTUNITIES FOR IMPROVEMENT OF BALANCE FUNCTION AFTER THE PHYSICAL REHABILITATION COMPLEX IN PATIENTS WITH OSTEOPOROTIC VERTEBRAL FRACTURES**Ekaterina Makarova, Larisa Marchenkova, Eryomushkin Mikhail, Styazhkina Elena**

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Aim: To evaluate effect of complex physical rehabilitation on postural function in patients with osteoporotic vertebral fractures (VFs). **Materials and methods:** Study comprised of 90 osteoporotic patients aged 50-80 (65.4 ± 9.1) with VFs who were randomized as 2:1 into intervention group (group1, $n=60$) and control group (group2, $n=30$). Patients in group1 received intensive rehabilitation course including back muscle training #10; sensorimotor training on unstable platform #10; kinesiohydrotherapy in a pool #15; physical exercises in a gym #10. Group2 was prescribed only physical exercises in a gym #15. All patients undergo Stabilometry, one leg standing test and Fukuda test at baseline, at the end of rehabilitation and a month after the rehabilitation. **Results:** Baseline examination showed no significant differences between groups in stabilometric parameters and coordination tests ($p > 0.05$). There were significant changes in group1 after the rehabilitation course vs baseline in balance function coefficient (BFC) with opened eyes from 77.0 ± 7.6 to $84.1 \pm 8.6\%$ ($p=0.008$) and with closed eyes from 67.1 ± 9.7 to $73.8 \pm 9.6\%$ ($p=0.007$), at the area of statokinesiogram (ASKG) from 176.8 ± 170.2 to $131.9 \pm 131.9 \pm 210.4 \text{ mm}^2$ ($p=0.04$), pressure center velocity (PCV) from 9.5 ± 4.4 to $12.2 \pm 10.1 \text{ mm/s}$, ($p=0.0004$), displacement in Fukuda test from 41.4 ± 21.3 to 32.8 ± 14.5 , ($p=0.03$) and in One leg standing test on both legs with open eyes from 9.7 ± 21.7 to $17.8 \pm 31.8 \text{ sec}$ and from 9.5 ± 15.3 to $17.1 \pm 30.1 \text{ sec}$ respectively ($p=0.001$). In group2 there was improvement in PCV from 9.2 ± 4.7 to $10.1 \pm 3.9 \text{ mm/s}$ ($p=0.05$). Positive dynamics in balance tests (BFC with open and closed eyes, PCV, ASKG, displacement in Fukuda test, time for both legs in one leg standing test) were maintained in group1 in month after the rehabilitation treatment. All the postural control parameters were significantly better in group1 vs group2 after 1 month of follow-up ($p < 0.01$). **Conclusions:** The complex physical rehabilitation aimed for trunk muscles and coordination trainings improve the postural function in patients with osteoporotic VFs.

P179

OSTEOPOROTIC VERTEBRAL FRACTURES AFFECTS MUSCLE STRENGTH AND IMPLIES CHANGES IN BODY COMPOSITION**Ekaterina Makarova**

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The aim of the study was to evaluate the degree of muscle dysfunction and relationship of trunk muscle strength and body composition in patients with osteoporotic vertebral fractures (VFs).

Methods. Study comprised 90 men and woman 40-80 years old with primary osteoporosis. Study group (n=60) included patients with at least 1 VF (confirmed by X-rays), control group (n=30) consisted of osteoporotic patients of the same age, BMI and BMD without any fracture. Trunk muscles strength was measured with tenzodynamometry at Back-Check Dr. Wolff diagnostic unit. Body composition was evaluated using densitometry Total Body program. Muscle function assessed with Up-and-go test, 10-meters-walk test, 4 back and abdomen static and dynamic muscle endurance tests.

Results. Patients with VFs had a significant muscle strength deficiency in trunk flexors (TF) -40.9% and extensors (TE) -18.1% with an adequate function of the left (LLF) and right lateral flexors (RLF). Patients in study group had lower muscle strength vs controls in TF (15.6 ± 9.8 vs 27.7 ± 9.9 kg, $p < 0.05$). Body composition analyses showed differences between study and control groups in relative skeletal muscle index (RSMI, 6.5 ± 1.2 vs 7.5 ± 2.1 kg/m², $p = 0.02$) and fat mass (29717 ± 8367.4 vs 35464 ± 9127.4 g, $p = 0.01$). There was no significant difference in soft tissue mass and lean (muscle) mass between groups. Strength of all studied trunk muscles strongly negatively correlated with the number of VFs ($p < 0.05$), fat mass, soft tissue mass and lean mass ($p < 0.05$).

Conclusions. Patients with VFs have a decrease in trunk muscles strength and lower RSMI, mass and % of body fat in compared with patients without fractures. Number of VFs, low BMD, fat mass, soft tissue mass and lean mass are the main factors of trunk muscle dysfunction in osteoporotic patients. Functional tests showed less specificity for estimation of muscle function than tenzodynamometry.

P180

EFFECT OF PHYSICAL THERAPY IN TREATMENT OF TENNIS ELBOW**Elena Brezovska**

Department of Physical Therapy and Medicine, PHI Specialized Hospital for Geriatric and Palliative Medicine 13 November, Skopje, North Macedonia

Introduction: Lateral epicondylitis or tennis elbow is a painful condition that occurs when the tendons in the elbow are overloaded, usually due to repetitive movements of the wrist and arm. The pain caused by a tennis elbow occurs primarily at the point where the tendons in the forearm of the muscle merge with the bony irregularities on the outside of the elbow. The pain can also spread to the forearm and wrist.

Objective: The aim of the paper is to show the importance of the application of physical therapy on pain and functional condition of the elbow joint.

Method: The sample included 33 patients diagnosed with chronic lateral epicondylitis treated in the Department of Physical Medicine, in the period from 02. 01. 2018 - 01. 10. 2019. During the treatment two parameters were monitored: 1.parameter of pain (0 without pain, 0-3 weak pain, 4-6 pain of medium severity, over 7 severe pain at rest) and 2.range of motion in the elbow joint (functionally satisfactory and functionally unsatisfactory).

Results: Out of the total number of patients, 20 (60.6%) were male and 13 (39%) were female, 30-50 years of age, of different occupations. The illnesses lasted an average of three months and they responded poorly to the medication that was previously applied. During the treatment, laser therapy, electrotherapy, ultrasound therapy and kinesiotherapy were received, which included cryotherapy and then active movement in the affected and adjacent joints. After ten treatments, the pain that existed in peace and movement disappeared in 18 (54.5%), 10 (30.3%) had lower intensity pain, while in 5 (15.15%) there was no significant improvement.

Conclusion: Timely applied physical therapy and rehabilitation result in pain reduction as well as in improving the degree of acquirement of elbow joint functionality.

P181

1P36 DELETION SYNDROME - A CLINICAL CASE**Elena-Silvia Shelby¹, Mihaela Axente¹, Ioana Streață², Andra Pintilie¹, Liliana Pădure¹**¹Dr. Nicolae Robanescu National Clinical Center for Children's Neuropsychomotor Rehabilitation, Bucharest, Romania² Craiova University of Medicine and Pharmacy

Introduction: 1p 36 deletion syndrome has a frequency of 1 to 5000 – 10.000 newborns. It consists of terminal or interstitial deletions of various sizes in the 1p36 chromosomal region, which contains approximately 30 Mb. Function of most of the genes in this region is still unclear. Most cases appear de novo, while about 20% are inherited from balanced translocation carriers. Expressivity is variable; the syndrome is characterized by specific facial dysmorphism, motor delay requiring medical recovery, mental retardation, seizures and hypotonia, IUGR, heart, brain, kidney, genital, skeletal, ocular abnormalities and hearing loss.

We present the case of a one year, three months old girl admitted in our hospital in May 2018 with normal family history. Fetal ultrasound showed brain cysts which resolved after birth. Patient was SGA. At the age of 7 months she was diagnosed with West syndrome. Clinical exam showed generalised hypotonia, dysmorphic facial features, microbrachycephaly, motor and cognitive retardation, seizures, amiotrophies and bruxism. We suspected 1p 36 deletion syndrome and confirmed the diagnosis by array-CGH. Genetic counselling was offered to the parents.

Objective: The goal was to establish a diagnosis for optimal medical management and for establishing the recurrence risk in order to offer genetic counselling to the family.

Method: CGH was performed at the Human Genomics Laboratory, UMF Craiova using a microarray chip with 60.000 oligonucleotides covering the entire human genome. Data was obtained using the Feature Extraction Program. Analysis was made using the CytoGenomics (Agilent) and CytoSure Interpret software.

Result: A deletion of 2,5 Mb with clinical significance was found in the 1p36.32 – 1p36.33 region. The diagnosis of 1p36 syndrome was confirmed. Patient's family received genetic counselling.

Conclusions: Genetic confirmation of the diagnosis is important for appropriate medical management - including medical recovery, establishing the recurrence risk and genetic counselling of the family.

P182

NUTRITIONAL MANAGEMENT IN THE REHABILITATION SETTING, LIKE A NONPHARMACOLOGICAL TREATMENT**Elizabeta Popova Ramova**

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Nutrition plays an important role in health promotion and disease prevention and treatment across the lifespan. In patients undergoing rehabilitation for any reason, assessment of comorbidity and eating habits can significantly influence the success of rehabilitation. How effective these exercises are depends on the quality of muscle tissue and blood glucose levels.

The purpose of our study was to study the effects of individual nutrients on muscle strength and disease symptoms.

Method: For the last 5 years we have been studying non pharmacological interventions to improve the quality of life in patients with stroke, Parkinson's disease, Multiple Sclerosis, diabetes, Sports injuries, and children with spinal deformities.

Results: We introduced questionnaires to assess nutritional status, pain, and fatigue as they are implemented in rehabilitation. The introduction of certain nutrients such as apple juice, sour cherry, turmeric, ginger, plant-based immunomodulators and insulin and dopamine stimulants can reduce the symptoms of the disease. This in turn will significantly affect exercise fitness and mobility. Hypoglycaemia can be a risk when exercising in a diabetic patient. Fatigue-reducing substances in patients with Parkinson's disease and Multiple Sclerosis may extend the time for exercise. In sports injuries, in addition to physical modalities and nutrients such as turmeric can be used to reduce pain. In children with spinal deformities, bone mass is associated with deformity, whereas physical activity and nutrition may be correlated with deformity.

Conclusion: Nutritional assessment is an additional burden in the rehabilitation plan but since diet and physical activity are consequently dependent, it will increasingly be in need of rehabilitation.

Key words: nutrition, rehabilitation.

P183

FAMILY-CENTRED SERVICE FOR CHILDREN WITH DEVELOPMENTAL DISABILITIES**Emira Švraka**

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Introduction: There is limited information about the benefits of Family-Centered Service for children, but these eight are the most relevant: developmental gains/skill development, better psychosocial adjustment, increased knowledge about development, increased participation in therapy home program, better psychological well-being, feeling competent as a parent, enhanced self-efficacy and sense of control, and individualized family outcomes.

Objective: The study aims to present the benefits of Family-Centred Service (FCS) for children with developmental disabilities and provide initial data on frequency of postural impairments, gross motor function and the efficiency of home physical therapy.

Method: The study included 120 patients with cerebral palsy (CP) who participated in the project implemented by the Cerebral Palsy Association of Federation of Bosnia and Herzegovina. The Gross Motor Function Classification System – GMFCS, is reliable and well-designed. Simple and consistent, GMFCS should enhance communication between families of children with CP and health care providers.

Results: Of 120 participants, the control group includes 36.7% (n=44) who were in degree - I and II of GMFCS. The test group includes 76 (63%) participants who were in degree - III, IV and V of GMFCS. The average age in the first group was 28.46 ± 16.01 years and in the second group was 25.60 ± 14.73 years. Participants in the test group very frequently had: their head tilted forward (46.5%), upper back left curving (29.9%), lower back left curving (28.6%), posterior pelvic tilt (31.2%), X legs (50.6%), internally rotated foot (35.1%), and forward tilted foot (24.7%).

Conclusion: It is necessary to establish Family-Centred Service (FCS) with educated local professionals and well informed parents and to practice home physical therapy continuously at least twice a week.

Key words: developmental disabilities, children, Family-Centred Service

P184

THERAPEUTIC EXERCISE: HOW TO PRESCRIBE EASILY AND QUICKLY AFTER ARTHROSCOPIC KNEE IN PATIENTS WITH ARTHROSIS. CREATION OF A CHECK LIST**Estela Martín Castillo¹, Simón Sosa González¹, Aníbal Báez Suárez²**Rehabilitation Dept., San José Hospital, Las Palmas de Gran Canaria, Spain¹, University of Las Palmas de Gran Canaria²

Introduction: Physiotherapy is one of the most important profession for therapeutic exercise prescription and development. Physiotherapist efficacy is totally demonstrated. In our daily activity, a lot of aged and nonathletes patients, are treated with surgery. In our hospital these patients start their rehabilitation treatment with patients with other pathologies, so it is important to optimise time and spatial resource. Furthermore, there are guidelines for knee arthrosic patients and after knee surgery, but there is not sufficient for knee arthrosic patients after meniscus surgery.

Objective: To make a useful checklist, with simple questions where physiotherapists could design a successful treatment after knee arthroscopy in patients with arthrosis.

Method: The observer of Rehabilitation Service made a questionnaire that includes personal background, type of surgery and physical exam. It was made the first day of treatment to choose specific exercises. These parameters were measured before and after treatment: joint mobility, muscular balance, pain, walking pattern, time used in patient exercises education and room necessary for treatment.

Results: Our checklist has 5 questions: inflammatory pattern, joint mobility, muscular balance, walking pattern and pain. We have made a pilot study with 10 patients with knee arthrosis operated in our hospital to evaluate the viability of this initiative. The functional results did not statistically significant change was seen, but time used in patient exercises education and room organization were better.

Conclusions: Our checklist could improve time used in patient education and room organization in patients after knee surgery with arthrosis. More studies are necessary for statistically significant results.

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NON-POWERED AUTOMATIC VELOCITY-CONTROLLED WHEELED WALKER IMPROVES GAIT AND SATISFACTION IN PATIENTS WITH HIP FRACTURE WHEN WALKING DOWNHILL: A WITHIN-PARTICIPANT REPEATED MEASURES EXPERIMENTAL STUDY**Eunsil Cha¹, Suk Hoon Ohn¹, Ki Deok Park², Hyoseon Choi³**

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Introduction: After a hip fracture, walking aids are provided for effective muscle training and ambulation. Standard four-wheeled walker is widely used nowadays, but it can increase the risk of falls at a downhill ramp due to unskilled control. As a result, the fear of falling hinders early mobilisation and recovery, making it difficult to achieve their pre-fracture functional abilities. Therefore, we developed the non-powered automatic velocity-controlled (NPAVC) wheeled walker.

Objective: We aimed to evaluate the effect of the NPAVC wheeled walker on the gait and satisfaction when the patients with hip fracture are walking downhill.

Method: Twenty participants using a four-wheeled walker after surgery of unilateral femur fracture were enrolled. Participants performed three times of walking trial per each walker (NPAVC wheeled walker vs. four-wheeled walker) at their self-selected speed along the downhill ramp (5m length, 5 degrees). Surface electrodes were placed over the tibialis anterior (TA), gastrocnemius (GCM), vastus medialis (VM), biceps femoris (BF) muscles of bilateral legs, and we measured the highest root-mean-square (RMS) value. Satisfaction degree was recorded using a 10-point. We utilized independent t-test to compare the RMS of each muscle, change of heart, and satisfaction score between groups. The level of statistical significance was set at p-value 0.05.

Results: The VM and TA muscles of the affected leg and the BF muscle of the unaffected leg generated stronger contractions in patients during the NPAVC wheeled walker trials. Moreover, patients reported more satisfaction when using the NPAVC wheeled walker compared to the four-wheeled walker.

Conclusion: An NPAVC wheeled walker, compared to a four-wheeled walker, can assist patients to generate stronger contraction in leg muscles when walking downhill. (This work was supported by the Technology Development Program (S2410642) funded by the Ministry of SMEs and Startups (MSS, Korea) and Hallym University Research Fund 2018 (HURF-2018-08).)

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THE OPTIMAL STARTING AGE FOR HELMET THERAPY IN INFANTS WITH DEFORMATIONAL PLAGIOCEPHALY**Eunyoung Kang**

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Introduction Plagiocephaly refers to asymmetry and flatness of the skull, and deformational plagiocephaly (DP) is defined as nonsynostotic plagiocephaly that results from continuous external pressure to the skull during the fetal and neonatal periods. The treatment of plagiocephaly consists of repositioning therapy or helmet therapy.

Objective The purpose of this study was to investigate the relationship between treatment duration and the age at which helmet therapy was started in infants with deformational plagiocephaly (DP) and to evaluate the appropriate starting age of helmet therapy in infants with DP of varying severity.

Method A total of 87 infants with moderate or severe DP completed helmet therapy. Therapy completion was defined as achieving a diagonal difference (DD) of ≤ 5 mm. Participants were grouped according to the age (in months) at which helmet therapy was commenced. Therapy duration, initial DD, and final DD were measured at monthly intervals. We also analyzed the outcomes of participants with moderate versus severe DP.

Results Treatment duration was correlated with age at the initiation of treatment ($r=0.683$)

Conclusions The duration of helmet therapy for the treatment of infants with DP was shorter in infants who started therapy at an earlier age in moderate and severe subgroups. In addition, starting helmet therapy before 6 months of age may reduce the treatment duration in infants with moderate DP.

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SWALLOWING IN PATIENTS WITH DISORDERS OF CONSCIOUSNESS: A BEHAVIORAL STUDY**Evelyne Mélotte**

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Introduction: After a period of coma, a proportion of patients with severe brain injury remain in an altered state of consciousness before regaining partial or complete recovery. Patients with disorders of consciousness (DOC) classically receive hydration and nutrition through an enteral feeding tube. However, the real impact of the level of consciousness on a patient's swallowing ability remains poorly investigated.

Objective: The aims of this study were to document the incidence and characteristics of dysphagia in patients DOC and to evaluate the link between different components of swallowing and the level of consciousness.

Method: We retrospectively analyzed clinical data on the respiratory status, oral feeding and otolaryngologic examination of swallowing of DOC patients admitted for a one-week multimodal assessment of consciousness.

Results: A total of 92 DOC patients were included, 26 patients with unresponsive wakefulness syndrome (UWS) and 66 in minimally conscious state (MCS). Deficits in the oral and/or pharyngeal phase of swallowing were present in 99% of the patients. Compared to MCS patients, UWS patients were more frequently tracheotomized (69% UWS vs 24% MCS) with diminished cough reflex (27% UWS vs 54% MCS) and no effective oral phase (0% UWS vs 21% MCS).

Conclusion: almost all patients with DOC presented at least one swallowing disorder, which represents the most important proportion of dysphagia in neurological population. Some components of swallowing (i.e., tracheostomy, cough reflex and efficacy of the oral phase of swallowing) correlate with the level of consciousness. In particular, the efficacy of the oral phase was not observed in any of the UWS patients, suggesting that its presence may be a sign of consciousness. Our study also confirms that objective swallowing assessment can be completed in DOC patients, and that specific care is needed to treat severe dysphagia in DOC patients.

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A RARE CASE OF A TRUE NEUROGENIC THORACIC OUTLET SYNDROME**Evelien Gryspeerdt**

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Case: We describe the case of a 25-year-old women with brachialgia and weakness of her left hand for ten years. She presents with pain and numbness in the left axillar region irradiating to the ulnar aspect of the forearm. The pain exacerbates while swimming, mountain biking, long distance running and doing overhead activities. Clinical examination shows weakness and severe atrophy of the thenar muscles and intrinsic hand muscles. There is a hypoesthesia along the ulnar aspect of the forearm. Elektromyography shows a severe chronic lower trunk brachial plexopathy. The nerve conduction study shows a low amplitude of the sensory ulnar nerve and motor median nerve. Magnetic Resonance Imaging of the cervical spine and brachial plexus is normal. X-Ray of the cervical spine shows a prominent transverse process of the seventh cervical vertebra, suggesting a True Neurogenic Thoracic Outlet Syndrome (TN-TOS) based on a prominent transverse process of the seventh cervical vertebra.

Discussion: True Neurogenic Thoracic Outlet Syndrome is rare, and diagnosing is challenging. The diagnosis rests on a combination of history, clinical examination and relevant technical examinations. Elektromyography is the golden standard for diagnosing TN-TOS. Typically, nerve conduction studies show a significantly reduced amplitude in absolute value or in comparison with the unaffected side (> 50%) of the medial cutaneous antebrachii nerve, the sensory ulnar and the motor median response. The needle EMG shows chronically neurogenic motor units in the musculature of the inferior brachial plexus. T1 innervated musculature is generally more affected than C8 innervated musculature. An EMG should be followed by a standard cervical or thoracic X-ray and MRI of the brachial plexus to find the possible underlying cause. Considering the current evidence, it seems appropriate to start with a conservative treatment for at least six months. If conservative treatment failed, surgery can be considered. However, high quality evidence in favour of surgery is lacking.

P189

CHRONIC INFLAMMATORY DEMYELINATING POLYNEUROPATHY WITH ANTI-CONTACTIN ANTIBODIES - CASE REPORT**Florina Monalda Nistor, Daiana Popa**

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Introduction: Chronic inflammatory demyelinating polyneuropathy (CIDP) is an immunologically mediated disorder of the peripheral nervous system. CIDP progression occurs over at least 2 months and motor symptoms usually predominate. Sensory involvement usually affects vibration and proprioception. The classic course of CIDP is one of recurrence and remittance.

Objective: Presenting a case where the correlation between an adequate medical treatment combined with a long-term rehabilitation therapy managed to improve the symptoms and quality of life of the patient.

Method: A 50-year-old patient is admitted to our clinic for tetraparesis, sensory disorders, global functional disability. The disease had a sudden onset in March 2018 with acroparesthesia in all limbs, motor deficit of the limbs, ataxic gait, for which he was admitted to the Neurology clinic where he underwent several immunoglobulin treatments, plasmapheresis and corticosteroid therapy with slight improvement in symptoms, followed by relapses. The patient was immunologically tested and anti-contactin1 antibodies were detected, thus it was decided to initiate the immunomodulatory treatment with Rituximab, with favorable response.

The rehabilitation treatment objectives were: preventing injuries of the segments with hypoesthesia, increasing the muscular strength and endurance, sensory re-education, improving the balance and gait, restoring independence in all ADLs and professional and social reintegration. The rehabilitation approach included: physical therapy, occupational therapy, robotic training of the upper limbs and the gait, psychological counseling.

Results: The rehabilitation treatment combined with the proper immunomodulatory medication brought a major benefit in the well-being of the patient, functional scales improved drastically from the first admission to our clinic until the last one.

Conclusions: CIDP mediated by anti-contactin antibodies was found in a small subset of patients. The clinical phenotype is not fully established, but is often severe, predominantly motor, with early axonal involvement. This condition may be receptive to Rituximab therapy and refractory to immunoglobulin therapy.

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THE BIOPHAMACEUTICAL POTENTIAL OF KANJIŽA SPA PELOID FOR DERMATO-COSMETOLOGICAL PURPOSES**Gábor Katona¹, Attila Klimó², Marina Kalic¹, Sladjana Vojvodic¹, Miroslav Sarac¹, Natasa Jovanovic Ljeskovic¹**¹Faculty of Pharmacy Novi Sad, Business Academy University Novi Sad, Novi Sad, Serbia²Special Rehabilitation Hospital "Banja Kanjiža" Kanjiža, Republic of Serbia

Introduction: Peloidotherapy has been used successfully at Kanjiža Spa as part of complex balneophysical treatment since 1936. Clay loam, a slate marl mixed with an alkaline hydrocarbon sulfidethermomineral water, is applied to the body in the form of mud baths and mud body wraps.

Objective: The development of adequate peloid based cosmetic product obtained from the Kanjiža Spa, and a preliminary examination of its cosmetic properties and potential dermatological-therapeutic effects.

Method: In the first part of the quantitative, a quasi-experimental clinical research pilot studies for the formulation of a peloid-based cosmetic product obtained from Kanjiža Spa was conducted at the Laboratory for Pharmaceutical Technology and Cosmetology, Faculty of Pharmacy in Novi Sad. The study with the protocol for research on human subjects was approved by the Institutional Review Board /Ethics Committee. Human subjects of both genders aged 18 - 60 with all skin types were included in the study. The peloid-based cosmetic formulation is formulated as a paste - a mask for facial skincare. Pre and post-testing included non-invasive measurement of sebum, transepidermal water loss (TEWL), and humidity of the forearm epidermis after 20 minutes of skin adjustment to humid conditions ($40 \pm 4\%$ RH) and the laboratory temperature ($20 \pm 2^\circ$ C).

Results: Based on organoleptic analysis and observation, the best consistency and smear on the skin was given by a suspension (paste) averaged at a sieve of 0.106 and a clay-water ratio of 75:25 with a pH of 6.11. Corneometer® pre / post-test (T-test 0.1774), Tewameter® pre / post-test (X increased to 199.8%), Sebumeter® pre / post-test was not fully analyzed due to lack of data.

Conclusion: The suspension (paste) of clay loams and thermal waters of the Kanjiža Spa is suitable for the preparation of a cosmetic composition which does not dry the skin, and has a slight peeling effect.

Key Words: peloid, thermal mineral water, skin, cosmetics.

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HYPERBARIC OXYGEN THERAPY (HBOT) IN PHYSICAL AND REHABILITATION MEDICINE**Gabriela Figas¹, Tomasz Adamczewski¹, Beata Pietrzak¹, Agnieszka Zawadzka¹, Piotr Król², Jolanta Kujawa¹**Department of Physical and Rehabilitation Medicine, Medical University of Lodz, Lodz¹, Department of Physical Therapy The Jerzy Kukuczka Academy of Physical Education, Katowice, Poland²

Introduction: HBOT is relatively rarely included in the rehabilitation program prescribed by PRM specialists although it has recently shown a promising effect in the management of many diseases.

Objective: The goal of the review is to provide current recommendations for using hyperbaric oxygen therapy in PRM.

Method: For the review of the literature, the main inclusion criterion was the relevance of the studies with the PRM profession according to the judgment of two authors. The search included PubMed, Medline and Embase articles from the last 5 years, including systematic reviews (SRs), meta-analyses (MAs), Randomized Controlled Trials (RCTs), controlled clinical trials, observational studies, reviews and guidelines in English.

Results: HBOT is recommend in the treatment of open fractures with crush injury, osteoradionecrosis (mandible), some soft tissue radionecrosis, anaerobic or mixed bacterial infections. It is suggested that HBOT may offer benefit in diabetic foot lesions, femoral head necrosis, crush injury without fracture, burns, other osteoradionecrosis. It would be reasonable to consider HBOT as part of a multi-interventional approach in the treatment of chronic pain, headaches, CRPS, trigeminal neuralgia, Perthes disease, fibromyalgia and long-healing fractures, delayed-healing (chronic), nondiabetic wounds and in recurrent, multiple non-healing wounds due to vasculitis limb replantation, craniocerebral and brain injuries in highly selected patients, SCI. HBOT should not be used in autism spectrum disorders, multiple sclerosis, cerebral palsy and acute state of stroke.

Conclusions: Hyperbaric Oxygen Therapy is promising and still developing method and should be consider as a part of a multi-interventional approach in the PRM. PRM specialists remain acutely aware of the need for high-quality clinical evidence before introducing emerging indications into routine practice.

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ELECTROMYOGRAPHIC PERIPHERAL MUSCLE FATIGUE AND FUNCTIONAL INDEPENDENCE IN ELDERLY WITH HIP FRACTURE

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Introduction: Muscle fatigue manifests the inability of the muscle to maintain a response to certain work demands. With it there is a decrease in strength, as well as a decrease in the precision of movements. In the elderly, this produces an increased risk of falling. Surface electromyography is a non-invasive technique that allows dynamic studies of gait and objectively measure muscle fatigue.

Purpose: To study relation between peripheral muscle fatigue and functional Independence in elderly patients with hip fracture.

Method: An observational, prospective study was done for a cohort of 81 patients aged 70 years or over, with an osteoporotic hip fracture, admitted to a post-acute care hospital, for a rehabilitation treatment. All patients were included in an interdisciplinary rehabilitation program consisted in occupational and physical therapy for 30 minutes on weekdays sessions. The measurement of peripheral muscle fatigue was done with surface electromyography (sEMG) recordings during a gait test. Functional capacity was evaluated using the Barthel Index. All the measures were done the day before discharge. Statistical analysis was done with SPSS program v.21.

Results: No relationship was found between the fatigue and the age or gender. Patients with more muscle fatigue in femoral biceps on both the healthy side and the fractured side, had greater dependence measured by Barthel Index. Likewise, patients with more muscular fatigue in the anterior rectum of the fractured side had a significantly higher level of dependence. There is a greater fatigue in patients with longer stays and with higher levels of comorbidity.

Conclusion: There is a negative correlation between localized muscle fatigue in anterior rectum of the fracture side and biceps femoral in both sides and the level of functional independence measured by Barthel Index.



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ROBOTIC REHABILITATION AND WEARABLE DEVICES IN MS PATIENTS

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Wearable sensors are designed to be worn on the body or embedded into portable devices (e.g. smartphones and smartwatches), allowing continuous patient-based monitoring, objective outcomes measuring, and feedback delivering on daily-life activities. Within the medicine domain, there has been a rapid increase in the development, testing, and use of wearable technologies especially in the context of neurological diseases. Although wearables represent promising tools also in multiple sclerosis (MS), the research on their application in MS is still ongoing, and further studies are required to assess their reliability and accuracy to monitor body functions and disability in people with MS (pwMS). Here, we provided a comprehensive overview of the opportunities, potential challenges, and limitations of the wearable technology use in MS. In particular, we classified previous findings within this field into macro-categories, considered crucial for disease management: assessment, monitoring, intervention, advice, and education. Given the increasing pivotal role played by wearables, current literature suggests that for pwMS, the time is right to shift from a center-based traditional therapeutic paradigm toward a personalized patient-based disease self-management. On this way, we present two ongoing initiatives aimed at implementing a continuous monitoring of pwMS and, consequently, providing timely and appropriate care interventions.

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ANALGESIC EFFECTS OF ACUPUNCTURE ON EXPERIMENTAL PAIN**Gligor Mastilovic, Sindi Rodic, Aleksandra Djuric, Stefan Rosic, Ana Radic, Ljubica Konstantinovic**

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Introduction: Acupuncture has been used in the treatment of acute and chronic pain conditions, as well as to assess pain-related events in experimental settings. While mechanisms of acupuncture analgesia remain unclear, several studies have shown the involvement of the endogenous opioid system, as well as spinal and supraspinal mechanisms (e.g., gate-control) in acupuncture-induced pain relief. Acupuncture point Large-intestine 4 (Li4) is one of the most studied points in acupuncture treatment of many painful conditions. Several studies in humans have demonstrated an increase in pain thresholds after manual acupuncture stimulation, although inhibition of experimental pain in healthy participants have revealed inconsistent results across the literature.

Objective: The study aimed to explore whether a single acupuncture point stimulation of Li4 can have a short-term analgesic effect on experimental mechanical pain, and to determine the distribution of these effects.

Methods: This study has included 14 healthy, pain-free volunteers. All subjects have undergone manual, single-point acupuncture stimulation of Li4 acupuncture point in 20 minutes. Pain detection threshold (PDT) and pressure pain tolerance (PPT) were measured using pressure algometry before and after the intervention. PDT and PPT were assessed on the point of acupuncture stimulation for localized effect, on Li10 acupuncture point of the same arm for regional effect, and Li4 of contralateral hand for generalized effect.

Results: there was a highly statistically significant mean rise in both PDT and PPT in each of the three observed points ($p < 0,001$), following the stimulation of Li4 acupuncture point. There were no statistically significant differences in mean changes of PDT ($p = 0,47$) and PPT ($p = 0,82$) between points

Conclusion: Single acupuncture point stimulation of Li4 can induce a generalized short-term rise in PDT and PPT, which is determined using experimental pain induced by pressure algometry.

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NUTRITIONAL STATUS IN FRAIL ELDERLY PATIENTS WITH HIP FRACTURE**Gema Flores, Paloma Galán, Auxiliadora López, Nerea De la Puente, Paloma De la Fuente, Carolina Mota**

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Introduction: The elderly with hip fracture have a high prevalence of malnutrition. Malnutrition is negatively associated with both vital and functional prognosis in the short and medium term.

Purpose: To analyze nutritional status in frail elderly patients with hip fracture.

Method: An observational study was done for a cohort of 81 patients aged 70 years or over, with an osteoporotic hip fracture, admitted to a post-acute care hospital, for a rehabilitation treatment. All patients included in the study was frail according to Fried frailty criteria. They were measured anthropometric parameters, body mass index (BMI), nutritional status according to the Mini-Nutritional Assessment (MNA), blood analytics and body composition by bioimpedanciometry (BIA). All measurements were made on admission. Statistical analysis was performed with the SPSS v23 package.

Results: Of the 81 patients, 61 were women (75.3%) and 20 men (24.7%).

The age was between 70 and 97 years with a mean of 83.2 ± 6.9 years.

56.8% of the patients presented malnutrition on admission.

Significant correlation was found between the MNA, serum albumin levels and the alteration of the calf circumference measurement, but not with the tricipital skin fold or the muscular circumference of the arm. 79% of patients had D vitamin deficiency and 71.6% folic acid deficiency. 82.9% of overweight or obese patients according to BMI, were malnourished. In the analysis of body composition by BIA, a decrease in phase angle was observed. The Na / K exchange was also altered. Muscle mass index was decreased in malnourished patients.

Conclusión: The most of frail elderly patients with a hip fracture who are admitted to a post-acute care hospital, still overweight, are malnourished. There is a correlation between nutritional status performed by MNA, serum albumin levels, calf circumference, muscle mass index and Na / K exchange. There is a high percentage of patients with D vitamin deficiency.

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GORHAM-STOUT SYNDROME MULTIDISCIPLINARY APPROACH (CASE REPORT)**Georgios Detsis, Natasa Nourloglou, Christina Gerasimopoulou, Danae Tsiamasfirou**

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Introduction: Gorham-Stout syndrome is an extremely rare bone disorder characterized by osteolytic bone resorption. Diagnosis of Gorham-Stout can be made after excluding other causes of bone resorption such as those caused by infection, inflammation, malignancy, and endocrine.

Objective / Method: In our report we present a 32-years old woman with Gorham - Stout syndrome. The patient begins with acute pain and reduced range of motion in the right hip joint. She was unable to walk without walking aid equipment. Treatment was initiated with bisphosphonates and radiotherapy. After 8 years a fracture in right acetabulum was diagnosed and a total hip arthroplasty was performed. After the surgery the patient followed a six-month multidisciplinary rehabilitation program with physiotherapy, occupational therapy and psychotherapy.

Results: According to physiotherapy initial assessment the patient was able to walk only with two forearm crutches. Right leg muscles test scores using Medical Research Council scale (MRC) in the right hip showed significant weakness. In addition, there was reduced range of motion in flexion, abduction and external/internal rotation of the hip joint.

As far as the occupational evaluation the patient couldn't accomplish activities of daily living without extra help from another person. The Modified Barthel Index (Shah version) score was 72 /100 and the Canadian Occupational Performance Measure (COPM) performance and satisfaction score was 6 and 5,2 respectively.

After psychological and behavioral assessment her Beck Depression Inventory (BDI) score was 36 and Beck Anxiety Inventory (BAI) was 35. She was diagnosed with severe depression and severe level of anxiety respectively.

The completion of a six-month multidisciplinary rehabilitation program showed significant improvement in walking, daily life activities, and depression and anxiety levels.

Conclusions: The multidisciplinary approach in this rare case signifies how important the collaboration of different health care professionals is in order to achieve the best treatment outcomes.

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"BREMBO" THE BREMBANA VALLEY HORSE WAY TO MANAGE TRUNK REHABILITATION IN NEUROLOGICAL DISEASE**Giovanni Pietro Salvi¹, Annamaria Quarenghi¹, Eleonora Sigismondi¹, Emanuele Mion², Marcello Simonini¹**Riabilitazione Neuromotoria, Istituto Clinico Quarenghi, San Pellegrino Terme¹, Università degli Studi Pavia², Italy

The aim of our study is finding a new, easy and repeatable technology to improve trunk control in post stroke patients.

METHODS; "BREMBO" (fig.2) is a mechanical horse based on springs and levers moved by the patients without any electronic system and the patients' movements are more flowing. This mechanical horse is also useful to prepare patients to hippotherapy and to rehabilitate the trunk control. We tested 12 patients affected Stroke haemorrhagic (4 patients) and ischemic (8 patients) with cardiovascular and respiratory stability, without cognitive impairment and Trunk Control Test Score (TCT) from 36 to 61. Each patient was evaluated by physician and then tested with Hunova System™ (fig.1) before riding and after the treatment with our Brembo Horse. The treatment with our mechanical horse is always under clinical control.

RESULTS: We collected 5 women and 7 men and we got an improvement both of Trunk Control Test (TCT) score and Hunova System™. Patients find benefit in improving trunk control, balance and joint rehabilitation, they like the new exercises always trained in safety and under physiotherapist control.

CONCLUSIONS: The new technology is cheap because it doesn't need robot (Trunk Control Test can easily replace Hunova System™) and the maintenance of BREMBO HORSE is very simple. It is an opportunity for patients with these diseases. It is also useful in adults and children as a propedeutic to hippotherapy.

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WHIPLASH SYNDROME: WHAT IS NEW IN ITS MANAGEMENT?**Giuseppe De Bernardo, Blanca Palomino Aguado, Juan Carlos Estupiñan Guzmán, Adrian José Maldonado Vilorio, Daniel Torres Noriega**

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Background and aims: Whiplash associated disorders are defined as injuries secondary to an acceleration-deceleration mechanism, that typically occurs with vehicle collisions. Annually worldwide, the number of medical consultations for acute whiplash injuries is 235-300 per 100,000 inhabitants. The treatment includes multiple interventions, and is associated with high direct and indirect costs. The prognosis is usually favorable: 85% of patients return to their previous activities within six months after the injury. The objective of this work is to present an update of the clinical and therapeutic management of whiplash

Methods: A review has been made on the management of acute whiplash syndrome based on the literature and clinical practice guidelines of the last 5 years.

Results: The treatments that have shown scientific evidence of effectiveness are: Reassure the patient and encourage him to stay active and not restrict the normal activities of life (level B). Active exercises: ROM, muscular resistance, stabilization, coordination, strengthening, McKenzie (level B). Pharmacological Therapy (Consensus): Simple analgesics, first line, NSAIDs, second line. Opioids exclusively for patients with severe pain (VAS > 8) and with muscular or neurological symptoms.

Conclusions: In the management of acute whiplash syndrome, measures that have shown solid evidence of effectiveness are considered first line. Treatments with limited evidence (Manual therapy, manipulations, Kinesio Taping, trigger point puncture) are not recommended routinely. Its application has to be closely monitored and maintained exclusively if it entails measurable benefits, in terms of pain and disability. We consider that the role of the rehabilitation physician is fundamental in the clinical and therapeutic management of this clinical entity.

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SYNOVIAL CHONDROMATOSIS: A CASE REPORT**Giuseppe De Bernardo, Carolina de Miguel Benadiba, David Pozo Crespo, María José Buzzetta Devis**

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Background and aims: Synovial chondromatosis is an uncommon benign neoplastic process of the synovial membrane of joint. The incidence is of 1:100000, and affects male two to four times more than females, frequently in the third to fifth decades of life. It's a monoarticular process that involves large joints like hip, elbow, shoulder, and ankle. Knee is the most commonly joint affected (65% of cases). It's characterized by the formation of multiple cartilaginous nodules in the synovial tissue of joints, that often detach and become free bodies. Secondary ossification occurs in 70% - 95% of cases. The main symptoms are swelling of the joint, pain, and restriction of movement. Radiology plays a key role for correctly diagnosing. Treatment includes removal of the loose bodies (with or without synovectomy) through an open or arthroscopic approach. Local recurrence is estimated from 3% to 25%. Radiotherapy, radiosynovectomy and local anesthetic and cortisone injections are also described.

Methods: A 40 years old male patient presented a 10 months history of unspecified knee pain in absence of preceding trauma. Physical exam manifested limitation of range of motion, stiffness and joint swelling. US evidenced multiple hyperechoic intrarticular foci. X-ray demonstrated multiple intrarticular calcifications of similar size. Finally a MR was executed, showing a synovial effusion including multiple intrarticular free bodies in which cortical and medullary bone were recognized, suggestive of osteochondromatosis. Differential diagnosis initially included Chondrocalcinosis and Pigmented Villonodular Synovitis.

Results: Conservative management based on NSAID, ROM exercises and electrotherapy, was indicated to induce symptomatic improvement, waiting for definitive surgical treatment, that was finally performed with good results.

Conclusions: Our contribution to the treatment as Physiatrists can be pre and post surgery, through the application of analgesic, electrotherapy and kinesitherapy, finalized to joint range enhancement, improve pain and quality of life.

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STROKE IN A YOUNG RECREATIONAL ATHLETE**Gonçalo Engenheiro, José Barreto, Inês Táboas, Sofia Toste, Joana Leal , Catarina Branco**

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Introduction: Ischemic stroke in young adults is relatively uncommon. Etiologies in this population are various, therefore requiring full and throughout investigation. Anabolic androgenic steroid (AAS) abuse may be related to cerebrovascular disease.

Objective: To report a case of a young man diagnosed with ischemic stroke and AAS abuse.

Method: Electronic health record consultation and PubMed database research from 2000 to 2019 with MeSH terms "Young adult", "Ischemic Stroke" and "Anabolic androgenic steroids".

Results: In October 2019, 36 year-old previously healthy male recreational athlete was admitted to Emergency Room with sudden onset of left side hemiparesis, 45min of evolution after awaking. Past medical history included allergic asthma and smoking and history of late life stroke in his father. He underwent successfully thrombolysis and then was admitted to Stroke Unit. Cranial magnetic resonance imaging (MRI) showed recent right nucleocapsular infarction and occipital ischemic findings. Transcranial Doppler identified right to left shunt. Etiology investigation revealed consistently AAS consumption for the preceding 5 years: cycles of oral mesterolone 25mg once daily combined with monthly intramuscular injection of testosterone enanthate 1mL for 1 month alternated with 4-month break period. After clinical stabilization, he was transferred to Physical and Rehabilitation Medicine (PRM) inpatient ward where he almost fully recovered from deficits, but presented exertion to small efforts. Laboratory tests found hypothalamic-pituitary-gonadal axis suppression. Workup is yet in progress to clarify this clinical picture, namely transesophageal echocardiography and cardiac MRI.

Conclusions :Several factors may explain an ischemic stroke in this young adult: training type, former smoking habits, AAS abuse and a possible cardiac malformation. Young patients usually have better prognosis following stroke. However, as in this case, endocrine and cardiac comorbidities pose a yet bigger challenge to PRM doctors in the fully reintegration of these patients.

P201

UNDERSTANDING AND RECOGNITION OF PREPOSITIONS IN PATIENTS WITH SPEECH AND LANGUAGE PATHOLOGY AFTER A STROKE**Goran Savic, Anja Drljic, Ljiljana Rakic**

Neurorehabilitation ISPRM Dr Miroslav Zotović, Banja Luka, BiH RS, Bosnia and Herzegovina

Introduction: A preposition is a word used to link nouns, pronouns, or phrases to other words within a sentence. They act to connect the people, objects, time and locations of a sentence. Patients with speech and language pathology (SLP) have difficulties of understanding and recognizing meaning of prepositions.

Objectives: Our goal was to determine whether patients with SLP after stroke could audibly and visually recognize the suggestions given.

Methodology:The sample consisted of 45 patients with different localization of brain damage. We put 3 sets of pictures in front of the patients. Each set had 5 pictures. Each image had two objects in different spatial relationships (inside, on the top, in front, beside and behind). The successfully recognized image scored by one point. (15 were total of points).

Results:The average age of the sample is 67.15 (\pm 9.30). In this sample, the gender ratio was (51.11% male: 48.89% female). Ischemic stroke was the most common. The sample included: 39 patients with right-sided impairment, 4 with left-sided, 1 with bilateral and 1 patient with no significant body damage. 30 patients had SLP by type of aphasia, and 15 of them had dysarthria. The average auditory recognition score of the proposal is 45.86%. Aphasia patients achieved a score of 26% compared with dysarthria patients who had an average score of 85.73% ($p = 0.0000$). An average success rate of 50% and less was achieved by 55.55% of patients. The poorest results were achieved by patients with localization of brain damage temporally and a combination of temporal and adjacent area damage.

Conclusion:Poor results were achieved in patients with aphasia compared with patients with dysarthria. The reason is that most of these patients did not audibly recognize the default preposition and did not adequately demonstrate the default preposition in the presented images.

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RETROSPECTIVE STUDY OF DISCHARGE DESTINATION STATUS OF POST STROKE**Hannan Osman**

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Objective: The main outcome measures were discharge destination status after rehabilitation post brain bleed (Traumatic/Aneurysm).

Methodology: This retrospective five-year study was conducted in the Department of Neuro rehabilitation centre at ward 5 (Phoenix unit) in Royal Liverpool and Broadgreen Hospital. The observation period was between June 2013 to February 2019.

Results: Out of 332 patients enrolled for rehabilitation in the participating institutions, 48 rehabilitants with stroke after a traumatic brain injury/non traumatic brain injury were included as study participants. Twenty-eight of them were males and twenty of them were females. Ten patients were above 67 years and thirty-eight of them were below 67 years of age.

Thirty-three patients (68.8%) were discharged home; thirteen (39.3%) of them received the benefits of package of care and Nineteen (57.6%) patients resumed to their life without any additional care support. Thirteen patients (27%) were transferred to Brain injury unit who required advanced rehabilitation. Two patients (4.2%) were discharged to nursing home. Data's were collected from the discharged summaries and patients notes and entered in the software.

Discussion: Wide range of discharge destinations are considered at the time of discharge from rehabilitation unit (Jette DU et al, (2014) most patients prefer discharge destination as home (Brain Injury Association of America, 2016).

Conclusion: This study confirmed that majority of patients were discharged home from rehabilitation centre and it suggest that positive and lasting results are achieved within the network rehabilitation in the sense of promoting participation and self-determined life-style.

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WHAT DO PATIENTS SAY ABOUT DEVELOPMENT OF THEIR PAIN: A CROSS-SECTIONAL STUDY OF POSSIBLE TRAJECTORIES OF CHRONIC PAIN DEVELOPMENT**Helena Jamnik**

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Introduction Chronic pain (CP) development is connected to allostatic load, accumulating throughout longer time periods, possibly since childhood.

Objective To explore different possible trajectories of chronic pain development according to patients' history among patients with chronic pain, spread into at least 4 regions, according to widespread pain index (WPI).

Method A cross-sectional study on sample of patients, examined by interdisciplinary pain rehabilitation team, including a list of 22 descriptors (yes/no statements about location, onset of pain development; headache, sleep and fatigue development in relation to the onset of pain; physical and mental comorbid conditions in relation to chronic pain development).

Results 298 consecutive patients were included, 13 did not want to participate; 242 female (age 50,5 SD 10.8), 43 male (50,4, SD 10,7) were included; 22 had WPI less than 4; 27 were uncertain in more than 1 descriptor; 25% reported 3 – 5 years CP, 22% 5 – 10 years CP, 20% 10 – 20 years CP, 11% 1– 2 years CP. The rest reported less than 1 or more than 20 years CP. The majority - 49% reported pain starting gradually without a clear provocative event (injury, disease), on one site (52% back, 15% neck, shoulders 8%, knees 5%, heels or elbows 6%), in »muscles and joints« 7%, in both legs 7%. In this group, 38% reported tension or migraine headache before CP. 10% had a history of CP since childhood, 23 % and 20% of all reported having sleep disorder or physical fatigue occurring before CP respectively; 24% reported different comorbid physical conditions as contributors to their CP, 7% had rheumatic inflammatory disease, 9% reported mental disorder before CP development.

Conclusions. According to patients' reports about CP development, sleep problems, fatigue of possible mental or physical origin, headache and CP since childhood are possible pre-existing conditions of chronic musculoskeletal pain.

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ANALYSIS OF CHANGES IN UPPER LIMB FUNCTION ACCORDING TO DIFFERENT UPPER LIMB ROBOT PROTOCOLS**Hye Jin Lee, Haeyoung Kim, Deokyun Jo, Jungeun Lim.**

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Robotic rehabilitation devices for upper limb has been shown to be an effective tool for rehabilitation for individuals with spinal cord injuries(SCI). According to a recent study, when comparing the effectiveness of the upper limb robotic therapy with the conventional occupational therapy in quadriplegic patients with spinal cord injury, the upper limb robotic therapy showed the same level of effectiveness as the conventional therapy. While there are some studies that have determined the effectiveness of upper limb robotic therapy with different frequencies and duration, there are few researches on which type of training is effective in improving motor function. Therefore, this study is conducted to determine which protocol of upper extremity robotic therapy is more effective in recovering the upper limb function of spinal cord injury patients, simple repetitive training or training to elicit complex movements using various games.

A total of 16 American Spinal Injury Association Impairment Scale(AIS) B,C,D tetraplegic patients were randomly assigned to one of the two training protocols and received robotic therapy with upper limb robots called Armeo power(Hocoma, Switzerland). The content of training was the same in both protocols that have movements of shoulder flexion/extension, shoulder abduction/adduction, and elbow flexion/extension, 10 minutes each. All patients trained for 30 minutes per session, 3 times a week, for a total of 5 weeks. The assessment was conducted before the training, at the end of the training. With Placing a circle with a radius of 20cm in front of 85% when the patient reaches out his or her arms in the chair position, participants performed touch the markers on the center of the circle, at 6, 12, 9 o'clock, and 3 o'clock in order. The duration, mean velocity, max velocity, ratio between mean velocity and max velocity, and time to velocity peak of movements were evaluated. In addition, Manual muscle test(MMT), modified ashworth scale(MAS), Korean version of spinal cord independence measure-3(KSCIM-3), the goal attainment scale(GAS), the capabilities of upper extremity(CUE) and upper extremity pain were evaluated.

The 7 participants performed simple repetitive training and the 9 participants performed training to elicit complex movements using various games. After training, Significant improvement in movement time was seen in the experimental group compared to before training, but not visible in the control group. However, there was no significant difference between the two groups. Both groups have significantly improved GAS scores after training, but there is no difference between the two. MMT, KSCIM-3, CUE, MAS, upper extremity pain were no significant improved and no difference between the two. Therefore, the capability of the upper limb robotic therapy has been improved overall by utilizing any type of upper limb robot protocol.



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A RARE CASE OF SCIATIC NEUROPATHY ASSOCIATED WITH HYPERMETABOLIC LESION IN POSITRON EMISSION TOMOGRAPHY–COMPUTERIZED TOMOGRAPHY

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Introduction: Sciatic neuropathy can be caused by various etiologies. The most common causes of sciatic neuropathy are hip surgery and direct nerve injury. Herein, we report a rare case of sciatic neuropathy in patient who had underlying disease of diffuse large B-cell lymphoma.

Case report: A 76-year-old woman suffered from tingling sensations in lower extremities and was diagnosed with lymphadenopathy in retroperitoneal region. In Positron Emission Tomography – Computerized Tomography (PET-CT) taken before the treatment, there was an increased fluoro-deoxyglucose (FDG) uptake in spinal cord, right S1-2, sciatic and pudendal nerves. After the surgical biopsy for para-aortic lymph nodes, she was treated for diffuse large B-cell lymphoma with chemotherapy. All the lesions were fully resolved in repeated PET-CT after the chemotherapy and there were no symptoms including pain or weakness. The disease state was considered as complete response status. However, after the 7 months, she was referred to our clinic for newly developed low back pain with decreased motor power in right lower extremity. Although there was no confirmation for the high FDG uptake lesion in right sciatic nerve in the initial PET-CT through biopsy, there might be the relationship between the results of the electrodiagnostic findings and high uptake of FDGs in the right sciatic nerve. The definite cause of the highly uptaked FDGs in right sciatic nerve was unclear but considering the disappearance after chemotherapy, the possibility of lymphoma invasion seemed plausible.

Conclusion: A sciatic neuropathy caused by the invasion of the lymphoma is very rare. Despite the low incidence, we should also consider the possibility of nerve invasion by lymphoma when these symptoms are present in lymphoma patients, which is necessary for early diagnosis and suitable treatments.

Keywords : Sciatic neuropathy, Lymphoma, Hypermetabolic lesion



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PARTICULARITIES OF REHABILITATION IN A PATIENT WITH COMPLEX TRAUMATISM OF THE HAND

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Introduction: Hand traumas can be unique or within more complex traumas and are important because of the functional impact they can have.

Objective: The present paper analyzes the challenges faced by a patient with complex trauma of the dominant hand, the solutions found and the evolution at three months after the accident.

Method: This presentation refers to a 24-years-old patient, who suffers trauma through crushing of the left hand (dominant hand) with transmetacarpal quasi-amputation, dorsal tegumental bridge of approximately two centimeters and acute ischemia of II-V fingers for which surgery is performed. He is presented in the rehabilitation service immediately after removing the wires and brushes from the II-V metacarpals, with pain and redness in the fist and fingers, pain in the left shoulder and vegetative phenomena. It is evaluated clinically and functionally and follows the specific recovery program that includes electrotherapy (short wave, cryo-ultrasound, laser, magnetodiaflux, interferential currents) and kinetotherapy (program for the upper limb kinematic chain and ergotherapy). It returns to reevaluation after 3 months.

Results: The response to the treatment was good in the context of the young patient and the early start of the rehabilitation program, the evolution being very favorable.

Conclusions: The goals of the treatment of traumatic injuries of the hand refer in particular to the functional and later aesthetic aspect. The hand is a sophisticated tool with which the man comes into contact and manipulates the environment. The functionality of the hand is directly involved in most professions and as a result, the goal of the treatment should be to restore the functional state of the hand as soon as possible. Early rehabilitation program for hand injuries have a direct implication in the final result.

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MANAGEMENT OF SYNKINESIS WITH BOTULIM TOXIN (BT) IN 51 PATIENTS WITH PERIFERIC FACIAL PALSY (PFP)**Irene Aguirre Sánchez**

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Introduction: Facial synkinesis is one of the most distressing consequences of facial paralysis.

Botulinum toxin with and without neuromuscular therapy has shown promising utility as a nonoperative method in restoring normal facial features and decreasing the severity of the personal morbidities and improve quality of life.

The Sunnybrook Facial Grading Scale (FGS) scores each facial nerve territory, examines static and dynamica activity, and documents a secondary feature. The Synkinesis Assessment Questionnaire (SAQ) is a reliable and easily administered instrument for the self-assessment of synkinesis in patients with facial palsy.

Objective: Analyze the effect of botulinum toxin (BT) injection in patients with facial palsy.

Material and Methods: 51 patients with PFP were recruited from our local hospital.

21 women and 30 men. 42 received Kinesitherapy, with an average of sessions of 19.76 (mode 10). Only 40 of them received BT injection, being the average of its administration of 10,94 months. The score FGS was interpreted pre and post injection of BT Pre FGS and Post FGS. Eight patients answered the SAQ questionnaire before and six weeks after the injection.

Results: There is a statistically significant difference in the improvement of the FGS score (Related samples T-Test $P < 0,05$) and synkinesia (Related samples T-Test $< 0,005$) in patients who received treatment with BT. There is also a statistically significant difference (T- Test $< 0,005$) in the self perception of synkinesis (SAQ) measure in this small sample.

Conclusions: The treatment with BT in patients with PFP seems to be effective for those patients with synkinesis regarding the improving of the FGS score. The SAQ questionnaire should be a validated tool in Spanish.

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NOTALGIAPARESTHETICA: DIAGNOSIS AND TREATMENT**Isabel María Pérez Saborido, Beatriz Entrambasaguas Estepa**

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Introduction: Notalgiaparesthetica is a chronic neuropathic dysesthesia of unknown etiology (possibly the irritation or damage of thoracic nerves T2-T6) characterized by a pruritus, pain, paresthesia/hyperesthesia and the appearance of a hyperpigmented macula located on the medial border of the inferior scapula. Typically seen in middle - aged females, is unilateral, and can last for months to years.

Objective: To make a correct diagnosis and treatment of this rare entity.

Method: We assessed a hypertensive and diabetic 58-year-old woman in medical consultation, because she has had a dark spot in the middle right scapular region associated with intense pruritus and rubbing pain for more than 6 months. Examination: hyperpigmented macula located in the right infrascapular region, allodynia and tingling on palpation.

Results: We requested an imaging study, which confirmed degenerative spinal pathology; and we request an examination by dermatologists, who supported diagnosis. Medical treatment with low-dose pregabalin associated with topical lidocaine patch and supplementation with alpha-lipoic acid, and a program of scapular stabilization and toning and stretching of periescapular and upper limb muscles are initiated. We reassessed our patient in 3 months; she reported very occasional pruritus and the allodynia has virtually disappeared.

Conclusions: Notalgiaparesthetica is usually underdiagnosed. It is related to similar disorders such as meralgiaparesthetica (involvement of the femoral cutaneous nerve) or gonalgia (involvement of the saphenous nerve), whose clinic is similar but in a different location. The diagnosis is clinical. Imaging studies such as x-rays, computed tomography, or magnetic resonance imaging are not required to establish a diagnosis. Although in our case there has been a good response to symptomatic treatment, the efficacy is usually partial or transient. Therefore, occasionally more invasive measures such as anesthetic or botulinum toxin blockages, and even orthopedic surgery are required.

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RESULTS OF REHABILITATION IN INFANTS WITH LOW-WEIGHT FOLLOWING LIVERTRANSPLANTATION**Iskra Takeva, Yordanka Uzunova**

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Introduction: Liver transplantation (LT) in children is a high-risk procedure, but experience and progress in immunosuppression have led to high survival rates in the postoperative period. Currently, the focus of transplantation is on improving the quality of life (QoL). Early rehabilitation of recipients is also essential for achieving this goal. We present our results of active rehabilitation of infants up to 6 months after LT.

Objective: The children monitored were with chronic liver disease, which led to malnutrition, growth retardation, and delayed psychomotor development (PMD). The study group included 9 pediatric liver transplant recipients. All children were under 1 year of age, weigh less than 8 kg, height up to 70 cm, delayed pre-transplant PMD, and lack of pathological neurological symptoms after surgery.

Method: The psychomotor development and motor function of the children were evaluated before the start of the rehabilitation, at discharge from the transplant center and 6 months later. The Manova-Tomova method and the Alberta Infant Motor Scale (AIMS) were used. Based on the functional assessment, an algorithm for inpatient and outpatient rehabilitation was applied.

Results: The results of the Manova-Tomova assessment show an increase in the overall development rate from 44.1% at the beginning to 67.3% of normal physical development at the third follow-up, which corresponds to a change from moderate to mild. The three AIMS assessment stages showed a respective increase in the average score of 15.1 ± 7.3 ; 17.9 ± 5.6 and 34.5 ± 8.8 . In the control study at 6 months after LT in all patients, improvement in PMD was significant ($P < 0.001$).

Conclusion: LT provides an opportunity for children to lead a long, active, fulfilling lifestyle. In combination with early-initiated and individualized rehabilitation, it compensates for the delay in PMD in children under one year of age.

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EFFECTIVENESS OF COLLAGEN TYPE II TREATMENT IN KNEE OSTEOARTHRITIS**Ivana Gajic¹, Tamara Filipovic², Aleksandra Ignjatovic³, Sanja Dimitrijevic⁴, Aleksandar Filipovic⁵, Milica Lazovic²**

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Knee osteoarthritis is one of the most common diseases of this joint that can greatly impair the quality of life. The importance of the collagen type 2 discovery for the structure and function of hyaline cartilage and then the possibility of its isolation from animal tissues, lead to the production of collagen preparations, and the increased demand on the market. The promising effects of such products are often the discussion subject among physicians and, therefore, the topic of numerous studies aimed at fighting against a slow but progressive disease such as osteoarthritis, in addition to modalities of physical therapy and programs of exercises.

The aim of this crossover study was to demonstrate the efficacy of 3-month administration of oral native type II collagen on the symptoms in patients with knee osteoarthritis.

Method: The study included 20 patients age between 43 to 78, both women and men, diagnosed with knee osteoarthritis verified by the X-Ray scan (Kellgren Grade I I II), who were treated 3-months with type II collagen therapy (daily dose of 40mg). During the 3-month follow up, the patients' functional status was assessed using Western Ontario McMaster (WOMAC) pane scale, before collagen treatment, after the first and after the third month. Analysis of variance (ANOVA) for repeated measures was used to assess functional status across time points. Statistical analysis was performed using the SPSS 20.0 software.

Results: After one month of administration of collagen type II therapy, statistically significant improvement in functional status was observed (43.84 ± 4.63 vs 39.45 ± 5.71 , $p < 0.001$). After three months there was further significant improvement (39.45 ± 5.71 vs 31.60 ± 5.05 , $p < 0.001$).

Conclusion: Our results suggest that native type II collagen therapy should be included in multi-modal treatment in patients with knee osteoarthritis, with the aim of reducing symptoms and improving the patients' functional status.

P211

THE IMPACT OF CO/POLYORBIDITY ON THE THERAPEUTIC RESPONSE TO VITAMIN D IN PATIENTS WITH OSTEOPOROSIS AND VITAMIN D HYPOVITAMINOSIS IN PRIMARY HEALTH CARE**Ivana Jelic¹, Draškovic Zeljko², Mihajlovic Filip³, Milosavljevic Aleksandar³, Corovic Irfan³, Djuric Dusan³**

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Introduction: Vitamin D, its active metabolites and analogs, represent a group of compounds with numerous functions in the body. The activated receptor for vitamin D in the intestines stimulates the synthesis of the binding protein for calcium, bone stimulates the production of osteocalcin, osteoponin, alkaline phosphatase, increases the transport of calcium from vancellular to intracellular cells, can mobilize calcium from the intracellular calcium reservoir and enhance the metabolism of phosphatidylinositol.

Objective: The aim of this paper is to examine the possible cause-and-effect linkages between the therapeutic response and the use of vitamin D and additional diseases and therapies in primary health care patients with vitamin D deficiency and osteoporosis.

Material and method: An epidemiological survey of osteoporosis and hypovitaminosis D vitamins, was conducted as a retrospective study in patients in primary health care of the Kragujevac Health Center, after receiving the decision of the Ethics Committee of the Kragujevac Health Center. In the period from February 1, 2018 to October 22, 2019 an intervention study was conducted, in which patients with various diseases, ages 30 to 65, were administered vitamin D (Detrical® 1000), and levels of serum D vitamins were measured before and after therapy.

Results: Statistically significant differences in the response to vitamin D (Detrical®1000) were observed in patients with hypertension, diabetes and thyroid disorders ($p < 0.05$). The results obtained also indicate, that there are statistically significant differences in patients with hypertension treated with combination therapy with ACE inhibitor and diuretic ($p < 0.05$). T-assay of samples showed a statistically significant increase in the level of vitamin D in the subjects after treatment with Detrical® ($p < 0.0001$).

Conclusion: Ensuring adequate vitamin D intake is a key ingredient in the treatment of osteoporosis. People at high risk of developing fractures benefit from taking vitamin D supplementation, at least 800 IJ per day. By taking one tablet daily, Detrical®1000, a better neuromuscular function is achieved.

Key words: vitamin D, Detrical®1000, osteoporosis, co / polymorbidities.

P212

EFFECTS OF PROLOTHERAPY USING PLATELET-RICH PLASMA FOR CHRONIC NON-SPECIFIC LOW BACK PAIN**Jaemin Kim**

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INTRODUCTION: Chronic low back pain is a common cause for which there is currently no effective intervention. Some Patients with chronic non-specific low back pain are weakened ligament, and prolotherapy is the effective treatment but their use remains controversial. These ligaments can be strengthened by platelet-rich plasma prolotherapy.

We hypothesized that the effectiveness of prolotherapy using platelet-rich plasma may decrease pain and improved disability of patient with chronic low back pain

METHOD: This study was a prospective, double-blind, randomized controlled trial. Thirty-four patients with chronic non-specific low back pain were randomized to platelet-rich plasma injection and lidocaine injection. Patients were treated with weekly platelet-rich plasma or lidocaine injections at the lumbopelvic ligaments for 2 weeks and then weekly prolotherapy with 15% glucose for 2 weeks and followed up 6 months. Visual analog scale, Oswestry Disability Index and Roland-Morris Disability Questionnaire were evaluated at initial, 4weeks, 3 months, and 6 months. Four patients did not complete this trial. Three were in the platelet-rich plasma injection and one was in the lidocaine injection.

RESULTS: The intensity of pain was significantly decreased in platelet-rich plasma injections at 6 months as compared to lidocaine injections. All participants were significantly decreased pain and disability index at 4 weeks, 3 months, and 6 months but there were no significant differences between groups except for visual analog scale at 6 months. The baseline parameters were no significant differences in both groups.

CONCLUSION: The platelet-rich plasma prolotherapy is an effective intervention in chronic non-specific low backpain. And injection at the lumbopelvic ligaments is also an effective treatment.

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RISK ASSESSMENT IN ADAPTED PHYSICAL ACTIVITY FOR PEOPLE WITH ACQUIRED BRAIN INJURY IN THE CENTER NAPREJ**Jasna Vešligaj Damiš, Zvonka Novak, Yoana Filipic, Vladimir Jačević**

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NAPREJ, Centre for Persons with Acquired Brain Injury offers long-term rehabilitation that includes physical, mental and social health care after acquired brain injury. All our programmes are designed to raise the quality of users' lives as well as the lives of their families. As part of our services we offer also sports rehabilitation. Thus we designed recommendations for sports activities and a risk assessment form, which we complete prior to including a user in a sports rehabilitation programme.

It assesses the risk areas with a risk matrix that helps us to evaluate the degree of risk with regard to the impact of the threat in relation to the likelihood of the risk.

If the risk or impact of the threat and the likelihood of risk is high, we should ask ourselves whether it is worth taking the risk or whether such a high risk for the user is still appropriate. Therefore, for such an area we prepare a risk management plan, which reduces the risk and damage and protects the user with ABI. The plan must include detailed measures to reduce the risk. There are a number of measures that we need to define clearly: how, who and what we will do to reduce the risk.

We discuss and check the understanding with regards to the risks and take responsibility for users actions. Relevant experts are also included in the plan. If the risk of including one is greater than his benefit of sports rehabilitation activities, if it is harming the user or others, and with various measures, we do not achieve sufficient safety for all, we do not include him in the activity. It is important that we work together with a user in looking for suitable solutions to the situation, considering different options, goals or find possible adaptations.

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SELF-ASSESSED VS MEDICALLY DETERMINED HAND OSTEOARTHRITIS IN POSTMENOPAUSAL WOMEN**Jelena Zvekic-Svorcan¹, Aleksandra Mikov², Bojana Stamenkovic³, Tanja Jankovic⁴, Rastislava Krasnik², Dragana Vuklis⁵**

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Introduction: Hand osteoarthritis (HOA) is a common degenerative disease that primarily manifests as hand joint pain.

Objective: To assess the difference between subjective disease perception by patients affected by HOA and controls experiencing hand joint pain as well as medically determined HOA scores.

Method: This prospective cross-sectional study conducted in 2017–2018 at the Special Hospital for Rheumatic Diseases Novi Sad, Serbia, included 100 postmenopausal women aged 60–70 experiencing hand joint pain corresponding to the Visual Analogue Scale (VAS) score ≥ 3 . The sample was separated into experimental (n = 60) and control (n = 40) group, whereby HOA was radiologically diagnosed in the first group (Kellgren-Lawrence grade II–IV), while it was absent in the second (KL grade 0 or I). Using statistical package SPSS ver. 25, between-group differences were analyzed with respect to the VAS score at the time of assessment and in the preceding week, global disease and general health self-assessment, as well as global disease evaluation by the researcher (medical specialist).

Results: Mean sample age was 65.89 ± 3.67 years. Both VAS scores (7.41 ± 3.59 vs 3.59 ± 0.71 ; $t=16.33$, $df=98$, $p < 0.001$) and global disease self-assessment ratings (7.235 ± 1.357 vs 3.400 ± 0.778 ; $t=15.24$, $df=98$, $p < 0.001$) were statistically significantly greater in the experimental relative to the control group, as were medical evaluation scores ($t=15.876$, $df=98$, $p < 0.001$). Pain during the preceding week was rated as more severe (72.667 ± 12.828 vs 34.800 ± 6.346 ; $t=17.29$, $df=98$, $p < 0.001$), and health perception was less favorable among patients diagnosed with HOA relative to controls (71.917 ± 15.344 vs 35.925 ± 7.447 ; $t=13.77$, $df=98$, $p < 0.001$) and these differences were statistically significant.

Conclusions: Patients with HOA rated hand joint pain as more severe at the time of assessment and during the preceding week, and scored their global disease and health more negatively. Medical specialists similarly rated global disease as more severe in the HOA group relative to controls.

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PREOPERATIVE AND POSTOPERATIVE EARLY REHABILITATION OF PATIENTS WITH CERVICAL MYELOPATHY - CASE REPORT**Jelena Mitric, Nataša Keleman, Milica Babic, Nataša Pilipovic**

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Introduction: Cervical spondylopathic myelopathy (CSM) is the most common type of myelopathy in adults 55 years and older. Symptoms occur gradually and are slightly progressive in most patients. Severe degenerative changes in the cervical spine and minor trauma can cause a sudden neurological deficit. The clinical picture is characterized by: pain in the neck, shoulders and upper arms, spasticity of the legs with a positive Babinka sign, which can be accompanied by disorders of sensibility and sphincters.

Objective: To demonstrate the positive effects of early rehabilitation on functional recovery after surgical treatment of cervical myelopathy.

Method: A case of preoperative and postoperative early rehabilitation of a 53-year-old patient treated primarily at the Neurology Clinic where she was diagnosed (endocranial CT, thoracic spine CT, cervical spine NMR) verifying cervical compressive myelopathy was presented. She was operated on in the Clinic of Neurosurgery where a laminectomy C3, C4, C5 is done. Early individual kinesitherapy was performed preoperatively with the aim of preventing resting complications and postoperatively - progressing exercises to reduce neurological deficit. On admission, the Upper Limb (GE) Manual Muscle Test (MMT) was performed: m deltoideus grade 2, m biceps brachii 2, m triceps brachii 2, flexors and extensors of fists 2-, flexors and extensors of fingers 1; lower extremities (DE): m. iliopsos 2, m quadriceps 2, dorsal and plantar flexors 0. On MMT GE release: m deltoideus 3, m biceps brachii 4-, m triceps brachii 3, hand flexors and extensors 3, flexors and finger extensors 3, DE: m iliopsos3, m quadriceps 3, dorsal and plantar flexors 3-. A European Myelopathy Score (EMS) was done on admission and release.

Conclusion: The use of early preoperative rehabilitation in patients with surgically treated CMS and the rapid continuation of postoperative rehabilitation leads to reduced complications of the disease itself, as well as complications due to inactivity and better functional outcome at all stages of recovery. rehabilitation. This significantly reduces the duration of hospitalization and is conducive to the continuation of extended rehabilitation.

KEY WORDS: cervical myelopathy, quadriparesis, early rehabilitation, laminectomy

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**JUST BECAUSE WE ARE MANAGING...DOESN'T MEAN HE'S BEEN MANAGED WELL."
FACTORS INFLUENCING THE CARE OF SERIOUSLY INJURED PATIENTS IN RURAL AND
URBAN SETTINGS**

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Introduction:For survivors of serious injury, the path to recovery can be long and complex. Within regionalised trauma systems, specialised trauma care and expertise are usually concentrated in urban areas. Ensuring the availability of post-discharge healthcare for those outside of urban centres is necessary to meet the needs of these individuals and optimise outcomes.

Objective:To understand the factors that affect the rehabilitation of community-based trauma patients in rural and urban settings.

Methods:Thematic analysis of 25 semi-structured interviews with healthcare providers (HCPs) from various Victorian geographic regions involved in delivering care to seriously injured patients.

Results:HCPs identified that there was an unmet need for professional development and specialised clinical resources for managing seriously injured patients in the community, particularly for those in remote areas or sole practitioners. HCPs reported difficulty managing patients whose mental health and challenging behaviours limited their engagement with rehabilitation. Insufficient psychological services in rural areas was perceived to compound this issue with other disciplines often having to provide counselling and support if psychology input was unavailable. In both rural and urban settings, HCPs also reported needing to work outside of their clinical specialty to provide additional care-coordination for patients engaged with multiple services. Allied health professionals stated that the limited communication with medical professionals limited continuity of care and progressing patients with their rehabilitation beyond hospital discharge.

Conclusion:A need for greater care-coordination of post-discharge health services and improved psychological services in regional areas are required to improve management of patients following serious injury. A support network specific for HCPs working with trauma patients may assist rural clinicians to obtain clinical advice when needed. Utilizing developments in electronic medical records and online systems may improve communication between allied health and medical professionals.

P217

CLINICAL APPLICATION OF LOW-INTENSITY STRENGTH TRAINING FOR THE IMPROVEMENT OF BALANCE IN THE ELDERLY: A PILOT STUDY**Jie Zhang**

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Objective: The high incidence of falls in the elderly population has been recognized as an important cause of morbidity and mortality worldwide. Improved balance control in the elderly may prevent the occurrence of fall events. However, effective strategies to improve balance in the elderly are lacking. The aim of the study was to evaluate the effect of low-intensity strength training on the balance of an elderly population.

Methods: Twelve elderly people (mean age: 90.50 years) were included in this study. These people received regular low-intensity aerobic training with power rehabilitation system for 12 weeks. A dynamic balance test system was used to evaluate the balance ability of the participants before and after the intervention.

Results: The balance scores of the Sensory Organization Test, from items 1, 2, 3, and 6, as well as the comprehensive balance scores were all significantly improved after the training as compared with those at baseline ($p < 0.05$). The systolic and diastolic blood pressures were not significantly changed after training, compared to those recorded before training ($p > 0.05$).

Conclusions: This low-intensity strength training can improve the balance ability of elderly patients without an additional incidence of adverse events. The effect of the training strategy on the incidence of fall events should be evaluated in future studies.

Key words: elderly people; strength training; balance; fall

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FUNCTIONING EVALUATION FOR PATIENTS WITH CHRONIC DISEASES USING WORLD HEALTH ORGANIZATION DISABILITY ASSESSMENT SCHEDULE 2.0**Jiejiao Zheng**

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Objective To test the reliability and validity of World Health Organization Disability Assessment Schedule (WHODAS 2.0) for assessment of functioning for people with chronic diseases.

Methods : From December, 2017 to June, 2018, 346 patients with chronic diseases who received rehabilitation interventions in Huadong Hospital-Jing'an District Rehabilitation Medical Association were selected and evaluated with WHODAS 2.0, and re-evaluated after two weeks. According to the actual use of clinical rehabilitation, in order to improve the accuracy of functional measurement, the items had been added in the second domain Getting Around including Handling, Moving and Manipulating Objects, while added in the third domain Self Care including Caring for Body Parts and Toileting, and added in the fourth domain Getting Along with People including Establishing Formal Social Interpersonal Relationship, with a total of 40 items. The content reliability and structural validity of the scale with four items added were verified by internal consistency reliability, test-retest reliability and confirmatory factor analysis.

Results : The Cronbach's α coefficient of the internal consistency reliability was 0.981, the Pearson coefficient of the test-retest reliability was 0.977 ($P < 0.001$). The final model of the scale with confirmatory factor analysis had good structural validity: the standardized factor loads between potential variables and corresponding measurement indicators were 0.710-0.960, and the standard errors were 0.023-0.066; Chi square degrees of freedom < 5 , root-mean-square error of approximation < 0.1 , standardized root mean square residual < 0.08 , the comparative fit index, normal of fit index, relative fit index, incremental fit index and Tucker-Lewis index all > 0.9 ; the reliability coefficients of the observed variables were > 0.5 , the combined reliability of each potential variable > 0.6 , and all the average variance extraction of each potential variable > 0.5 , all $P < 0.001$, absolute value of the standardized residual < 3 , Modification Index < 4 . There was significant difference in the total score and scores of domains among the patients with different diseases ($F > 10.21$, $P < 0.001$).

Conclusion : WHODAS 2.0 can be used as an assessment tool for the overall health and functioning for people with chronic diseases. Each item, including four new items added, had good content reliability and structural validity.

Key words: International Classification of Functioning, Disability and Health; World Health Organization Disability, Assessment Schedule; reliability; validity

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GAIT PARAMETERS AND ISOKINETIC FORCE OF ANKLE FLEXO-EXTENSORS IN PATIENTS WITH LISFRANC FRACTURE DISLOCATION

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Introduction: Lisfranc fracture dislocation is a rare entity, underdiagnosed in 20% of cases. The main complications described are pseudoarthrosis, chronic pain and loss range of motion.

Objectives: To determine the degree of involvement of the braking, propulsion, take-off and morphology forces of mid-lateral forces on the overall functionality of the gait and to objectify the isokinetic force of the sural triceps in patients affected by these fractures.

Correlate gait parameters with isokinetic and quality of life.

Method: Descriptive transversal study of 16 patients treated at Bellvitge Hospital from 2011 to 2018 after Lisfranc fracture dislocation. We did a kinetic study of gait on dynamometric platforms and isokinetic test of ankle flexo-extensors in each patient. We value the Quality of life through questionnaire (SF-36). Statistical analysis performed with SPSS 20 and taking as significance level $p < 0.05$.

Results: 56.3% of patients have a pathological gait. Statistically significant differences were found in mid-lateral support morphology in 71.4% of cases. The average walking speed was 0.85 meters/seconds, presenting slow gait in 81.3% of patients. The average time of evolution in patients with normal gait is 61 months, and in pathological gait is 39.5 months. Test isokinetic showed a Peak-Torque deficit in plantar flexor muscles of the affected ankle compared to the contralateral in 37,5% at a speed of 60°/seconds. Not finding association with a peak-torque of 120°/second. The average assessment of the quality of life in patients with pathological gait is 65.5% and in patients with normal gait is 71.4%.

Conclusions: The gait pattern is altered in most of the patients analyzed. The main parameters of gait altered are slowing of gait velocity, mediolateral morphology and decreased plantar flexion, associating it with a decrease in propulsion force. We do not observe a worse significant quality of life in patients with pathological gait.

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ISOLATED ACHILLES TENDON SHORTENING RELATED PERIVENTRICULAR LEUKOMALACIA WITHOUT ANY PERINATAL ISSUE: CASE SERIES**Jong Kyu Kim, Ga Yang Shim, Seunghee Han**

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Introduction: Periventricular leukomalacia (PVL) is a well-known cause of cerebral palsy associated prematurity, such as spastic diplegia or quadriplegia. We experienced isolated Achilles tendon shortening cases with brain MR images suspicious periventricular leukomalacia without any perinatal history.

Case 1: An 8-year-old boy with tip-toe gait for 5 years showed of ankle dorsiflexion limitation, 5/5 degrees with knee flexion and 0/0 degrees, extension. There was no other neurological sign. Brain MR showed asymmetry and mild enlargement of lateral ventricles, suggested PVL.

Case 2: A 21-year-old male suffered from short Achilles tendon. His ankle dorsiflexion was 10/5 degrees with knee flexion and 0/-5, extension. Brain MR showed wall irregularity of left lateral ventricle dorsal horn with mild thinning of adjacent white matter, suggested PVL.

Case 3: A 13-year-old boy complaint tip-toe walking with ankle dorsiflexion limitation, 10/0 degree knee flexion and -20/-30 extension. His brain MR suggested PVL.

Case 4: A 5-year-old boy with ankle dorsiflexion limitation, 5/5 degrees with knee flexion and -5/-5 degrees with knee extension complained intermittent tip-toe walking with excessive pes valgus. Brain MR image minimal cystic PVL without related Periventricular other any neurologic sign.

Conclusions: We experienced 4 cases of isolated Achilles tendon shortening patients without any history of prenatal or perinatal history and without any other motor impairment and showed periventricular leukomalacia. We thought these are PVL-related problems. Further study is needed about these subtle periventricular leukomalacia sequelae.

P221

STARTING FROM THE NEEDS: A MULTIDISCIPLINARY APPROACH TO GENERATE NEW SOLUTIONS FOR CHILDREN WITH DISABILITIES**Johanne Mensah-Gourmel¹, Maxime Bourgain², Christopher Newman³, Guy Letellier⁴, Sylvain Brochard⁵, Christelle Pons⁵**MPR, CHRU, Brest, France¹, EPF, France², CHUV, Suisse³, ESEAN, France⁴, Ildys Brest, France⁵

Introduction: Children with disabilities can experience participation restrictions. For several situations, technical solutions could be useful to help them carry out activities of daily living and participate in social activities. In this study, we aim to work in a first step on the emergence of needs and on a second step on the development of innovative solutions to overcome the limitations preventing disabled children from being involved in daily activities.

Objective: To propose relevant solutions, an integrative and collaborative approach associating children and families, engineers and healthcare professionals was developed from the identification of the needs to the development of technical prototypes.

Methods: To identify the needs, a questionnaire was first developed in three different versions addressed to children with disabilities, relatives, and professionals. Secondly, focus groups and interviews were organized with children and teenagers. Thirdly, an in-person meeting gathering healthcare professionals, parents of disabled children, engineers and researchers (50 persons) has been held during a pre-conference of the European Academy of Childhood Disability 2019 conference (Paris). Eventually, the gathered needs were submitted to EPF engineering students to work on technical solutions during a dedicated Hackathon on June 2019.

Results: More than 600 answers were obtained to our questionnaire. Some major themes like mobility and intimacy are emerging. In-person meetings enabled us to deepen subjects with multidisciplinary teams, whereas focus groups and interviews enabled us to hear directly children and teenagers' voices. Gathered needs were submitted to engineering students and some prototypes emerge, such as a new version of a one-handed guitar.

Conclusion. Thanks to the collaboration between patients, families, engineers and healthcare professionals, we developed methods to identify the needs, obtained a large amount of answers in terms of situations of restrictions of participation, some prototypes for some of them, and we are pursuing the development of innovative solutions.

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THE ROLE OF THE REHABILITATION AFTER BILATERAL HIP REPLACEMENT AND KNEE ARTHRODESIS IN PATIENT.CASE REPORT**Jovana Kojovic Avramovic, Tamara Filipovic, Dragana Nedic, Milica Lazovic**

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Introduction: Independent walking after surgical replacement of the lower extremity joints is the goal of the rehabilitation. Sometimes it's very difficult to achieve and it presents a major challenge for the rehabilitation team.

Materials and methods: We report the case of 76 years old female with a history of bilateral hip and knee osteoarthritis . The patient was admitted to our Institute for Rehabilitation, Organization Unit Selters from 07.07.2019 until 28.07.2019 after total left hip replacement with hybrid endoprosthesis, performed at the Orthopedic Clinic, Clinical Center Belgrade, Serbia in April 2019.

The patient had replacement of the right hip in 1997 caused from severe osteoarthritis. In 2000 she had the supracondylar right femur fracture that had been surgically treated with internal fixation. Postoperative course was disturbed with bacterial infection that led to the extraction of internal fixation. In 2016 she had the left Tibial plateau fracture. In 2018 she had osteoplastica of the right hip and arthrodesis of the right knee. There was no medical record on the treatment of osteoporosis.

Results: At the entry of the rehabilitation treatment patient was bedridden with lower extremities musclehypothrophy, reduced range of motion of the hips and knees and 6,5 cm inequality of lower limbs. During three weeks of inpatient rehabilitation kinesi, occupational, lasero and electro (IFS) therapy were performed.

At the end of the rehabilitation treatment the functional range of motion was achieved in both hips and left knee, with enhanced muscular strength and improved transfers .Patient was able to walk alone with four point walker and 5 cm foot elevation.

Conclusion: The benefit of the rehabilitation for walking and functional restoration had been achieved in three weeks despite our initial unsecured prognosis considering the difficulty of medical history and functional status at the entry of the rehabilitation.

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THE EFFICACY OF COMBINATION TDCS AND TENS IN STROKE PATIENTS

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Objectives: Transcranial direct current stimulation (tDCS) and sensory stimulation via transcutaneous electrical nerve stimulation (TENS) have been reported to be effective in improving motor function in stroke patients. We investigate the effects on combination of tDCS and TENS on upper extremity function in stroke patients.

Design: Patients with post-stroke paralysis and upper limb dysfunction were randomly assigned to one of two groups. Only TENS (Modulated frequency: 70-130Hz, 5 second cycle, 20 minutes) via a conductive glove was applied with the control group. Study group applied tDCS and TENS concurrently. 8 stroke patients in each group were enrolled and received therapies for 4 weeks. Manual muscle test, modified Ashworth scale, box and block test, 9 hole peg test, Fugl-Meyer Assessment and somatosensory evoked potential were used to evaluate the effects of the treatment

Results: Both groups improved in upper limb function score after 4 weeks of treatment. By comparing the two groups, the study group showed more significant improvement than the control group in box and block test, 9 hole peg test and Fugl-Meyer Assessment ($p < 0.05$)

Conclusions: It was found that combination of tDCS and TENS is more effective treatment compared to TENS only. We recommend to use both tDCS and TENS. Thus, we suggest to apply the combined therapy to the stroke patients.

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THE EFFECTIVENESS OF MEDICAL AND EDUCATIONAL COMBINATION IN SCHOOL-AGED CHILDREN WITH CEREBRAL PALSY**Juping Liang**

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Introduction: Although children with cerebral palsy (CP) are at an increased risk for development, they also have the right to be educated. medical and educational combination model may effectively improve their motor function and happiness.

Objective: To comprehensively assess the motor and cognitive dysfunction in school-age children with cerebral palsy (CP), and to verify the effectiveness of medical and educational combination in children with school-age cerebral palsy.

Method: Participants and Setting: 87 children (53 boys and 34 girls) with CP aged 11.10 ± 3.27 years, were enrolled in this study. Among them, 40 CP children in the gross motor function classification system (GMFCS) Levels I,7 in Level II, 2 in Level III, 3 in Level IV, 9 in Level V. Medical and educational interventions included rehabilitation and school education. The rehabilitation protocol was carried out by the physical therapist at school and home, which included posture exercise control, muscle strength training, etc. All included CP children received the rehabilitation program once a week, 45 minutes for each time. Teachers and parents received the school education guided by physicians and physical therapists, to add the rehabilitation into children's regular teaching activities, family life. The whole intervention period were 18 months. The gross motor function measure (GMFM) was used to evaluate the gross motor function of CP children, which consists of five functional areas: lying position and rolling, sitting, climbing and squatting, standing, walking and running. The intelligence development was evaluated by the Wechsler Children's Intelligence Test. The gross motor function and intelligence ability were assessed at baseline and 6 months, 12 months, and 18 months, relatively.

Results: At baseline, the average score of GMFM66, GMFM88 in 87 CP children were 72.41 ± 25.01 , 80.04 ± 29.55 , of lying position and rolling, sitting, climbing and squatting, standing, walking and running were 88.59 ± 18.35 , 77.27 ± 33.58 , 67.49 ± 39.37 , 53.85 ± 37.26 , 38.76 ± 32.09 , elatively. The average IQ score was 45.50 ± 5.66 . After 6 months and 12 months intervention, the average scores of GMFM66 and GMFM88 in CP children were 54.18 ± 23.99 and 60.95 ± 31.94 ; 62.09 ± 21.33 and 67.80 ± 25.21 , which showed there were not significantly different than before. However, after 18 months intervention, the total score of GMFM88 (93.12 ± 1.71), climbing and squatting (98.41 ± 1.37), walking and jumping(9.16 ± 4.81) were statistically significantly higher than the baseline ($P_1=0.001 < 0.05$, $P_2=0.041 < 0.05$, $P_3=0.047 < 0.05$). The average IQ scores of CP children were not significantly different before and after intervention($P > 0.05$).

Conclusions: The medical and educational combination rehabilitation mode can effectively improve the gross motor function of CP children.

P225

PHYSICAL TRAINING AND CARDIOVASCULAR REHABILITATION**Katarina Markovic**

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Introduction: In some patients with left ventricular dysfunction, physical training has a beneficial physiological effect without the risk of deterioration of cardiac function. Beneficial effects are reflected in the improvement of functional working capacity, reduction of symptoms and improvement of quality of life, as there are hemodynamic, morphological and metabolic changes.

Objective: Understanding the impact of physical training on the functional capacity of persons with left ventricular dysfunction after myocardial infarction and surgical myocardial revascularization.

Material and method: The study included a group of 124 patients of both sexes, an average age of 57.6 years, who had surgical myocardial revascularization and echocardiographically verified left ventricular dysfunction ($EF \leq 45\%$) without congestive symptoms and signs, referred for rehabilitation to the Niška Banja Institute. Rehabilitation took an average of 21 days. All patients underwent an exercise test on a cycle-ergometer before and after three weeks of physical training, which included morning gymnastics, field hiking, and cycling on an cycle-ergometer. The following parameters were analyzed: the level of physical activity, the duration of the physical exertion test, the dual product at rest and at the end of the test. In the patients studied, the most common risk factor for CD was physical inactivity (67.4%), followed by hypertension (65.7%), while smoking and inheritance were present in about 55% of patients. Three patients had no risk factors, 7 had only one risk factor, and 23 patients had two risk factors, while the rest had three or more CV risk factors. The exercise test was considered positive if pain and/or depression of a horizontal type ST-segment greater than 1 mm on the electrocardiogram occurred. The training intensity was submaximal, i.e. it was 75-80% of the maximum physical work capacity of the patient.

Results and discussions: After rehabilitation treatment a statistically significant decrease ($p \leq 0.01$) of the double product was found, a statistically significant increase in the level of physical activity on the second exercise test ($p \leq 0.05$), as an extension of the duration of the exercise test ($p \leq 0.01$). An increase in physical work capacity and a decrease in DP is due to an increase in skeletal muscle strength, a more adequate distribution of blood in the periphery and an increase in the enzyme system's power, but also to an increase in myocardial cell sarcolemma and mitochondrial size, as well as myocardial cell concentration - which causes oxygen to be transmitted to tissues - thus speeding up metabolism and increasing the arteriovenous difference in oxygen. An increase in physical work capacity and a decrease in DP is partly due to an improvement in central hemodynamics

Conclusion: During an average of three weeks of rehabilitation at the Niška Banja Institute, 124 patients with metabolic syndrome were monitored. By using adequately dosed and controlled physical training in these patients, functional capacity was improved. Therefore, this form of rehabilitation plays a significant role in the prevention of new, adverse coronary events in these patients.

P226

EFFICIENCY OF ROBOTIC GUIDED TRAINING IN CHILDREN WITH UNILATERAL IMPAIRMENT OF UPPER LIMB**Katja Groleger Sršen, Anja Snedic, Andreja Istenič**

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Introduction: Upper extremity impairment in children after neural damage remains the challenge in rehabilitation. There are several training programs available, such as constraint induced therapy and bimanual training. In recent time there are some reports with promising results on robotic guided upper extremity training.

Objective: We wanted to analyze the efficiency of training on Armeo Spring Pediatric (ASP) in group of children with unilateral upper limb impairment with diverse origin.

Methods: Data on children referred to the university rehabilitation institute in the period from 2015 to 2018 were included. Children trained on ASP twice a day for 10 days, in average 16 units, with duration of 30-35 minutes per unit). During the program we were progressively increasing the level of tasks complexity and decreasing the upper extremity support. Functioning was evaluated at the beginning and at the end by Assisting Hand Assessment (AHA) for children below the age of seven years or Southampton hand assessment procedure (SHAP) for older children.

Active range of movement (AROM) was evaluated by the ASP software.

Results: We included 40 children (22 boys), with mean age of 6,0 years. There were 33 children with cerebral palsy, five with obstetric brachial palsy and two children after traumatic brain injury. Immediately after the training program, the mean scores were significantly higher for both, younger (N= 17; AHA at the beginning 58.5 points and at the end 61,8 points) and older children (N= 23; SHAP at the beginning 41.6 points and at the end 47.0 points). Also AROM improved.

Conclusions: Robotic guided training in children with unilateral impairment of upper limb is efficiently improving its function. Long term efficiency remains to be explored.



P227

RE FRAMING NARRATIVES AS A TOOL TO COPE WITH STRESS

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His article explores collective efforts by trained volunteers and social educators to use storytelling of people those have faced serious adverse or challenging hardships or events in their lives and to re-frame the debates around their migration status. Drawing on 18 months of fieldwork, 25 in-depth interviews by families and individuals those have been victims of discrimination, inequality or persecution. In this papers we will show how social educators and trained volunteers have intervened and worked together to help individuals to re-frame their stories and helped them to develop supportive evidence to their positive thoughts above stories that: (1) drew into questionnaire (2) Enable individuals to understand to adopt a different way of looking at a situation, person, or relationship by changing its meaning.

I conclude by discussing some of the practical implications and limitations of using narrative re-framing strategies to advance the social change agendas of marginalised movement factions.

Strategies covers how cognitive re-framing techniques are used in psycho-social support and how cognitive restructuring and Re-framing is used by using six simple steps to help individuals and families to overcome their anxiety and fear.

P228

EFFECTS OF PULMONARY REHABILITATION ON THE PHYSICAL CONDITION OF PATIENTS WITH LUNG CANCER**Kristina Popovic**

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The aim of the study was to investigate the impact of a preoperative rehabilitation program in patients with lung cancer who are preparing for surgery.

Method: A group of 60 patients who had evidence of lung cancer and who were scheduled for surgical treatment were examined. As part of the preoperative preparation, pulmonary rehabilitation and physical training on a bicycle of 10 days were conducted in all patients. The 6-minute walk test (6MWT) in these patients was measured at the beginning of rehabilitation and then just before surgery. In addition to the distance expressed in meters, we also measured the oxygen saturation, the degree of dyspnea using a modified Borg scale, as well as heart rate and respiration, as well as the degree of fatigue on the VAS scale.

The results showed that there was a statistically significant improvement in the distance of 6MWT after rehabilitation. All other parameters showed a significant decrease.

Conclusion: For the success of pulmonary rehabilitation, but also for determining training, we use as a measure of 6MWT values and parameters that tell us the degree of dyspnea and fatigue, which is a true indicator of improvement or worsening of patients.



P229

THE GREAT BURN: A CHALLENGE FOR THE REHABILITATION TEAM IN A POST-ACUTE CARE HOSPITAL

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Introducción:The incidence of burn injuries in elderly is increasing as the age of the population increases in many countries throughout the world. They are more likely to develop complications after injury. Scar contracture is a sequela of burns that may limit function.

Clinical case:A 67-year-old patient with burns on 35% of the body surface of grades II and III, with respiratory complications that required tracheotomy and severe dysphagia with enteral nutrition by nasogastric tube. He was admitted to a post-acute care hospital for a rehabilitation treatment.

On admission, the patient was not balance body control and his muscular strength was globally 3/5 in Daniels scale, except in right hand, without active mobility and with severe scar contractures. He was totally dependent on transfers and the rest of the activities of daily living (ADLs). He was not able to walk.He was previously totally independent although he had an intellectual disability of 75%The goals of the rehabilitation treatment were the preservation of the range of motion through the management of scar contracture and training in ADLs to achieve maximum functional independence. For this, treatment with physiotherapy, occupational therapy and speech therapy was prescribed in sessions of 30 minutes per day, with progressive increase in the intensity and duration of the same, according to the patient's tolerance. He required an orthosis for the right hand.

After multidisciplinary treatment, the patient regained the ability to walk with a walker and up and down stairs. He collaborated in ADLs although he needed help for them. He needed an arthrodesis in functional position for right hand. His severe dysphagia made it impossible to restore the oral route for food, so gastrostomy was performed.

Conclusion: The great burned elderly benefit from admission to a post-acute care hospital to perform rehabilitation treatment and achieve greater functionality.

P230

PSYCHOSOCIAL PROBLEMS PERSIST AT TWO YEARS IN PERSONS FOLLOWING TRAUMATIC LOWER LIMB AMPUTATION**Jemma Keeves, Thomas Hale, Adrian Sexton, Abby Hutchison**

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Background: There is a paucity of research of functional outcomes in younger persons with traumatic amputations compared to those with amputations due to diabetes or vascular disease. Thus, longitudinal research in this area is necessary to optimise health-related outcomes in this patient population and to inform healthcare service delivery.

Objective: To examine the health-related outcomes for people following traumatic lower limb amputation over a two-year period.

Method: Thirty-nine subjects were recruited from the amputee rehabilitation unit at Epworth Hospital between 2014 and 2019. Self-reported questionnaires assessing physical and emotional health, post-traumatic stress disorder, prosthetic satisfaction, ambulation and pain were administered at 4 months, 8 months, 1 year and 2 years following amputation.

Results: 85% of subjects were male, and had a median age of 56 years at time of amputation. At two-years, 44% of patients had anxiety in a clinical range and 50% patients had clinical depressive symptoms on Hospital Anxiety and Depression Scale. At two-years following amputation, 25% had returned to vocational roles in varying capacities and 36% deemed themselves to be 'non-vocational'. Pain remained at moderate intensity at both one and two-years post amputation (VAS: 1 year median = 3.8/10; 2 year median = 5.8/10). Pain descriptors at 2 years included: tender, aching, burning, sharp, stabbing, and shooting on the McGill Pain Questionnaire.

Conclusions: At two-years following traumatic amputation, health-related problems persist and limit a return to work and normal life roles. Ongoing outpatient interventions and community follow up must be prioritised in this population. Close monitoring by community-based physicians, rehabilitation specialists and allied health professionals to ensure timely referral to necessary services may minimise the ongoing psychological comorbidities experienced. Further research with a larger cohort and longer follow up is warranted to provide stronger evidence and inform best practice for rehabilitation.

P231

TREATMENT OF EARLY QUADRICEPS FIBROSIS: A LONG-TERM APPROACH AND OUTCOMES (case report)

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Introduction: The consequences and the adequate treatments of iatrogenic retractile quadriceps fibrosis post intramuscular injections of quinine salts during childhood in children living in tropical countries remain unclear.

Objective: We report here the case of a 17 years old girl who experienced unilateral quadriceps fibrosis with her long term rehabilitative and surgical management.

Method: The case report is documented between the age of 6 years old and the end of the growth with clinical and functional evaluations, isometric strength assessment, muscle MRIs and gait analysis.

Results: This girl had a rehabilitative management with orthoses and physiotherapy between the age of 6 years old, at which knee flexion limited to 90° was identified, and the end of growth. At the age of 12 years old, she underwent a surgical treatment by quadriceps's desinsertion using Judet's technique.

At the end of the growth, surgery and rehabilitation management restored satisfying articular range of motion (Flexion 110°). Functional evaluations (KOOS CHILD: 91,7; ADL: 96, Sport and play: 85) reported good results.

Gait analysis showed the recovery of a normal gait cycle.

The quadriceps isometric strength of the involved limb remained lower than the uninvolved limb (Knee extensors ratio 0,73) and the average standards of healthy children at 17 years old (Knee extensors Mean Torque [59,9 N.m vs (98 SD 14,9)].

Using MRIs, an amyotrophy of the quadriceps and more specifically of the vastus intermedius was identified. Fat atrophy was mainly found in the distal third of the vastus intermedius.

Conclusions: There is a lack of rehabilitative recommendations regarding quadriceps fibrosis whereas it seems essential that these children benefit from a long-term rehabilitation follow up along growth and several years after surgery. The rehabilitation program should grant a large part of global muscle reinforcement and not be limited to a simple range of motion objective.

P232

CHILDREN WITH CEREBRAL PALSY IN PHYSICAL MEDICINE AND REHABILITATION

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Background: Cerebral palsy (CP) is a group of disorders that affect movement and muscle tone or posture. It's caused by damage that occurs to the fetal brain or infant brain before the age of two years. CP cause activity limitations and may also affect sensation, perception, cognition, communication, and behavior.

Aim: This study aims to: To identify the epidemiological and clinical profile of children with CP, To identify the lack of the medical care and the difficulties of the medical follow up of children with CP

Methods: We conducted a retrospective, descriptive and analytical study, based on a population of patients followed in the department of physical medicine and rehabilitation at the Military hospital of Tunis between the year 2000 and 2016.

We included in our study all patients followed for CP older than two years and which have a minimal medical follow up of one year.

Results: Sixty-seven patients were included, the mean age of children was 3.5 ± 2.8 years in the initial stage of management and the sex ratio was 1.23.

Thirty percent of the patients were from consanguineous marriage and 41% of CP was related to perinatal causes.

Ninety-one percent of our population had a spastic CP, the topography of the motor disorders in this spastic form was quadriplegia in 67%, hemiplegia in 18% and diplegia in 15%.

Neuro-orthopaedic deformities observed in 80% predominated in the lower limbs.

We evaluated the disability level with the Gross Motor Function Classification Scale (GMFCS) and the Functional ambulation categories (FAC), 19.4% had a GMFCS level V and 50% had a FAC score equal to 5.

Associated disorders were found in 73% of children, in fact 52.2% had epilepsy, 42% had an intellectual disability, 27.1% had a strabismus and 2 children had an autism spectrum disorders.

Thirty-four point three percent of our patients had an irregular follow up and irregular rehabilitative care and this was related to the defect of the material resources.

Conclusion: Walking disability and neuro-orthopaedic deformities present significant barriers in child's life. Children with CP require regular and close follow up.

P233

EVALUATION AFTER TWO YEARS OF FUNCTIONAL RESTORATION FOR CHRONIC LOW BACK PAIN : TUNISIAN EXPERIENCE

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Introduction: functional restoration of the spine is a proven method in the short-term management of chronic low back pain. The aim of our study was to evaluate the effect of a functional restoration program at two years of evolution.

Methods: retrospective study of patients enrolled in a functional restoration program during 2014 and summoned after two years, in 2016. Patients have had the same clinical and functional evaluation before the program, at five weeks and at two years.

Results: Thirty patients were enrolled in the study. The average age was 45 years. Eighty % of the patients were overweight. Significant improvement for all clinical and functional parameters at five weeks was noted. This gain was maintained significantly for some parameters at two years.

Conclusion: The results of the functional rehabilitation of the spine are satisfactory at two years of evolution.

P234

EPIDEMIOLOGICAL AND CLINICAL PROFILE OF FOOT DISORDERS IN PHYSICAL MEDICINE AND REHABILITATION**Jihene Bahri, Najla Mouhli, Meriem Hfaïdh, Hajer Rahali, Imene Ksibi, Rim Maoui**

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Background: Foot disorders are a common complaints encountered by general practitioners, orthopedists and rheumatologists.

It's also a cause of consultation in physical medicine and rehabilitation (PMR), in fact in our department a day of consultation is devoted to podiatry.

Aim: This study aims to describe the epidemiological and clinical aspects of foot disorders in physiatrist consultation, in order to prove that podiatry is an integral part of PMR.

Method: We conducted a prospective and descriptive study in the department of PMR at the Military Hospital of Tunis from 1 April 2019 to 30 June 2019.

All patients who consulted for foot disorders were included.

Results: Forty-nine patients were included in our study, most of our patients were women with a sex ratio of 0.68.

Patient age ranged from 2 years to 72 years with an average age of 45.40 years.

Most of patients were referred to our department by general practitioners.

The most common reason of consultation was the heel pain [N=22], in fact this heel pain is due to Achilles tendinitis, Heel spur and plantar fasciitis.

The second reason of consultation was forefoot [n=19] pain which is mainly due to hallux valgus, hallux rigidus and Morton's neuroma.

Others reasons of consultation are found such as complications of diabetic foot, ankle pain and corns.

Conclusion: Foot disorders is a frequent reason of consultation in PMR, podiatry must be an integral part of the training of a physiatrist.

The heel pain was the most common reason of consultation in our department, are there the same foot disorders grounds in the other specialties?



P235

THE ILIZAROV METHOD APPLIED AT THE “ST. ERAZMO” SPECIAL HOSPITAL FOR ORTHOPEDIC SURGERY AND TRAUMATOLOGY IN OHRIDR.MACEDONIA

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Introduction: The methodology according to Ilizarov is minimally invasive elongation technique for the extremities. It is used for treatment of fractures, pseudoarthrosis and correction on deformities. “St. Erazmo” Special hospital for orthopedic surgery and traumatology in Ohrid has been using the Ilizarov methodology since 1983. As from 1986, the Special hospital has been established as a referral center for application of the principals of Ilizarov.

Objective: The article aims at presenting the first stage in a treatment of patient, according to the methodology of Ilizarov, as part of the practice performed at the Special hospital in Ohrid. The results achieved include: protection of the vascular elements, early mobilization of the surrounding joints and putting weight on the treated extremities on the second day post-surgery.

Method: The methodology is based on mechanical and biological principles (for the elongation of the bone and of the soft tissues), for the distracation of Osteogenesis and a supercharged fixator.

Results: Three months after the first stage of the intervention has been performed, 4.5 cm elongation was achieved of the left femur, as well as correction of the previously existing deformity of the bone. Preconditions have been created for the upcoming second stage of the intervention of the callus, aiming at the bone elongation for additional 3.5 cm., and for further physical therapy.

Conclusions: The minimally invasive elongation technique for the extremities according to Ilizarov methodology, is justified approach in recovering injuries and conditions resulting in invalidity. The intervention is brief, followed by short-lasting hospitalization period, the fixator is adjustable on individual bases, it is a solid solution in regard to the cases of polytraumatic invalidity.

Key words: :Ilizarov, elongation, correction, physical therapy

P236

METABOLIC BONE DISEASE OF PREMATUREITY – HANDLE WITH CARE**José Barreto, Sónia Tomé, Vítor Pereira, Joana Matos, Sofia Toste, Catarina Aguiar Branco**

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Introduction: Metabolic bone disease (MDB) of prematurity is characterized by a reduction of bone mineral density and remains a major concern in the neonatal period, as it can negatively impact the early development of the premature.

Objective: We reviewed the literature regarding MBD of prematurity and complimented with a case report.

Methods: Review on MEDLINE/PubMed database using as keywords «MBD», «osteopenia», and «prematurity» and consultation of the patient's medical file.

Results: We present a female 27-week-gestation premature (caesarean delivery due to HELLP syndrome) with extremely low birth weight (470g) among other complications of prematurity. On examination at 83 days of age at the Neonatology ward, she had decreased ROM on the right hip and proximal right thigh oedema. Arthritic sepsis and osteomyelitis were excluded and a skeletal radiography showed multiple fractures (right tibia, both cubitus and old rib cage fractures) and generalized bone rarefaction.

MBD of prematurity is multifactorial and greatly associated with extremely low birth weight newborns (<1000g) among other antenatal and postnatal risk factors, which may contribute to the reduced placental transfer of phosphate and calcium related to preterm birth. There are no specific diagnostic exams but there are some suggestive biochemical markers and radiological/ultrasonographic findings. Concerning treatment, nutrition must be optimized (specifically the calcium, phosphate and Vitamin D intake, which initially may require total parenteral nutrition - TPN) and physical activity with passive mobilization and joint compression (5-15min daily, 4-8 weeks) has demonstrated bone mineralization improvement.

Conclusions: MBD is one of many complications of prematurity where PRM can have an important role. Interventions may include feeding training while transitioning from TPN to enteral nutrition and musculoskeletal kinesiotherapy through a passive mobilization protocol. Still, we highlight the importance of a thorough examination, since MBD can lead to fractures, such as in the case reported.

P237

An Idiopathic Syringomyelia patient presenting with bilateral upper limb sensory and motor deficits**Jun Hyun Choi, Suk Bong Yun, Yong Soon Yoon**

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Case Diagnosis

A 35-year-old woman with unremarkable past medical history, experiencing bilateral arm weakness along with tingling sensation, presented to our clinic. These symptoms were subjectively noted 3 weeks prior to presentation. Both biceps and knee jerks were mildly accentuated and Hoffmann sign was objectively noted. Babinski sign was absent. Bilateral arm strength was grade 4 by manual muscle testing. Central nervous system(CNS) lesions were suspected which prompted diagnostic evaluation by cervical spine x-ray(C spine X-ray), electromyography(EMG), somatosensory evoked potential(SEP) test and cervical spine magnetic resonance image(C-MRI) studies. Results of these studies were all normal with the exception of C-MRI, which revealed a localized syringomyelia at the C6-C7 spine level. The patient was treated conservatively and resulted in resolution of both arm pain and motor weakness following a course of pharmacotherapy.

Case Description

Syringomyelia is a neurogenic disease which can damage the spinal cord due to formation of a fluid-filled space in the form of a cyst (syrinx), usually found in the high cervical level of the spinal cord. Arnold-Chiari malformation, spinal cord tumor, adhesive arachnoiditis and trauma are some of the more commonly known causes of syringomyelia. However, IS is not associated with any of the aforementioned conditions. We report herein, a case, of a patient without evidence of other underlying pathologic conditions who was subsequently diagnosed with IS and later was found to have improvement of the associated neurologic symptoms with supportive care.

Discussions

The precise etiology and management for idiopathic syringomyelia is still unclear.

Conclusions

We diagnosed IS in a patient who presented with neurologic deficits. The suspected diagnosis of IS was confirmed by imaging study with C-MRI. Subjective symptomatology was shown to have improved with supportive care. We recommend considering an MRI study when CNS pathology is suspected in patients presenting with neurologic symptoms including sensory and motor deficits.

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FUNCTIONAL ASSESSMENT OF CEREBRAL PALSY PATIENT WITH IPSILATERAL MEP EVOKED**Ju-Yul Yoon¹, Gi-Wook Kim², Yu-Hui Won², Myoung-Hwan Ko², Jeong-Hwan Seo², Sung-Hee Park²**Department of Physical Medicine and Rehabilitation, Chonbuk National University Hospital, Jeonju-si, Jeollabuk-do, Republic of Korea¹, Chonbuk National University Hospital²

Introduction In general development, the most of the ipsilateral connections are withdrawn by the contralateral motor cortex. As a result, movements of limbs are regulated by contralateral motor cortex through corticospinal tract. However, early damage of motor system can prevent the development progress by preserving the ipsilateral connections between the contralesional hemisphere. Stimulation of motor cortex of brain by using Motor evoked potentials (MEPs) and hand function test indicate the preserved connections of ipsilateral side.

Objective Many studies compared the results of MEPs for ipsilateral evoked patients and contralateral evoked patients for TMS as a treatment, we investigated on functional differences in CP patients with MEPs.

Method Out of 78 CP patients who has done MEP, Among those who were contralateral MEP evoked, there were ipsilateral MEP evoked patients (n=24) and not-evoked patients (n=43). In addition, we attempted to show the relationship between gestational weeks and weight. Retrospective observation was done for hand function test, birth weight and gestational weeks. To compare properly, from hand function test, we selected ratio of lesional side and intact side as dependent variable.

Results Among the hand function test, 9-hole test had significant result from paretic side by having time delay (p=0.032) while grip power and Box and block results showed p=0.107 and p=0.093 respectively. Longer gestational week (37.85week vs 34.44week) was associated with ipsilateral MEP evoked patients (p=0.021) and higher birth weight (3.07kg vs 2.35kg) was related to ipsilateral MEP evoked patients (p=0.020).

Conclusion In this study of cerebral palsy, 9-hole show more noticeable result than grip power and box and block test for the assessment of hand function; It suggests that ipsilateral motor tract more influence on fine-motor function. And longer gestational week has tendency as ipsilateral MEP is evoked; therefore, it gives clue that the further study is required to evaluate the time of rearrange of ipsilateral corticospinal tract.

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TYPES OF DETRUSOR-SPHINCTER DYSSYNERGIA IN THE SPINAL CORD INJURED AND NON-NEUROGENIC BLADDER**Ju-Yul Yoon¹, Gi-Wook Kim², Yu Hui Won², Sung-Hee Park², Myoung-Hwan Ko², Jeong-Hwan Seo²**Department of Physical Medicine and Rehabilitation, Chonbuk National University Hospital, Jeonju-si, Jeollabuk-do, Republic of Korea¹, Chonbuk National University Hospital²

Introduction The pathophysiology of detrusor-sphincter dyssynergia (DSD) in neurogenic bladder is represented by disruption of spinobulbospinal tract between the pontine micturition center and Onuf's nucleus. However, dyssynergic sphincter activity can also be seen in non-neurogenic bladder.

Objective In this retrospective study, we aimed to find out the differences of dyssynergic sphincter activity patterns and urodynamic parameters in the dysfunctional bladders of spinal cord injury (SCI) and the non-neurogenic (NN) patients.

Method One hundred and seven patients of dysfunctional voiding who conducted urodynamic study (UDS) from January to March, 2018 were enrolled. They were divided into SCI group (n=32) and NN group (n=75). We categorized the UDS findings into 5 types according to dyssynergic sphincter activities. Type 1-3 belonged to true DSD and type 4 belonged to pseudo-DSD. And, type 5 represented patients who didn't show dyssynergic sphincter activity. We also analyzed urodynamic parameters such as bladder capacity, compliance, detrusor leak point pressure (DLPP), peak detrusor pressure (PdetQmax), post-void residual urine volume (PVR) and electromyographic activity of the sphincter.

Results 37.3% (28 out of 75) of NN group and 84.4% (27 out of 32) of SCI group showed dyssynergic sphincter activity, respectively. Pseudo-DSD was shown in 3.6% (1 out of 28) and 22.2% (8 out of 36) prevalence in each SCI group and NN group. Bladder capacity was significantly higher in SCI group (mean=456.78) than NN group (mean=368.04) who had true DSD (p<0.05). And, DLPP, PdetQmax, and PdetQmax(flow) were significantly higher in true DSD group (mean=30, 45, 39, respectively) than pseudo-DSD group (mean=18.78, 25.56, 18.33, respectively).

Conclusion DSD was relatively frequent in patients with NN bladder. And SCI patients had higher bladder capacity than NN bladder among true DSD. DSD presents more common in SCI patients. However we also could see the DSD in 37.3% of NN patients. Further studies with prospective and good design are necessary for more valuable clinical findings.

P240

CLINICAL APPLICATION OF ICF IN NEUROREHABILITATION IN THE CZECH REPUBLIC AND OCCUPATIONAL THERAPIST**Kateřina Svěcená¹, Petra Sládková²**Department of Addictology Charles University¹, Prague, Czech Republic, Charles University²

Introduction: ICF (International classification of functioning, disability and health) classifies health-related states, it is not only classification tool, it is a functional concept. The neurorehabilitation of patients with brain damage is an interprofessional, complex, intensive, long-lasting and individually oriented process. These "disabled" functions can be compensated by undisturbed functions, i.e. functional health and environmental factors (facilitators). The concept of disability has become an umbrella term in an international context in the area of functional disorders, activities, participation and environmental factors.

Methods and design: One frequent consequence of brain damage is hemiparesis, which also causes a disorder of the upper extremity movement pattern. The movement ability of the upper extremity is essential for an individual's self-sufficiency, the performance of common daily activities, and thus for an independent life in a family setting. ICF Core Set is the list of ICF categories that are relevant to the patient with a specific health condition, we typically use Core Sets for patients after Traumatic Brain Injury and for Stroke patients. The crucial role of occupational therapist in clinical application of ICF is mainly to detect crucial facilitators and help to reduce barriers with using categories Activities and Participation and Environmental factors.

Results and conclusion: Thanks to ICF, it is possible to better define and evaluate the positive or, on the other hand, negative impacts of various aspects of the environment on the participation of person with disability. We are preparing the new legislation in the field of medical, social, educational and vocational rehabilitation according ICF in Czech Republic.

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HOW DOES THE LEVEL OF PAIN CHANGES IN PATIENTS WITH KNEE OSTEOARTHRITIS DEPENDING ON THEIR AGE, WITH THE HELP OF KINESIO TAPE.

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Introduction: Knee osteoarthritis is a chronic degenerative disease, known as the most common cause of difficulty walking in older adults and subsequently is associated with slow walking. Pain is very noticeable while walking in rugged terrain, during ascent and descent of stairs, when changing from sitting to standing position as well as staying in one position for a long time. Kinesio Tape (KT) is a physiotherapeutic technique, which reduces pain and increases muscular strength by irritating the skin receptors.

Objectives: The aim is to verify if the application of KT on quadriceps femoris muscle (QF) decreases the level of pain while walking in patients with knee osteoarthritis depending on the age group.

Method: In this study we observed the change of the level of pain while walking for 10 meters at normal speed in patients with knee osteoarthritis, before, one day and three days after applying KT on QF, with the help of Numerical Pain Rating Scale (NRS). In the study participated 102 out-patients with a clinical diagnosis of primary knee osteoarthritis. We divided them in 4 groups. The first age group was over 70, second age group 66-70, third age group 60-65 and the fourth age group 50-59 years.

Results: Prior to the application of KT it was observed that age groups over 66 years have a comparatively higher pain level than age groups below 65 years, indicating that in older subjects the knee pain is higher. In the age group over 70 years it was observed that NRS level before application was 7.93, one day after application was 6.93, and three days after application was 4.31 points. In the age group of 66-70 years it was observed that the NRS level before application was 7.10, one day after application was 6.13, and three days after application was 3.48 points. In the age group 60-65 years it was observed that the NRS level before application was 6.5, one day after application was 5.5, and three days after application was 3.22 points. In the age group 50-59 years it was observed that the NRS level before application was 5.923 on average, one day after application was 5.179, and three days after application was 2.89 points.

Conclusions: It is proven that the pain level changed significantly three days after the application of KT in m.quadriceps femoris regardless of the patient's age.

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SELECTIVE DORSAL RHIZOTOMY AS A TREATMENT OF SPASTICITY IN CHILDREN WITH CEREBRAL PALSY: GOALS OF A NEW "0 LEVEL" SURGICAL TECHNIQUE**Lara Mancini¹, Syril James², Michel Thétio³, Clément Le Fur³, Raphael Pionnier⁴, Myriam Sauner³,**

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Introduction: Selective dorsal rhizotomy (SDR) is a long-standing procedure to treat permanently spasticity in children with cerebral palsy (CP). This intervention, consisting in selective section of lumbosacral afferent nerve rootlets, has been abandoned for long, due to postoperative complications. As time passed it has resurged and the technique refined. The surgical access has been reducing from a multi-level laminectomy followed by laminoplasty, to a single level laminectomy followed or not by laminoplasty, the latter being nowadays the most practiced technique. The following rehabilitation period is the key for surgery success.

Objective: To describe a new "zero level" surgical technique without laminectomy, performed at the Necker Hospital in Paris and its short-term effects, underlining the impacts on rehabilitation.

Method: We used a little retrospective case series analysis to compare 3 patients who underwent a "zero level" SDR to 5 matched controls who underwent multi-level or single level SDR. The interventions were performed by the same neurosurgeon.

Results: The surgical time of the new technique is reduced if compared to multi-level surgery. Postoperative pain and alongside the intake of analgesics are limited in the "zero-level" technique. Length of total hospital stay is reduced in patients who underwent a zero-level SDR. Kyphosis in children operated with this new technique tend to remain stable over time.

Conclusions: SDR is nowadays a safe and useful intervention for CP targeted patients. The challenging development of a zero-level surgical technique has brought many advantages regarding surgical time, length of hospital stays, experienced pain, spine degeneration in time. Post-operative rehabilitation is less affected by complications, allowing a continuity of care, bringing psychological benefits to families and children, enabling the return to everyday life as soon as practicable.

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THE INFLUENCE OF COMPLEX SUPPLEMENTATION WITH CALCIUM, VITAMINS D3 & B6 CAN MAINTAIN EFFECT OF REHABILITATION IN PATIENTS WITH OSTEOPOROSIS**Larisa Marchenkova, Ekaterina Makarova, Valeriya Vasileva, Mikhail Eryomushkin, Elena Stiazhkina, Ekaterina Chesnikova**

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The aim of the study was to evaluate the effect of complex food supplement with calcium and vitamins D3 and B6 intake on muscle strength and balance function during 1-year follow-up after rehabilitation course in patients with osteoporosis and high fracture risk

Methods: The study comprised 119 men and women aged 50-80 y.o. with established osteoporosis or high probability of major osteoporotic fracture by FRAX® model initiating 3-week course of rehabilitation. 41 patients who had already received anti-resorptive therapy were included in the Studied group 1 (SG1), and 78 patients who were never previously treated with anti-osteoporotic medication were randomized in SG2 (n=39) or SG3 (n=39). The food supplement containing Vitamin D3 30 mg, Pyridoxine Hydrochloride 4 mg, Calcium Citrate 320 mg and HDBA organic complex 400 mg in daily dosage was administered to patients in SG1 and SG2 for 12 months. Changes in dynamometry and balance tests were assessed after 3 weeks, and in 6 and 12 months as follow-up.

Results: Achieved higher levels of muscle strength during the rehabilitation course were maintained for up to 12 months in the back extensors and flexors in SG1 and SG2, and up to 6 months in the lateral back flexors in SG1 ($p > 0.05$ vs 3 weeks). The effect of medical rehabilitation completely disappeared in SG3 after 6 months ($p < 0.05$ vs 3 weeks). Improved vs baseline stabilometry data in balance coefficient and pressure center deviations speed were registered in SG1 and SG2 in 6 and 12 months ($p > 0.05$ vs 3 weeks). Achieved during rehabilitation positive result of balance control measured with One-leg-standing test was maintained only in SG1 for 12 months ($p > 0.05$ vs 3 weeks), but it significantly ($p < 0.05$) worsened in SG3 at follow-up.

Conclusion: Long-term intake of food supplements containing calcium with vitamins D3 and B6 can help to maintain the effect of rehabilitation on muscle strength and balance in patients with osteoporosis and a high risk of fractures.

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THE EFFECT OF COMPLEX DIETARY SUPPLEMENT ON MUSCLE STRENGTH AND BALANCE FUNCTION IN PATIENTS WITH OSTEOPOROSIS**Larisa Marchenkova^{1,2}, Ekaterina Makarova², Liliya Shakurova², Valeriya Vasileva², Mikhail Eryomushkin², Ekaterina Chesnikova²**Department of somatic rehabilitation¹, National Medical Research Center of Rehabilitation and Balneology of Russian Federation², Moscow, Россия

Background and aims. Osteoporosis is metabolic bone disease associated with muscle weakness and high risk of falls and fractures.

The aim of the study was to investigate the effect of Osteomed Forte on muscle strength and balance function in patients with osteoporosis.

Methods. 60 postmenopausal women aged 43-80 years with primary systemic osteoporosis were included in the study. Diagnosed of osteoporosis established by WHO criteria using dual X-ray absorptiometry when bone mineral density T-score in lumbar spine or femoral neck or total hip was below -2.5. Complex dietary supplement Osteomed Forte contains Vitamin D3 7.5 mg and Vitamin B6 as Pyridoxine Hydrochloride 1 mg, Calcium as Calcium Citrate 80 mg and HDBA organic complex 100 mg in a pill was administered in dosage of 4 pills a day for 6 months. Muscle isometric strength of trunk extensors - TES and trunk flexors - TFS and left lateral flexors - LLFS and right lateral flexors - RLFS was measured on Dr Wolff Back-Check diagnostics unit. Up and Go test and One Leg Standing test on right leg open-eyed and Fukuda-Unterberger test were performed at baseline and in 6 months.

Results. There was an increase in muscle strength of TES from 15.2±9.1 to 19.6±10.4 kg (p<0.01) and TFS from 14.6±9.2 to 20.4±11.3 kg (p<0.001) and LLFS from 11.8±7.2 to 14.7±8.5 kg (p<0.01) and RLFS from 13.8±7.3 to 16.5±9.3 kg (p<0.01) in 6 months. Results of functional tests also improved in 6 months such as Up and Go test from 11.3±4.5 to 9.4±3.2 sec (p<0.01) and One Leg Standing test from 21.2±9.6 to 36.6±19.9 sec (p<0.01) and Fukuda-Unterberger test from 0.8±0.4 to 0.6±0.3 m (p<0.05).

Conclusions. The complex dietary supplement Osteomed Forte intake increases muscle strength and improve balance function in patients with osteoporosis.

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STATIC AND DYNAMIC BALANCE FUNCTION IN PATIENTS WITH OSTEOPOROTIC VERTEBRAL FRACTURES**Larisa Marchenkova, Ekaterina Makarova, Mikhail Eryomushkin, Liliya Shakurova**

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Objective. The aim of the study was to estimate the change of static and dynamic balance function in osteoporotic patient with vertebral fractures (VF).

Material and Methods. 90 patients aged 43-80 with primary osteoporosis were enrolled. Study group comprised of 56 women and 4 men (age 65.4 ± 7.1 years) with at least 1 VF confirmed by X-rays. Control group included 28 women and 2 men (age 62.0 ± 5.2 years) with the same BMI, BMD and without any osteoporotic fracture. Stabilometry, Fukuda-Unterberger test and One-leg-standing test were performed.

Results. Study group was characterized by change vs control group of balance coefficient (BC) (77.2 ± 7.6 vs 85.7 ± 9.4 % with opened eyes, $p=0.002$, 67.1 ± 9.8 vs 73.4 ± 9.9 % with closed eyes, $p=0.03$), pressure center of media-lateral (PCML) deviation in sagittal plane ($1.2 [-1.1;1.5]$ vs $-1.2 [-1.5;1.2]$ mm, $p=0.025$) and PCML displacement in sagittal plane ($6.8 [3.1;37.7]$ vs $4.8 [1.8;10.7]$ mm, $p=0.01$). BC correlated with age ($r=0.41$ with opened eyes, $r=0.40$ with closed eyes, $p=0<0.01$) and BMI ($r=0.16$ with opened eyes, $p=0<0.05$). PCML deviation in sagittal plane correlated with age ($r=-0.42$, $p=0<0.01$), number of VFs ($r=0.40$, $p=0<0.001$) and femoral neck BMD ($r=-0.43$, $p=0<0.05$), and in frontal plane only with age ($r=-0.27$, $p=0<0.05$). PCML displacement in sagittal plane correlated with age ($r=-0.29$, $p=0<0.01$), number of VFs ($r=0.22$, $p=0<0.01$) and femoral neck BMD ($r=-0.38$, $p=0<0.05$) and in frontal plane only with BMI ($r=-0.15$, $p=0<0.05$). Fukuda-Unterberger test results showed greater side dislocation in patients with VF vs controls ($40^\circ [25.0;45.0]$ vs $30^\circ [10.0;45.0]$, $p=0.02$). Side dislocation correlated with number of VFs ($r=-0.30$, $p<0.05$). Patients with VF lose their balance measured with One-leg-standing test faster vs controls with open eyes ($5.0 [1.0;10.0]$ vs $7.5 [5.0;10.5]$ sec, $p<0.05$) and with closed eyes ($2.0 [0;3.0]$ vs $3.5 [3.0;5.0]$ sec, $p<0.05$). One-leg-standing test results correlated with age ($r=-0.35$, $p<0.001$ with open eyes, $r=-0.42$, $p<0.01$ with closed eyes).

Conclusions. VFs negatively effect on static and dynamic balance function. Age, high BMI, low BMD and number of VFs are the main factors of balance dysfunction in patients with osteoporosis.

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FOLLOWING PATIENTS WITH SCI IN A FIRST-PERSON VIEW (VIDEO)**László Váraljai**

Rehabilitation Department of Spinal Cord Injuries, National Institute of Medical Rehabilitation, Budapest, Hungary

Introduction: Spinal cord injury (SCI) can result in a drastic change in one's lifestyle. The altered ability to move affects the performance of daily tasks. Rehabilitation aims to offer and teach strategies to balance out this difference in ability to achieve similar results with the execution of tasks before the injury.

Objective: Our goal was to make the change more visible for health care professionals, thus increasing empathy.

Method: We have obtained video recordings via GoPro headcameras worn by our patients in our department. The recordings were sequenced according to the levels of rehabilitation from the arrival to our institute until the organized practice in community-setting.

Results: Our findings, in their essence, are self-explanatory, but we have discovered an additional benefits from using headcameras. We can grossly follow the view, which reveal what the patients may expect to be a source of help or an alternative way to achieve their goal. This method also allows us to realize what is out of view for the patient, therefore allowing the health care providers to improve their communication.

Conclusions: Experiencing the perspective of patients with SCI should improve the relationship between the patient and the health care providers. Additionally, analyzing these videos is a way to explore novel strategies to daily tasks for these patients.

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**EFFECTIVENESS OF SHOCK WAVE TREATMENT VS "CONSERVATIVE PHYSIOTHERAPY".
CHALLENGE FOR MANAGING SHOULDER PAIN AND DYSFUNCTION****Lejla Manchev¹, Aleksandra Hadzieva-Pejcic², Dragana Vucic³**Physical medicine and rehabilitation, Private clinic "MatarMedika"¹, Public Health Centar Zelezara, Skopje, Republic of North Macedonia², Orthopedic clinic "OrthoExpert", Beograd, Serbia³

Introduction: Shoulder pain is a very common regional pain syndrome which is presented with large mobility deficit and loss of function. A wide range of conservative treatment options are published and yet lots of debates throughout scientific literature are going on regarding sufficient evidence of the effectiveness of conservative interventions for shoulder pain. This persistent pain interferes with a person's daily activities and influence overall quality of life.

Objective: To compare the effectiveness in reducing shoulder pain and improving function of shock wave therapy (SWT) and "conservative physiotherapy" (electrotherapy, sonotherapy and kinesitherapy) in patients with the following entities: rotator cuff tendinopathy (tendonitis, tendinosis, and calcific tendonitis), adhesive capsulitis, shoulder impingement with or without subacromial/subdeltoid bursitis and bicipital tendinopathy.

Method: The sample consists of 70 patients presented with shoulder pain originated from the above mentioned entities, clinically and radiologically followed and assigned in two groups. The first group (n=35) of patients constituted the shock wave therapy group and the control group (n=35) are those treated with "conservative physiotherapy" in a period of 6 months, September 2019 – February 2020. The intensity of pain and functionality are evaluated by using the Constant Shoulder Outcome Score questionnaire before starting the treatment, the 4th week and at 6th week follow up period in both groups. At the 6th month after the first visit invitation/phone call will follow. The pain scores will be compared and statistically analyzed.

Results: This research will demonstrate the effectiveness of SWT compared to "conservative physiotherapy" in the treatment of shoulder pain and improving functionality. The primary outcome includes pain intensity and shoulder function. The secondary outcomes consist of time-consuming treatment and recurrence in 6 months.

Conclusions: Its findings may provide latest evidence of SWT in reducing shoulder pain and improving mobility as a first line choice of treatment option.

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STRENGTH ASSESSMENT TESTS IN CARDIAC REHABILITATION PROGRAMS**Leyre Oliver Ruiz, Iban Plaza, Sophie Gorostiaga, Miguel Moreno, Irene Aguirre, Claudia Villanueva**

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Introduction: Strength assessment tests are essential tools for a correct measurement of results in cardiac rehabilitation programs. Rikli and Jones Arm Curl Test (ACT) measures the number of arm curls that are possible to do within 30 seconds. Rikli and Jones Chair Stand Test (CST) measures the number of complete stands in 30 seconds. Timed Up and Go (TUG) test records the number of seconds it takes to rise from the chair, walk 3 meters, walk back to the chair, and sit down.

Objective: Measure the improvement in strength assessment tests results in patients undergoing a cardiac rehabilitation program.

Method: Observational study in three patients with low risk myocardial infarction who completed 24 aerobic and strength training sessions. Strength was measured with ACT, CST and TUG tests.

Results

Patient-nº1: 71 years old.

-ACT: 22 repetitions before the training program (TP); 26 repetitions after TP (functional improvement from 80 to 95 percentile).

- CST: 17 before TP; 24 after TP (functional improvement from 75 to 95 percentile).

-TUG: 3.5s before TP; 3.3 after TP (functional improvement from 90 to 95 percentile).

Patient-nº2: 49 years old. Excluded due to age.

- ACT: 27 repetitions before TP; 32 repetitions after TP.

- CST: 19 before TP; 22 after TP.

-TUG: 3.1s before TP; 2.9 after TP.

Patient -nº3: 64 years old.

- ACT: 23 repetitions before TP; 27 repetitions after TP (functional improvement from 80 to 95 percentile).

- CST: 19 before TP; 22 after TP (functional improvement from 75 to 90 percentile).

-TUG: 3.4s before TP; 3.3 after TP (functional improvement from 80 to 85 percentile).

Conclusions: Patients undergoing aerobic and strength training programs, as part of a cardiac rehabilitation program, improve strength assessment tests results. These tests are essential tools for a correct management of cardiac rehabilitation programs.

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ARE SPIRITUALITY AND FAITH IMPORTANT FACTORS IN REHABILITATION?**Laszlo Irsay, Viorela Ciortea, Monica Borda, Rodica Ungur, Alina Ciubean**

Rehabilitation and Physical Medicine University of Medicine And Pharmacy "Iuliu Hatieganu", Cluj-Napoca, Cluj, Romania

Objective: we set out to analyze patient's perception on spirituality and faith on a rehabilitation wards. The data in this study are compared with the data from an older study made 12 years ago and performed on the same department.

Method: All patients were inpatients in a Rehabilitation Department. They were asked to fill anonymously a questionnaire which included: 5 questions about personal-demographic data, followed by 34 questions on how the patient perceives the disease, the role of pray in their life, how pray influence pain level, the patient's vision on prayer and its role, visual analog scale of the pain and the duration of the disease in years. The data were compared with the same study performed 12 years ago. The study was conducted with the approval of the ethics committee of the hospital.

Results: The mean age of the patients was 61.5 years, 76% were female. Almost half of the patients (46.93%) chose pain intensity on visual analog scale over 7. The average duration of disease was 11.8 years. 69% of respondents believe that only God can heal them, this percentage being higher than the one in the previous study: 62%. Interestingly, 41% trust the priest the same as the doctor, this percentage being smaller than in the previous study where over 57% claimed this. Half of the of patients declare an improvement of their well-being after praying, this number being smaller than in the past, where 54% stated this. Of the respondents, 61% believe that prayer keeps them alive, a higher percentage than in the previous study: 50%.

Conclusions: spirituality and faith is important in patient's daily living. Physician should not neglect these aspects, and they should be used for the benefit of the patient in order to obtain a better result in the rehabilitation process.

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FOLLOWING PATIENTS WITH SCI IN A FIRST-PERSON VIEW (VIDEO)**László Váraljai**

Rehabilitation Department of Spinal Cord Injuries, National Institute of Medical Rehabilitation, Budapest, Hungary

Introduction

Spinal cord injury (SCI) can result in a drastic change in one's lifestyle. The altered ability to move affects the performance of daily tasks. Rehabilitation aims to offer and teach strategies to balance out this difference in ability to achieve similar results with the execution of tasks before the injury.

Objective

Our goal was to make the change more visible for health care professionals, thus increasing empathy.

Method

We have obtained video recordings via GoPro headcameras worn by our patients in our department. The recordings were sequenced according to the levels of rehabilitation from the arrival to our institute until the organized practice in community-setting.

Results

Our findings, in their essence, are self-explanatory, but we have discovered an additional benefits from using headcameras. We can grossly follow the view, which reveal what the patients may expect to be a source of help or an alternative way to achieve their goal. This method also allows us to realize what is out of view for the patient, therefore allowing the health care providers to improve their communication.

Conclusions

Experiencing the perspective of patients with SCI should improve the relationship between the patient and the health care providers. Additionally, analyzing these videos is a way to explore novel strategies to daily tasks for these patients.

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**ROLE OF FUNCTIONAL ULTRASOUND TO DETECT POINTS OF NERVE FIXATIONS:
SUPRATARSAL TIBIAL NERVE TENSION SYNDROME IN MEDIAL HEEL PAIN****Lev Kalika¹, Rostyslav Bubnov²**

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Clinical hospital 'Pheophania' of State Affairs Department, Kyiv, Ukraine; Zabolotny Institute of
Microbiology and Virology, NAS of Ukraine²

Introduction: Neurodynamic testing appear to be only way to look at nerve mechanics (Shacklocks et al.), detecting adverse neurodynamic tension. Neurodynamic tests meet new sense with using ultrasound (US), potentially valuable imaging modality in detecting abnormal disease-specific nerve mechanics, however are still unstudied and rather underestimated modality, far from validation.

The aim was to assess the role of functional ultrasound to detect points of nerve fixations: tibial nerve motility in heel pain.

Methods: We included 22 patients (13 females, aged 24–42 y.o.) with medial heel pain and 10 controls without pain. All patients underwent general exam, precise physical tests, measured postural stability parameters, functional neuromuscular US using 4-8 MHz /5-12 MHz using M-mode. We did ultrasound of medial heel, medial soleus and gastrocnemius muscles, evaluated tarsal tunnel and surround tissue structure, CSA, muscles of foot and ankle; evaluated tibial nerve structure and nerve movements during functional test – overflexion, squatting, dorsiflexion, modeling loading the calf/soleus and all plantar flexors during walking or running.

Results: In asymptomatic patients during tests their tibial nerve was detecting moving posterior irrelevant to initial position. In 9/12 patients with medial heel patients we detected restriction / abnormal excursion of tibial nerve was located less than 2 mm away from tibia and moved towards the tibia anteriorly during dorsiflexion/eversion. All symptomatic patients had flat or overpronating foot. Dynamically muscle hypertrophy within the calf can compress/irritate/tension the nerve (not detectable on US). Muscle hypertrophy in case the group of muscles are working functionally opposite of their proposed regime during loading changed nerve-fascia-muscle interface and therefore nerve dynamics visible on US whether directly or indirectly through fascia tensioning the nerve.

Conclusion: Functional ultrasound is highly effective to detect points of nerve fixations in particular evaluate abnormal tibial nerve motility in medial heel pain. Ultrasound imaging of abnormal tibial nerve mechanics is promising marker for diagnosis so called “supratarsal tibial nerve tension syndrome” as trigger of medial heel pain. Tibial nerve fixations in tarsal tunnel can be indirect marker of neuropathy and can be helpful to determine focused therapeutic strategy.

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PARTICIPATION ASSESSMENT IN PATIENTS WITH PULMONARY ARTERIAL HYPERTENSION: IPA & SF-36 CONTEXTUAL ANALYSIS**Lina Butane, Daina Smite, Andris Skride**

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Introduction: Nowadays, participation as a concept has been increasingly used in rehabilitation literature. Unfortunately health care specialists outside the rehabilitation field does not use participation concept and in studies choose to use health related QoL measures both – generic or disease-specific. In context of chronic and progressive disability (as in such rear disease as Pulmonary Arterial Hypertension (PAH)) the challenge of rehabilitation is to achieve a person to live a good and meaningful life and to participate in the activities of one's choice. We suppose that measurements of QoL reveal only small part of previously mentioned concerns, because these measurements mainly answer the question "how does a person experience one's social existence", but don't give notion of life as a perceived by the individual.

The objective of this study was to explore the overlapped and diverse items measured by IPA (Impact on Participation and Autonomy) and SF – 36 (Short Form (36) Health Survey) surveys.

Methods: This mixed methods study included participants diagnosed PAH. Outcome was based on the IPA, SF-36 surveys and semi structured in-depth interview. In data analysis we used correlation analysis, thematic content analysis and data triangulation (both quantitative and qualitative data).

Results: Correlation analysis showed statistically significant ($p < 0,05$) weak correlation between several SF-36 domains and IPA autonomy domains. Both summary scores of SF-36 (PCS, MCS) didn't showed statistically significant correlation with IPA summary scores. Only few categories ruled out in thematic analysis of interviews could be linked both with SF-36 and IPA domains and there were found more links with IPA domains compared with SF-36 in context of participation.

Conclusions: Person's wish to live a fulfilled life despite disability and fear about frightening prognosis clarify poor connection between scores of SF-36 and IPA. It is outline need for participation measure instead of QoL questionnaires in context of rehabilitation in chronic and progressive disability.

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NEW APPROACH TO CHRONIC SHOULDER SUBLUXATION AND PERSISTENT UPPER EXTREMITY PARALYSIS SECONDARY TO HEMORRHAGIC STROKE IN A PATIENT WITH AUTISM: A CASE REPORT**Linette Garcia, Jeffrey Montes**

JBM Physical Medicine and Rehabilitation Centre Inc, Malolos, Philippines

Introduction: Chronic glenohumeral (CGH) subluxation and persistent paralysis of left upper extremity (UE) due to hemorrhagic stroke in a young male adult with autism is quite devastating and problematic especially if it involves the dominant left hand. The goal of the family is to explore possibility of motor recovery for the left UE beyond 2 years post-stroke using novel physical modalities such as Pulse Electromagnetic Therapy (PEMT), Transfert Electrical Capacitive And Resistive (TECAR) Therapy and High Intensity Laser Therapy (HILT) coupled with therapeutic exercises. Management of these impairments in this type of patient is not available in the literature.

Objective: To describe the outcome of using novel physical modalities in a patient with autism who have

CGH and persistent left UE paralysis

Method: Case report, descriptive study

Results: The use of PEMT, TECAR Therapy and HILT coupled with therapeutic exercises in most days of the week showed promising motor recovery of left UE. Initially two months after start of treatment, patient gained active left elbow flexion and, then 7 months after, some degree of active shoulder flexion. CGH subluxation was also reduced from 2-finger breadth to 1-finger breadth. No adverse reactions noted.

Conclusion: The case report showed that motor recovery and CGH subluxation in a patient with autism and hemorrhagic stroke can possibly still be expected beyond golden period of recovery with the use of these novel physical modalities incorporated with therapeutic exercises.

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STUDY ON THE EFFECTS OF SPEECH THERAPY COMBINED WITH PSYCHOLOGICAL SUPPORT FOR DYSARTHRIA AFTER STROKE**Linru Duan, Jiejiao Zheng**

Department of Rehabilitation Medicine, Huadong Hospital affiliated to Fudan University, Shanghai, China

Objective: To observe the curative effect of speech therapy combined with psychological support for dysarthria after stroke.

Methods: 20 cases with dysarthria after stroke were randomly divided into observation group (10 cases) and control group (10 cases). The observation group using speech therapy combined with psychological support, while the control group using conventional speech therapy. A comparative study was made between 2 groups in the articulation function and psychological improvement.

Results: The score of the modified Frenchay articulation disorder rating scale of the patients in both groups after treatment were obviously lower than those before treatment ($p < 0.01$), the decrease in observation group was even greater ($p < 0.01$); the number of "a" items of the patients in observation group after treatment were much higher than that before treatment and that in control group ($p < 0.01$, $p < 0.05$); the score of Hamilton depression rating scale of the patients in observation group after treatment were dropped down more than that before treatment and that in control group ($p < 0.05$, $p < 0.05$).

Conclusion: Speech therapy combined with psychological support can help improve the articulation function and mental status in patients with dysarthria after stroke

[KEYWORDS] speech therapy; psychological support; stroke; dysarthria

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RESEARCH OF THE CORRELATION OF VERTIBRO-BASILARY BLOOD SUPPLY, STABILOMETRY AND BERG BALANCE TEST IN PATIENTS WITH PERIPHERAL DIZZINESS AND CERVICAL DORSOPATHY**Liskov Yaroslav^{1,2}, Kolisnyk Petro^{1,2}, Kolisnyk Serhii^{1,2}, Horobets Kostiantyn³, Tryhub Roman⁴, Dolylna Olena¹**¹Department of Medical Rehabilitation and Medical and Social Expertise, National Pirogov Memorial Medical University, Vinnytsya, Ukraine²Center of Medical Rehabilitation and Sports Medicine, Vinnytsia, Ukraine³ Municipal Institution of Kyiv Regional Council "Kyiv Regional Clinical Hospital" ,Ukraine⁴Military Medical Center of West Region Rehabilitation unit, Lviv, Ukraine

Introduction: Dizziness is one of the most common reasons for visiting a doctor. The incidence of dizziness is about 5-10% in patients over 40 years old and 25% after 65 bounded with high risk of falls (Hesham M Samy, 2017). According to Yahno N.N. (2005), cervical dorsopathy may be the cause of vertebrobasilar circle (VBC) blood supply disorders. The dependence of the risk of falling on postural functions has been studied enough, but the relationship between vertebrobasilar supply, stabilometry, and the Berg balance test (BBT) needs to be studied.

Objective: To investigate the relationship between VBC blood supply counts, stabilometric data, and BBT in patients with peripheral dizziness (PD) and cervical dorsopathy, to evaluate the correlation between rheoencephalography (REG), stabilometry, and BBT data.

Methods: 31 patients with PD of 22-63 (41.78 ± 13.3) years old were enrolled in the study. REG registration was performed in standard leads. Stabilometry was performed in an upright position with opened eyes, all patients evaluated by BBT. The calculations were performed using Pearson's correlation coefficient and Mann-Whitney test.

Results: Significant difference of the center of mass deflection indices in the sagittal plane was found in patients with PD ($U = 10.3$; $p < 0.01$). A direct correlation was observed between the blood flow asymmetry coefficient (BFAC) in VBC and the deviation of the center of mass in the sagittal plane (DCMSP) and an inverse correlation between BBT and BFAC ($r = 0.59$, $p < 0.05$ and $r = -0.54$, $p < 0.05$ respectively).

Conclusions: Obtained results indicate a direct correlation of the mean strength between BFAC in the VBC and DCMSP and an inverse correlation between BBT and BFAC in patients with PD, which may indicate a correlation of blood supply abnormalities in VBB with PG and cervical dorsopathy that needs to be studied further.

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POSSIBILITIES AND LIMITS IN REHABILITATION PROGRAM OF PATIENT WITH OPERATED C5-C6 HERNIA AND NEUROLOGICAL IMPAIRMENT**Lili Silvia Meiu¹, Sarah Adriana Nica^{1,2}, Brindusa Ilinca Mitoiu^{1,2}, Ioana Ghiorghiu^{1,2}, Delia Alexe^{1,2}, Roxana Nartea^{1,2}**¹National Institute of Rehabilitation, Bucharest, Romania² University of Medicine and Pharmacy Carol Davila

Introduction: Cervical spine disc herniation is a disabling source of cervical radiculopathy, pain and dysfunction. Usually conservative treatment is the first choice for treatment, but for patients with neurological impairment surgery represents the first option of treatment. Residual neurological impairment represents most important symptomatology for the patients to begin rehabilitation treatment as early as possible.

Objective; to demonstrate that early rehabilitation reduces functional disability.

Material and method; A male patient of 39 years has presented in our rehabilitation clinic being referred from neurosurgery service, after he underwent surgery for cervical C5 disc herniation, two weeks prior.

History; symptomatology debuted 4 weeks prior to surgical intervention, with intense neck pain (VAS 9/10) and without neurological deficit. He underwent neurological consult, that recommended MRI examination. After 2 weeks he begun developing neurological deficit in C5-C6 right dermatomes.

He underwent surgical treatment, with decompression and rahiintersomatic synthesis with cage.

After surgery, clinical evolution was favorable.

Clinical examination at presentation in our rehabilitation showed; pain in the neck region 8/10 VAS scale; voluntary motor control present distal and intermediate present; voluntary motor control outlined proximal; muscle strength 4/5 for intermediate and distal segment of right upper limb and 2/5 in proximal segment; osteotendinous reflexes absent for right biceps and deltoid.

For functional evaluation we used DASH questionnaire.

After clinical and functional evaluation, the patient received complex rehabilitation program consisting of; electrostimulation, kinetotherapy and massage. The rehabilitation program was prescribed daily, for 4 weeks.

Results and discussion;

The patient was evaluated after 4 weeks of treatment. At that evaluation patient obtained 3/5 muscular strength in proximal segment of right upper limb.

He will undertake another 2 evaluations at 2 and 3 months from surgery.

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EFFECTS OF ETIOLOGY ON FUNCTIONAL LEVEL IN PATIENTS WITH UNILATERAL LOWER-LIMB AMPUTATION**Ljubica Pasic, Marijana Levicanin, Igor Simanic, Sonja Ralevic, Borka Gavrilovicp**

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INTRODUCTION: In patients who suffer from diabetes mellitus-a (DM) and occlusive peripheral vascular disease, one of complications can include lower-limb amputation (LLA).

OBJECTIVE: To present achieved functional levels in patients with LLA after first hospitalization in Specialized Hospital for Rehabilitation and Orthopedic Prosthetics (SHROP), as a reference institution in Republic of Serbia.

METHOD: We performed a cross-sectional retrospective study in the period from January 01 until October 01, 2019. Evaluation was performed with patients who underwent primary prosthetic rehabilitation after unilateral transtibial (TT) or unilateral transfemoral (TF) amputation. Causes of amputation included DM and occlusive peripheral vascular disease. We excluded patients who had bilateral amputations regardless of etiology or unilateral amputations of other etiology. Observed characteristics included sex, age, cause of amputation and functional assessment after conducted rehabilitation according to Amputee Mobility Predictor (AMP).

RESULTS: The study included 87 patients [67 males (77%) and 20 females (23%)], with average age of 67.14 years. Of the total number of patients, there were 54 subjects (62.1%), 39 males (58%) and 15 females (75%) who sustained amputation as a consequence of DM, and 25 subjects (28.7%), among whom there were 20 males (29,9%) and 5 females (25%), whose cause of amputation was occlusive peripheral vascular disease. There were 42 male subjects (62,7%) and 14 female subjects (70%) with TF amputation. There were 19 male subjects (28,4%) and 6 female subjects (30%) with TT amputation. Achieved results at the end of rehabilitation - male subjects: K1:14 (20,9%), K2: 24(35%), K3: 14(20,9); female subjects: K1:6(30%), K2:5(25%), K3: 2(10%).

CONCLUSION: Quality of life is significantly diminished after amputation. Achieved functional levels indicate successful rehabilitation and returning to everyday life, as well as independent functioning.

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COMBINING LOWER LIMB EXOSKELETON THERAPY WITH OPTICAL SENSOR BASED MOVEMENT ANALYSIS – CASE PRESENTATION**Luca Toth¹, Adrienn Pallag¹, Viktoria Bors¹, Adam Schiffer², Peter Cserhati³, Andras Buki¹**Neurosurgery Clinic, University of Pecs, Pécs, Baranya, Hungary¹, University of Pécs, Faculty of Engineering and IT Technologies², National Institute of Medical Rehabilitation, Budapest³

Introduction: Traumatic spinal cord injury (SCI) is a devastating condition affecting the young adult population. Following a complete lesion, the patients are forced to use wheelchair and the activity of daily living as well as the quality of life is severely affected. Robotic exoskeletons are novel solutions in rehabilitation and could be adopted as assistive walking devices for home use to reinforce mobility and avoid long term medical complications due to immobility.

Objective: Our aim is to evaluate the impact of long – term exoskeleton training on bone density, general health, bladder and bowel functions following complete SCI. Furthermore, we aimed to test our real time optical based movement analysis system.

Method: The patient suffered complete SCI injury on Th11 level, 2 years ago. According to the training protocol the team performed preparative physiotherapy to improve the trunk balance. The exoskeleton training session is performed five days a week. General rehabilitation outcomes measured and movement analysis performed in every milestone to track the posture changes during the therapy.

Results: The movement analysis system is working sufficiently, capable of life-stream recording of 25 different joints, movement vectors and joint angles. During post-processing method, filtering and gait cycle analysis were performed. According to the rehabilitation efficacy the Trunk Control Measurement Scale, Berg Balance scale outcome substantially improved according to the baseline and to milestone measurement as well. Besides, Timed up and go and 10 meter walking test performance significantly improved between the second and third milestone.

Conclusion: The initial system set up is feasible. There is a considerable demand for long term follow up trials with more patients and standardized outcomes and movement analysis measures, thus we plan to extend our research to multicenter research with National Institute of Medical Rehabilitation in Hungary.

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AICARDI-GOUTIERES TYPE 2 SYNDROME - ANOTHER CAUSE OF CEREBRAL PALSY?**Madalina Leanca¹, Liliana Padure²**

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Objective: Aicardi-Goutières syndrome (AGS) is a rare genetic autoinflammatory disorder affecting the brain and skin. Onset occurs within the first few days or months of life with severe, subacute encephalopathy (feeding problems, irritability and psychomotor regression or delay) associated with epilepsy, chilblain skin lesions on the extremities and episodes of aseptic febrile illness.

Methods: We report a 3 years old female patient with normal pregnancy and delivery, normal neuropsychomotor development who presented clear developmental regression after age of 11-12 months when performed an cerebral MRI with sedation. He had subacute encephalopathy and loss of acquired skills (no head control, no more sitting). The cerebral MRI shows extensive degeneration of white matter hypomyelination with cerebral atrophy without basal ganglia involvement. Neurological examination shows pyramidal signs (spasticity, brisk deep tendon and Babinski sign), axial hypotonia, extrapyramidal symptoms (abnormal eye movement, dystonic postures of the upper limbs). After this episode the diagnosis of the patient was cerebral palsy.

Results: The investigation performed in this patient was leukodystrophy and eukoencephalopathy panel. The results in this case were: RNASEH2B c.529G>A, p.(Ala177Thr) which is pathogenic. Biallelic pathogenic variants in RNASEH2B gene cause autosomal recessive Aicardi Goutières syndrome type 2 (AGS2).

Conclusion: For the positive diagnosis in the case of cerebral palsy is important to know the history of the disease, the evolution with regression in our case and brain imaging findings. AGS2 involving the c.529G>A allele is likely under-diagnosed and easily mistaken for spastic cerebral palsy. Early recognition influences reproductive decisions and may allow for current and future therapeutic interventions targeting the damaging effects of CNS autoinflammation.

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NEONATAL EPIDERMOLYSIS BULLOSA-WHAT IS THE ROLE OF REHABILITATION MEDICINE?**Madalena Rangel, Sandra Claro**

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Introduction: Epidermolysis bullosa (EB) is rare genetically determined connective tissue fragility disorder characterized by blister formation in skin and mucosal membranes in response to minor trauma. The severity of clinical presentations is variable and dependent of mutations and gene penetration, but almost all patients suffer from feet and/or hand involvement, causing ulcers, dystrophic scarring, digital fusion, articular limitation, flexion contractures and deformities with a high impact on function and quality of life.

Objective: This study aims to present a clinical case of EB in a newborn and to describe the available strategies in wound care, deformity prevention and developmental stimulation.

Method: Description of a clinical case based on medical records from various specialties (PRM, Pediatrics/Neonatology, Dermatology and Stomatology). Medline/PubMed search using the Medical Subject Headings (MeSH) terms "epidermolysis bullosa" and "rehabilitation" for studies published until October 2019.

Results: Female infant, gestational age 37 weeks, eutocic delivery at Hospital with no neonatal complications. Mother 21 years, G1P1 and father 25 years, with no previous medical conditions or relevant family diseases. At day 3, the infant begins to present blisters on both feet, elbows and hands that progressively become worse, with skin detachment and muscle and tendon exposure at the dorsum of the right foot. The infant was evaluated by PRM, began wound treatment, foot orthoses and physiotherapy and was referred to Dermatology that confirmed EB diagnosis by skin biopsy. The infant was discharged after 2 months, with satisfactory wound resolution and maintained physiotherapy as an outpatient. Currently, at 7 months, the infant has been re-admitted twice due to new blister formation (trunk and oropharynx) but remains with no limitations despite the extension of the lesions.

Conclusions: This case intends to demonstrate the importance of communication and knowledge exchange between different specialties, that proves to be particularly important in the management of rare conditions.

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THE PATIENT EXPERIENCE PROJECT (PEP) AT(AFFILIATION)**Maeve Nolan, Claire Keogh, Simone Carton, Suvi Dockree, Sarah Casey, Hannah Gallivan**

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Background:There is increasing interest in the patient experience of illness and healthcare. The Patient Experience Project (PEP) grew out of the recognition by the Psychology Department of the need to capture that experience with online materials that would provide peer support, cater for different learning styles and be consistent with a self-management rehabilitation ethos.

Objective:Develop a range of online, patient friendly educational resources including animations, patient and family interviews and short professional inputs on various aspects of rehabilitation and living with acquired disability.

Expand the availability of self-management tools that can be accessed in people's own time in an increasingly preferred format, thereby counteracting barriers to learning including timeliness, readiness and health literacy increase disability awareness and provide a valuable teaching resource for community professionals

Method:collaboration with students of film at a local college to develop short, lively animations on topics including adjustment to rehabilitation, managing anger and fatigue and reluctantly accepting long-term care commissioning a series of patient and family experience videos complemented by brief 'teaching inputs' from the Psychology Department.

Results: Eleven animations and an expanding range of patient experience videos capturing real life stories of rehabilitation and living with disability for use with patients, families and healthcare professionals. Feedback from patient and staff groups indicates that the PEP project provides valuable peer support, self-management skills and staff training.

Conclusion:Patient experience and empowerment is at the heart of this ongoing project which seeks to enrich the lives of patients and be responsive to their changing and complex needs. Patients are 'experts by experience' and stories from those who have experienced rehabilitation and life altering injuries have much to offer others going through similar experiences. In addition, they offer listeners the opportunity to expand their understanding of the profound identity transformation imposed by sudden disability.

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REHABILITATION OF CALCIFIC TENDINOPATHY OF THE ROTATOR CUFF WITH RADIAL EXTRACORPOREAL SHOCKWAVE THERAPY

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Introduction: The most common cause of shoulder pain is calcific tendinopathy of the rotator cuff. The clinical assessment of the disease is dominated by pain and limited range of movement in the shoulder. Treatment of calcific tendinopathy of the rotator cuff can be conservative and operative. Radial extracorporeal shockwave therapy is newer form of nonsurgical treatment with physical modalities.

Objective: The aim is to evaluate the effects of the radial extracorporeal shockwave therapy (RESWT) in rehabilitation of calcific tendinopathy of the rotator cuff.

Methods: Ten patients came for examination due to pain and limited range of movement in the shoulder. The patients were treated with medication and conventional physical treatment two months before. Plain radiography of the shoulder revealed presence of calcific rounded masses in the attachment of tendons within the rotator cuff. The patients were underwent on RESWT treatment, number of strokes was 2000, duration of treatment - 7 minutes (determined by an application protocol), 5 treatments applied once a week in one session, local in the area of the shoulder.

Results: After the rehabilitation protocol with RESWT there was a significant improvement in range of movement in the shoulder and decrease of VAS score in the shoulder.

Conclusions: RESWT is an effective alternative treatment of calcific tendinopathy of the rotator cuff. This treatment shows efficiency in terms of pain relief, improved shoulder joint function, safety, noninvasiveness and cost-effectiveness. Therefore RESWT should be the treatment of choice in this pathology.

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CONTRIBUTION OF THE MESOTHERAPY IN THE TREATMENT OF CHRONIC NECK PAIN

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Background: Mesotherapy can be included as an ancillary treatment in the management of localized pain in rehabilitation.

Aim: The aim of this study is to evaluate effectiveness of mesotherapy in pain control in patients with chronic neck pain.

Method: We conducted a prospective study, based on a population of patients followed for medically refractory chronic neck pain in the department of physical medicine and rehabilitation at the Military hospital of Tunis between November and December 2015. Three sessions of mesotherapy treatment was performed to our patients with a cocktail of drugs (Lidocaine 1%, Thiocolchicoside and Piroxicam). Pain intensity was assessed before the first treatment, at the end of the first week, at the end of the second week and at the end of the third week using the a pain visual analogue scale (VAS)

Results: Fifteen patients were included in our study, the mean age was 43 years and the sex ratio was 0.75. The treatment was well tolerated, there were a decrease of the pain VAS the average pain VAS was 7.66 at the end of the first week, 5.35 at the end of the second week and 2.45 at the end of the third week.

Conclusion: Mesotherapy were found to be effective in the short term in reducing pain in chronic neck pain.

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A DOUBLE BLIND PLACEBO-CONTROLLED STUDY OF THE USE OF THE DRUG CEREBROLYSIN FOR CHILDREN WITH CEREBRAL PALSY**Maria Maltseva, Aleksei Shmonin, Elena Melnikova**

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Introduction: Low physical tolerance and fatigue reduce the effectiveness of medical rehabilitation of children with cerebral palsy (CP) over 10 years of age who have learned helplessness in the field of mobility and everyday life. Cerebrolysin is a peptide drug that stimulates neuroplasticity. Hypothesis: Cerebrolysin reduces fatigue and increase physical tolerance; as a result, Cerebrolysin increases the physiological resource for the rehabilitation of children with CP and makes rehabilitation more successful.

Purpose: to evaluate the effectiveness combination therapy of Cerebrolysin and multiprofesional interdisciplinary team-based rehabilitation children with Cerebral palsy.

Methods: Children 11-14 years old with a spastic form of cerebral palsy, with homogeneous disorders, according to GMFCS level 2 motor capabilities, have not previously received functional rehabilitation, have not received medications for 9 months. 60 children received Cerebrolysin intravenously in 10 ml for 21 days, 60 children received placebo. Initially, all groups of patients were comparable. All patients received a rehabilitation course consisting of physical therapy, occupational therapy and dog assisted therapy for 2 months. Primary end was FIM. Secondary and points were COPM and fatigue, anxiety, physical tolerance scales. Assessment of the patients were at the end of the rehabilitation course, and after 3 months.

Results:Patients receiving Cerebrolysin mastered more manual skills. On average, a walk test to fatigue was performed 15 minutes longer. Assessment by FIM are significantly better in the Cerebrolysin group - 94 [93; 95] points, in the placebo group - 90 [89; 92] points (Mann-Whitney test $p<0.001$), after 3 months the effect was sawed - in the Cerebrolysin group, the score was FIM 97 [96; 97] in the placebo group 92 [90; 95] (Mann-Whitney test $p<0.001$)

Conclusions: Using combination Cerebrolysin with multiprofesional interdisciplinary team-based rehabilitation children with CP significantly decrease of fatigue, increase physical tolerance and lead to better functional recovery.

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THE EFFECTS OF TIMING ON DURATION AND OUTCOME OF PROSTHETIC REHABILITATION IN LOWER-LIMB AMPUTEES**Marijana Levicanin**

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INTRODUCTION: Lower-limb amputation is a surgical procedure which can have significant functional, psychological and social consequences for quality of life. Rehabilitation after amputation includes early rehabilitation, preprosthetic and prosthetic phase. Early rehabilitation aims to prevent complications, accelerate preprosthetic preparation and facilitates prosthetic rehabilitation.

OBJECTIVE: Demonstrate whether etiology and time since amputation until start of rehabilitation influence duration and outcome of prosthetic rehabilitation.

METHOD: A retrospective study. We analyzed case histories of patients who were for the first time after lower-limb amputation hospitalized in the Specialized Hospital for Rehabilitation and Orthopedic Prosthetics (SHROP) from January 1 until October 1, 2019, totally 87 patients (m/f 67/20, age 67, 14±1,21). We excluded patients who left rehabilitation due to worsening of condition or did not undergo a definitive assessment. Subjects were divided into 3 groups according to amputation etiology: diabetic gangrenes, vascular diseases and other causes (trauma, tumors). The data were presented as percentages and numbers by use of analytical statistics methods.

RESULTS: Out of 87 patients 67 were prosthetized. The most common cause of amputation is diabetes mellitus [54 patients (62.1%)], followed by vascular diseases [25 patients (28.7%)] and other conditions and diseases [8 patients (9.2%)]. The average time since surgery unit discharge until admission to SHROP was 75.68 days (other causes group took the longest time, 126.63 days). Evaluation and preprosthetic preparation lasted 40.05 days on average (diabetic amputation group took the longest time, 46.63 days). Prosthetic rehabilitation lasted 51.99 days on average (other causes group took the longest time, 113 days). After amputation average stay at the surgical department was 15.15 days. Duration of preprosthetic preparation negatively correlates with the time since amputation until admission to SHROP.

CONCLUSION: Patients who took longer time to recover after a surgical intervention went faster through the preprosthetic phase and underwent prosthetic fitting more often

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PATIENT MOTIVATION IN REHABILITATION OF OPERATIVELY TREATED HAND INJURIES**Marina Brndušić¹, D. Vučković¹, I. Glišović Jovanović¹, T. Palibrk^{1,2}, S. Milutinović^{1,2}, S. Matic^{1,2},**¹Clinic of Orthopaedic Surgery and Traumatology, Clinical Centre of Serbia, Belgrade, Serbia²Faculty of Medicine, University of Belgrade, Belgrade, Serbia
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Motivation has been defined as the level of effort and desire to perform well. A key problem in physical rehabilitation treatments is patient motivation since those treatments involve slow, repetitive, and often painful movements. Consequently, little progress may be achieved after a session, leading to longer or even uncompleted treatments.

The goal is to show the difference and impact which we have noticed during our clinical practice, which motivation has on a final result in rehabilitation of operatively treated hand injuries. We have examined patient several times during their treatment and compared final rehabilitation results of patients with different level of motivation. Having a positive attitude toward the disability, setting goals in therapy and having the desire to overcome dependency on others were found to promote participants motivation for recovery.

Key words: hand injuries, patient motivation, hand rehabilitation

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EARLY REHABILITATION OF A PATIENT WITH COVID 19- OUR FIRST EXPERIENCES IN MONTENEGRO**Marina Vukovic¹, Jelena Borovinic Bojovic², Nermin Abdic³**

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Introduction: The first cases of patients with COVID 19 in Montenegro were registered on March 17, 2020.

Objective: to present the success of the early rehabilitation process (ERP) in a patient with COVID 19 infection.

Method: Patient aged 44, without chronic diseases, was admitted to the Intensive Care Unit on March 30, 2020, due to respiratory insufficiency and hemodynamic instability. 12 days before admission, symptoms of the disease appeared, he positively tested on SARS-COV-2 virus. On admission he is in a coma, on mechanical ventilation, febrile (T)-39.5 C, blood pressure (BP) 70/40 mm Hg, pulse (p) 90/min, SpO2 95%, diuresis 100 ml. On CT scan- acute respiratory distress syndrome. Hemodialysis was performed three times. On April 13, the patient was extubated, PRM specialist was invited for a consultation. The patient is conscious, disoriented, afebrile, on oxygen supplementation, SpO2 94%, p 71/min, respiratory rate (RR) 22/min. He is included in ERP- positioning, passive expansion of the chest, passive exercises for the extremities. The next day, the patient understands the orders, he performs extensions in both wrists and ankles. During the night, he had a series of epileptic seizures, a break from rehabilitation for 36 hours. In the next two days after continuing rehabilitation, he sits in bed, tolerates the sideways position, performs active exercises for the distal segments and actively assisted for middle and proximal segments of extremities.

Results: on April 30, the last day of hospitalization, patient sits on the edge of the bed, maintains balance, performs active limb exercises in a sitting position. Performs transfers independently. SpO2 99% without oxygen supplementation, p 83/min, RR 16/min.

Conclusions: ERP started in ICU leads to improvement of respiratory function, musculoskeletal system function and neurological status of patients with COVID 19 infection.

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ORTHOTIC MANAGEMENT WITH A CUSTOMIZED HUMERAL BRACE FOR GORHAM STOUT DISEASE OF THE HUMERUS: A CASE REPORT**Margaux Mae Rayos, Gaerlan Inciong**

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Introduction: Gorham-Stout Disease is characterized by massive osteolysis or “vanishing bone” on radiograph. Due to its rarity, no standard Physical Medicine and Rehabilitation management has been published. With this comes the dilemma of managing another possible case of vanishing right humerus, the absence of which, affects the bimanual overhead and tabletop activities. To date, this could be the third documented case in the Philippines, and the first to manage using a customized humeral brace.

Objective: To manage the limited activities as well as to provide an external structural support to prevent further deficit or injury using a customized humeral brace.

Method: A customized humeral brace was provided and the patient’s level of hand functioning was tested using the Jebsen Taylor Test of Hand function and Minnesota Manual Dexterity tests, pre and post fabrication of the brace.

Results: There were improvements in activities such as writing, card turning, stacking, and lifting objects of variable weights, as well as with hand dexterity as evidenced by the standardized hand function tests done prior and post brace fitting.

Conclusions: Being a rare bone disease with no standard management and unpredictable involvement and course, cases are managed symptomatically. Depending on the affected bone, its attachments and its functions, there could be a need to support, align, prevent, or correct deformities and improve function of the moveable parts of the body in which, orthotic management would address. The role of orthotic management can then be considered upon identification of the bony structure that has undergone massive osteolysis such as in this case wherein the brace protects the upper limb from further injury, as well as aid in his performance of activities of daily living requiring overhead arm functions.

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SURVEILLANCE OF CEREBRAL PALSY IN EUROPE (SCPE). RESEARCH PRIORITIES IN GREECE**Maria Pyrgeli, Antigoni Papavasiliou, Afrodite Kotsi, Marianna Petra**

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Introduction. Greece is the 31st European member of SCPE registry, that commenced during 1998. Other members of SCPE are Germany, France, Portugal, Spain, Italy, Denmark, Sweden, Norway, Island, UK, Ireland, Slovenia, Hungary etc.

Objective. To register children suffering from C.P. in Greece, being treated in outpatient pediatric hospitals and PRM departments, in order to improve the methods of descriptions of children with C.P. and consequently their therapeutic interventions.

Method. We reviewed the medical files of 480 C.P. patients born in Greece, during 2000-2016

Results: Research information were recorded, concerning their perinatal medical history, their functional level, any comorbidities and any findings on their CNS images.

Statistical and epidemiological findings were extracted, concerning children suffering from C.P. at a European level.

Conclusions: Grouping C.P. patients' characteristics can be a valuable tool for treatment planning for the majority of C.P. patients.

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THE EFFECTS OF MIRROR THERAPY ON PHANTOM LIMB PAIN AFTER UPPER AND LOWER LIMB AMPUTATION-A CASE REPORT**Marija Spalevic, Mirjana Kocic, Ivona Stankovic, Lidija Dimitrijevic, Vesna Živkovic, Hristina Čolovic**

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Introduction: Phantom pain is a very common issue after limb amputations. It can be enduring and debilitating, significantly decreasing patient's quality of life. Recent studies have shown that mirror therapy can be a helpful tool to alleviate pain in addition to pharmacotherapy and physical therapy procedures.

Objective: To study and report the effects of mirror therapy in the management of phantom limb pain after an upper and lower limb amputation.

Case presentation: We present the case of a 58-year old man, a right upper and lower limb amputee, as a result of the severe electrocution injuries (he survived 35 000-volt electric shock), who has been experiencing phantom pain, successfully treated with the mirror visual feedback.

Method: Patient was asked to perform the assigned exercises for upper and lower extremities using the mirror (moving the remaining limb and watching the reflection in the mirror), 30 minutes per day for 4 weeks. The primary outcome was pain measured by ten point Visual Analogue Scale. Patient was also advised to record the number and the duration of the pain episodes per day.

Results: Mirror therapy practiced for 4 weeks provided a significant decrease in severity of phantom pain, episodes of unpleasant sensations occurred less frequently and lasted shorter.

Conclusions: Mirror therapy can be effective for reducing phantom pain in patients with upper and lower limb amputation. It is a safe, economical, easy to use method, feasible at home environment; patients can practice it independently on daily basis, increasing self-control over phantom pain.

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OCCUPATIONAL DIFFERENCES IN DISABILITY RETIREMENT DUE TO A SHOULDER LESION: DO WORK-RELATED FACTORS MATTER?**Maria Sirén**

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Introduction Musculoskeletal conditions, including shoulder lesions, contribute to a substantial proportion of work disability. Knowledge on the occupational differences in the risk of disability retirement due to a shoulder lesion and the relative contribution of work-related factors to these differences might help target preventative measures at the workers with the highest risk.

Objective To identify occupations with a high risk of disability retirement due to a shoulder lesion and to examine the effect of physical and psychosocial work-related factors on occupational differences in disability retirement.

Methods We followed Finnish wage-earners aged 30–60 ($n=1,135,654$) from 2005 to 2013 for full disability retirement due to a shoulder lesion. The work-related exposures were assessed with job exposure matrices. We calculated age-adjusted incidence rates and hazard ratios to test for the association between occupation and disability retirement due to a shoulder lesion. We also examined the contribution of work-related exposures to the excess risk of disability retirement.

Results As compared to professionals, the age-adjusted risk of disability retirement was increased among men in all occupational groups except managers and customer service clerks and among women in all occupational groups. Adjustment for education attenuated the occupational differences considerably, particularly among women. The physical work-related factors fully explained the excess risk of disability retirement due to a shoulder lesion among male finance and sales associate professionals and administrative secretaries as well as among agricultural and fishery workers. In women, the physical work-related factors fully explained the excess risk among construction workers, electricians and plumbers. For both genders, the contribution of psychosocial factors to excess risk of disability retirement was modest and seen for monotonous work only.

Conclusions Interventions targeted at reduction of the level of physical work load factors and monotonousness of work have a potential to prevent work disability due to a shoulder lesion.

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INVESTIGATION OF VIRTUAL REALITY TRAINING EFFECTS ON MENTAL HEALTH IN STROKE SURVIVORS**Marina Shurupova, Marina Shurupova, Alina Aizenshtein, Maria Bulatova, Nadezhda Cherepakhina, Galina Ivanova**

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Introduction. The application of Virtual Reality (VR) in treatment approaches emerges to be the prominent tool in rehabilitation of stroke survivors. VR could be useful in functional recovery with regard to motor function, attention and mental health. Whereas these systems provide interactive, motivating and multisensory biofeedback during training it could affect on motivation, anxiety and depression in participants.

Objective. The aim of our case study was to investigate the effect of VR training on motor performance and mental health characteristics in stroke patients.

Methods. 4 patients (age 50.25 ± 8.38 ; ≤ 3 for Modified Rankin Scale) after stroke were examined. They were evaluated by Montreal Cognitive Assessment and passed through exclusion criteria (>25 scores). Participants received 12 sessions of VR training using the GRAIL system (Motekforce, Netherlands). Training applications were based on the therapeutic goals for every patient, according to postural stability and gait adaptation. Motor and psychological assessments were conducted before and after training.

Results. According to motor assessment (Berg Balance Scale, FIM, Hauser Ambulation Index) no significant changes were revealed probably because of high level of their baseline scores.. Herewith, patients demonstrated improving of motor performance in most of applications in VR training. According to State-Trait Anxiety Inventory (Spielberger Scale) 3 patients showed enhancement of situational anxiety (from 10.1 to 47.6% of scores decrease) and personal anxiety (from 11.7 to 26.8%). 1 patient showed no any anxiety dynamic. According to Beck Depression Inventory all patients demonstrated enhancement of depression symptoms (from 36.3 to 76.9%).

Conclusions. VR training improves characteristics of mental health in stroke survivors. Further investigation will be directed to expansion of the patient cohort and evaluation of motor and psychological dynamics during rehabilitation. Moreover, the investigation of VR training on cognitive functions will be included in the study.

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FUNCTIONAL MAGNETIC STIMULATION FOR TREATING ACUTE BACK PAIN**Mariya Koleva**

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Introduction: Functional magnetic stimulation is a relatively new type of therapy in Bulgaria. We have studied its effect on treatment of urinary incontinence, chronic back pain and now, we are presenting the effect of the therapy on acute back pain from different genesis.

Objective: To determine the efficacy of the High Intensity Functional Electromagnetic Stimulation with the system SALUS TALENT PRO – REMED for treating acute back pain.

Method: The study was conducted in Physiomed Clinic – Pleven, Bulgaria. We used the system SALUS TALENT PRO – REMED, which generates pulsed electromagnetic field up to 3 Tesla. For the period June 2019 – October 2019, in the study were covered 112 patients with acute back pain – 67 women and 45 men. To assess the treatment effect we used a questionnaire for Daily Activities at the beginning and the end of the procedures and Visual Analogue Scale for the extent of pain. We used built-in programs. Treatment continued 5-7 sessions x 20-25 minutes each, for a period 1-2 weeks.

Results: Average patients' age was 48.5 years. After finishing the magnetic stimulation 82% of the patients (94 patients) showed significant improvement in the daily activities according to the questionnaire and significant reduction in VAS – 4-5 degrees lower than the beginning ones. In 16% (18 patients) – relative improvement in VAS -2-3 degrees, one patient was not feeling any change. Pain reduction is felt after 1-2 procedures. There were no side effects.

Conclusions: Magnetic stimulation is successful in treating acute back pain. It is convenient for patients, non-invasive method of treatment. The therapy with SALUS TALENT PRO - REMED is effective and fast way to reduce back pain, with no side effects.

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OCCUPATIONAL DIFFERENCES IN DISABILITY RETIREMENT DUE TO A SHOULDER LESION: DO WORK-RELATED FACTORS MATTER?**Maria Sirén¹, Eira Viikari-Juntura², Jari Arokoski¹, Svetlana Solovieva²**¹Department of Physical and Rehabilitation Medicine, Helsinki University Hospital, Helsinki, Finland²Finnish Institute of Occupational Health, Helsinki, Finland

Introduction: Musculoskeletal conditions, including shoulder lesions, contribute to a substantial proportion of work disability. Knowledge on the occupational differences in the risk of disability retirement due to a shoulder lesion and the relative contribution of work-related factors to these differences might help target preventative measures at the workers with the highest risk.

Objective: To identify occupations with a high risk of disability retirement due to a shoulder lesion and to examine the effect of physical and psychosocial work-related factors on occupational differences in disability retirement.

Methods: We followed Finnish wage-earners aged 30–60 (n=1,135,654) from 2005 to 2013 for full disability retirement due to a shoulder lesion. The work-related exposures were assessed with job exposure matrices. We calculated age-adjusted incidence rates and hazard ratios to test for the association between occupation and disability retirement due to a shoulder lesion. We also examined the contribution of work-related exposures to the excess risk of disability retirement.

Results: As compared to professionals, the age-adjusted risk of disability retirement was increased among men in all occupational groups except managers and customer service clerks and among women in all occupational groups. Adjustment for education attenuated the occupational differences considerably, particularly among women. The physical work-related factors fully explained the excess risk of disability retirement due to a shoulder lesion among male finance and sales associate professionals and administrative secretaries as well as among agricultural and fishery workers. In women, the physical work-related factors fully explained the excess risk among construction workers, electricians and plumbers. For both genders, the contribution of psychosocial factors to excess risk of disability retirement was modest and seen for monotonous work only.

Conclusions: Interventions targeted at reduction of the level of physical work load factors and monotonousness of work have a potential to prevent work disability due to a shoulder lesion.

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THE EFFECTS OF MUSIC THERAPY DURING NEUROREHABILITATION WITH PERSONS AFTER ACQUIRED BRAIN INJURY**Marketa Gerlichova, Aneta Krivankova**

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Introduction: A long-time practice together with the feedback from patients, their relatives or friends affirm the positive effect of music therapy (MT) on communication, quality of movement, self-knowledge and self-acceptance. This finding was supported by a research carried out within the leader author's PhD studies on the effects of music therapy during neurorehabilitation and education rehabilitation in persons after brain injury (ABI) in the context of their quality of life.

Objective: The research looked into the therapeutic possibilities of MT in order to improve the level of functional abilities in persons with ABI and thus facilitate the return of these people to society, including professional placement in some cases.

Method: The research consisted of a quantitative part aiming to follow 100 patients undergoing MT at the authors workplace, evaluating the change in their functional abilities concerning movement, communication, cognitive skills, and self-sufficiency. The patients were measured according to FIM (Functional Independent Measure). The qualitative part of the research looked into the significance of MT with 15 of these patients according to Grounded Theory.

Results: Music therapy affects people after ABI regardless of gender, age, time delay from ABI event, diagnosis, or education. It has been shown that the profit of MT grows with the increasing number of MT sessions. MT is seen as a non-invasive, positive approach that opens a space for experiencing emotions. It has a role as a communication and social interaction tool.

Conclusions: The results of the combined research show that MT plays an important role in the rehabilitation process for persons with ABI, bringing positive effects in movement, communication and self-sufficiency. A major contribution of MT in the perception of quality of life is a positive influence on the communication, perception of motoric, dynamics, self-perception, as well as gaining emotional stability and enhancing relaxation.

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BAYLEY III SCALES OF INFANT AND TODDLER DEVELOPMENT IN THE FOLLOW UP OF PREMATURE CHILDREN AND IN THE PEDIATRIC REHABILITATION**Márta Ráczné Kárpáti, Erika Kubinyi**

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The follow up of low birth weight babies help the therapy selection in the pediatric rehabilitation. The Bayley III Scales are sensitive and exact scales in the early intervention. They assess cognitive, language, motor skills, social-emotional and adaptive behavior. How can it be used in the pediatric rehabilitation? What kind of problems are the most frequent among the toddlers who were born with extreme low birth weight?

Bayley III Scales are used in the Pediatric Rehabilitation in Nyíregyháza since 2016.

We analysed the Bayley III Scales results of 50 extremely low birth weight toddlers in the age of 26-29 months. The most of them have quantitative and qualitative delay in their development (attention problems, lag of expressive communication, fine motor delays). The results can help to select the most effective therapies for them. The reassessments show the effectivity of the therapies and give for doctors, therapist and parents feedback about the development. The protokoll of the Bayley III assessments can support the communication and the team work with the parents too.

According our experiences Bayley III Scales are effective methods to assess the current status of premature and risk babies and toddlers. They can be used also like reassassments

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REACTIVE PERFORATING COLLAGENOSIS SECONDARY TO MESOTHERAPY: FIRST REPORTED CASE**Martina Cristinziano¹, Calogero Foti¹, Andrea Saggini², Concetta Ljoka¹**¹Physical and Rehabilitation Medicine Department, University of Tor Vergata, Rome, Italy²Anatomic Pathology, Department of Biomedicine and Prevention, University of Rome Tor Vergata

Introduction: Mesotherapy is a minimally invasive, local intradermal drug therapy which uses compounds belonging to the common pharmacopoeia at minimal dosage. Nevertheless, such treatment may be associated with a plethora of adverse effects, which may be classified into immediate, early and late.

Objective: In the present report, we described the first known case of reactive perforating collagenosis (RPC) in a patient suffering from type 2 diabetes mellitus, induced by mesotherapy.

Method: A therapeutic cycle of cervical-brachial mesotherapy with Diclofenac was prescribed to a patient because of chronic neck pain associated with vertigo and tingling-like paresthesia in the upper right limb. His medical anamnesis was relevant for a history of recurrent kidney stone disease, long-standing type 2 diabetes mellitus and arterial hypertension; no known allergies to drugs and food were reported. After the first session the patient developed multiple, pruritic papulonecrotic erythematous lesions on the upper back at sites of previous mesotherapy injections. Mesotherapy treatment was suspended. A skin biopsy was taken and based on clinico-pathological correlation, a diagnosis of reactive perforating collagenosis (RPC) was made.

Results: It appears unlikely that the cutaneous changes observed in the patient had been induced by a specific immune-mediated reaction against any of the therapeutic principles administered through mesotherapy. Indeed, the patient had been taking the same pharmacologic compounds also systemically, without undergoing any adverse reaction. However it is possible to speculate that the traumatic stimulation of the skin, caused by the needle employed for mesotherapy, might have unleashed the clinically silent predisposition of the patient to develop RPC.

Conclusions: We hereby described the first reported case of mesotherapy-induced RPC. In our patient, suspension of mesotherapy treatment and clinical observation were sufficient to control the skin reaction. Further research is warranted to better clarify the relation between mesotherapy and RPC.

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REHABILITATION AND PAIN TREATMENT IN THE FAILED BACK SURGERY SYNDROME: A CASE REPORT**Matteo Orfei**

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Introduction: The term "failed back surgery syndrome" refers to the clinical picture characterized by the persistence of pain and disability after a laminectomy. The main causes are a degeneration of the adjacent vertebral segment, a surgical scar that incorporates nerve roots or inappropriate choice of the type of operation.

Objective: We report our experience in managing the pain of a patient with chronic lumbosciatica. 62-year-old woman admitted to our rehabilitation clinic with chronic lumbar pain radiated to the left lower limb following L4-L5 laminectomy.

Method: The patient's medical history shows: arterial hypertension, neonatal hypocalcemic tetany, in 1982 subjected to Harrington's arthrodesis of the column due to severe scoliosis. Since then, a situation of well-being until 2001 when lumbar pain symptoms appear with irradiation to the left lower limb; performs NMR rachis LS: herniated discs L4-L5 and L5-S1. In 2002 she underwent surgery to remove the synthesis media and abundant scar tissue and L4-L5 laminectomy. After a relative period of well-being in 2012 the reappearance of left lumbosciatalgia, performed EMG which showed chronic neurogenic suffering L4-L5 on the left and L4 on the right. In 2013 RMN rachide LS which highlighted ED L4-L5 on the right and L5-S1 on the left. He performed cycles of FKT and medical therapy with Ibuprofen and diclofenac with relative well-being but subsequent exacerbations. Upon entering our department (09/30/2015) the patient presents with rigid spine in its entirety, pain prevalent at the lumbosacral passage; paresthesia spread to the left lower limb on the territory of L5-S1. It follows positive on the left at 30°. Maximum difficulty in postural passages and walking for short sections with lameness and sagging at the start. The proposed treatment plan was: kinesitherapy and functional rehabilitation of the spine with the McKenzie method, hydrokinesitherapy and medical therapy with tapentadol 100mg, 1p at 8, 1p at 20; performed a daily session of physiotherapy and hydrokinesitherapy for 6 days a week. The patient was evaluated at entry (T0), after 2 weeks of therapy (T1) and 4 weeks after the start of therapy (T2) with NRS scales, and Barthel index. She was asked to complete the Roland Morris disability questionnaire at T0-T1 and T2.

Results: At the entrance the patient had lumbar tract pain and irradiated to the left lower limb equal to NRS 8/10, Barthel index 40/100, Roland Morris disability questionnaire 16/24. After 2 weeks of medical and rehabilitative treatment we observed the following results: pain NRS 4/10, Barthel index 60/100, Roland Morris disability questionnaire 11/24. At discharge (10/31/2015) pain is almost completely regressed NRS 1/10, the disability quantified as low: Barthel index 80/100, Roland Morris disability questionnaire 08/24. At discharge, the patient is autonomous in the postural passages, an almost complete rachis mobility and in the absence of pain in the lower limb. However, paresthetic symptoms remain in the left lower limb. The patient was discharged with tapentadol 100mg, 1px2 / day medical therapy and with a home exercise program.

Conclusions: In consideration of the neuropathic component, it was preferred to include tapentadol in therapy as indicated in the WHO guidelines on chronic pain. In fact this has allowed us to obtain good pain control without the appearance of side effects, such as reduced intestinal function. Furthermore, with the exercise program and water therapy, the function of the spine and lower limb movements in the absence of pain was achieved.

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LONG-TERM MONITORING OF THE EFFECTS OF PHYSIOTHERAPY TREATMENT ON A PATIENT WITH METAPHYSEAL DYSPLASIA**Maya Krastanova, Radostina Madzharova, Polina Cvetkova**

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Introduction: Metaphyseal dysplasia (Pyle type, Bakwin-Krida syndrome) is a rare autosomal recessive disease that primarily affects the metaphysis. Pyle disease is inherited in an autosomal recessive pattern, which means both copies of the SFRP4 gene in each cell have mutations. These mutations in the SFRP4 gene prevent the production of functional SFRP4 protein and cause metaphyseal dysplasia. The altered synthesis of SFRP4 impairs the normal bone development and dental status of the patients.

Method: The treatment consists of: long-term, regular rehabilitation; orthopaedic treatment in cases of complications such as fractures of the tubular bones; and orthodontic treatment for dental disorders.

Objective: This study presents the results of a case in which the condition of a child with Pyle's disease was monitored for 5 years while undergoing rehabilitation therapy.

Results and conclusion: In conclusion, we can summarize that having knowledge of rare diseases like this one leads to these diseases being diagnosed faster by doctors. Conducting long-term, regular rehabilitation for such patients ensures an improvement in: their physical conditions, their growth/development, their resocialization, their daily activities and their psychological and emotional development, and also prevents complications of their existing condition.

Key words: *Metaphyseal dysplasia; Pyle's disease; Metaphyseal dysplasia Pyle type*

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INCIDENCE OF SCAPULAR DYSKINESIA IN THE SURGICAL TREATMENT OF BREAST CANCER, PROSPECTIVE STUDY**Meritxell Ortí, Sira Salinas, Jimena Terra, Marta Beranuy, M^a Lluïsa Catasús, Rosa Planas**

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Introduction: Breast cancer is globally the most common cancer pathology among women, affecting one in eight. Survival rate is high, reaching an 82% in Europe after 5 years. The adverse effects from breast cancer treatment have increased in conjunction with prolonged life expectancy. One of the most common complications resulting from surgical treatment is restricted shoulder joint balance. The scapula function is basic for shoulder mobility. To achieve shoulder flexion, glenohumeral joint and scapulothoracic joint must act synchronously. This coordination is altered in scapulothoracic dyskinesia. Scapulothoracic dyskinesia is one of the most underdiagnosed shoulder mobility impairment causes. The most obvious clinical presentation is the winged scapula.

Objective: to identify the primary risk factors involved in the onset of scapulothoracic dyskinesia in post-surgical breast cancer patients.

Methods: this was a prospective, observational and multidisciplinary study. 214 post-surgical breast cancer patients between 2013 and 2018 were included and followed by Rehabilitation service, in order to identify winged scapula and therefore scapular dyskinesia.

Results: Among the 214 patients, seven winged scapula were observed, each case linked to scapular dyskinesia. Two patients required an electromyogram test revealing that both had experienced a long thoracic nerve injury. The cumulative incidence of winged scapula among all patients was 3.6%. All cases were diagnosed in the first visit, after one month of the intervention. In the univariate analysis, the only significant risk factor was the axillary approach, with lymphadenectomy being a riskier technique compared to the lymph node excision. We did not find differences between the different levels of Berg in the lymphadenectomy technique.

Conclusions: According the results obtained, lymphadenectomy is a risk factor for developing scapular dyskinesia. There is a risk of injuring the long thoracic nerve at any level of lymphadenectomy.

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THE EFFECT OF ADAPTIVE SEATING SYSTEM ON CORONAL AND SAGITTAL BALANCE OF THE SPINE AND PELVIC OBLIQUITY IN NONAMBULATORY PATIENTS WITH CEREBRAL PALSY AND SCOLIOSIS

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Introduction: Impaired sitting position in cerebral palsy (CP) has associated with curvature of the spine with pelvic obliquity. Seating systems are one of the nonoperative modalities for these patients.

Objective: To evaluate the efficacy of an adaptive seating system (ASS) which corrects pelvic obliquity and sitting position on coronal and sagittal balance of the spine and pelvis in children between aged 6-15 years with Gross Motor Function Classification System (GMFCS) Level V CP and scoliosis.

Methods: A prospective, randomized and controlled, single-blind study was included 30 patients who were admitted to our Pediatric Rehabilitation Unit between April 2016-December 2018. The inclusion criteria were CP (GMFCS Level IV-V), between 10-40 degrees of Cobb angle, absence of scoliosis operation history. The patients with rigid deformities, comorbidities and using sitting devices in the past year were excluded. All patients were randomized into 2 groups. Group 1 and Group 2 were given exercise program for scoliosis at least 3 days/week, 1 set/day and 10 repeats in 1 set. Group 1 also used an AAS which included a sitting elevation for correcting pelvic obliquity, a thoracic support unit for providing the alignment and controlling of the spine by pressing the convex side with the pads and a hip block for preventing the sliding of the hips, at least 4 hours/day. Cobb angle (CA), pelvic obliquity degree, sagittal spino-pelvic parameters (thoracic kyphosis angle (TK), lumbar lordosis angle (LL), sagittal vertical axis (SVA), pelvic tilt (PT), pelvic incidence (PI), sacral slope (SS) were evaluated by using Surgimap® software program at before (BT) and 3 months after treatment (AT).

Results: 29 patients were enrolled in the study (1 was dropped-out): 15 in Group 1 and 14 in Group 2. There was no statistically significant change in the CA BT ($n=23,77^{\circ} \pm 12,98^{\circ}$) and AT ($n=21,52^{\circ} \pm 11,64^{\circ}$) in Group 1 ($p > 0,05$), whereas there was significant increase in Group 2 (respectively BT and AT $26,31^{\circ} \pm 9,99^{\circ}$ and $30,46^{\circ} \pm 12,10^{\circ}$; $p=0,013$). The pelvic obliquity degrees decreased in Group 1 (BT $n=6,46^{\circ} \pm 3,15^{\circ}$ and AT $n=4,39^{\circ} \pm 2,34^{\circ}$; $p=0,013$) while there was no significant change in Group 2 (respectively $7,39^{\circ} \pm 4,28^{\circ}$ and $9,74^{\circ} \pm 5,49^{\circ}$). In the evaluation of sagittal spino-pelvic parameters, there was no significant differences in TK, LL, PT and SS among the groups. However, there was a significant decrease in the mean values of SVA and PI angle in Group 1 ($p=0,016$ and $0,011$).

Conclusion: Our results demonstrate that the AAS was found to be superior to only exercise treatment by slowing the progression of CA, decreasing the pelvic obliquity and correcting sagittal balance of the spine and pelvis.

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COPYING WITH MUSCULOSKELETAL PROBLEMS FOR PATIENTS IN COVID-19 PANDEMICS IN TURKEY**Merve Damla Korkmaz¹, Tugba Sahbaz¹, Basak Cigdem Karacay², Cansin Medin Ceylan³**¹Department of Physical Medicine and Rehabilitation, Kanuni Sultan Suleyman Training and Research Hospital, Istanbul, Turkey²Department of Physical Medicine and Rehabilitation, Yerkoy State Hospital, Yozgat, Turkey³Department of Physical Medicine and Rehabilitation, Istanbul Physical Medicine and Rehabilitation Training and Research Hospital, Istanbul, Turkey

Introduction: COVID-19 pandemic is a very interesting period of our life. During this period, we were exposed to restrictions in our daily life.

Objectives: The aim of this study is to reveal musculoskeletal system problems (MSP) and copying with them in Turkish population during the pandemic period.

Methods: The study is a cross-sectional survey study and it was conducted through online channels eight weeks after COVID-19 outbreak in Turkey. The inclusion criteria were being 18 years or above, being in home quarantine during pandemics and able to read and write. Participants who had functional ambulation scale level 1-2 and had a recent surgical history to restrict the level of physical activity were excluded. All participants filled out the voluntary consent form on the online platform. The participants were asked about MSP and ways to deal with them.

Results: 514 participants with an average age of 42.88 ± 13.81 were included in the study. 306 (59.5%) of them stated that they experienced a MSP during the pandemics. Most common problem was neck pain (n=146). Back and low back pain were followed it. 78 patients applied any health institution for their problems. Only 12 patients stated that their ongoing physical therapy was interrupted. Using nonsteroidal anti-inflammatory drugs and myorelaxants were the most common way for copying with MSP.

Conclusion: According to our results, home quarantine was aggregating MSP. Because of limiting the hospital acceptance, medication-use was decreased. However, more researches and preventive programs should be prepared to prevent further problems.

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BRUXISM AND PSYCHOLOGICAL STATUS OF HEALTHCARE WORKERS DURING COVID-19 PANDEMIC IN TURKEY**Merve Damla Korkmaz¹, Basak Cigdem Karacay², Cansin Medin Ceylan³, Tugba Sahbaz¹**¹Department of Physical Medicine and Rehabilitation, Kanuni Sultan Suleyman Training and Research Hospital, Istanbul, Turkey²Department of Physical Medicine and Rehabilitation, Yerkoy State Hospital, Yozgat, Turkey³Department of Physical Medicine and Rehabilitation, Istanbul Physical Medicine and Rehabilitation Training and Research Hospital, Istanbul, Turkey

Introduction: Coronavirus disease 2019 (COVID-19) is an emerging infectious disease of pandemic proportions. Healthcare professionals who treat COVID-19 patients are exposed to high risk of infection and long work shifts to meet country's health needs. This situation can lead to prolonged exposure to stress.

Objective: We aimed to evaluate frequency of bruxism, anxiety and depression and their relationships with each other.

Methods: Our study is a cross-sectional survey study conducted through online channels. Health care workers in Turkey who were caring for patients with COVID-19 were invited to participate with a self-administered questionnaire to evaluate frequency of bruxism, Hospital Anxiety and Depression Scale that was analyzed as global scoring, anxiety and depression subscale In addition to information on demographic characteristic

Results: Four hundred and twenty one healthcare professionals were included in our study. The average age was 32.8 ± 7.06 . Of the 263 people who did not have complaints before the pandemic process, 57 stated that they had suffered bruxism, and 32 stated that they had a sleep bruxism complaint at night for the first time. In anxiety and depression evaluations, women had significantly higher levels of anxiety and depression scores compared to men ($p < 0.001$). By profession, the highest anxiety (72.4%) and depression (63.8%) rate was in the auxiliary healthcare personnel.

Conclusions: Working in pandemic affects health workers' physical health as well as mentally like bruxism. It appears in parallel with the increase of anxiety and depression in Turkish health workers during pandemic

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EVALUATION OF TRIGGER POINTS IN MYOFASCIAL PAIN SYNDROME IN UPPER TRAPEZIUS MUSCLE BY CLINICAL FINDINGS, ALGOMETER AND ULTRASONOGRAPHY: RELATIONSHIP WITH FUNCTIONAL STATUS AND QUALITY OF LIFE**Merve Denizli, Pinar Borman, Serkan Tas**

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Introduction: Myofascial pain syndrome (MPS) which is the leading cause of musculoskeletal pain and disrupts the quality of life and functionality.

Objectives: The aim of this study was to determine the severity of the pain at the trigger-points by VAS and algometer, and to evaluate the relationship between the patients' functional status, quality of life (QoL), quantitative USG measurements and clinical variables, in patients with MPS.

Methods: A total of 88 patients with MPS who were aged between 18-60 years and who had been admitted to PMR outpatient unit, were included to the study. Age, gender, duration of symptoms, education, body mass index were recorded. Physical examination was performed and the pressure-pain threshold at the most painful trigger point was measured by algometer; the same point was evaluated by shear-wave elastography (SWE). Patients completed VAS, Neck Pain-and-Disability Index (NPDI) and Nottingham Health Profile (NHP) for assessment of pain intensity, functional-status and QoL respectively.

Results: Seventy-eight (89%) of the patients were female and 10 (11%) were male. The mean age was 33.6 ± 11.8 years. VAS-pain scores were moderately correlated with NPDI scores and as well as with the first/second parts of the NHP. There was no correlation between the duration of symptoms and the number of trigger points with pain-score, pressure pain threshold and SWE variables. No correlation was observed between SWE velocity measurements and other clinical variables.

Conclusion: The severity of pain in MPS patients was correlated with functional status and QoL, but no correlation was observed between ultrasonographic measurements and clinical variables. In recent years, ultrasonographic evaluation of musculoskeletal problems is very important. Further research is required in order to determine the relationship between ultrasonographic measurements and severity of pain, functional-status and QoL and also to suggest the SWE in the diagnosis and treatment follow-up of patients with MPS.

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THE MULTIDISCIPLINARY APPROACH IN THE NEUROREHABILITATION PROCESS OF CHILDREN WITH SEVERE TRAUMATIC BRAIN INJURY IN „DR NICOLAE ROBANESCU” NATIONAL NEUROREHABILITATION CENTER FOR CHILDREN**Mihaela Axente, Liliana Padure, Anca Grigoriu, Andra Pintilie**

National Teaching Hospital of Pediatric Neurorehabilitation "Dr. Nicolae Robanes, Bucharest, Romania

Introduction: Severe Traumatic Brain Injury (TBI) cases are a frequent pathology admitted in our center, usually in acute or subacute condition referred from the ICU /Neurosurgery Department.

Objective: The multidisciplinary approach of TBI pathology in our hospital's Rehabilitation department consists in physicians (physical medicine and rehabilitation, neurology, pediatrics, anesthesiology, psychiatry, endocrinology) and therapists (physiotherapy, occupational therapy, speech and language therapy, electrotherapy). The rehabilitation program includes a multidisciplinary assessment, treatment and follow up, using human resources and modern high technology with the purpose of achieving early standing, neurosensory stimulation, cognitive stimulation, deglutition recovery and motor function recovery.

After performing a complex assessment (general clinical exam: cardiac and respiratory parameters, neurological examination including EEG) patients undergo a very complex rehabilitation program using modern tools of active and passive stimulation of motor function, cognitive and neurosensory stimulation. Besides the robotic rehabilitation devices which are also useful in spasticity decrement, an important role is played by ultrasound guided botulinum toxin intramuscular administration.

After standing is obtained and the patient is able to autonomous walk, gait analysis will be performed as a precise and objective assessment and follow up tool.

Results: The majority of the severe TBI cases (more than 80%) recover from the vegetative state, improving the motor function and cognitive state, but most of them have secondary neurological impairment. 20-30 % of cases have been fully recovered. 10-20 % develop post traumatic epilepsy.

Conclusion: Multidisciplinary approach is a key element in managing TBI patients with mild/severe neurological impairment, and can only back up the nowadays results regarding improving the quality of life of these patients, either by using human resources but also robotic rehabilitation devices.

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POWER TEST DIFFERENTIATION THE LOWER BACK PAIN ON THE DEVICE WITH BIOLOGICAL FEEDBACK ON THE FORCE.**Mikhail Tsykunov**

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INTRODUCTION: Kinesiological, static and dynamic characteristics are objective assessments of the functional state of the dynamography of the spine using dynamographs is traditionally used to determine dynamic characteristics. In literature, there is no data of the power differentiation of the spine muscle stabilizers both in normal and in pathological conditions. At the same time, the ability to reproduce intension with a given intensity ensures adequate work of muscle stabilizers at various household, professional and sports loads.

PURPOSE: Objective assessments of rehabilitation effectiveness in patients with lower-back pain by data of ability to differentiate intension of muscles- stabilizers of the spine.

MATERIALS AND METHODS: We suggested the original test (sitting position) for an objective assessment of this indicator with the help of a dynamometer, which is used as the device with biological feedback on the force. The maximum muscle strength of the stabilizer muscles was determined. Then we asked to repeat this intensity with 50% maximum intensity, controlling it visually with the help of the monitor screen (performed 10 cycles for 5 seconds-tension, 5 seconds-relaxation), then asked to repeat the same without visual control. The obtained results were statistically processed. 24 patients with the lower back pain, lasting from 1 to 15 months at the age of 25 to 65 years of them 11 men and 13 women were examined, average age was 44,8+11,4 years, pain syndrome lasting 4,7+1.9 months. Assessment of the severity of pain syndrome was carried out on a visual analog scale (VAS) from 0 to 10, and it was 6.2+0.8 points.

RESULTS: During the initial examination, the accuracy of the task was determined in%, with open eyes it was 72.3%, and with closed eyes - 64.4%. After a course of rehabilitation (gymnastics, massage, electrical stimulation, simulators for muscles-stabilizers of the spine), consisting of 10-12 sessions for a month, a second examination was performed. The intensity of pain significantly decreased and amounted to 1.3+0.9 points on VAS. In patients with pain syndrome lasting less than 4 months, this regression was observed faster. The accuracy of the test with open eyes increased to 90.3%, with closed eyes-to 87.6%, and the existing gap was restored to the level of statistical error.

CONCLUSION: Thus, the proposed test is enough informative to assess the effectiveness of a rehabilitation complex measures for lower back pain.

KEY WORDS: Lower back pain, rehabilitation, muscles-stabilizers, dynamography, power test differentiation.



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THE INTEGRATIVE EXERCISE

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The Integrative Exercise Model (Integrative Kinesitherapy) was initially conceived as a hypothetical project, where classical and clinically based techniques and applying methods of medical exercises could be refined in conjunction with "energy stimuli", which are certain elements of Chi Gong, Tai Chi, physical and breathing Yoga.

In support of the urge of today's time for physiotherapy to be comprehensive or holistic, which is what today's medicine as a whole requires, the project was conceived and tested at the Niška Banja Institute, after analyzing latest suggestions from the cardiorehabilitation guide.

Integrative kinesitherapy involves the implementation of existing energy concepts into therapeutic motion.

Integration refers to the coupling of structure and function with body energy, through breathing and movement.

Objective: To examine the practical possibilities of combining both, existing scientifically based techniques of "clinical" exercises with one another, and integration of classical exercises with traditional models (Yoga, Tai-Chi and Chi Gong).

Methodology: Research on the effects of Tai Chi and Yoga from the available materials. A survey conducted at the Niska Banja Institute about acceptability of integrative exercises by patients undergoing cardiorehabilitation.

Based on the experience and the survey, we found that integrative exercise have a beneficial effect on patients. The Tai Chi method is somewhat complicated and motor-intensive in terms of coordination. The best results are given by combinations of classic exercises with the already mentioned traditional techniques, from which modern kinesitherapy originated. Exercises are performed lightly with a purposeful combination of proper breathing. The benefits of this type of exercise are the reduced risks of an adverse events in cardiorehabilitation. There are also advantages to all locomotor problems, where integrative exercises can be a matter of choice.

Integrative exercises are a clinically acceptable type of active (individual or group) kinesitherapy.

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THE IMPORTANCE OF THE HOUSE-BRACKMANN SCORE IN ESTIMATION OF FACIAL NERVE LESION RECOVERY IN CHILDREN**Milena Adzic¹, Ivana Petronic², Jelena Vukicevic³, Marija Kolinovic³**

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Objective: The aim of this study was to evaluate the importance of clinical findings and the House-Brackmann (HB) score in estimation of facial nerve lesion and its recovery in children after 6 and 12 months of physical treatment.

Patients and Methods: The study included 30 patients, of both genders, aged between 0 and 16 years, diagnosed with paralysis of the facial nerve and treated by physical therapy, in an outpatient or inpatient setting of the Department of Physical Medicine and Rehabilitation of the University Children's Clinic in Belgrade. The House - Brackmann Scale was used to assess the status of the mimic musculature.

Results: In the studied sample, the etiology was unknown in 46.6%. The idiopathic - Bell's palsy was observed in 36.7%, otitis media in 13.7% and the arachnoid cyst of internal auditory canal was found in 3.3% patients. There was no statistically significant difference between the patients with congenital and idiopathic paralysis in relation to gender ($p=0.346$) and the affected side ($p=0.233$). The average HB score at first examination in children with congenital paralysis was 4.9 ± 0.7 and 5.1 ± 0.3 in those with idiopathic paralysis. The average HB score in children with congenital paralysis was 3.3 ± 0.9 after 6 months and 2.8 ± 0.8 after 12 months. The HB scores in patients with Bell's palsy decreased to 1, after 12 weeks except in one 15 year-old child who had the HB score 5, after 12 months.

Conclusion: This study confirmed the correlation between the ages at the time of diagnosis and the level of control HB scores, pointing out that the HB score has a predictive value in the estimation of degree of lesion and prognosis of recovery. A less favourable recovery had older patients with idiopathic facial nerve lesion.

Key words: facial nerve paralysis, children, House-Brackmann score.

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THE INFLUENCE OF REHABILITATION TREATMENT ON RISK FACTORS FOR CARDIOVASCULAR DISEASES IN PATIENTS AFTER CORONARY ARTERY BYPASS GRAFT SURGERY**Milena Stoickov¹, Viktor Stoickov, Slavisa Mitic**

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Introduction: After coronary artery bypass graft surgery (CABG), good control of the risk factors of coronary disease is necessary for the purpose of secondary prevention of coronary disease.

Objective: The aim of this study is to determine the impact of rehabilitation treatment on risk factors for cardiovascular disease in patients after CABG.

Method: The study involved 149 patients after CABG, average age 57.4 years. Patients were randomly divided into the exercise training group (TG: 113 patients) and non-training group (NTG: 36 patients). In all subjects clinical examination and exercise test on treadmill according to Bruce protocol, were performed and after that TG patients were included in rehabilitation treatment for three weeks. TG of patients were instructed to follow a training program using the bicycle ergometer, gymnastic exercises and walking. The patients continued to take the same medicaments in same doses. After the follow-up period of three weeks, the exercise test were performed, once again.

Results: In TG of patients, after 3 weeks, there was a significant reduction of systolic blood pressure (from 139.2 ± 13.6 to 128.5 ± 9.8 mmHg; $p < 0.001$), diastolic blood pressure (from 88.7 ± 8.3 to 83.3 ± 5.8 mmHg; $p < 0.001$), heart rate (from 78.1 ± 7.7 to 69.1 ± 6.8 beats/min; $p < 0.001$), double product (from 12015.3 ± 894.3 to 10096.2 ± 632.8 beats/min x mmHg; $p < 0.001$), total cholesterol ($p < 0.025$), LDL cholesterol ($p < 0.05$) and glycemia ($p < 0.005$). TG of patients who were on the second exercise test, achieved significantly longer time (8.3 ± 1.9 vs 5.2 ± 1.3 min; $p < 0.001$). While the non-training group showed no significant changes.

Conclusions: The study showed, that in patients after CABG, rehabilitation treatment led to significant reduction of blood pressure, heart rate, double product, cholesterol, glycemia and significantly improved physical exercise capacity, which favorably affects the prognosis of these patients.

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NEUROPATHIC PAIN COMPONENT IN PATIENTS WITH KNEE OSTEOARTHRITIS**Milica Basaric**

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Objectives:To determine the frequency of neuropathic pain (NP) in patients (pts) with knee osteoarthritis (OA) and its association with physical function, degree of OA and symptom duration.

Material and Methods:A total 50 pts (15 males,35 females;mean age 61.8 ± 5.1 years, range 45 to 75 years) diagnosed with knee OA (according to the American College of Rheumatology criteria) were examined. Exclusion criteria:diabetes mellitus, polyneuropathy (sensory-motor,alcoholic, post-herpetic), lumbar radiculopathy, fibromyalgia,cancer, central nervous system diseases.Of these 50 patients,31 had a diagnosed bilateral and 19 pts with unilateral knee OA.The degree of knee OA and disease activity were determined by: symptomduration, movements of the knee,examination ultrasound (synovial hypertrophy, joint effusion), Kellgren Lawrence grade (KL), Visual Analogue Scales (VAS) and West Ontario and McMaster University Index of Osteoarthritis (WOMAC). NP was determined using the PainDETECT questionnaire.

Results: Pain from knee OA revealed that 9.8% are likely NP, and 19.2% are possible NP. NP was found more frequently in patients with bilateral knee OA (bilateral OA in 40.2% pts, unilateral in 21,2% pts, $p=0.025$), with a higher radiographic degree ($KL \geq 2$, in 41% pts, $KL \leq 2$, 29.8% , $p=0.046$) and with longer symptom duration (<5 years in 25% pts, >5 years in 45% pts, $p=0.033$). In knee OA patients PainDETECT was in correlation with WOMAC index ($p<0.001$) and VAS ($p<0.001$). Compared with the PainDETECTscore, there was positive correlation with the KL grade ($p=0.048$) and symptom duration ($p=0.035$), but there was no correlation between PainDETECT and ultrasound sign ($p=0.587$) and mobility of the joint ($p=0.774$).

Conclusions:This study has shown that nearly one third of our patients with knee OA had likely or possible neuropathic component pain of the knee. Patients with NP had more increased severity of pain,severe form of knee OA and longer duration of symptoms. It is important to be aware of consider the existence of NP in the treatment of knee OA pain.

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APPLICATION AND EFFECTS OF COMBINED PHYSICAL THERAPY IN THE REHABILITATION OF PATIENTS AFTER IMPLANTATION OF TOTAL KNEE ENDOPROSTHESIS DUE TO GONARTHROSIS**Milos Poleksic, Zoran Djuric, Aleksandar Jeftic, Ljiljana Sekularac, Vesna Knezevic, Dragana Nedic**

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Introduction: Gonarthrosis is a degenerative disease of the knee joint. The main symptoms are pain, movement restriction, swelling, cracking, instability and stiffness after rest. In patients with unsuccessful conservative forms of treatment, operative treatment with total knee endoprosthesis is applied.

Objective: Evaluation of pain in the operated knee according to the VAS scale, measurement of knee circumference, measurement of superficial skin temperature (ic thermometer), measurement of the extent of movement of the knee joint and MMT rating for mm. quadriceps.

Method: The study was conducted with a prospective study. It included 60 patients, 30 women and 30 men, average age 64.8 years, who had a twenty-one-day rehabilitation at the Selters Rehabilitation Institution in the period 01.08.2019. to 10/15/2019. Physical therapy included kinesio therapy, occupational therapy, hydro kinesio therapy, electro therapy and thermo therapy. Standard descriptive and analytical statistical methods were used for data processing (arithmetic mean for all parameters except for the estimation of muscle strength where the median value was used).

Results: According to the VAS pain scale, there is a highly statistically significant reduction in pain at the end of therapy $p < 0.01$. The extent of movement in the operated knee, as well as the volume of the knee measured at the beginning and end of therapy showed a statistically significant difference $p < 0.05$ (increased range of motion, muscle strength mm. quadriceps, as well as decreased swelling expressed through the circumference of the knee). Superficial skin temperature showed a difference in terms of reduced superficial skin temperature, but the difference was not statistically significant $p > 0.05$

Conclusions: The study showed that the application of combined physical therapy after implantation of the knee endoprosthesis leads to reduced pain, decreased knee swelling, increased range of motion, as well as increased strength of the test muscle.

Key words: gonarthrosis, endoprosthesis, effects, combined, physical, therapy.

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NON-PHARMACOLOGICAL HOLISTIC APPROACH IN FIBROMYALGIA SYNDROME**Mihai Dragoi, Anca-Raluca Dinu, Mihai-Alexandru Sandesc, Razvan-Gabriel Dragoi**

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Introduction: Fibromyalgia is currently considered one of the most complex pathologies that affects especially women. It is a syndrome characterized by generalized pain that causes substantial disability, with a prevalence in the general population of 6.4%, according to recent studies. It is characterized by increased central sensation and decreased systemic pain. The involvement of a multidisciplinary team is necessary. The treatment is currently complex, both pharmacological and non-pharmacological.

Objective: The present study aimed to follow the holistic approach of the complex nonpharmacological treatment (classical techniques plus modern techniques) during 30 days. The main aim of this study is to observe if it is possible to treat fibromyalgia, using only nonpharmacological treatment.

Method: The study included 20 patients, aged 30-50 years. Patient's evaluation was performed on day 1 and after one month of complex treatment, using the Fibromyalgia Impact Questionnaire (FIQ), HADS (Hospital Anxiety and Depression Scale), SCORE SS (Symptom severity score).

The non-pharmacological treatment was performed daily, alternating the specific techniques: Injecting trigger points with ozone (3 times/week), aromatherapy and melotherapy (both daily at home), vulcanic rock therapy and acupuncture (3 times per week), auricular therapy (once a week), daily stretching exercises and relaxation massage accompanied by the treatment of trigger points.

Results: The FIQ scale, which assesses the disease's impact on life quality, showed a visible improvement in 70% of patients after one month of non-pharmacological treatment. The HADS scale assessing anxiety and depression had a 10-point drop in 8 people evaluated, 14 points in 6 people and 8 points in 6 people, and the SS score registered an improvement in all patients in terms of fatigue, cognitive symptoms and decrease in pain symptomatology.

Conclusion: Fibromyalgia should benefit from a holistic approach. The non-pharmacological treatment efficiency and its importance were observed. Very good results have been obtained without the combination of the classic pharmacological treatment.



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INFLUENCE OF TARGETED MUSCLE STRETCHING AND BASIC CORE STABILITY EXERCISE ON THE OVERALL ON-ICE PERFORMANCE AND INJURY PREVENTION FOR SHORT TRACK SPEED SKATERS

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Considering repetitive single direction of movement during training and competition short track speed skaters have un-proportional muscle development making them more prone to the same types of injuries. During 3 month period of competition season, dry land training will have specific targeted muscle stretching and core stability exercise added.

Goals:

1. to observe whether the addition of those exercises would improve efficiency and muscle control during short track speed skating requirements;
2. to measure changes during on-ice performance and
3. to evaluate injury tendencies by number or severity during this period.

Training protocol will be created to include specific muscle stretches and core stability exercises that can easily be incorporated as a component of regular dry land training and the skaters performance monitored or corrected by either physiotherapist or coach.

The expectation following this protocol would be that specific stretching and stability at exercise would provide short track speed skaters with better muscle control and coordination during on-ice performance as well would decrease number and severity of injuries.

As the result of targeted training to improve overall flexibility and stability even with unidirectional sport such as short track speed skating, athletes could achieve better performance and fewer injuries. Also with positive results during 3 month period this training protocol would become part of regular training in and out of season, as well as could be referred to other ice skaters.

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IS THERE A DIFFERENCE BETWEEN MOTOR FIM SUBSCALE AND BARTHEL INDEX IN PREDICTING MORTALITY IN ELDERLY HIP FRACTURE PATIENTS?**Milica Aleksic¹, Emilija Dubljanin Raspopovic²**University of Belgrade Faculty of Medicine, University of Belgrade Faculty of Medicine, Belgrade, Serbia¹, Clinic for Physical Medicine and Rehabilitation, Clinical Centre of Serbia²

Introduction: Hip fractures represent an important medical, social and economical problem of modern age. Between 14% and 36% of people with hip fracture die in the first year after the fracture. High rates of mortality point out the necessity of early and easy way of identification of patients at increased risk of mortality

The aim: To determine if there is a difference between the motor subscale of the Functional independence measure (motor-FIM) scale and Barthel index functional scales in their ability to predict mortality in elderly patients with hip fracture.

Materials and Methods: The study included 299 hip fracture patients older than 65 years who were operatively treated at the Institute for Orthopaedic Surgery and Traumatology, Clinical Center Serbia for a period of one year. Preoperatively, patients were examined regarding socio-demographic variables, cognitive status, pre-injury functional status, type of hip fracture and general health. Pre-injury functional status was measured using motor FIM scale and Barthel index. In order to examine the association between different preoperative variables and intrahospital one-year mortality, multivariate logistic regression analysis was performed, in which the influence of motor FIM and the Barthel index were examined separately.

Results: The study confirmed that patients with a higher level of functional disability before fracture, had a lower risk of short-term and long-term mortality after hip fracture. Barthel's index and motor FIM test were equally effective predictors of short-term and long-term mortality.

Conclusion: Because of its simplicity the Barthel index should be the test of choice for the evaluation of pre-injury functional disability when predicting mortality in hip fracture patients.

Key words: hip fracture; FIM; Barthel; mortality

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DIAGNOSTIC ULTRASOUND OF ANKLE SPRAIN BEFORE AND AFTER PHYSICAL THERAPY**Mirela Dizdarevic-Husic¹, Suada Kapidzic-Durakovic², Adevija Imsirovic¹, Adela Music¹, Nedzama Begovic-Spago³**¹Community Base Rehabilitation Center, Primary Care Gracanica, Gracanica, Bosnia and Herzegovina²University Kalos, Bosnia and Herzegovina³Regional Medical Center Mostar, Bosnia and Herzegovina

Introduction: Ankle sprain (AS) is most commonly caused by inversion and usually is injured talofibular anterior ligament (TFAL). Ankle sprains are classified: Gradus I (distension), Gradus II (partial rupture), Gradus III (complete rupture). Diagnostic ultrasound (US) of ankle confirms the morphological characteristics after trauma.

Objectives: To determine the morphological characteristics of the ligaments of AS patients and whether the mechanism of injury and the type of lesion affect the duration of physical therapy (FT).

Material and methods: The research was at the three centers for community base rehabilitation during six months. The study included 25 patients with AS who were examined by a physiatrist, a FT was performed, and an ultrasound of ankle was performed before and after FT. Patients had FT (IF, therapeutic US, kinesiotherapy) during at least 2 weeks. Patients data were collected: age, gender, mechanism of injury, pain intensity (VAS). At first and follow-up examination (after FT) were evaluated the ankle ROM and balance (single leg stance test, TUG test). Ultrasound identified the location and degree of morphological lesion of the ankle ligaments. Statistical data processing was performed with SPSS 20 and statistical significance at **Results:** Female were 12 (48%), male 13 (52%), an average age of 32.9 years. The most common mechanism of injury was inversion (76%). Pain intensity was 4-6 according to VAS (0-10) in 60% of patients. The ankle ROM at the first examination were reduced by 1/2 of full amplitudes. The balance was impaired in 64% of patients as measured by standing on one leg and by 40% according to the TUG test. Patient recovery: ROM and balance after FT was statistically significant ($p < 0.05$)

Conclusion: Ankle sprain patients most commonly have an inversion injury mechanism with TFAL impairment. Partial or complete rupture of the ankle ligaments leads to longer treatment. Ultrasound can be an inexpensive and accessible method to predict recovery and duration of treatment.

Key words: ankle sprain, diagnostic ultrasound, physical therapy.

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KLIPPEL FEIL SYNDROME IN AN ADULT PATIENT - A CASE REPORT**Mirjana Durutovic Mozetic¹, Branko Vujkovic²**Physical medicine and rehabilitation Department¹, Sabac General Hospital, Phizikalcentar by SMA², Sabac, Serbia

The syndrome of congenital short pterygoid once sloping neck with reduced range of motion and low hairline was independently defined by Maurice Klipel and Andre File in 1912. The incidence of the anomaly is low, from 0.5% to 2%. Anatomically, it is basically a complete or partial fusion of one or more cervical vertebrae, with or without other anomalies. Syndrome is detected in early childhood if there is torticollis that is not corrected by physical treatment, or later in childhood, when the first symptoms usually begin.

The aim of this paper is to present an adult with late development of symptoms and a diagnosis of Klippel Feil syndrome.

Patient V.S. (36 years old), police officer. The first problems in the form of pain in the right side of the neck, occasionally in the right hand, appeared in the third decade of life. Complaints occurred occasionally, stopped by drug therapy prescribed by the general practitioner. In the last two years, intensification of problems, more difficult tolerance of activities and some positions, weak response to previous treatment, has been reported to the physiatrist. MRI of the C spine performed in July 2018 showed a completely reduced cervical lordosis, a partial fusion of the vertebral bodies C6,7, Th1 to the right laterally with a rudimentary disc space in the central part.

Clinically, patient is obese - general type, low hairline, short, dextroposed neck with significantly reduced range of motion and clinical picture of radiculopathy C6,7 on the right. Muscle shortening of the right side of the neck with slight asymmetry of the face.

Treatment: physical therapy, regular drug therapy with topical and oral NSAIDs, neurotropic therapy. In the phases of greater pain, cervical orthosis. Due to the nature of the work and poor tolerance of medications for chronic neuropathic pain, the patient discontinued this segment of therapy. We are working on adjusting the conditions at work.

For now, the pain control and the level of functionality and working ability are satisfactory. Further monitoring is planned, the continuation of treatment adjusted to objective circumstances, in case of significant progression of neurosurgeon consultations.

Although Klippel Feil syndrome is a rare disorder in childhood, it is a rarity in adulthood, which does not diminish the importance of the differential diagnosis of cervical pain with radiculopathy.



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ELECTRONEUROGRAPHY ASSESSMENT OF PERIPHERAL NEUROPATHY IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Introduction: Rheumatoid Arthritis (RA) can be associated with peripheral neuropathy. Polyneuropathy (PNP) and Carpal Tunnel Syndrome (CTS) often cause symptoms of sensorimotor dysfunction of the legs and arms.

Objective: In this study, PNP and CTS were investigated by electroneurography nerves of the legs and arms of patients with RA. The aim of the research is to establish correlation between RA and PNP and to compare this correlation with that between RA and CTS.

Method: The 50 patients with clinical diagnosis of RA (who had/did not have symptoms and signs of neuropathy) were electrophysiologically examined for evidence of peripheral neuropathy of the legs and arms. Nerve conduction velocity was performed for all patients.

Results: Polyneuropathy was determined in 26 patients with RA (52%). Sensitive polyneuropathy was registered in 16 patients with RA (32%) and sensorimotor polyneuropathy was found in 10 patients with RA (20%). Carpal tunnel syndrome was determined in 15 patients (30%) with RA, while 10 patients (20%) have bilateral CTS and 5 patients (10%) have unilateral CTS. All unilateral CTS diagnoses were found on dominant hand. Mild degree of CTS was registered in 11 patients (22%), moderate degree of CTS was registered in 4 patients (8%) and severe degree of CTS was not registered. Significant relationship was not found between PNP/CTS and RA duration ($p > 0.05$). Significant relationship was found between PNP/CTS and patients ages in the group of the oldest patients (over 65 years old) ($p < 0.05$).

Conclusions: The results of our research confirm that both polyneuropathy and carpal tunnel syndrome are common in patients with rheumatoid arthritis. Therefore, we recommend that electrodiagnostic evaluation of nerves in legs and arms should be performed in patients with rheumatoid arthritis as routine diagnostic procedure.

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RELATIONSHIP BETWEEN INTERVERTEBRAL FORAMINAL STENOSIS AND DERMATOMAL SOMATOSENSORY EVOKED POTENTIALS**Nam-Gyu Jon¹, Gi-Wook Kim^{1,2}, Yu Hui Won^{1,2}, Sung-Hee Park^{1,2}, Myoung-Hwan Ko^{1,2}, Jeong-Hwan Seo^{1,2},**

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Introduction: Dermatome somatosensory evoked potential (DSEP) study is a method for evaluating the abnormality of the somatosensory tract. In patients with radiculopathy, DSEP can be an auxiliary diagnostic regimen secondary to needle electromyography.

Objective : This study was performed to identify if there is a relationship between intervertebral foramen (IVF) stenosis and DSEP findings.

Method: This retrospective study reviewed patients (n=37) who were examined by DSEP and lumbar spine MRI from 2017 to 2018. For evaluation of IVF size, bilateral L4/5 and L5/S1 IVF were selected and measured at the narrowest IVF image of sagittal MRI view, and the pixel count of the area was defined as the size using the Lasso Tool of the adobe photoshop CC 2019 program. In the same way, for evaluation of central lumbar spinal stenosis, the pixel count of lumbar spinal canal was also measured at the most stenotic level above IVF corresponding to DSEP level. In addition, foraminal stenosis and central spinal stenosis were graded to 4-point-scale. DSEP results were divided into normal and abnormal.

Results: The average IVF size were smaller in the abnormal DSEP sites than normal DSEP sites (L4/5 level; mean pixel count = 226.08±77.03 VS 187.24±73.18, L5/S1 level; mean pixel count= 186.06±47.65 vs 161.12±70.08). There was a significant difference in the pixel count between the normal and abnormal DSEP sites in only L4/5 level(p=0.041), but was not in L5/S1 level(p=0.106). In the logistic regression analysis for the effects of IVF stenosis and central lumbar spinal stenosis on the DSEP, the effect of IVF stenosis on the DSEP was significant in only L4 DSEP findings (p=0.02), but was not in L5 DSEP findings(p=0.210).

Conclusions: The results of this study showed that L4/5 IVF size was significantly related to L4 dermatome somatosensory pathway dysfunction patients. We suggest that DSEP can be an auxiliary diagnostic regimen for IVF stenosis.

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THE EFFECTS OF DIFFERENT PREVENTIVE COUNSELING PROGRAMS ON BLOOD PRESSURE CONTROL IN PATIENTS WITH PAROXYSMAL ATRIAL FIBRILLATION AFTER CATHETER ABLATION**Nana Pogosova¹, Anastasia Telegina², Yulia Yufereva³, Olga Sokolova³, Karapet Davtyan⁴, Aza Ausheva³**

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Introduction: Hypertension is an established risk factor both for the development of atrial fibrillation (AF) and for AF recurrence after catheter ablation (CA).

Objective: To assess the impact of different preventive counseling programs on blood pressure (BP) control in patients (pts) after CA performed for paroxysmal AF.

Method: A prospective randomized controlled study with 3 parallel groups of pts with paroxysmal AF after CA (radiofrequency or cryoablation). Pts were randomized (1:1:1) into 3 groups. Before discharge, pts from all groups received 1 preventive counseling session with focus on their individual risk factors profile. After discharge, both intervention groups received 6 sessions of biweekly remote preventive counseling by phone (Group 1) or via email (Group 2) for 3 months after enrollment. Group 3 received usual care. BP was assessed at baseline and at 12 months after CA.

Results: A total of 135 pts aged 35 to 80 years were enrolled (mean age, 57.3±9.1 years, men, 51.8%). At 1 year of follow-up, systolic BP decreased significantly in Group 1 from 129.3 ± 16.1 to 120.6 ± 13.4 mm Hg ($\Delta\%$, Me [25%; 75%] -7.1 [-14.8; 2.8], $P < 0.001$ vs Group 3) and remained stable in Group 2 (127.7 ± 15.7 mm Hg at baseline and 126.9 ± 11.5 at 12 months, $\Delta\%$ -1.5 [-7.0; 4.8], $P = 0.003$ vs Group 3) whereas it slightly increased in the control group (126.6 ± 15.7 mm Hg at baseline and 130.6 ± 11.9 at 12 months, $\Delta\%$ 3.3 [-2.2; 10.9]). There were no significant changes of diastolic BP.

Conclusions: Preventive counseling programs with remotesupport via phone and e-mail improve systolic BP control in AF pts after CA.

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THE FEATURES OF SPINAL PROPRIOCEPTION AND FUNCTIONAL MOVEMENT IN ADOLESCENT IDIOPATHIC SCOLIOSIS**Nan Chen**

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Introduction: Many studies have shown that adolescent idiopathic scoliosis (AIS) may have neuromuscular and balance disorders. The proprioception system plays an important role in maintaining normal neuromuscular function and balance, also it helps keep spinal alignment and adjust the movement of the spine. The abnormal proprioceptive function may be an important factor for AIS and may increase injury risk during daily or therapeutic activities for AIS patients.

Objective: This study aims to explore whether the proprioceptive function and basic motion patterns in AIS are abnormal in comparison with healthy adolescent.

Method: 35 patients (9 males, 26 females) were recruited from Xinhua hospital, Shanghai, who were diagnosed as AIS for the first time. Patients were excluded if they had any disorders or there was a clear etiology for scoliosis. 13 age-matched healthy adolescent (3 males, 10 females) were enrolled from Yangpu middle school, Shanghai, as the Controls. All subjects accepted the same active spine position reproduction test (included cervical spine and trunk) and functional movement screen test (FMS). Mean absolute error (MAE) and FMS original score were calculated for statistical analysis.

Results: Cervical spine: MAE in right side flexion is 3.1 ± 1.7 of AIS and 1.9 ± 1.2 of Controls ($p=0.019$). MAE in right rotation is 6.1 ± 3.4 of AIS and 3.0 ± 2.0 of Controls ($p=0.002$). **Trunk:** MAE in flexion is 4.5 ± 3.4 of AIS and 2.0 ± 1.5 of Controls ($p=0.007$). MAE in the right side flexion is 3.4 ± 2.4 of AIS and 1.9 ± 1.1 of Controls ($p=0.033$). **FMS scores:** the score of *push-up* of AIS was significantly different from that of Controls ($p < 0.001$). There was no significant difference between the two groups in other items. AIS may have abnormal spinal proprioception and be at high risk of injury during daily or therapeutic activities.

Conclusions: It is suggested that AIS should be evaluated with the proprioception function test and FMS to help them achieve comprehensive rehabilitation and exercise participation.

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MACROSCOPIC ANALYSIS OF CHANGES OCCURRING IN SOME ORGANS AS A RESULT OF MODELED CENTRAL LYMPH STASIS IN MICE**Natalia Solovjova, Marija Milanović, Ljiljana Crnčelić Radović, Danijela Pecarski**

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Introduction: The lymphatic system transports proteins, lipids and water. The center of the lymphatic system is located in the venous angle, into which lymph pathways flow from around the body. Obstacles in the lymph flow can cause lymph stasis. Currently, there are widely applied methods of peripheral lymph drainage, which encourage the movement of lymph from the treated parts towards the "center", with the assumption that, after extrusion of lymph from the tissue, it will by its nature return to its "center".

Purpose: The physical angle between the internal jugular vein and the subclavian vein is located behind the sternoclavicular joints. We wanted to prove that different changes in the interrelationships of the elements of this joint can put pressure on the angulus venosus, which is significant for lymphodynamics.

Methods: In 4 female mice under anesthesia, I performed subluxation of the sternoclavicular joints (in 2 mice the clavicle was displaced cranially and in the other two caudally). One mouse from each pair died.

Results: After 14 days, 2 surviving mice were opened and enlargement of the expected organs, namely was observed macroscopically. In one mouse the heart was enlarged drastically more. Organs surfaces were glossy, smooth, outer membranes tense, but elastic, colors mostly blue. The largest increase was in the spleen. Microscopic: The stasis in the lungs and spleen is observed in mouse 1, while the stasis in the lungs and spleen, bleeding in the liver, and enlarged blood vessels filled with blood in the heart are observed in mouse 2. Inside the pancreas, near the islets, are seen enlarged blood vessels filled with blood. The organs were sent to the Department of Histology for making histological samples.

Conclusions: Central lymph stasis, caused by targeted manual manipulation of the sternoclavicular joints of mice may cause changes in some organs.

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MACROSCOPIC AND MICROSCOPIC ANALYSIS OF THE EFFECTS OF CENTRAL LYMPHATIC PATHWAY MODELING IN MICE**Natalia Solovjova, Marija Milanović, Ljiljana Crnčelić Radović, Danijela Pecarski**

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Introduction: One of the most important functions of the lymphatic system is its function of transferring of protein bodies, lipids and water. Currently, the physiotherapy practice uses wide variety of methods stimulating lymph movement from treated parts. On the lymph's flow to the center of the lymphatic system, numerous obstacles can cause the lymphatic path to be more distant from the obstruction.

Purpose: The center of the lymphatic system is located in the angulus venosus behind the sternoclavicular joints. We can assume that different changes in the mutual relations of the elements that make up this joints can put pressure on the angulus venosus.

Methods: Two female mice previously received intraperitoneal narcosis, also I performed subluxation of sternoclavicular joints (one mouse-cranially and in the other caudally),

Results: After 14 days, the mice were surgically opened and the following expected changes of the organs were macroscopically determined: 1) the heart, spleen, liver enlarged, with the pancreas changing its appearance but not size.

The organs were altered in different ways, e.g. one mouse's heart enlarged drastically (subluxations performed by two different mechanisms). The organs surfaces were glossy, smooth, outer membranes (the adventitias) were strained but elastic, the colors generally more blue. The largest increase was in the spleen.

Microscopic: In mouse 1, a path is observed in the lungs and spleen, whereas in mouse 2 a pathway in the lungs and spleen, bleeding in the liver, and enlarged blood vessels filled with blood in the heart are noted. And in the pancreas, blood vessels filled with blood are seen in several places near the islands.

Conclusions: Central lymphatic pathway, caused by targeted manual manipulation of the sternoclavicular joints of mice can cause changes in some organs.

Keywords: central lymphatic path, angulus venosus, sternoclavicular joint, subluxation

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FUNCTIONAL GAIT ASSESSMENT SCALE AS A TRAINING INSTRUMENT DURING ACUTE PHASE OF NEUROREHABILITATION**Nataša Kos**

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Introduction: Patients in the acute phase after vestibular tumour surgery frequently experience balance disorders. The Functional Gait Assessment Scale is usually used for assessment of balance during gait.

Objective: To evaluate the usefulness of Functional Gate Assessment Scale as a training instrument during acute phase of neurorehabilitation.

Methods: Ten patients recovering from vestibular tumour surgery were included in the prospective study. All included patients achieved a score higher than 25 points on the Mini Mental State Examination and 8 points or more on the Barthel Index. After the surgery and before discharge from the hospital the patients' balance was evaluated using the Berg Balance Scale. During hospitalisation the patients were taking part in the individually prepared rehabilitation program with emphasis on Functional Gate Assessment Scale task performance in order to achieve better balance during gait.

Results: Patients included were aged between 18 and 57 (mean = 39.5 years) and were hospitalised between 7 and 14 days (mean = 10.5 days). The minimum perceptible change for Berg Balance Scale in our research was calculated to be 6 points, which was exceeded by 80 percent of all patients, indicating an improvement in balance. After the completion of individually prepared programmes, patients on average scored 11.7 points higher on Berg Balance Scale.

Conclusion: In the early postoperative period the Functional Gate Assessment Scale proved to be an excellent training tool for improving balance disorders and for transferring the specifically learnt movement skills into everyday life.

P304

EFFECT OF WEATHER CONDITIONS ON THE TREATMENT OF PATIENTS WITH CARDIOVASCULAR DISEASES**Nazim Badalov¹, Maxim Yakovlev², Anastasia Mukhina², Irina Borodulina³, Svetlana Volovets¹**

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To determine the meteoropathology of patients suffering from chronic diseases of the cardiovascular system, studies have been conducted to investigate the dependence of the patients' appealability for emergency medical care from weather conditions. During the reporting period (01/01/2018 - 31/12/2018), in 2 cities of the RF (Gelendzhik and Novorossiysk), data on the number of referrals for emergency medical care were analysed in the following cases: ischemic heart diseases, a heart rhythm disorder, acute myocardial infarction, acute cerebrovascular accident. Subsequently, the dependence of turnover on the influence of geo-heliophysical factors was determined: ambient temperature, atmospheric pressure, wind speed, humidity, and oxygen content in atmospheric air.

According to the correlation analysis, it was revealed that the most significant changes were noted in July 2018. Low atmospheric pressure was associated with an increase in the number of calls for emergency medical care on the occasion of acute myocardial infarction ($r=-0.706$, $p<0.05$) and coronary heart disease ($r= -0.721$, $p<0.05$) in patients of the age of over 50 years old. During periods of low atmospheric pressure, there was an increase in appeals on the occasion of an acute violation of cerebral circulation in patients over 50 years old ($r= -0.740$, $p<0.05$).

The dependence of wind speed with the frequency of appealability for emergency medical care on the occasion of acute myocardial infarction in men ($r= -0.754$, $p<0.05$) was revealed. Such dependence, in our opinion, was associated with the temperature factor. At the same time, this fact is confirmed by the fact, that the values of the ambient temperature in July 2018 had a correlation dependence with the frequency of appeal for emergency medical care on the occasion of a hypertensive crisis in over 50 years old patients ($r= -0.712$, $p<0.05$).

In our further studies, we are planning to develop individual programs to prevent the development of meteoropathic reactions in individuals with increased meteorosensitivity.

P305

TREATMENT OF THE NON-PALLIATIVE CANCER PATIENT: ABOUT A CASE**Nerea De la Puente, Lourdes González , M^a Auxiliadora López, Paloma Galán, Gema Flores, Elena Tarjuelo**

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Introduction: Rehabilitation of cancer diseases requires a multidimensional approach to meet the physical, emotional and social needs of patients. The interdisciplinary rehabilitation team should work toward common goals.

Clinical case: A 76-year-old patient admitted to a functional Recovery Unit with a diagnosis of disseminated prostate cancer and paraparesis secondary to multiple bone metastases (T11 to L5) with pathological fracture of L4. He was treated by lumbo-sacral fusion by internal fixation and posteriorly with adaptation of rigid spinal orthosis in the immediate postoperative period. Prior this event, the patient was independent for all the activities of daily living (ADLs) although he presented pain and some instability to walk, but he did not use technical aids.

On admission, the patient presented with a reactive depression, sitting pain, paraparesis, dependence on transfers, inability for stand and walk and dependence for all ADLs. Multidisciplinary treatment with physiotherapy, occupational therapy and psychological support was established.

The physiotherapeutic treatment consisted of daily sessions of 1 hour, from Monday to Friday. Initially active-assisted exercises were performed in supine position and muscular electrostimulation. Progressively introducing lower and upper limb enhancement exercises. During the whole process, rest periods were favored and the patient was motivated according to the small achievements obtained in each session. As muscle strength improved, gait retraining began with different assists progressively: standing, gait training with partial body-weight support, walk in parallel bars and walker. As an added complication, it presented a fall resulting in a non-displaced proximal fracture of the tibia and fibula. They was treated conservatively. The occupational therapy treatment was training the ability to perform ADLs. Moreover he received psychological support twice a week.

Conclusion: The clinical and psychological profile of patients is a challenge for rehabilitation teams. It is necessary a multidisciplinary treatment to provide them the greatest possible autonomy, controlling pain and associated symptoms.

P306

OUTCOME OF PROSTHETIC REHABILITATION IN PATIENTS WITH BILATERAL LOWER LIMB AMPUTATION**Nikola Bajic**

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Introduction: Rehabilitation of bilateral amputees is more demanding than rehabilitation of unilateral amputees and it represents a great challenge for both the prosthetics team and patients as well.

Material and methods: Monitoring time period was 3 years, from 2016 to 2018. Total number of patients with bilateral amputation was 34. Patients were observed within groups divided according to age, sex, level of amputation, time period between two amputations and the existence and extent of preexisting diagnostic evaluation of blood vessel condition and surgical procedures before amputations. The success rate of the primary prosthetic rehabilitation program was measured by K-level activity scale (AMP Pro). Descriptive statistics was used for data evaluation.

Results: In time period from 2016 to 2018, the total number of patients with bilateral amputation was 34. Of these, 27 were men (79%) and 7 were women (21%). In 29 patients (85%) the primary cause of amputation was diabetes, while in 5 (15%) patients the cause of amputation were occlusive changes to blood vessels. Of the 34 patients with bilateral amputation, 23 (68%) had bilateral transtibial amputation, 9 (26%) had combined transtibial/transfemoral amputation and 2 (6%) of them had bilateral transfemoral amputation. 28 patients (82%) had a second leg amputated within the first 5 years after the first amputation, 4 (12%) had a second amputation 5-10 years after the first one and 2 (6%) after 10 years. 14 patients out of 34 underwent some sort of diagnostic procedure in the purpose of evaluation of lower extremities blood vessels condition prior to amputation. In 5 patients there were attempts of surgical recanalization before amputations. Primary prosthetic rehabilitation was successful in 25 patients and unsuccessful in patients (21 patients with bilateral transtibial amputation and 4 with a combined transtibial/transfemoral amputation.) 23 patients that had bilateral transtibial amputation were divided into following categories according to the K level of activity: (1 patient in K0 category, 5 in K1 category, 14 in K2 category and 3 patients in K3 category). Both of our transfemoral amputees were classified as K0. In the combined transtibial/ transfemoral group 4 patients were categorized as K0, 3 patients as K1 and 2 patients as K2.

Conclusion: Rehabilitation of patients with bilateral amputation is a major challenge, most of the successfully rehabilitated amputees were amputees with bilateral transtibial amputation, the leading cause of amputations was diabetes, the risk period for second amputation is within 5 years from the first amputation. The results show that 60% of patients after prosthetic rehabilitation are categorized as K2 group, indicating a limit of prosthetic rehabilitation after bilateral amputations.

Key words: bilateral amputation, prosthetic rehabilitation, diabetes

P307

THE INCIDENCE OF INJURY THROUGH 2018/2019 ACADEMIC YEAR IN THE POPULATION OF MALE STUDENT OF SCHOOL OF MEDICINE WHO PLAYING UNIVERSITY SPORTS LEAGUE**Nikola Topalovic, Sanja Mazic, Biljana Djuric, Dejan Nesic**

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Introduction: Injury is the one of the major stressor for everyone who participate in sport. In addition to having to deal with athletic requirements, students also have stringent academic requirements ahead. That is why injuries of student participate in sport are significant, because they diminish success both on the playground and in the classroom.

Objective: The aim of our study was to describe the incidence, type and anatomical location of injuries in different sports played by man of school of medicine in a competitive university league.

Methods: Our study included 60 male students (futsal, basketball, handball, volleyball and swimming players) who were followed through 2018/2019 academic year during their participate in university sport league. We had the same number of students which we followed by each sport and they were all between 19 and 24 years old. All students had 2 training sessions per week, and participated in at one competitive game per week.

Results: The results show that 21 out of 60 male students (35%) has a different injury, with the highest incidence within basketball players (44%) and volleyball players (28%). The most common injuries was distortion (57%), then a ligament rupture (38%) and fracture (5%). As for the anatomical location of the injuries, the lower hock was the most common (62%), the knee and the lower leg in the same relationship (14%), and on the last place was hand/foot with 10%. In almost 80% the injured tissue was ligaments, muscles in 15% and the bone in 5%.

Conclusions: Injury rates were greater among basketball and volleyball players. Percent of all injuries was significant. Distribution of injuries by body part, type and injured tissue were similar. In future, we need to improve injury-prevention strategies for students at all sport because they may have benefit from similar.

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RADIAL SHOCK WAVE THERAPY IN THE TREATMENT OF STROKE SPASTICITY COMPLICATED BY TENDON RETRACTIONS: A CASE-REPORT**Noemi Gentileschi¹, Stefano Brunelli², Marco Traballesi², Calogero Foti¹**Physical and Rehabilitation Medicine Tor vergata University, Rome italy¹, IRCCS Fondazione Santa Lucia, Rome²

Introduction: Radial shock wave therapy (rESWT - Extracorporeal Shock Wave Therapy) appears to be a promising approach to reduce spasticity and consequently to improve functionality in stroke survivors. Often prolonged spasticity induces muscle-tendon retractions.

Objective: To evaluate whether rESWT is effective in improving upper limb function, ROM and hypertonia in a patient with both retractions and spastic hypertonia.

Methods: We present the case of a 64-year-old patient suffering from dystonia, spasticity and tendon retraction in the upperleft limb as a result of a stroke. The patient presented a Fugl-Meyer-Motor-Function-Assessment of 43/66, a Frenchay-Arm-Test of 2/5, and a Modified Ashworth Scale of 3 at the elbow and 2 at the wrist. There also was a retraction of the flexor digitorum and flexor carpi with possible wrist extension up to 30° and a pathological flexion of about 10° of the hand fingers. We treated the muscles of the arm and forearm with a low intensity spasticity protocol of rESWT (2000 hits; 12 Hz; 1.5 Bar) with a weekly session for 4 weeks. In the same session we also treated the flexor digitorum and flexor carpi tendons with a high intensity protocol (3 bar, 1400 hits).

Results: An improvement was observed in both functionality of the affected upper limb and tendon retraction. At one month follow-up we found the following scores Fugl-Meyer-Motor-Function 58/66, Frenchay-Arm-Test 4/5 and a reduction in spasticity (score of 1 at the elbow and of 0 at the wrist). We also observed a complete recovery of passive finger extension and a 10° improvement in wrist extension.

Conclusions: Our experience suggests that it is crucial to choose the right rESWT protocol according to clinical presentation, favoring lower intensity for hypertonia treatment and higher intensity for tendon retractions

P309

PERSONIFIED PREVENTIVE AND CORRECTIVE WORK FOR PREVENTING DYSPHONIA DURING THE MUTATION PERIOD**Olga Orlova¹, Elena Radtsig Pirogov², Polina Estrova³, Anton Radtsig Pirogov²**

Introduction Prevention and correction of voice disorders in Federal center for Cerebrovascular Pathology and Stroke of the Ministry of Health, Moscow, Russia¹, Russian National Research medical university², Moscow State University of Education Russian Federation³,

Introduction: Prevention and correction of voice disorders in adolescents during the mutation period remains an important problem of modern phoniatriy and voice therapy.

Objective: Improving the effectiveness of voice rehabilitation in adolescents during the mutation period.

Materials and methods: Questioning and a comprehensive clinical, psychological, and pedagogical examination of schoolchildren and students of pedagogical and medical universities were carried out with the aim of informing and identifying voice disorders during its formation period, and, if necessary, medical and preventive measures to prevent persistent voice disorders were made too.

Result: 300 adolescents with mutational dysphonia were examined under our supervision. It was found that the majority of schoolchildren and students (75%) underestimated the importance of preventive measures in preventing voice disorders. In the framework of the Russian project "Voice Secrets" for teachers, parents, and students, we pay special attention to the problems of development and voice staging, also its violations. For patients with MD, which reduces the quality of life, a personalized course of preventive and correctional measures was developed, including traditional treatment (medication, physiotherapy) and voice therapy with personalized biological feedback. For this, at different stages, depending on individual psychological characteristics and the leading sensory channel, computer programs, "Visible Speech", and apparatuses: "Inton-M", "Vibrostim", "Master Sound" were used.

Conclusions: Personified preventive and corrective work for preventing dysphonia during the mutation period should begin during the period of study at school. The use of biological feedback in complex therapy with traditional treatment increases the effectiveness of rehabilitation and allows to reduce the duration of therapy and achieve more stable functional results and successful socialization and overcoming restrictions in choosing.

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BOTULINUM TOXIN TREATMENT OF SPASTICITY

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Botulinum Toxins (BoT) are the most potent neurotoxins known to mankind; they are produced by strains of Clostridium Botulinum Bacteria.

Mechanism of action: Botulinum toxin acts at the neuromuscular junction to cause muscle paralysis by inhibiting the release of acetylcholine from presynaptic motor neurons.

Clinical indications: Botulinum Toxins have various clinical indications including limb spasticity, dystonia, eyelid spasm, hemifacial spasm, migraine, neuropathic bladder, achalasia, anal fissure, hyperhidrosis, sialorrhoea and cosmetic facial wrinkles treatment.

Side effects: In a study of 327 patients, underwent 1043 injections, the main side effects were excessive weakness of lower limbs in 6.2 % of the patients (lasted 13.8 days on average), local pain in 5.2% and flu-like symptoms in 4.1%. (Slawek et al, 2005).

Post injection management: BoT injection does not work in isolation and it has to be part of a comprehensive combined treatment programme of assessment, injection, physiotherapy and orthotic splinting in that order aiming for the goals of initial assessment.

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PATIENT ENGAGEMENT DURING REHABILITATION PROCESS ON PATIENTS WITH HIP FRACTURE.

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Introduction: The recent studies on patient engagement acknowledges that patients have a central role in the health care system. In this context, measuring and promoting patient engagement both in chronic and acute care is today a priority for healthcare systems.

Objective : Few papers focus on the application of patient engagement measures in the hospital setting and specifically in acute care. The purpose of this study is to determine the impact of patient engagement in rehabilitation setting after a fall-related hip fracture.

Method: We measured the different levels of engagement by the Patient Health Engagement Scale (PHE-scale). Moreover we used the Patient Activation Measure (PAM), especially the short form (PAM-13), to determine how engaged an individual is in their own care. The clinical indexes used to assess the outcome included the Barthel Index (BI), Cumulative Illness Rating Scale (CIRS), the Ten Meter Walk test (10MWT) and the Mini Mental State Examination (MMSE).

Results: Patient engagement and patient activation significantly affect the functional recovery outcomes after hip fracture, reducing the average length of stay in hospitals and the risk of institutionalization.

Conclusions: Patients engagement increase the recovery in rehabilitation setting, likely through their reported medication adherence. In patient with hip fracture, patient engagement is a useful model for assessing the degree of emotional understanding and adjustment reached by the patients concerning their own health condition when engaging in health management, improving their functional recovery.

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THE BIO-PSYCHO-SOCIAL IMPACT OF ADAPTED PHYSICAL ACTIVITY IN PATIENTS WITH OSTEOARTHRITIS.

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Introduction: The beneficial effect of physical activity on a large spectrum of diseases is well known, with particular importance for elderly people. Among the different types of activity, adapted physical activity (APA) has been applied in a number of disease-related physical deficit

Objective :The purpose of this study is to determine the outcome of APA program in elder patients with osteoarthritis concerning physical and functional health and as second endpoint to determine the potential effect of AFA on reducing the risk of institutionalization.

Method: The clinical indexes used to assess the outcome included the Blaylock Risk Assessment Screening Score (BRASS), the Psychological General Well Being Index (PGWBI), the Cumulative Illness Rating Scale (CIRS), the Short Physical Performance Battery (SPPB), and the visual analogue scale (VAS).

Results: A significant difference between the pre-APA and the post-APA value was found for BRASS, and highly significant differences were found for SPBB and VAS.

Conclusions: These findings show that APA program in elder patients with osteoarthritis improves physical function, reduces pain intensity and decreases the risk of institutionalization. Moreover the positive outcome of APA we found in elder patients with osteoarthritis suggests a more frequent use of such rehabilitation approach.

P313

**IONTOPHORESIS WITH CORTICOSTEROIDS IN MUSCULOSKELETAL PAIN SYNDROMES:
AN OVERVIEW OF THE EXISTING LITERATURE****Othmar Schuhfried**

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Introduction: Iontophoresis using corticosteroids seems to be a promising therapeutic option in the treatment of common musculoskeletal pain syndroms.

Objective: To find trials in which iontophoresis with corticosteroids has been successfully used in the treatment of musculoskeletal pain syndromes.

Method: A structured literature search was carried out in the database Medline with the search terms `iontophoresis` and `steroidal antiinflammatory agents` and `corticosteroids` for the period from 1980 to 10/2019. All controlled clinical trials (placebo, other modalities) were included. To complete this, reference lists of the included papers were analyzed for additional controlled studies.

Results: The most common used substance was dexamethasone. It was usually applied from the negative electrode (cathode). Successful treatment especially in pain reduction was reported in patellar tendinopathy, lateral epicondylitis, shoulder tendinopathy and shoulder girdle myofascial syndrome, Achilles tendinitis, rheumatoid arthritic knee, plantar fasciitis, temporomandibular joint dysfunction and mild carpal tunnel syndrome.

Conclusions: Applying dexamethasone-iontophoresis a relevant reduction of pain was found in various musculoskeletal pain conditions. Therefore this method is a therapeutic option in the treatment of musculoskeletal pain syndromes.

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INTERVENTIONAL TREATMENT OF PAINFUL SHOULDER IN ELDERLY PATIENTS**Paloma Galán, Gema Flores, Nerea De la Puente, M^a Auxiliadora López , Lourdes González, David Olmo**

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Introduction: Interventional treatment in rehabilitation is the activity based on minimally invasive techniques whose objective is to relieve pain and restore the capabilities of patients suffering from functional restriction. Shoulder pain is very prevalent in the elderly, being the third cause of consultation due to musculoskeletal pathology in our environment.

Objective: To assess the effectiveness of suprascapular nerve block in the elderly with shoulder pain regardless of its etiology.

Method: A retrospective study of patients older than 70 years admitted to a post-acute care hospital with shoulder pain, who had had an ultraguided block of the suprascapular nerve with 5 ml of 5% levobupivacaine. Previously, all of the patients had received conventional treatment without improvement. The duration of the study was 6 months. Pain intensity was measured with a visual analog scale (VAS). Statistical analysis was performed with the SPSS v23 package.

Results: 32 patients were treated, 17 men (53.12%) and 15 women (46.88%). Their average age was 79.25 + 7.72 years (range 70-91). In 81.25% the shoulder pain was of neurological origin (hemiplegic shoulder) and in the remaining 18.75%, of traumatic or rheumatological origin.

The VAS prior to the nerve block was 8.48 + 0.99 decreasing to 2.47 + 2.18 after it ($p < 0.01$). In 28.13% of cases there was a recurrence of shoulder pain after a few weeks, but in all cases it did not reach previous intensity, with a VAS of 5.11 + 1.69 ($p < 0, 05$). There were no adverse effects or complications after the technique in any of the patients.

Conclusion: In our experience, Suprascapular nerve block is a safe and effective technique in the treatment of the elderly's painful shoulder, regardless of its etiology.

P315

SEPSIS AND FOUR LIMB AMPUTATION**Patrícia Cruz¹, António Pedro Cantita¹, Joana Santos², Jorge Melo³, Rui Brito¹, Sara Amaral¹**¹Physical Medicine and Rehabilitation, CHUP, Porto, Portugal, ² CHVNG³ CHTAD

Introdução: Recently we had in our Physical Medicine and Rehabilitation (PRM) Department 3 cases of four limb amputation due to generalized sepsis. This is an uncommon condition that deserves our concern. Four limb amputation leads to significant disability and requires an accurate Rehabilitation Program. In order to maximize functionality, we need a multidisciplinary approach with specific PRM interventions that should be clarified. In a context of a four limb amputation due to sepsis this becomes even more relevant.

Objective: To contribute to the knowledge of the epidemiologic data, causes, efficient interventions (including bionic prostheses) and outcomes in four limb amputation patients.

Methods: We performed a systematic review of the published literature on this topic, in English, in the last twenty years, registered on the medical data platforms PubMed, Cochrane Review, Scielo, and Google Search. Congenital deformities were excluded.

We also performed a monocentric retrospective review, analysing our own clinical cases of four limb amputation as a contribution of our experience to achieve this article's goals.

Results: In our Systematic review we found 47 articles linked to four limb amputation. No RCT'S, meta-analysis or systematic reviews on the subject were found. Only 2 articles were found dealing specifically with sepsis as a cause of four limb amputation cause. We registered 5 cases of four limb amputation in our Department in which three were due to sepsis. We present their casuistic analysis including the functional level.

Conclusion: Four limb amputations as a result of sepsis remain rare. Although, due to the increasing survival of this condition, we assist of a growing number of cases. PRM interventions are of major importance to provide all the possibilities to these patients to achieve the maximum

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FUNCTIONAL ASSESSMENT IN NEUROREHABILITATION WITH USING OF SPECIAL INERTIAL SENSORS**Petra Sládková, Karolína Jakovcová**

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Introduction: The using of inertial sensor is possibility for objective functional assessment in neurorehabilitation. Special therapeutic neurorehabilitation approaches should involve the training of new activities, including the motor learning mechanism that activates brain plasticity.

Methods and design: In neurorehabilitation of the patients with hemiparesis is possible to use inertial sensors for monitoring of functional changes of movement pattern. The basic principle is measuring of static and dynamic acceleration. Sensors can be used objectively to quantify amount of movement paretic and non-paretic upper limb activity. The parameter studied with inertial sensor was daylong physical activity of the upper limbs, paretic and non-paretic. We used 3 different types of sensors: left blue sensor is on the left wrist, orange sensor is on the right wrist and grey body sensor on the left hip. Data from sensors monitoring were analysed in special program WMSAPP (Wrist Motion Sensor APPLication software) version 0.0.5. The patients were detected at the first and the last week during 4 weeks in a neurorehabilitation day care center. Two groups of patients after stroke were studied, one group with an inertial sensor (35 patients - Group A) and one group without an inertial sensor (35 patients - Group B). All patients in a study have daily 120 minutes of individual physiotherapy and also 120 minutes of individual occupational therapy.

Results and conclusion: Using of sensor – inertial sensor in the experimental group (group A) improved upper limb movement activity, can objectively detected the positive changes in movement spastic pattern. The results confirmed that inertial sensor is a suitable instrument for detecting of the changes of upper limb movement activity. The most important positive parameters of the monitoring are the increased motivation of patients for physical therapy and the use of the principles of a feedback inertial sensors.

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ASSESSMENT OF APPLICATION OF RePETITIVE TRANSCRANIAL MAGNETIC STIMULATION IN MOTOR FUNCTION RECOVERY IN PATIENTS AFTER STROKE**Polya Lambeva¹, Vladislava Krachunova², Stoyan Bozhinov¹**Neurology and Neurosurgery, Medical University of Pleven¹, University Hospital "Dr. Georgi Stranski" – Pleven², Pleven, Bulgaria

Objective: To assess the effect of different treatment protocols of repetitive transcranial magnetic stimulation (rTMS) on motor function recovery in stroke patients.

Methods: The use of transcranial magnetic stimulation (TMS) in stroke patients has increased significantly in recent years due to the discovery of two potentially beneficial functions. On the one hand, TMS can be used to predict the motor function recovery after stroke, and on the other, it can be used for post-stroke rehabilitation. The following scales are used to evaluate the motor deficiency: Barthel Index, Ashworth Scale, Katz Basic ADL Scale and Modified Rankin Scale. We use following single protocols or combination of them: Motor function recovery (affected hemisphere) – stimulation of Hand Motor Cortex (HMC) with 3 Hz, 100%, 540 pulses, 3,00 min; Post-acute motor stroke (affected hemisphere) – stimulation of HMC with 10 Hz, 90%, 1000 pulses, 03,13 min; Post-acute motor stroke (unaffected hemisphere) – stimulation of HMC with 1 Hz, 100%, 1800 pulses, 29,59 min; Chronic motor stroke 1 Hz (unaffected hemisphere) – stimulation of HMC c 1 Hz, 100%, 1500 pulses, 24,59 min; Chronic motor stroke 5 Hz (unaffected hemisphere) – stimulation of HMC with 5 Hz, 90%, 750 pulses, 03,37 min; Aphasia 1 Hz (unaffected hemisphere) – stimulation of HMC with 1 Hz, 90%, 1200 pulses, 19,59 min.

Results: Patients in whom TMS on the primary motor cortex evoked a motor evoked potential (MEP) in the paretic limb during the first 30 days after stroke have better motor recovery than those in whom absent. Thus, the registration or lack of motor evoked potentials in the single-pulse magnetic stimulation of the affected hemisphere is used to predict the function recovery after stroke. Nowadays, repetitive transcranial magnetic stimulation (rTMS) is becoming increasingly popular as an innovative method of modulating cortical excitability to improve motor function after stroke, despite the lack of standardized work protocols. We compare the efficacy of application of single or combine rTMS protocols in patient after stroke based on scales assessed the motor function mentioned above.

Conclusion: The predicted effect of rTMS on motor function recovery in patients after acute and chronic cerebral circulation disorders by evaluation of MEP, set of inventories and scales and EEG can be used to prepare standardized protocols for complex neurorehabilitation therapy.

Key words: rTMS, motor function recovery, MEP, EEG, stroke patient, cerebral circulation disorders.

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EFFECT OF HOME-BASED EXERCISE ON MOTOR DEVELOPMENT IN CHILDREN TREATED FOR CONGENITAL HEART DISEASE WITH CATHETERIZATION**Qing Du**

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Introduction: It has been demonstrated that children with congenital heart disease (CHD) often display neurodevelopmental problems. Home-based exercise is a safe and effective treatment that can improve exercise capacity. However, home-based exercise has not been verified in young children treated for congenital heart disease with catheterization.

Objective : The objective of this study was to examine the effects of home-based exercise on motor development, cardiac function and structure, and bone quality in young CHD children with cardiac catheterization compared with home-based exercise education only.

Method: This study was a prospective, single-blinded, randomized controlled trial. A total of 159 CHD children (70 boys, 89 girls) with cardiac catheterization were recruited. This study was performed in subjects' homes and in rehabilitation department of a teaching hospital. CHD children who would perform a cardiac catheterization were recruited through advertisement in pediatric cardiology department. A total of 159 CHD children with cardiac catheterization were randomly assigned to either an experimental group (which performed home-based exercises for 6 months) or a control group (which received only home-based exercise education). Assessments of motor ability quotients, modified Ross score, cardiac function and structure, and speed of sound at the tibia were carried out before catheterization and at 1, 3 and 6 months after catheterization. The Peabody Developmental Motor Scales was used to assess motor development. The Modified Ross Heart Failure Classification was used to assess cardiac function. Echocardiography was used to assess cardiac structure. Quantitative ultrasound measurements was used to evaluate bone quality.

Results: There was no difference in motor development, cardiac function and structure, and bone quality between the experimental group and the control group before catheterization. All CHD children showed increased developmental quotient scores over time. At 1, 3 and 6 months after catheterization, the experimental group had higher developmental quotient scores than the control group, with higher gross motor development quotient scores, fine motor development quotient scores, and total motor development quotient scores. No difference in either cardiac function, cardiac structure, or bone quality was observed between the experimental group and the control group at 1, 3 and 6 months after catheterization. Limitations of this study included a short follow-up duration, and a lack of objective supervision of home-based exercise.

Conclusions: Home-based exercise has a beneficial effect on gross and fine motor development in CHD children with cardiac catheterization.



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COMPARING THE EFFECT OF CONVENTIONAL PHYSIOTHERAPY AND RADIAL SHOCKWAVE THERAPY IN A PATIENT WITH CAPSULITIS ADHESIVE ON SHOULDER JOINT

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Introduction: Capsulitis adhesive is a degenerative disease of soft tissues around the shoulder joint. Characterized by pain and limited movements in the shoulder joint. It has always been considered important because of the impact on the quality-of-life and long period of illness. Therefore, the use of noninvasive and safe techniques that can speed up the healing process of the disease is important.

Objective: The aim of the follow-up the effect on pain and range of motion (ROM) after conventional physiotherapy versus radial shockwave therapy (RSWT) in the same patient with Capsulitis adhesive.

Method: A patient was treated for 2 months with a conventional physiotherapy without improvement and followed 6 weeks treatment with RSWT. Visual analogy scale (VAS) used for pain assessment, goniometry for the ROM and Neer test, Upper limb Activity of daily living (ADL) to objectify the patient state before and after both therapies.

Results: The patient's condition has not improved after conventional therapy. The treatment with RSWT provides a significant reduction of pain, increase ROM in the shoulder joint and improve ADL for the upper limb.

Conclusions: Usage of RSWT alone is much better option compared to the conventional physiotherapy in a patient with Capsulitis adhesive.

Key words: *Capsulitis adhesive, physiotherapy, radial shockwave therapy*

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CONSERVATIVE TREATMENT IN ADOLESCENT IDIOPATHIC SCOLIOSIS – A REVIEW**Raquel Araujo, Margarida Ribeiro, Sara Amaral**

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Introduction: Scoliosis is a structural three-dimensional deformity of the spine that persists despite positional adjustments and is mostly idiopathic (~80% of cases). Adolescent idiopathic scoliosis' (AIS) estimated prevalence ranges from 1 to 12%. AIS' conservative treatment can be divided in observation, physical activity (PA), physiotherapeutic scoliosis-specific exercises (PSSE) and/or bracing.

Objective: Review the indications of each option of conservative treatment option in AIS.

Methods: A PubMed database research was performed with the terms: "*adolescent idiopathic scoliosis*" AND "*conservative treatment*" AND "*rehabilitation*" AND "*physical therapy*" AND "*bracing*". The literature search included articles written in English, published in the last 10 years, up to October 2019. Criteria for inclusion were studies investigating the effect of conservative treatment in AIS. We analyzed published material with an emphasis on randomized controlled trials.

Results: Of the 25 database search results, 18 were selected after duplicate removal, abstract screening and full-text eligibility assessment. Comparative studies' evaluation showed:

Observation is an active approach that consists of periodic clinical evaluation and follow-up. It is recommended for patients with lower Cobb angle curves;

PSSE fail to alter the natural history of scoliosis, however they have a primordial role in maintaining fitness, improving respiratory function and preventing complications. There is evidence that auto-correction is the main goal. No studies were found comparing the different types of PSSEs or PA;

Bracing is recommended to treat patients with higher Cobb angle curves, still growing and with demonstrated progression of deformity or elevated risk of worsening. The use of rigid cast always implies the performance of oriented rehabilitation exercises.

Conclusions: For a specific subset of clinical characteristics, we found relevant data regarding each conservative treatment option in AIS. The decision of the best treatment plan should be adapted to patient preference and weigh the various risk factors for curve progression.

P321

USING A ROBOT TRAINER MAY IMPROVE ADHERENCE OF ELDERLY PATIENTS WITH MILD COGNITIVE DISFUNCTION ON PHYSICAL EXERCISES**Razvan Gabriel Dragoi^{1,2}, Anca Dinu², Daniel Popa², Adina Duse², Dragoi Mihai²**Balneology, Rehabilitation and Rheumatology¹, "Victor Babeş" University of Medicine and Pharmacy², Timișoara, România

Introduction: Cognitive dysfunction is one of the main issues in elderly people that impacts negatively on quality of life, activities of daily living and adherence to physical exercises.

Objective: To determine if elderly patients with mild cognitive disorder can be stimulated to increase adherence to physical therapy using a robot trainer.

Methods: 20 patients with mild cognitive disorder (montreal cognitive assessment score: 23+3) from one inpatient rehabilitation unit (13 males, age:69+3) who had been prescribed physical exercises as part of the rehabilitation program were randomized into 2 groups. 10 patients performed the physical exercises program assisted by a robot trainer (James®) that showed them how to perform exercises on a tablet screen and the physiotherapist (PT), the other 10 (control group) performed physical exercises assisted by the PT alone.

All patients were asked to keep a daily diary where to express willingness to do exercises that day and characterize their own satisfaction after the training. At the end of hospitalization (mean: 20 days) patient satisfaction was evaluated with the short assessment of patient satisfaction (SAPS). Also, the PT that worked with the patients were interviewed using a semistructured interview in order to determine patient adherence.

Results: Patients who interacted with the robot were more willingly to perform physical exercises according to patient diary and the PT semistructured interview. All of the 10 patients reported that training with a robot can make the exercises more fun to follow, and scored higher on SAPS than the control group.

Conclusions: Our cohort revealed that a robot may be seen as a stimulating factor by the patients in order to perform physical exercises more willingly .

Acknowledgment: the present study is part of the project „Robotic ePartner for Multitarget INnovative activation of people with Dementia”, AAL2017-26-ReMIND-2.

P322

PHYSICAL THERAPY IN POST OPERATIONAL TREATMENT OF SHOULDER INJURY**Renata Bergam Grandis, Predrag Dabovic, Kaca Tomcuk**

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Introduction: Shoulder dislocations are among the most frequent injuries of the locomotor apparatus due to the complexity of the joint itself as well as its functions.

Aim: To note the importance of rapid implementation of physical rehabilitation in post operational procedure of shoulder injury recovery

Methodology: A 51-year-old patient had had painful shoulder for 3 years and was treated in conservative way by physical therapy but with no improvement. Pains in his shoulder were continuous accompanied with limited and painful mobility, active ABD 90 degrees, 30 degrees SR, 25 degrees UR, flexion is 115 degrees and palpatory painful sensitivity of the same shoulder region.

M R was done which indicated the partial rupture of the muscles of supraspinatus 1 CM, the damage to the cartilage of the head of the humerus III and IV degree diffusely, slap lesion.

The operation procedure: reconstruction of arthroscopic tendinis m. supraspinati, reconstruction of arthroscopic insertionistendinis caput longus m. biceps brachii, bursectomia et acromioplastika arthroscopica art humeroscapulare. During the postoperational period the intensive pain is being prolonged therefore the patient is immediately directed to physical therapy and rehabilitation in accordance with protocol.

Results: After 10 days: the mild reduction of the painful state and improvement of the active movements of the operated shoulder.

After 30 days: the full active mobility without the pain

The patient, trained for individual kynesitherapy program, is released home after dosed and controlled rehabilitation program in hospital conditions.

Conclusion: Shoulder injuries which are operatively taken care of, can lead to improvement only with the dosed and controlled physical rehabilitation.

P323

THE EFFECTIVENESS OF RADON IN THE REHABILITATION OF PATIENTS WITH ANKYLOSING SPONDYLITIS**Renata Cop**

Physical Medicin KLINIKUM BAD GASTEIN, BAD GASTEIN, SALZBURG, AUSTRIA

Introduction: More than 70 years patients suffering from rheumatic diseases have been treated with Radon²²² in the Bad Gastein thermal galleries (37-41,5°C). Hyperthermia treatment has been well documented to exert analgesic effects in inflammatory disorders and to reduce systemic levels of the anti-inflammatory cytokine. The individual treatment at Klinikum Austria - Bad Gastein includes a unique therapy combining radon-rich thermal spa (36-38 °C) and thermal galleries, resulting in significant benefits after 3 weeks, and continuing up to 6 months benefits vs. standard treatments. In this study we presented results of objective indicators of treatments.

Methods: Individual, personalized treatment at Klinikum Austria, Bad Gastein consisted of a 3-week therapy: individualised exercise, breathing exercise, hydro and mud-therapy, massage, radon-rich thermal spa (for 30 minutes), targeted patient education and an average of 10 time admittance (per hour) to the thermal gallery. At admission and after treatment the following were observed: VAS (0-10), chest expansion, re analysed during 2019. At discharge VAS was 40% better than at admission. At discharge BASDAI was 30% better than at admission. Measurement of chest expansion: at discharge 25% improvement compared to admission. Measurement of morning stiffness: at discharge 41 % improvement compared to admission

Conclusion: Through the individual rehabilitation programme a 30-40% pain reduction was achieved in patients with AS after treatment with low doses of radon in the thermal galleries of Bad Gastein and BASDAI as additional non-pharmacological therapy. The treatment considerably increases the quality of patient's lives.

Keywords: Spondyloarthritis · Rehabilitation-Radon Klinikum Bad Gastein

P324

COMPLEX REGIONAL PAIN SYNDROME ASSOCIATED WITH PSORIATIC ARTHRITIS. TIME, TASK, RESULT AWARENESS AND MULTIDISCIPLINARY TREATMENT. CASE REPORT**Renata Czego¹, Cristina Ghilimei², Monica Copotoiu³**¹Department of Rehabilitation, Physical Medicine and Balneology, Constanta County Hospital, Constanta, Romania²National Institute of Rehabilitation, Physical Medicine and Balneoclimatology³Mures County Hospital

Introduction Complex Regional Pain Syndrome (CRPS) is a painful condition with associated sympathetic alteration and functional impairment.

Objective To emphasize the importance of multidisciplinary treatment and physical therapy in order to improve the quality of life.

Method We report the case of a 56 years old male patient, who suffered a traumatic injury of the right foot during a car crash, shortly after being diagnosed with psoriatic arthritis. He followed a treatment at the orthopedic and plastic surgery department right after the injury, but the treatment for the psoriatic arthritis was postponed due to elevated liver enzymes. The diagnosis of the complex regional pain syndrome was contoured only after 6 months, when physical therapy was initiated (electrotherapy, kinetotherapy, hydrotherapy, mechanotherapy). The physical examination revealed multiple functional alteration and decompensation (at the level of the ankle joint, spine, coxo-femoral joint) and a carpal tunnel syndrome due to improper use of the assisted device.

Results The patient underwent multiple programs of physical therapy during our follow-up of 2 years but none of them were showing a good result regarding the improvement and the progress of CRPS. Slight improvement was observed in the pain triggered by walking. Also the psychic condition was altered by the onset of a depressive syndrome.

Conclusions Early diagnosis and proper treatment is indispensable to ensure a good outcome. In our case the poor outcome was due to the late diagnosis and postponed treatment of the psoriatic arthritis and also the difficult collaboration with the patient. The case illustrates the predisposition of patients with psoriatic arthritis to sustain inflammatory processes and to maintain a vicious-cycle which resulted complications and major functional and psychological impact on the patient and pain management challenges for the medical staff.

P325

ELECTROMYOGRAPHY OF SCALENE AND RECTUS ABDOMINIS DURING THE RESPIRATORY CYCLE IN HEALTHY SUBJECTS**Rola Tout**

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Objective: Expose the electromyography and spirometry relationship and establish the chronology of the contraction of Scalene and Rectus abdominis which works together in synergy antagonism in physiological breathing

Methods: 128 electromyographic tests were performed during the respiratory cycle on 43 healthy adults. EMG signals of Scalene, Rectus abdominis were recorded using LabView program. The breathing was recorded by using a spirometer (vernier®).

Results: The duration of the contraction of Scalene are superior to Rectus abdominis 82% p-value = 0.000058, the amplitude of Scalene is superior of Rectus abdominis, p-value = 0.000000073. 109 tests of Scalene contraction begin before that of Rectus abdominis (63.74%), p-value = 0.000012. RMS is $0.02 \pm 0.011 \mu\text{v}$ for Rectus abdominis and $0.04 \pm 0.021 \mu\text{v}$ for Scalene, p-value = $6.76591\text{E}-06$. Duration of inspiration is $1.25 \text{ s} \pm 0.19$, the expiration is $1.04 \text{ s} \pm 0.19$. The mean frequency of Rectus abdominis is $54.19 \text{ Hz} \pm 6.35$, it is $57.21 \text{ Hz} \pm 7.08$ for Scalene, p-value is $9.84081\text{E}-08$. The median frequency of Rectus abdominis is $51.05 \text{ Hz} \pm 6.51$, it is $52.72 \text{ Hz} \pm 6.94$ for Scalene, p-value is 0.0098. The muscle fatigue of Rectus abdominis decreased from 60.40 ± 0.45 to 19.98 ± 4.32 . For Scalene it decreased from 60.41 ± 0.4 to 23.52 ± 4.41 .

Discussion: There is a synergistic - antagonism relationship between Scalene and Rectus abdominis during respiration. Scalene is a main inspiratory muscle, its contraction is important in amplitude, duration and frequency. Both muscles are fatigable during the inspiratory cycle.

P326

MULTIPROFESSIONAL INTERDISCIPLINARY REHABILITATION OF A SOLDIER WITH TRAUMATIC BRAIN INJURY: A CASE REPORT**Roman Tryhub**

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Background: Necessity of multidisciplinary team approach for the rehabilitation of soldiers with severe traumatic brain injury is presented.

Case presentation: A 23-year-old soldier with TBI was admitted to the rehabilitation unit on a 43th day after mine-blast trauma occurred in a combat zone. Surgery: trepanation and resection of the left temporal lobe, primary surgical treatment of the open brain wound.

Day 8 after injury: re-surgical treatment of the mine wounds, radiographic microsurgical removal of intracerebral bone fragments.

Clinical assessment: Rancho Los Amigos Scale Level 4; Barthel Scale 0.

Early intervention in the intensive care unit: prevention of secondary complications; verticalization; increasing muscle strength in extremities; learning of alternative communication methods; teaching relatives to provide care for the patient.

Long-term goal: in 4 months – going to the shop accompanied by his mother for buying fast food. Difficulties in achieving of the abovementioned goal: orthostatic disorders; reduced endurance; muscle weakness; low cognitive level; decreased clinical scores ADLs and instrumental ADLs; swallowing disorders; moderate left-sided hemiparesis, elements of motor aphasia.

Day 63: percutaneous endoscopic gastrostomy. Neurologically: left-sided hemiparesis; motor aphasia; bulbar disorders; cognitive impairment.

Day 84: left fronto-temporo-parietal zone cranioplasty.

Day 93: gastrostomy removed.

Day 95: Barthel Scale 85 points; Rancho Level 6; MoCA 6 points; Six-minute walk test: 400 m; Four Step Square Test (FSST) 18 s; Time up and go test 8.6 s; Ten-Meter Walk Test 0.25 m/s.

Day 153: left-sided minicraniotomy, microsurgical removal of the intracerebral foreign body (mine fragment) from the frontal lobe.

Day 170: Barthel Scale 100 points; Rancho Level 7; MoCA 12 points; Six-minute walk test 570 m; FSST 11.9 s; Timed up and go test 8 s; Ten-Meter Walk Test 0.56 m/s.

Conclusions: In this case interdisciplinary approach proved to be effective in rehabilitation of the soldier with TBI and concomitant deep neurological and cognitive impairment.

P327

ULTRASOUND NEURODYNAMIC TEST USEFUL TO EVALUATE TREATMENT OF CARPAL TUNNEL SYNDROME**Rostyslav Bubnov¹, Lev Kalika**Ultrasound, Clinical hospital `Pheophania`, Kyiv, Ukraine¹, New York Dynamic Neuromuscular Rehabilitation & Physical Therapy

Background: Median nerve structure and size is known marker, however can be unchanged in many cases of carpal tunnel syndrome (CTS). Precise dry needling of muscle trigger points under ultrasound (US) guidance is proved and effective method for treatment variuos pain conditions [1] including CTS [2].

Materials and methods: We included 16 patients (9 females), avarage age was 42±6 years old, with symptoms of CTS and pain in hand. The treatment approach by R.Bubnov [1] was applied that included ultrasound identification of myofascial trigger points, precise neuromuscular ultrasound; with following dry needling under US guidance using steel fine needles (28 gage) to elicit the local twitch response (LTR) effect verified on M-mode ultrasound. Visual analogue scale data (0 to 10) were measured before, immediately after and 24 hours after the intervention. A decrease in pain as measured by a VAS of 50% or more one week after treatment was considered as success.

Results: Active active trigger points were diagnosed in deep forearm muscles, mostly in supinator muscle, potnetially compressing radial nerve branches (posterior interosseous nerve, PIN entrapment near arcade of Frohse). Additional needling was conducted in thenar area (flexor pollicis brevis) and small muscles in hand and forearm and in muscles in the cross-section of carpal area with possible compressing impact when neccessary. In one session 1-3 needles were inserted. Retention of needles in muscles depended of accuracy of needle position in spastic area and LTR detection.

All patients demonstrated decreasing pain as measured by a VAS of 90 %, the difference was significant in this group (p<0.01) and pain relief outcome after month observation.

Structure of median nerve was not significant different vs contrlateral hand n medianus (4.5-7 mm x 2,2-3.4 mm). Fingers flexing evoked of 5-10 mm motion of medianus nerve across the tendon ("jump over" symptom). Restriction neurodynamics less than 5 mm was detected in cases of posfracture, swelling, congestion, tendinitis, decreased tendon movemets, scars. After DN neurodynamic test and symptoms of neuropathic pain in arm numbness improved. We observed decreasing CSA of carpal tunnel, swelling tissues, vaginitis, restoring movement of tendons, likely enabling improvement movement of medicn nerve.

Conclusion: Median neurodynamic test is useful to evaluate treatment in carpal tunnel syndrome, can be indirect sign of neuropathy when nerve structure is unchanged. Dry needling trigger points under ultrasound guidance is effective for treat various types of CTS.



P328

SIGNIFICANCE AND RESULTS OF HBO THERAPY IN THE SPECIAL HOSPITAL RIBARSKA BANJA

Rozeta Inic

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Introduction : HBOT is therapy with 100% oxygen in conditions of elevated ambient pressure above 1 bar and is performed in special devices, hyperbaric chambers. Numerous diseases threaten the transport of oxygen in the blood or impede the binding of oxygen to hemoglobin and thus its transport to tissues and organs. The origin of many diseases is the state of hypoxia in cells. Oxygen deficiency in the mitochondria leads to disorder in biochemical and physiological reactions within each cell, resulting in the pathological state of the organism. HBOT is therefore used as a medicine and is intended to compensate for the lack of oxygen in the cells, which does through the high levels of dissolved oxygen in the plasma, in the process of inhaling 100% oxygen under conditions of elevated ambient pressure of 1.5 to 3 bar.

At the special hospital Ribarskabanja, HBOT is applied from 01.11.2016.

Purpose : The purpose of this paper is to inform the public about the work of our HBOT cabinet, in the period from 01.11.2016. until 31.12.2019.

Material and results : The paper will show the number of patients, exposures, the pressure in ATA, duration of exposure, as well as the structure of patients, by gender, age, occupation and by diagnosis.

Conclusion: Institution in Ribarska Banja where medical rehabilitation has been used for more than half a century mainly for patients with bone and joint diseases has recently become an institution that deals with modern medical rehabilitation by expanding the indication area by continuous application of its natural agents in the treatment, constantly expanding the range of different types of apparatus . HBOT as a therapeutic procedure takes very significant place in the prevention and treatment of patients at the Special Rehabilitation Hospital Ribarska Banja.

P329

ANALYSIS OF RESEARCH RESULTS OF PHYSICAL DEVELOPMENT IN CHILDREN AGED 5-6 YEARS IN STARA ZAGORA MUNICIPALITY – BULGARIA**Ruska Paskaleva**

Medical Rehabilitation and Ergotherapy, Physical Medicine anTrakia University, Medical Faculty, Stara Zagora, Bulgaria

The high incidence of disturbed posture among preschool children is not only a public concern but also a public health problem for wider preventive measures to improve the motor activity of children. The purpose of the present study is to analyze the results of a research of the physical development study in pre-school children aged 5-6 to prevent vertebral distortions and overweight in kindergartens on the territory of the town of Stara Zagora and to prepare a rehabilitation program for prevention of vertebral distortions. The children in 25 kindergartens in Stara Zagora were studied for the period October - December 2017. Out of all 2,029 children, 1483 (73.1%) were examined, of whom 970 children (65.41%) have a disorder, 181 (12.2%) are overweight, the other 333 children (22.39%) have no problems. The largest share of the studied children (75-80%) is in six kindergartens (№7, №25, №3, №23, №10, №8) and the lowest is less than 50% in SG №11 . This is proof of the good scale of the study. Physical development study was performed with a specially designed Early Diagram Attachment Card, adapted to the age of the children, corresponding to their physical development, with the tests of OTT and Schober being modified for 5-6 years old children compared to the height. Overweight children were also surveyed by innovative methodology, compliant with the physical development and compared with the height and weight, individual peculiarities and eating habits. In the study of physical development, the total percentage of children with impaired standing was 65.41% with 95% CI (62.91%, 67.83%), confidence interval. Kindergartens with numbers 6, 24, 29 and 34 have statistically significantly higher values of the percentage of children with disordered posture compared to the total for all kindergartens ($P < 0.05$).

Key words: **physical development, vertebral distortion, overweight, pre-school age, children.**

P330

PAIN SYNDROMES IN ONCOLOGY REHABILITATION**Sabina Saric**

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Introduction: There has always been a dilemma as to whether the newly arising pain in oncology patients has been caused by exacerbation of the basic illness or a consequence of the applied medical treatment protocols i.e. caused by some other pathophysiological casus.

Objective: Establishment of frequency and specificity of pain syndromes in relation to tissue structures with the patients under oncology rehabilitation with pain as the dominant symptom.

Method: The research included oncology patients under oncology rehabilitation with the pain as the dominant symptom in the Community Basic Rehabilitation Centre (CBR)-SarajPolje within the period from 01.01.2018 to 31.12.2018. Based on detailed check up and insight into medical documentation specificity of pain syndromes has been diagnosed in relation to the coverage of tissue structures. The pain intensity has been followed up at the beginning and at the end of the therapy using visual analogous scale (VAS).

Results: Within the quoted period in CBR-SarajPolje 86 (100%) oncology patients were rehabilitated. 48 (56%) patients with pain as dominating symptom were treated. Painful lymphedema was manifested in 20 (23,2%) patients. At the beginning of the therapy average VAS pain estimates amounted to 6, dropping to 0 at the end. Axillary web syndrome was manifested in 11 (13%) patients. At the beginning of the therapy average VAS pain estimate amounted to 9, dropping to 2 at the end. Shoulder joint contracture of the treated breast was manifested in 9 (10.5%) patients. At the beginning of the therapy average VAS pain estimate amounted to 6, dropping to 1 at the end. Chemotoxicity syndrome was manifested in 8 (9.3%) patients. At the beginning of the therapy, average VAS estimate amounted to 8, dropping to 4 at the end.

Conclusion: Multidisciplinary approach, detailed check up and insight into medical documentation are essential for the establishment of the main illness status as well as tissue structure of organic system enabling selection of optimum therapies for the treatment and rehabilitation of new pain conditions in oncology patients.

P331

CLINICAL EFFECTIVENESS OF CARDIAC REHABILITATION AND DIET THERAPY FOR PATIENT WITH DILATED CARDIOMYOPATHY HEART FAILURE: CASE REPORT**Satty Saaed**

Cardicrehabilitation, A G hospital, Kartom, Khrtoum, SUDAN

Introduction: 56 years old female with (DCM) Heart Failure NYHA class II with ejection fraction 50% associated with DM and HTN. Her chief complains are; SOB and fatigue during

Objective : Dilated cardiomyopathy (DCM) is dilating of left ventricle leading to insufficient heart. Life Expectancy is thought to be 5 year and survival rate is about 50% in the recent years. The main goal of combined treatment is to improve diet care and quality of life. activity, hyperglycemia, and anaemia.

Method: On initial assessment 3 out of six minute walk test (6 MWT) with onset of chest pain from the 1st minute. She received aerobic training of 7 sessions to improve cardiovascular endurance and challenge her functional capacity using low intensity activities. Dietary history was performed by food frequency and 24hrs recall, Sodium, Fluids and CHO intake was estimated and DASH diet was used.

Result: Within the 4th session the patient reached 97% of (THR). The period of exercise session was 30 mins of stable HR. The last 3 sessions we increase THR from 97 to 107. The patient was able to do 45 mins of exercise session. Final report for 6 MWT was achieved successfully. Calories calculated to 1419 Kcal/day distributed as follows (55%CHO, 25% PROTIEN, 20% FATS), her BMI became 40, Hb corrected to 11 mg/dl. Fluids restricted to 1500L/day with 2300mg Na consumption /day.

Conclusion: Noticeable change was shown in patient management of symptoms when performing ADL, improved dietary patterns and quality of life.

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ASSOCIATED FACTORS OF AXILLARY WEB SYNDROME IN PATIENTS AFFECTED BY BREAST CANCER: A RETROSPECTIVE STUDY

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BACKGROUND: Breast cancer is the most frequent cancer among women in the world. The increase in early cancer detection and a better knowledge of the disease has made longer the survival rates for women with this neoplasia. Surgical treatment is an essential part of therapy, which includes chemotherapy, radiotherapy and hormonal therapy. As a consequence of these treatments, a multitude of morbidities that affect the quality of life of patients can occur.

The objective of this study is evaluate the frequency and risk factors that favour the appearance of axillary web syndrome (AWS), and the association with treatments performed in patients with breast cancer.

METHODS: Retrospective study of 213 patients visited at Bellvitge Hospital Rehabilitation Department between 2013-2018, after breast cancer surgery. They were enrolled, interviewed and submitted to a specific physical exam to investigate the axillary cords. First visit made one month after surgery and, subsequently, successive visits every 6 months, until completing 3 years follow-up. Patients with less than 3 visits were excluded.

RESULTS: The incidence of AWS was 16.4% in the women. According to literature, higher risk of triggering the syndrome has been associated with younger age (average age of 49,5 years old), this was statistical significance. A lower body mass index (BMI) is also associated, without statistical significance. Similarly, the relationship between AWS and secondary lymphoedema warrants further investigation. Furthermore, there is an increased risk in patients receiving neoadjuvant chemotherapy and adjuvant radiotherapy (average dose 40-50Gy) being this significant.

CONCLUSIONS: The AWS is a frequent complication in the early postoperative period after breast cancer surgery. It is important to know the risk factors associated with AWS and increase surveillance. Screening, prevention and appropriate referral is necessary for the early post-operative management of AWS.



P333

SPINAL MUSCULAR ATROPHY IN 2-YEAR OLD GIRL - CASE REPORTS

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Background: Spinal muscular atrophy (SMA) is an autosomal recessive degenerative neuromuscular disorder characterized by loss of spinal motor neurons leading to muscle weakness. Recent advances in therapy of SMA have dramatically altered prognosis (like recently approved antisense oligonucleotide (ASO) nusinersen). The best motor response was observed in children who received early treatment.

Case report: We report a 31-months old girl presented with hypotonia and weakness restricted to the lower limbs. At 25th month old she was examined for deformity of the feet. Review observed gait imbalance, valgus foot and abdominal lordosis, without a past medical history of developmental delay (she started walking in the age of 18 month). She was referred to genetic analysis by neurologists and results showed presence of a homozygous deletion within the survival of motor neuron 1 gene confirmed the diagnosis of SMA type 3a. Nusinersen therapy is planned and is included in physical therapy at our Institution.

Conclusions: The purpose of this report is to raise awareness how important it is to think of SMA in children with hypotonia and feet deformity in early development. Because early identification of SMA is crucial for children who would potentially benefit from prompt initiation of targeted treatment.

Keywords: spinal muscular atrophy, neuromuscular disorders, physical therapy



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SPINE BEHAVIOR IN OPERATED CHILDREN WITH NEGLECTED HIP DISLOCATION AND IN CHILDREN WITH IDIOPATHIC SCOLIOSIS

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Introduction: The lumbar or thoraco-lumbar curvature created on a pelvic tilt due to the congenital dislocation of the hip, especially if it is unilateral, is at the origin probably of the structuring of this vertebral curvature and the birth of a scoliosis. This spine behavior remains unpredictable. The developing of scoliosis during the growth period is not excluded.

Objective: The purpose of this study was to compare spine behavior in operated children with neglected hip dislocation and in children with idiopathic scoliosis.

Method: We conducted a retrospective descriptive study of 20 children, divided into two groups of ten. The first group had a neglected hip dislocation operated and the second group had idiopathic scoliosis. We compared clinical and radiological data on the total front and profile spine radiograph between the two groups, the comparison is based on the Cobb angle on the front, kyphosis, lordosis, and the pelvic parameters on the profile.

Results: The mean age of the overall sample is 11.47 ± 4.38 years, sex ratio is 4/1 (F/M), and Cobb angle is $14.45^\circ \pm 6.77^\circ$. The difference is weakly significant between the mean age (8.10 ± 2.99) of the hip dislocation group and the scoliosis group (10.60 ± 1.95). There is no significant difference between the sex ratio of two groups. The mean Cobb angle in hip dislocation group ($11.30^\circ \pm 5.71^\circ$) is significantly different compared to the idiopathic scoliosis group ($17.6^\circ \pm 6.5^\circ$). There is no significant difference between the two groups considering kyphosis, lordosis, and pelvic parameters.

Conclusions: The vertebral curvature noted in hip dislocation group is secondary to the orthopedic disorder. It remains minor because these children are in pre-pubertal period; they are always at risk of developing or even worsening their curvature during the pubertal period. The group of scoliosis children has a moderate curvature since they are in pubertal period.

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MANAGEMENT DYSPHAGIA IN DUCHENNE MUSCULAR DYSTROPHY: CURRENT RECOMMENDATIONS**Sara Amaral¹, Bernardo Moreno², Patricia Cruz¹, Margarida Ribeiro¹, Raquel Araujo¹**¹Physical and Rehabilitation Medicine Department, Centro HospitalarUniversitário do Oporto, Porto, Portugal, ² Hospital Senhora da Oliveira, Guimarães, Portugal

Background: Duchenne muscular dystrophy (DMD) is a rapidly progressive neuromuscular disorder causing weakness of the skeletal, respiratory, cardiac and oropharyngeal muscles with up to one third of young men reporting difficulty swallowing (dysphagia). Recent studies on dysphagia in DMD clarify the pathophysiology of swallowing disorders and offer new tools for its assessment but little guidance is available for its management.

Aim: To review the current recommendations of management of dysphagia in Duchenne muscular dystrophy.

Methods: Bibliographic research in databases Pubmed and Medline. Inclusion criteria: 1) meta-analyses, systematic reviews and reviews; 2) language: Portuguese, English and Spanish; 3) in humans; 4) last 10 years.

Results: Dysphagia can worsen the condition of ageing patients with DMD. Apart from the difficulties of chewing and oral fragmentation of the food bolus, dysphagia is rather a consequence of an impairment in the pharyngeal phase of swallowing. By contrast with central neurologic disorders, dysphagia in DMD accompanies solid rather than liquid intake. Symptoms of dysphagia may not be clinically evident; however laryngeal food penetration, accumulation of food residue in the pharynx and/or true laryngeal food aspiration may occur. The prevalence of these issues in DMD is likely underestimated.

Conclusion: There is little guidance available for clinicians to manage dysphagia and improve feeding for young men with DMD. Symptoms of dysphagia must be actively sought and investigated. In the management of dysphagia in DMD, it may be challenging to identify the appropriate therapeutic approach to provide optimal management given the underlying disease. Suitable treatments should be carefully chosen in order to advantageously improve the quality of life of young adults with Duchenne.

Keywords: Duchenne,Dysphagia, Treatment, Quality of life.

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EXTERNAL FIXATION OF TIBIAL FRACTURES**Sasa Milenkovic**

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Introduction Tibial fractures are the most common type of large long-bone fractures. Successful treatment involves evaluating of multiple factors, including bony and soft-tissue injuries. Many methods have been developed for the definitive surgical treatment of tibial shaft fractures. Most surgeons prefer to intramedullary nail to stabilize tibial shaft fractures. External fixation or plating is also considered as an other treatment methods, depending on various factors such as surgeon experience, fracture severity, fracture location or the degree of soft- tissue injury. Results of external fixation as a definitive method of the tibial fractures treatment are presented in this work.

Materials and methods Patients with tibial fractures were treated by external fixation method from 2010. to 2019. All patients had external fixation surgery using Mitkovic external fixators. This retrospective study include patients with tibial fractures who had been treated by external fixation.

Results We monitored the healing time, complications such as infections, pin site infection, nonunion, malunion , the end functional outcomes. Tibial fractures are severe injuries. Its treatment can be followed by a high rate of complications such as delayed union, non-union, malunion, infection or compartment syndrome.

Conclusion External fixation of tibial fractures with convergent pins configuration provides three-dimensional stability of the fracture and good biomechanical conditions for fracture union followed by lower rate of complications. Physical therapy is of great importance for achieving good results.

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EFFECTS OF OCCLUSAL SPLINT THERAPY AND THERAPEUTIC EXERCISES ON NEUROPATHIC PAIN AND ORAL HEALTH-RELATED QUALITY OF LIFE IN TEMPOROMANDIBULAR DISORDERS: A RANDOMIZED PROSPECTIVE STUDY**Secil Pervane Vural¹, Ali Ekemen², Cagil Vural²**Physical medicine and rehabilitation, Ankara Training and Research Hospital¹, Ankara University Faculty of Dentistry ², Ankara, Turkey

Background: The aim of the present study to compare the efficacy of oral occlusive splint and therapeutic home exercises in the quality of life and somatic and neuropathic pain in patients with temporomandibular joint dysfunction.

Methods: One hundred and one patients were divided into two groups: The first group received a maxillary oral occlusal splint (MOS), and the second group was given a home exercise program. The patients were evaluated based on their maximum mouth opening (MMO), visual analog scale (VAS), McGill pain questionnaire (MPQ), painDETECT (PT), oral health-related quality of life (OHRQoL) at the beginning of treatment and at the end of the first and sixth months.

Results: The MMO, VAS, MPQ, and OHRQoL values were significantly improved in both groups at the end of the first treatment month. At the sixth-month follow-up, the MOS group maintained well-being in pain-free MMO but their VAS, MPQ and OHRQoL scores worsened compared to the first-month data. In the exercise group, improvement continued in the MMO measurements and the VAS, MPQ and OHRQoL scores. The PainDETECT scores showed a statistically significant decrease in the exercise group only at the sixth month compared to the baseline and first-month follow-up.

Conclusions: The temporomandibular joint exercise program implemented by patients under the close follow-up of the clinicians is an easy and non-invasive method that does not cause any additional financial and psychological burden on patients in both acute and chronic processes and improves the quality of life and reduces neuropathic pain in the long term.

Key words: Temporomandibular disorders, exercise therapy, occlusal splint, neuropathic pain, oral health-related quality of life

P338

ROLE OF ULTRASOUND GUIDED PROCEDURES IN PAIN MANAGEMENT IN KNEE OSTEOARTHRITIS**Sérgio Pinho, Duarte Calado, Nuno Tomás, Eduardo Gonçalves, Miguel Andrade, Suzana Gouveia**

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INTRODUCTION: Pain is a significant cause of disability in knee osteoarthritis. Ultrasound guided procedures (UGP) can be used to reduce symptoms and improve functional independence.

OBJECTIVE: Assess pain evolution and functional impairment in patients with knee osteoarthritis submitted to UGP.

METHOD: Prospective observational open study of patients that underwent an UGP between 11/2018 and 05/2019. Pain magnitude was evaluated through an assessment in which maximum pain levels were registered according to the numeric pain rating scale. Functional impairment in daily life activities (DLA) and quality of life (QoL) was assessed through a Likert scale. The assessment was performed in person before the procedure, and by telephone inquiry at 1st, 3rd and 6th month after the procedure. The following data were collected: sex, age and drugs administrated. Factors of exclusion of this study were the impossibility of providing assessment data, conventional rehabilitation, surgery or other procedure of the interventional area during the assessment period. No patient was excluded from this study. IBM-SPSS software was used for data analysis.

RESULTS: We included 40 patients: medium age was 63.80 years ($SD \pm 13,01$ years) and 82,22% were women. A total of 45 procedures were registered. There was a statistically significant improvement of maximum pain levels in 1st ($p=0,000$), 3rd ($p=0,006$) and 6th month ($p=0,001$) and pain impairment in DLA and QoL when compared to baseline ($p<0,05$). Comparing the maximum pain intensity in the various classes of drugs used, no drug showed superiority over the others at 1st ($p=0.924$), 3rd ($p=0.767$) and 6th month ($p=0.446$) post-intervention.

CONCLUSIONS: UGP are useful and effective in pain management of knee osteoarthritis, allowing the improvement functional independence in DLA and QoL. Limitations of the study were lack of control group, researchers were not blinded, difficulty of telephone inquiry and possible interference of other external factors.

P339

INVESTIGATION OF VALIDITY AND RELIABILITY OF TURKISH VERSION OF TASC AND EFFECT OF UPPER EXTREMITY SMC ON GROSS MOTOR FUNCTION OF CHILDREN WITH SPASTIC CP**Seyma Kilcioglu**

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Introduction: Many studies have shown that in children with cerebral palsy (CP), damage in corticospinal tract affects selective motor control (SMC) in various ways. However, there was no tool for assessment of upper extremity SMC of children with spastic cerebral palsy (SCP) in Turkey.

Objective: This study was designed to investigate validity and reliability of Turkish version of Test of Arm Selective Control (TASC) and to provide more understanding of relationship between upper extremity SMC and gross motor function in children with SCP.

Methods: The study included 21 hemiplegic, 11 diplegic and 4 quadriplegic children with CP whose ages are from 4 to 18 and Gross Motor Function Classification System (GMFCS) levels change from 1 to 4. Gross motor functions of children were evaluated with GMFCS. TASC scale was used via video recording to evaluate of upper extremity SMC of children. We calculated concurrent and discriminant validity to test validity of TASC. Internal consistency, test-retest and inter-rater reliability methods were used to analyse reliability of TASC. The relationship between TASC and GMFCS score was examined by using Spearman correlation test.

Results: TASC can make distinction between less affected and more affected sides in hemiplegic CP ($p < 0.05$). The obtained TASC measurements have a high level of internal consistency (Cronbach Alpha: 0.87-0.92), high and excellent level of test-retest reliability (ICC: 0.93/0.95) and excellent level of inter-rater reliability (ICC: 0.96). A strong negative correlation is found between TASC score and GMFCS level ($r: -0.61$ $p < 0.01$).

Conclusions: These findings revealed that Turkish version of TASC is an appropriate tool to objectively evaluate upper extremity SMC in children with SCP. There is a strong correlation between upper extremity SMC and gross motor function in all groups.

P340

HEMORRHAGIC BURSITIS AS A COMPLICATION OF TRANSTIBIAL AMPUTATION: A CASE**Seunghye Han¹, KyungYeul Choi², Ki Chun KIM², JongKyu KIM²**Dept of Physical Medicine & Rehabilitation, Seoul Medical Center, Jungnang-gu, Seoul, Republic of Korea¹, Seoul Medical Center²

Introduction: Stump pain is the most common complaint after lower limb amputation. Commonly it is caused by skin abrasion, neuroma, loosened socket, and mechanical failure. Sometimes infection such as cellulitis may also cause stump pain. We experienced hemorrhagic bursitis associated bony stump spur as a rare complication after transtibial amputation and report it.

Case: A 54-year-old man with both transtibial amputated state complained pain, tenderness, swelling with reddish skin color change on his left stump. He got right transtibial amputation 4 years ago due to diabetic foot ulcer with osteomyelitis. And left transtibial amputation was done with the same reason 2 years ago. For left stump, he suffered for neuropathic pain, and have surgical neuroma excision twice. His last surgery was 6 months ago.

MR image showed soft tissue swelling and septated fluid collection at the stump with rim enhancement, with spicular margin, bone marrow edema at the amputated end of the tibia. Official radiologic reading suggested bursitis below the bony projection of the stump, less likely infection.

Ultrasound-guided aspiration of the bursa was tried and 50cc of red colored fluid was aspirated. Then his pain was relieved. Microscopic exam of the fluid suggested hemorrhagic bursitis. He was referred to orthopedics for surgical excision of the bursa. At the surgical field, the spinous bony spur at the end of the tibia was found. Total bursectomy with bony stump grinding was done. At POD#47, he discharged to home using both prostheses. Now he can walk independently for 100m outdoor with prostheses.

Conclusion: We experienced hemorrhagic bursitis associated bony stump spur after transtibial amputation. It mimics infection such as bursitis or cellulitis. Further study about bony stump spur formation after amputation may be needed.

P341

THE CHARACTERISTICS OF THE HYPERTROPHIC SCAR FIBROBLASTS-DERIVED EXOSOMES IN BURN PATIENTS**SeungYeol Lee¹, So Young Joo²**¹Department of Physical Medicine and Rehabilitation, Soonchunhyang University Bucheon Hospital, Bucheon, South Korea²Department of Rehabilitation Medicine, Hangeang Sacred Heart Hospital Hallym University, Seoul, South Korea

Introduction: Post burn hypertrophic scars are a most common complication of burn injury. The fibroblasts derived from the wound are characterized by increased collagen synthesis and contraction. Exosomes are a kind of membrane lipid vesicles with 30-100nm in diameter, and exosomes were thought to be metabolic products of cells. Stem cell-derived exosomes have some functions of repairing the damaged tissues, and exosomes in cancer cells could affect the pathogenesis of the diseases. There are few studies about the characteristics of exosomes which are derived in the fibroblasts of hypertrophic scar.

Objective: In this study, we investigate the characteristics of hypertrophic scar fibroblasts(HTSFs)-derived exosomes in burn wound compared with human normal fibroblasts(HNFs)-derived exosomes.

Method:HNFs in this study were derived from skin biopsy, while HTSFs were isolated from hypertrophic scars tissues derived during surgical procedures, and HNFs and HTSFs were matched from 5 patients.

Results: The isolated vesicles present an enrichment of several exosomal markers such as CD63, CD9, and CD81, which clearly indicate that this vesicle population is enriched in exosomes. The miRNA expression profiling of HTSFs-derived exosomes and HNFs-derived exosomes from 5 burn patients by miRNA quantitative PCR arrays allowed us to identified 21 miRNAs differentially expressed, among which 7 miRNAs were upregulated and 10 miRNAs were down regulated in HTSFs-derived exosomes. Using miRNA quantitative PCR array, we found a substantial dysregulation of exosomal miRNA levels between HTSFs-derived exosomes and HNFs-derived exosomes.

Conclusions: This study is the first characterization of miRNA content of HTSFs-derived exosomes in burn patients. The results identified biomarkers for hypertrophic scars and contributed to find the specific mechanisms of developing the hypertrophic scars after burn injury.

Key words: Hypertrophic scar, Fibroblast, Exosome
Acknowledgments: This research was supported by Hallym University Fund (2019-24)

P342

REHABILITATION OF AN ACCESSORY NERVE INJURY AFTER RADICAL NECK DISSECTION - CASE REPORT**Silvija Mahnik, Ana Aljinovic, Ksenija Kocijan**

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Introduction: Injury of the 11th cranial nerve (n.accessorius) occurs in 60-80% of cases after radical neck dissection. Nerve injury leads to trapezius muscle paralysis, scapular instability, lowered shoulder, impaired shoulder abduction and pain. We will present a 20-year-old female patient with right shoulder pain and muscle weakness after surgery for metastatic papillary thyroid cancer. On examination, the right shoulder was lowered, the middle part of the trapezius was hypertrophied, the abduction and elevation in were weakened and painful. Right scapular instability was present. Electromyography and nerve conduction study revealed an accessory nerve lesion.

Objective: After the examination, a rehabilitation program was designed to improve shoulder function.

Method: The patient was referred to physical therapy, which included individual exercise and biofeedback. During physical therapy, the patient performed active exercises to strengthen the muscles of the rotator cuff and scapular stabilizers. The reeducation of trapezius activation was performed using biofeedback.

Results: After physical therapy shulder pain was reduced, trapezius muscle function was improved, and active abduction and shoulder elevation were also improved. With the help of biofeedback, the patient learned to control the unstable scapula.

Conclusion: Rehabilitation procedures have achieved satisfactory results of shoulder function in patient with accessory nerve injury after radical neck resection. In such patients, it is necessary to identify the nerve damage as soon as possible and prove it with EMG and NCS and to start treatment.

P343

INFLUENCE OF PHYSICAL REHABILITATION ON PAIN REDUCTION IN PATIENTS WITH PERIPHERAL ARTERY OCCLUSIVE DISEASE**Silvana Stojicic-Djulich, Tatjana Radovanovic, Sanja Tomnanovic-Vujadinovic, Una Nedeljkovic, Slavica Varagic-Markovic, Nela Ilic**

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Background and aims: Peripheral artery occlusive disease (PAOD) is one of the most common cardiovascular diseases. Since the effectiveness of medical therapy is limited and often insufficient, it is important to find additional therapeutic methods in order to achieve the best possible functional outcomes. The aim of our research was to show the effect of physical therapy procedures (electrical therapy, magnetic therapy and exercises) in patients with PAOD.

Methods: Sixty five patients with PAOD were randomly assigned to treatment group (receiving conventional and physical therapy) and control group (conventional therapy). Patients in treatment group underwent 15 physical therapy procedures, every day for 1 hour. Patients were assessed before and right after treatment using claudication distance values, ankle brachial indexes (ABI) and visual analog scale (VAS) for pain reduction.

Results: There were no statistical differences between the groups in age, sex and comorbidities. However, treatment group showed lower claudication distance values, ABI indexes and higher VAS scores before therapy. After the end of treatment there was statistically significant improvement in all outcome measures in treatment group compared to control group.

Conclusion: Physical therapy treatment influences improvement of both, subjective and objective parameters of PAOD. Our findings suggest that it could be considered as one of the additional therapeutic approaches in treatment of these patients.

P344

EXTRACORPOREAL SHOCK WAVE THERAPY IN POSTMENOPAUSAL WOMEN**Simona Balaban, Danijela Kuzmanovic, Natalija Radovančević**

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Introduction: Extracorporeal shock wave therapy (ESWT) is used for conservative treatment of several chronic insertional tendinopathies including the treatment of plantar fasciitis. The latest studies examine the link between the presence of sex hormone receptors in fascial tissue and the influence of the decrease in estrogen hormone levels on myofascial pain .

Objective: The objective was to establish the part that peri and postmenopausal women play in the total number of patients treated by ESWT for chronic plantar fasciitis and the presentation of achieved treatment results.

Method: The study included 68 patients with clinical and ultrasound diagnosis of plantar fasciitis unrelated to systemic disease with symptoms duration more than 3 months treated with ESWT. The sonographic appearances were: thickened plantar fascia, convex shape and hypoechoic change. The treatment included radial ESWT using 2000 impulses 2,2 Bar, 15 Hz in five sessions once a week. The pain level was assessed with a visual analogue scale (VAS) before and after the therapy.

Results: The majority of 68 participants were postmenopausal women, 35 of them, which with 6 perimenopausal women is 60%. Premenopausal women were 9 and 18 were men. In the postmenopausal women group the mean pain score decreased from 8,4 to 2,6; in the perimenopausal group from 7,6 to 2,2; and in the premenopausal women from 8,8 to 2,6. All groups have significantly decreased pain score according to SPSS 19.

Conclusions: According to this study the prevalence of plantar fasciitis is higher at postmenopausal women. After applying ESWT the results showed statistically significant decrease of pain level in groups of pre, peri and postmenopausal women which justifies its use.

P345

CORRELATION BETWEEN PRESENCE OF KYPHOSIS AND DURATION OF TRAINING IN ADOLESCENTS PRACTICING SWIMMING**Slavica Jandric¹, Predrag Kragulj²**

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Introduction. The presence of kyphosis in adolescents could be associated with specific physical activity and duration of training.

Objective. The aim of this study is to investigate correlation between presence of kyphosis and duration of training in adolescents practicing competitive swimming.

Methods. This investigation involved 50 adolescents practicing swimming (25 girls and 25 boys), average age of $11,7 \pm 1,3$ years, ranged 10-14 years. The average duration of the swimming training was 3.0 ± 2 years. Modified original The physical activity and postural disturbance test was used for the investigation. For statistical analysis Pearson coefficient of correlation test was used in order to estimate correlation between presence of kyphosis and duration of training in adolescents practicing swimming. **Results.** It was shown that there was not statistically significant correlation between presence of kyphosis and duration of training in adolescents practicing swimming ($r = -0.120$, $p > 0.05$).

Conclusion. Presence of kyphosis in adolescents trained swimming did not show statistically significant correlation with duration of training in adolescents practicing swimming ($p > 0.05$). Presence of kyphosis did not associated with duration of training. These findings could be useful in practice and further investigation

Key words: kyphosis, adolescents, swimming

P346

EFFECT OF CONTINUOUS AND INTERVALUAL PHYSICAL TRAINING IN THE REHABILITATION OF PATIENTS AFTER SURGICAL REVASCULARIZATION OF THE HEART**Slavica Kozomara**

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Cardiovascular rehabilitation is an integral part of the complex therapy of cardiovascular patients
AIM: The aim of the study was to compare the effect of continuous and interval physical training on the tolerance of effort, muscular strength of the upper and lower extremities and respiratory index in patients after surgical revascularization of the heart.

MATERIAL AND METHODS: The study included 92 patients after surgical cardiac revascularization, who were divided into two groups. The first group consisted of 44 patients and the second group 48 patients. In the first group, there were 30 male and 14 female patients with a mean age of 66 ± 2.9 years. In the second group, there were 30 male and 18 female patients. Mean patient age 65 ± 3.8 years. The first group of subjects were enrolled in a complex continuous-type cardiovascular rehabilitation program, while the second group of patients practiced according to the interval program.

RESULTS: At the end of the 21-day rehabilitation treatment, a statistically significant difference in upper and lower extremity muscle strength was observed in both study groups ($p < 0.05$) and between study groups ($r < 0.001$); a statistically significant difference was registered with respect to physical effort tolerance in both groups of subjects and between the groups tested ($p < 0.05$); the length of the exercise test at showed a statistically significant difference ($p < 0.05$) in the first group of subjects, whereas a statistically significant difference ($p < 0.001$) was statistically significant in the second group of subjects; respiratory index values in both groups of subjects were statistically significantly higher ($p < 0.001$).

CONCLUSION: In both groups of subjects after the rehabilitation treatment, there was a statistically significant difference in the increase in upper and lower extremity muscle strength, physical effort tolerance and respiratory index.

KEY WORDS: physical training, muscle strength, effort tolerance, respiratory index.

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THE IMPORTANCE OF EARLY DIAGNOSIS AND REHABILITATION OF INFANTS WITH BRACHIAL PLEXUS DAMAGE**Slavica Varagic Markovic¹, Sanja Tomanovic Vujadinovic¹, Silvana Stojcic Djulic¹, Nela Ilic¹, Una Nedeljkovic¹, Ivana Petronic Markovic¹**Clinic for physical medicine and rehabilitation, Clinical Centre of Serbia, Belgrade, Serbia¹, University Children Hospital, School of Medicine University of Belgrade²

Introduction: Birth defects of the brachial plexus in newborns are a major problem both in the world and in our country, even though everything is done preventively through prenatal diagnostics with the aim of expanding the accommodation in pests. The method of choice of therapy depends on timely accurate diagnoses as lessons are provided that give a clinical picture similar to the clinical picture in infants with brachial plexus damage (fractures of the large bones and humerus, epiphysiolysis, osteomyelitis, etc.).

Objective: The aim of the paper is to show incidence of brachial plexus damage in our institution and to point out the importance of timely diagnosis of brachial plexus damage in newborns and to show the importance of early rehabilitation whose application would allow better recovery and quality of life of the child.

Method: A ten-year retrospective study design was used. This study include all newborn (after vaginal delivery) with brachial plexus palsy who were born between 2007 and 2017. Their gender and birth weight were recorded also.

Results: The incidence rate of brachial plexus palsy was 0,123% (63 of 51346 newborns). It were 43 female and 20 male newborn with average weight of 4400 gr.

Conclusion: Brachial plexus palsy is rare, but severe complication, the most common in female and newborn with higher birth body weight. The importance of early diagnosis and rehabilitation is to restore as much as possible the lost function and power of the paralytic muscles, to prevent the onset of atrophy and contractures, and to establish coordination and movement patterns with the lesion of the affected limb.

P348

APPLICATION OF OSSEOINTEGRATION IN THE REHABILITATION OF TRANSFEMORAL AMPUTEES**Slavica Stojanovic¹, Bozidar Grujicic¹, Milutin Radotic¹, Gordana Matovic¹, Marko Lukic², Srdjan Djordjev³**Specialised Hospital for Rehabilitation and Orthopedic Prosthetic, Belgrade, Serbia¹, Orthopedic Company Humanis, Belgrade, Serbia², Hospital Vrsac, Serbia³

INTRODUCTION: Osseointegration is implantation of a prosthetic device directly into bone, which facilitates the process of securing an implant, avoiding common complications by conservative transfemoral amputation. **AIM:** was to report first results of the application of the osseointegration in Serbia.

METHODS : Patients admitted in the specialised hospital for rehabilitation and orthopedic prosthetic in period from 2017-2019. 'Keep Walking' transfemoral osseointegration was done. Trauma was the reason for amputation. Followed outcomes were: usage of prosthetic device during the day, patients' independence, soft tissue response, complications, prosthetic device comfort .

RESULTS: Male patients age 33-54ys with transfemoral traumatic amputation. Prosthetic rehabilitation according to osseointegration protocol was undergone. Usage of prosthetic device was significant prolonged, patients' independence with device was increased. Energy expenditure was lower. Full control of prosthetic device was achieved. Complications in terms of soft tissue infection and swelling are more frequent by osseointegrative prosthetic device.

CONCLUSION: First results on small number of patients have shown that osseointegrative prosthetic device have superior applicability in comparison to conventional prosthetic device. Limitations of Osseointegration are higher complications rate and expressiveness. **KEY WORDS:** osseointegration, transfemoral amputation, prosthetic device , prosthetic rehabilitation

P349

SPINAL MANIPULATION- MYTH OR EVIDENCE BASED MEDICINE?**Slaviša Zagorac, Goran Tulic, Jovana Grupkovic, Miloš Vasic, Stefan Korica, Uroš Novakovic**

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Introduction: Spinal manipulation is the basis of work of chiropractors around the world. Unlike the well-developed western countries, where spinal manipulation is strictly defined by law, in middle and poorly developed countries abuse of this technique is very common – when the technique is wrongly indicated or poorly performed which can lead to serious complications and consequences.

Objective: The aim of this study is to determine whether spinal manipulation is safe in nonoperative treatment of spinal conditions.

Method: The patients shown in this report were subjected to spinal manipulations that, due to misdiagnosing and poorly performed manipulation, led to serious consequences. After that a systematic review based on spinal manipulations is shown.

Results: These cases showed that any manipulation on the spine (including spinal surgery) requires detailed diagnostics which, in addition to x-rays, today implies obligatory CT scan or MRI, and the majority of cases require both.

Furthermore, detailed anamnesis is of crucial importance since it shows comorbidities, as it was the case regarding the first patient who suffered a CVI due to undiagnosed aneurism.

Conclusion: Spinal manipulations represent a method that has an important place in nonoperative treatment of conditions of the spine, but only if it is preceded by detailed and accurate diagnosis, and if the manipulation is performed by a board certified physician.

P350

CORRELATION OF COLOR DUPLEX ULTRASONOGRAPHIC FINDINGS ON CAROTID ARTERIES AND LOWER EXTREMITIES ARTERIES IN PATIENTS WITH BALNEOPHYSICAL TREATMENT**Snežanab Radulovic, Aleksandra Jovanovic, Ljiljana Josov, Aleksandar Jokic S**

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Introduction. Color duplex ultrasonography (CDS) is a non-invasive diagnostic procedure for the examination of blood vessels, which by measuring blood flow velocity and showing the internal wall of the blood vessel, assess the degree of narrowing or enlargement of the vessel, changes in the blood vessel structure and the shape and length of the blood vessel are observed. The most common pathological process in the arterial network is atherosclerosis. It is a chronic, systemic, progressive, degenerative-proliferative disease of the large and medium arterial blood vessels.

Objectiv: The aim of this study is to visualize changes in the carotid arteries and lower extremity arteries in the same patient, as well as to correlate the ultrasound findings.

Method: This retrospective-prospective study includes patients, both of sexes, who was on balneophysical treatment for the period of 01.06.2018. All were made CDS of the vessels of the neck and lower extremities. For statistical data processing, it was used Hi square and T test.

Results: Of the 60 patients treated, 54.5% were female. The analysis of risk factors for atherosclerosis showed that the highest rate of subjects had hypertension 64% and hyperlipoproteinemia 52%. Comparative analysis of the two segments showed no statistically significant difference in the degree of damage compared to the changes, since moderate changes in the carotids and arteries of the lower extremities were observed in 45% of patients, while severe changes were observed in only 7% of subjects in carotid blood vessels. It has been shown that as many as 75% of subjects who have experienced changes in blood vessels consume cigarettes.

Conclusion: Timely implementation of non-invasive diagnostic procedures in patients presenting with risk factors for atherosclerosis in the blood vessels can promptly detect changes, initiate adequate treatment, and thus prevent subsequent complications.

Keywords: carotid arteries, plaque, atherosclerosis, color duplex.

P351

COMPARISON OF PAIN-RELATED CHANGES IN CEREBRAL BLOOD VOLUME IN BURN PATIENTS WITH NEUROPATHIC PAIN**So Young Joo¹, Seung Yeol Lee²**

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Introduction : Most burn patients suffer neuropathic pain. Neuropathic pain is generally chronic and disabling, and responds poorly to conventional treatment. The mechanisms that cause chronic pain after burn are not clear. There are few understandings of how chronic pain develops after injury. Some Studies have reported that both brain structure and function are altered in the presence of chronic pain.

Objective : To investigate changes in the pain network associated with neuropathic pain, magnetic resonance imaging(MRI) was used to measure cerebral blood volume(CBV) in burn patients.

Method: 55 in patients subjects were recruited to participate in this study. The Subjects had complaints of severe pain that rated at least 5 on visual analogue scale(VAS) despite treatments including medications and physical modalities. We also recruited 20 healthy, age-matched control participants. For each of the participants, two high-resolution T1-weighted images were acquired, one before and the other 7 minutes after IV injections of gadolinium contrast agent. The CBV maps between 55 burn patients and 20 healthy controls were compared. The relationship between individual participant CBV and VAS score was examined.

Results : Our analysis revealed that non-electrical burn patients with neuropathic pain had hypermetabolic state of the brain cortex(precentral gyrus and postcentral gyrus) and had lower CBV in the anterior lateral temporal cortex. And the analysis found that electrical burn patients with neuropathic pain had no hypermetabolic state of the brain cortex and had lower CBV in inferior middle temporal gyrus, anterior lateral temporal lobe, and insula.

Conclusions: We observed increased and decreased CBV in patients with thermal injury compared with the CBV in healthy controls. And also this study found the increased and decreased CBV in different regions associated with cerebral pain network between electrical injury patients and non-electrical injury patients.

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EFFECTS OF AEROBIC EXERCISE AND INCENTIVE SPIROMETER USE ON THE RESPIRATORY MUSCLE STRENGTH OF NEURO-DISABLED PATIENTS**Sofia Ferfeli, Vasiliki Vaza, Evgenios Diamantidis, Aikaterini Spilioti, Charalampos Syntetos, Anna Danopoulou**

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Introduction: Respiratory muscle weakness may be present in patients with neurological disorders among which Stroke, Spinal Cord Injury, Cerebral Palsy (CP), Poliomyelitis, Multiple Sclerosis (MS), Myasthenia Gravis, Guillain-Barre' syndrome and Amyotrophic Lateral Sclerosis. It is recorded by measuring the Maximal Expiratory Pressure (MEP) and Maximal Inspiratory Pressure (MIP) at the mouth, which are noninvasive muscle strength indices.

Objective: To assess the respiratory muscle strength change of 15 neuro-disabled inpatients by implementing aerobic exercise and incentive deep breathing exercises to their rehabilitation program.

Method: 15 inpatients with neuro-disability such as stroke, CP, MS, poliomyelitis and Friedreich's ataxia, already undergoing a personalized rehabilitation program, had low impact cardiovascular exercise added to their program via standard arm ergometry 3 times per week for 2 months. Also implemented to their daily routine was the use of an incentive spirometer 3 times per day, also for a 2-month period. Before and after the intervention we recorded the patients' MEP and MIP values by a Respiratory Pressure Meter (Carefusion Micro RPM), as well as resting heart rate and oxygen saturation with pulse oximetry.

Results: At the end of the 8-week intervention we recorded slightly higher maximal respiratory mouth pressures, in both MEP and MIP. Resting heart rate and oxygen saturation did not vary significantly. Most patients were satisfied with the alteration in their rehabilitation program and requested to continue following it after the end of the 2-month period.

Conclusions: We found that the addition of low impact cardio-pulmonary and deep breathing exercise to already existing rehabilitation programs for neuro-disabled patients seems to have a positive effect on their respiratory muscle strength, as well as provide them with new incentive for adhering to their programs.

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EFFECTS OF PROPRIOCEPTION TRAINING ON SOMATOSENSORY DEFICITS AND WALKING ABILITY IN A PATIENT WITH MULTIPLE BRAIN AND SPINAL CORD EPENDYMOMA EXCISION. A CASE REPORT**Sofia Ferfeli¹, Christos Stamatopoulos², Zaira Simeonidou³**

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Introduction: Ependymomas are tumors that develop in the Central Nervous System (CNS) from ependymal cells. They are classified in 3 different grades (Grade I to III) according to their characteristics and the treatment of choice is neurosurgical removal, with other treatment options being radiation therapy, stereotactic radiosurgery and chemotherapy.

Objective: To determine the effect of a home based proprioception training program on somatosensory deficits and walking ability, in a patient with multiple prior excisions of Grade II CNS ependymomas.

Method: A 44 year old male patient has undergone two brain and two spinal cord ependymoma excisions as well as a stereotactic radiosurgery procedure within the last 11 years. Following his last cervical ependymoma excision he experienced improvement in muscle strength and function but was found to exhibit proprioception deficits. When discharged he was instructed to follow a daily 2- month home based proprioception training program which included balance exercises on stable and unstable surfaces and somatosensory discrimination training. Before and after the intervention the patient was evaluated with the Revised Nottingham Sensory Assessment (RNSA) and his functional mobility was recorded using the Timed Up and Go (TUG) and Two-Minute Walk Test (2MWT).

Results: At the end of the 2-month intervention the patient exhibited improvement in joint position sense, direction of movement and stereognosis as recorded by the RNSA. His TUG and 2MWT performance was found slightly improved and the patient reported more self-confidence when walking.

Conclusions: The implementation of proprioception training was found to be beneficial for our patient, improving his somatosensory deficits as well as his functional mobility and it was further included in his rehabilitation program.

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PAIN MANAGEMENT WITH PROLOTHERAPY FOR QUADRICEPS ENTHESITIS IN A BILATERAL LOWER LIMB AMPUTEE. IMPROVING PROSTHETIC USE AND PERFORMANCE. A CASE REPORT**Sofia Ferfeli, Vasiliki Vaza, Charalampos Syntetos, Marios Spiliotis, Evgenios Diamantidis, Anna Danopoulou**

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Introduction: Musculoskeletal pain, during or after the use of a prosthesis is a common problem encountered following a lower limb amputation. Though usually treated with rest, anti-inflammatory medication, physical modalities and temporary discontinuance of the prosthesis, sometimes the pain persists, discouraging the amputee from further using his prosthesis.

Objective: Our goal was to adequately manage the knee pain of a 65 year old male bilateral amputee, which was only experienced when walking. Clinical examination and plain x-rays revealed a quadriceps enthesitis with calcinosis as a pain generator. The patient had already undergone conventional treatment with rest, Non Steroid Anti-inflammatory Drugs and physical modalities with minor improvement.

Method: Three consecutive prolotherapy injection treatments were applied, with a two week interval between them. The patient followed the same rehabilitation program as before the prolotherapy treatment, which consisted of active kinesiotherapy, muscle strengthening and aerobic exercise. Before and after the intervention we recorded the patient's level of pain using the Numeric Pain Rating Scale (NPRS), the Timed Up and Go (TUG) and Two-Minute Walk Test (2MWT) with both prostheses in use.

Results: There was great improvement in the patient's self-assessment of pain as recorded by the NPRS and, as a result, a better adherence to the rehabilitation program. The amputee's functional exercise capacity as measured by the 2MWT was also found improved, whereas the TUG test was only slightly improved. No significant side effects were noted.

Conclusions: We conclude that prolotherapy proved to be a safe and effective pain management technique for our patient. It greatly diminished his pain level and improved his mobility and functional exercise capacity, giving him incentive to resume his rehabilitation program with use of his prosthesis.

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RISK FACTORS OF DYSPHAGIA IN CRITICAL ILLNESS MYOPATHY**Sofia Vourli**

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Introduction: Dysphagia is frequent among patients with CIM. However, neither its prevalence nor the predisposing factors are well established.

Objective: This study aims to evaluate the prevalence as well the contributing risk factors of dysphagia in patients with CIM during rehabilitation phase.

Methods: we conducted a retrospective case-control study, including patients with CIM hospitalized in a rehabilitation clinic from 2018 to 2019.

Results: Thirty-seven patients with CIM (22 males and 15 females) were enrolled, with a mean age of 70 years old. On average patients stayed in the ICU for 29 days and received 20 days of mechanical ventilation. Dysphagia was present in 78.4% of them (enteral feeding or oral feeding with diet texture modification), while acute term severe dysphagia (tube feeding) was present in 29.7% of patients after the initial clinical feeding assessment. Length of stay in ICU, duration of mechanical ventilation and tracheostomy were evaluated as risk factors. Longer duration of mechanical ventilation was independently associated with dysphagia and need for enteral feeding while each day of mechanical ventilation significantly increased the odds for tube feeding (OR=1.226, p=0.015). Sepsis, pneumonia, tracheostomy, duration of mechanical ventilation and history of major surgery were evaluated as predisposing factors for long term severe impairment of swallowing function. Sepsis was found to be an independent risk factor for long term severe dysphagia (OR=8.9, p=0.017), as well the duration of ventilation (OR=1.13, p=0.02).

Conclusions: Dysphagia in patients with CIM is a predictor of complications and important determinant of the patient's outcome. Therefore, defining the predisposing factors could lead to an early detection of the entity and implementation of a specific rehabilitation program, in order to reduce the disease burden.

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GASTRIC ADENOCARCINOMA REVEALED BY PARANEOPLASTIC CEREBELLAR DEGENERATION**Sónia Tomé¹, Margarida Sampaio¹, José Barreto¹, Ana Azevedo², Joana Leal¹, Catarina Aguiar Branco¹**

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Introduction: Paraneoplastic cerebellar degeneration (PCD) is an uncommon immune-mediated neurological syndrome associated with malignancy (most often lung, breast and ovarian cancers). Its functional impact may be devastating, limiting the remaining active life expected for this patients. Treatment consists in management of the neoplasm, immunotherapy, and rehabilitation. Prognosis depends on neoplasm type and stage at the time of detection. Full functional recovery is unlikely, however rehabilitation can improve physical capacity and activities of daily living, which can positively impact the quality of life (QoL) of patients.

Objective: to describe a case of gastric neoplasm presenting with PCD and highlight the importance of comprehensive rehabilitation programs in oncologic care.

Method: Description of the case. Brief review of the literature; search motors: Pubmed, Medline, NIH; MESH terms: "paraneoplastic cerebellar degeneration/treatment."

Results: A male patient, 66 years old, was transferred to the Neurology department of our hospital with a history of altered vision and gait. He presented with nystagmus, appendicular and gait ataxia and severe difficulty in standing. An extensive study revealed a gastric adenocarcinoma. Other causes of cerebellar ataxia were excluded (metastases, toxic, metabolic, neurodegenerative); therefore, PCD was determined. The patient initiated chemotherapy and immunotherapy, while surgical treatment was planned. He soon started rehabilitation with a multidisciplinary approach, consisting of rehabilitation nursing, physical therapy, and speech therapy (due to development of dysphagia and dysarthria). Some functional recovery was achieved, particularly in standing/orthostatic balance. After hospital discharge, he was to be admitted to a rehabilitation facility to maintain a comprehensive rehabilitation program.

Conclusions: PCD has a profound impact on patients' functional status and overall QoL. Rehabilitation is one of the cornerstones for treatment in PCD and should be considered in the care of oncologic/terminally ill patients, in order to enhance their QoL and enable them to live in the most functional, independent way possible.

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RELATIONSHIPS BETWEEN SHOULDER PAIN AND DISABILITY IN PATIENTS WITH SHOULDER DYSFUNCTION**Sonja Nejkov¹, Vesna Bokan-Mirkovic¹, Marina Vukovic¹, Tatjana Matejevic²**Center for Physical Medicine and Rehabilitation, Clinical Center of Montenegro, Podgorica, Montenegro¹, Special Hospital for Rehabilitation Ribarska Banja, Ribarska Banja, Serbia²

Introduction: Shoulder pain is a common musculoskeletal disorder that has a significant impact on the patient's quality of life and functional health. Shoulder problems can significantly affect a patient's ability to work and other activities of daily life. A variety of shoulder disorders can cause subsequent disability.

Objective: The purpose of this study was to investigate the relationship between the shoulder pain and disability in patients with shoulder dysfunction.

Method: Fourteen patients (5 man and 9 women) participated in this study, with shoulder disorders with a varying diagnosis including rotator cuff disorder and that tendinosis, calcific tendinitis, partial thickness tears, subacromial bursitis and acromioclavicular joint pathology. All patients are clinically and ultrasound screened. Patients were asked to reported the shoulder pain intensity on visual analog scale (VAS) and the shoulder pain and disability index (SPADI). SPADI was developed to measure current shoulder pain and disability in an outpatient setting. The SPADI contains 13 items that assess two domains; a 5-item subscale that measures pain and an 8-item subscale that measures disability.

Results: Mean value of VAS was 6.28 ± 1.93 and the duration of the symptoms was 11.76 ± 8.31 months. We found a good positive correlation using Pearson's rank test between VAS and total pain score ($t = 3.4537$, $df = 12$, $p\text{-value} = 0.004$, correlation coefficient= 0.7060386), and moderated positive correlation between VAS and total disability score ($t = 2.7523$, $df = 12$, $p\text{-value} = 0.001$ correlation coefficient= 0.6220785) but there is no correlation between total SPADI score and VAS ($t = 1.7787$, $df = 12$, $p\text{-value} = 0.1$, correlation coefficient= 0.4567797)

Conclusions: The study showed correlation between the shoulder pain and disability in patients with shoulder dysfunction.



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GENDER-RELATED DIFFERENCES IN DYSVASCULAR LOWER LIMB AMPUTEE PATIENTS

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Introduction: Lower limb amputation (LLA) is one of the most devastating consequences of peripheral arterial disease and diabetes and is associated with significant morbidity and mortality. Patients with amputations are usually elderly with several comorbidities and thus survival rate after amputation is poor. Despite the considerable number of studies on lower limb amputations, there are not many addressing gender differences.

Objective: To evaluate clinical differences between male and female dysvascular lower limb amputee patients.

Method: Observational study of patients with first dysvascular major (transtibial and transfemoral) lower limb amputation admitted to rehabilitation from January to September 2019. Amputations due to tumor, trauma, congenital abnormality, orthopedic complications or intra-venous drug use were excluded.

Results: The total number of patients was 102, mean age 68.6 (SD 10.2), 75.5% had transfemoral LLA and 70.6% had diabetes. Overall, 19.6% of patients were women. There were no significant gender differences by age (68.4 vs 69.7 years, $p=0.617$), previous lower limb revascularization (24.5% vs 10.0%, $p=0.089$), time from amputation to rehabilitation (104.3 vs 106.0 days, $p=0.976$) and duration of rehabilitation (76.1 vs 76.3, $p=0.909$). Female patients with LLA had significantly higher levels of cholesterol (5.2 vs 4.3, $p=0.022$), triglycerides (2.4 vs 1.6, $p=0.040$) and urea (7.8 vs 6.4, $p=0.022$). Levels of hematocrit (39.0 vs 36.2, $p=0.035$), total bilirubin (11.5 vs 7.4, $p=0.000$), ALT (16.0 vs 12.1, $p=0.010$) and AST (20.9 vs 18.2, $p=0.022$) were significantly higher in males. Regarding comorbidities and drugs, no significant differences were noted between males and females, except for ever smoking which was significantly more common in males (76.8% vs 45.0%, $p=0.011$).

Conclusion: Compared to male, female dysvascular lower limb amputee patients had higher levels of cholesterol and triglycerides. There is a need for better control of these important modifiable factors.

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APPLICATION OF REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION IN THE INSULAR CORTEX FOR THE TREATMENT OF PATIENTS WITH ABUSE**Stoyan Bozhinov¹, Dimitar Vasilev², Plamen Bozhinov¹**Neurology and Neurosurgery, Medical University of Pleven¹, Pleven, Medical Center "Therapy 2007", Varna², Bulgaria

Introduction: In recent years there is an increasing number of articles concerning the use of magnetic brain stimulation for treating patients with substance-use disorders (SUDs). After careful literature review of more than 50 articles we qualified the insular cortex as a leading target in the modern therapy of abusive behavior.

Objective: To put the new methods of brain stimulation into the perspective of the difficult therapy of SUDs and evaluate the efficiency of rTMS applied to the insular cortex among patients with abuse.

Method: The including criteria for the patients were having a history of harmful substance use for over a year. The repetitive transcranial magnetic stimulation (rTMS) was carried out for 10 consecutive days with the coil being placed over the insular cortex. We performed EEG monitoring of each patient on admission and two weeks after the final rTMS session to objectify the results.

Results: From 10 patients subjected to this treatment we had 3 with alcohol abuse, 4 with abuse towards benzodiazepines and 3 with severe amphetamine abuse. For 5 of these patients we achieved complete withdrawal from the harmful substance use, in 4 of them there was a significant reduction in the dosage and frequency of intake and one patient was lost for follow-up.

Conclusion: rTMS in the insula is a promising alternative to standard protocols for the treatment of addiction both as monotherapy and in combination with drug therapy.

Keywords: rTMS, insula, substance-use disorders, abuse, EEG

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THE PREVENTION EFFECT OF WHOLE BODY VIBRATION ON ORTHOSTATIC HYPOTENSION IN SPINAL CORD INJURY PATIENTS – A PILOT STUDY**Sukbong Yun**

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Introduction: Orthostatic hypotension results in cerebral hypoperfusion and several symptoms such as dizziness, fainting and syncope. This is a negative impact upon the ability of SCI individuals to participate in rehabilitation. Therefore, prevention and treatment of orthostatic hypotension in SCI patients is very important.

Methods: Participants with inclusion criteria were: cervical SCI patients with orthostatic hypotension symptoms above a certain angle at the tilt table. Participants were excluded if they had any condition, such as severe hip or knee flexion contractures $>30^\circ$, and/or uncontrolled autonomic dysreflexia. A tilt table angle at which they began to show orthostatic hypotension symptoms was measured before treatment. After that, tilt table with whole body vibration treatment was applied for 20 minutes at the angle that orthostatic hypotension symptoms began to appear. A vibration frequency was 10 Hz and amplitude was 4.0mm. Ten treatment sessions were given for 2 weeks. The tilt table angle at which they began to show orthostatic hypotension symptoms was measured after treatment.

Results: Five participants A) 35 years old female, neurological level of injury C2, ASIA B, B) 61 years old male, neurological level of injury C3, ASIA A, C) 55 years old male, neurological level of injury C5, ASIA A, D) 42 years old male, neurological level of injury C4, ASIA A, E) 75 years old male, neurological level of injury C5, ASIA D complete the intervention. In all patients, the tilt table angle was increased after treatment and there was no orthostatic hypotension symptoms at the pre-treatment angle. Patient A had an angle of 35 degrees before treatment and improved to 80 degrees after treatment. ($35^\circ \rightarrow 80^\circ$), B($40^\circ \rightarrow 65^\circ$), C($70^\circ \rightarrow 85^\circ$), D($50^\circ \rightarrow 80^\circ$), E($45^\circ \rightarrow 70^\circ$).

Conclusion: A Tilt table with whole body vibration therapy in adults with SCI might help prevent symptoms of orthostatic hypotension.

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LYMPHATIC DRAINAGE AS A PART OF REHABILITATION**Suzana Miletic**

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Introduction: impairment of lymphatic circulation can cause very serious health issues, especially if lymph vessels or nodes are impaired or missing and lymph cannot move forward. Injuries, some surgical interventions, removal of lymph nodes or other issues can lead to swelling (lymphoedema, oedema, lipoedema). Application of manual lymphatic drainage (MLD) decreases volume of swelling, stops the reaccumulation of fluid, and speeds the recovery of patient. In rehabilitation process, MLD has a tremendous influence.

Goal: the goal is to point to effects of MLD as a therapeutic method and to its use in preserving health and decreasing swelling at certain conditions and disorders.

Method: the methods used in rehabilitation are: measurement of healthy and affected extremity before and after therapy, inspection of swelling, skin appearance and joint mobility.

Results: in the analysis of the results the data was used that was collected through the table of measurements of circumference of swelling. The data indicates that the decrease of oedema is 50-100%. In 1 year period 30 patients with different conditions were treated with MLD and their progress followed. It was noticeable that MLD not only decreases oedema but stops the reaccumulation of oedema and speeds up the rehabilitation.

Conclusion: to preserve and enhance health, MLD can be used as a method of prevention and treatment. It is necessary to apply this technique in resolving oedema, lymphoedema and lipoedema, and make it regular practice in treatment of patients with swelling of different type.

Key words: Lymphatic drainage, oedema, lymphoedema, lipoedema



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HAND FUNCTION DISORDERS OF CHILDREN

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The big range of motion of the thumb, the ability to recess the palm, the placement of the thumb and the fifth finger in opposition to the other fingers, as well as the fact that multiple muscles of the hand and fingers are involved in all movements simultaneously, result in very precise and coordinated movements of the hand and fingers. This allows different hand grips to be performed. Grips are a pattern movements used by man in his daily activities. There are power grasps and skill grasps. The movements of the thumb represent the most complex and effective phenomenon of the functional possibilities of the fingers.

Objective: To demonstrate the specificity of kinesiotherapy treatment for children with impaired hand function.

Methodology: presentation of cases of hand dysfunction in conditions after brachial paralysis, trauma, burns, spastic hand, transposition of the tendon from the foot to the hand and polycization of the index finger.

Results: Kinesiotherapy treatment leads to improved mobility, coordination and grip of strength and skill.

Conclusion: By knowing the proper functioning of the hand, the therapist recognizes deviations from the optimal kinesiological parameters. With specific kinesiotherapy treatment, the manipulative abilities of the child's hand increase, even in the event of their deficiency.

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EVALUATION OF THE LEVEL OF KINESIOPHOBIA IN PATIENTS WITH HEART FAILURE**Svitlana Hrechko^{1,2}, Tetyana Amelina², Irina Trefanenko²**Internal Medicine, Physical Rehabilitation and Sports Medicine¹, Bucovinian State Medical University², Chernivtsi, Ukraine

In recent years Secondary prevention programs focused on physical activity and cardiac rehabilitation and have been widely used as prevention of all causes of cardiovascular mortality and morbidity. However, insufficient participation and adherence to rehabilitation programs are an increasing problem for this population due to the limited daily life activities. Meanwhile the patients with chronic diseases or avoidance behavior in pain characterize an adaptive part of the behavior as a natural response to damage and only part of them will suffer true kinesiophobia without being able to avoid their fear. Kinesiophobia is a fear of physical exercises that might get worse the case of cardiovascular disease.

The aim of the study was an assessment of the level of kinesiophobia for cardiac function evaluated by clinical parameters in patients with cardiovascular disease. The analysis of clinical, laboratory, instrumental, including echocardiographic (Echocardiography) 81 patients (28 women) aged 61.9 ± 7.48 years hospitalized in the acute coronary insufficiency unit was performed. Kinesiophobia was assessed using the Tampa Scale of Kinesiophobia Heart (TSK-Heart) questionnaire.

In the case of concomitant valve pathology (valves insufficiency) was observed a significantly higher TSK compared to the mean or mild (45.7 ± 2.05 vs. 37.9 ± 3.18 , $p < 0.05$). TSK scores increased with age ($p < 0.05$), higher in women than in men (45.71 ± 3.14 vs. 38.11 ± 2.19 , $p = 0.05$) and in patients with atrial fibrillation (45.3 ± 3.23 vs. 35.9 ± 3.38 , $p < 0.05$). Index TSX rises significantly in the case of severe heart failure (NYHA IV) than in the lower classes ($p < 0.05$). Patients with heart failure are characterized by increasing body mass index ($p = 0.05$)

Thus, among the patients with cardiovascular disease, kinesiophobia has many causes and increases with progression of the symptoms of heart failure.

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QUALITY OF LIFE IN PATIENTS WITH LOWER LIMB AMPUTATION**Tamara Vukic, Marjeta Majer, Nada Ozimec, Pero Hrabac**

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Introduction: The evaluation of quality of life in amputee patients contributes to the better evaluation of the prosthetic rehabilitation process and should result in improvement of rehabilitation procedures and satisfactory quality of life after the rehabilitation.

Objective: The aim of this study was to estimate the quality of life in patients after the lower limb amputation.

Method: A prospective quality of life study was conducted on 140 amputee patients (mean age 65.9 years, females 31.4%) with unilateral transfemoral or transtibial amputation. Quality of life was assessed by the Short Form (36) Health Survey (SF-36).

Results: Compared to general Croatian population, mean values of six out of eight sections of the SF-36 questionnaire were lower in the population of amputees. The most significant differences were seen for physical functioning (mean of 10.6 in amputees, compared to mean of 69.1 in general population) and role-physical (means of 5.7 and 61.5). The sections role-emotional (72.4/68.6) and mental health (62.8/61.9) had higher means in our subjects compared to general population. Aging had a negative effect on quality of life for physical functioning ($p < 0.001$), social functioning ($p = 0.001$), general health ($p = 0.003$), bodily pain ($p = 0.010$), and vitality ($p = 0.023$). In all eight sections, males had higher mean values than females, with differences reaching statistical significance for physical functioning ($p = 0.001$), social functioning ($p = 0.011$), and role-emotional ($p = 0.014$). Regarding the level of amputation, differences between the groups were not significant.

Conclusions: Results showed that in amputee patients most sections of quality of life were below the average compared to general population with the exception of limitations due to emotional problems and mental health, which were above the population average. This indicates that there is no permanent decrease in mental health for people with disabilities as these individuals adjust over time and redirect to other values in life.

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THE IMPORTANCE OF CHRONIC BACK PAIN IN THE DIAGNOSIS OF VERTEBRAL FRACTURES IN POSTMENOPAUSAL WOMEN**Tanja Jankovic¹, Jelena Zvekic-Svorcan¹, Aleksandra Mikov^{1,3}, Rastislava Krasnik², Dragana Vuklis³, Danijela Kuhajda⁴,**Faculty of Medicine, University of Novi Sad¹, Special Hospital for Rheumatic Diseases², Institute of Child and Youth Health Care of Vojvodina³, Institute for Pulmonary Diseases of Vojvodina⁴, Novi Sad, Serbia

Introduction: Vertebral fractures are one of the most common manifestations of osteoporosis, which is responsible for increased back pain, decreased mobility and poor functional ability. About ¾ vertebral fractures are asymptomatic and remain unrecognized.

Objective: To determine the association between severe and chronic low back pain with the onset of asymptomatic vertebral fractures in postmenopausal women.

Material and methods : The study was conducted at the Special Hospital for Rheumatic Diseases in Novi Sad in the period of one year on 150 patients in menopause, aged between 50 and 70. The intensity of low back pain in patients was determined by a visual analog pain scale. Vertebral fractures were verified by thoracic and lumbar spine radiography and bone mineral density -BMD, DXA measurement (Dual Energy X-ray Absorptiometry) by „Lunar“. The application of the questionnaire investigated the presence of risk factors.

Results: Average value of intensity of low back pain was 56 mm and lasted approximately for 6.3 months. According to X-rays of the thoracic and lumbar spine, 43.3% (65/150) of the patients showed the existence of vertebral fractures. 21.5% (14/65) of patients had normal DXA findings, 53.84% (35/65) osteopenia and 24.6% (16/65) osteoporosis. The most common fracture localization was at Th 12 in 58% cases and in 38% cases at the L2 vertebra. 110 patients had some risk factors, and the most common was early menopause (43.5%), smoking 42.6% and earlier fractures 22.7%. Patients with vertebral fractures had three or more risk factors.

Conclusion: Asymptomatic vertebral fractures are associated with severe chronic low back pain that increases with the number of vertebral fractures. For early diagnosis, the onset of chronic low back pain, especially in patients with risk factors for osteoporosis, requires special care from the clinician and evaluation in the direction of osteoporosis.

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EFFECTS OF A TABLET PRACTICE PROGRAM FOR APHASIA IN PATIENTS WITH STROKE**Tanja Milovanovic¹, Jovana Malešević², Martina Kovač¹, Aleksandra Vidakovic³, Suzana Dedijer Dujovic¹, Ljubica Konstantinovic³**

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Introduction: It is estimated that 40% of patients diagnosed with stroke experience some degree of aphasia. Aphasia is the loss or impairment of language functions that affect daily social life. Due to the heterogeneity of the lesions, therapy must be adapted to the individual needs of the patient. Tablet applications are a promising treatment method due to the dynamic and intense presentation of the stimulus.

Objective: The goal of this study was to compare the effects of classic therapy with tablet applications therapy.

Methods: The sample consisted of 20 subjects, 12 of whom had severe aphasia, while 8 had milder aphasia. The Boston Diagnostic Aphasia Examination (BDAE) performed language proficiency assessment. Tablet application consisted of two levels (easier and more difficult level), which included tasks for stimulating the production and understanding of oral and written language. The therapy consisted of three blocks, and each lasted two weeks (six weeks in total). Initial testing was followed by therapy A (Tablet application), then therapy B (classic therapy), and again therapy A.

Results: The results showed that subjects with more severe aphasia had a significant improvement in comprehension of orders after A1 therapy ($Z = 3.69, p < .01$) and after A2 therapy ($Z = 3.43, p < .05$), whereas subjects with mild aphasia had significant differences in the field of production after therapy A1 ($Z = 3.74, p < .01$) and A2 ($Z = 3.72, p < .01$), as well as in the field of understanding, after A1 ($Z = 3.94, p < .01$) and A2 ($Z = 3.87, p < .01$). Both groups of subjects did not show significant improvement after therapy B.

Conclusion: The tablet applications therapy can contribute to a better recovery of comprehension of tasks in severe aphasia, and better production and comprehension in milder aphasia than conventional therapy.

Keywords: stroke, aphasia, tablet, applications, therapy



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FOLLOW-UP OF VISUAL EVOKED POTENTIALS IN CENTRAL NERVOUS SYSTEM MATURATION OF PRETERM INFANTS

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Introduction: Visual evoked potentials (VEP) are a valuable diagnostic tool in the detection and assessment of the degree of central neurological dysfunctions as well as for monitoring of central nervous system (CNS) maturation in specific pediatric disorders.

Objective: The aim of our study was to evaluate changes on VEP diagnostics in specific pediatric disorders

Methods: We evaluated 72 preterm infants on 3 separate time occasions: 6, 9 and 12 months old respectively. They were divided into two groups according to the etiology: asphyxia and hemorrhageintracranialis. The diagnostic method that was implemented is VEP flash stimulation with detection of cortical responses according to international 10/20 system. Both eyes were separately tested twice for up to 130 stimulations. Wave forms, latencies and amplitudes were analyzed.

Results: Patients with asphyxia had significantly frequent severe degree of central dysfunction versus than those with hemorrhageintracranialis ($p < 0.05$). Improvement in CNS maturation significantly positively correlated with age ($p < 0.05$).

Conclusion: All patients present some form of dysfunction on VEP evaluation that correlated with the degree of central nervous system damage and age. The VEP is useful in detecting and follow-up of visual conduction disturbance and maturation of CNS, although it is not specific with regard to etiology.

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THE ROLE OF CALCIUM AND VITAMIN D IN THE DEVELOPMENT OF OSTEOPOROSIS DURING PREGNANCY AND AFTER CHILDBIRTH**Tatjana Matejevic¹, Zaklina Stankovic¹, Ljubomir Velimirovic¹, Aleksandar Matejevic², Sonja Nejkov³**¹Specialy hospital Ribarska Banja, Krusevac, Serbia²Worwag pharma³Klinicki centarCrne Gore, centarza fizikalnumedicinuirehabilitaciju

Introduction Pregnancy is a state in which there is an increased need of calcium by a fetus. The organism of a mother adapts to this need by an increased intestinal absorption, or calcium mobilization from the bones. Although rarely, these two processes may lead to the development of osteoporosis and the occurrence of a fracture, most frequently after the first pregnancy.

Objective In order for the calcium to be absorbed from the intestines, vitamin D is necessary. During pregnancy, the ionized calcium values are constant, but a significant reduction of total calcium and phosphorous reserves takes place. Intestinal calcium absorption of a mother is significantly increased, and in the 20th week of pregnancy it is doubled, which is probably conditioned by 1.25 dihydroxyvitamin D, the level of which is constantly increased.

Methods What is shown here is the case of a thirty-year-old patient, with whom a serious case of osteoporosis was diagnosed during the first pregnancy (T score in the region L1-L4 =3,8). During five years of monitoring and adequate advising about the treatment and diet- the sufficient amount of calcium and vitamin D intake, the bone density was noted.

Results Bone density with the most expectant mothers was spontaneously retrieved in 12-18 months, although, most frequently, the normal values were not reached, and the improvement continued 2-4 years after giving birth with the appliance of 1000 mg of calcium daily. What was recorded was the increase in the bone mineral density after 5 years (T-score in the region L1-L4=2,3). During that period the patient had another successful pregnancy.

Conclusion Rarely, but rather seriously, the state of osteoporosis in the third trimester of pregnancy requires full doctor's attention and a possible testing of expectant mothers and new mothers who have pains in the lower spinal part and the hips. Moreover, it requires an adequate diet with enough calcium and vitamin D, as well as an individually adapted physical activity.

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PRIMARY PROPHYLAXIS - THE IMPORTANCE IN THE PREVENTION OF VENOUS TROMBOEMBOLISM IN SURGERY OF THE HIP AND KNEE**Tatjana Radovanovic, Andjela Milovanovic, Nevena Krstic, Tatjana Medic, Slavica Rajevic, Sanja Tomanovic Vujadinovic**

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Introduction: Orthopedic surgeries such as hip and knee surgery lead to high risk (40% - 60%) for the occurrence of VTE. Timely prophylaxis, however, reduces the risk for 10% up to 30%.

Purpose: This paper is aimed at showing the incidence of VTE in patients operated from the hip and knee as well at the importance of primary prophylaxis.

Method: In the period of three years was performed study of 100 patients, who were hospitalized at the Clinic for Orthopedic Surgery and Traumatology, Clinical Center of Serbia, and had surgery of the hip and knee (50 in the hip region, 50 in the knee region). Postoperatively the patients received *heparin*, low molecular weight, and some of them used an elastic bandage (elastic stockings).

Results: Elastic stockings, as a form of mechanical prophylaxis, was used only by 6.7% of patients operated of the hip, and 14.5% of patients operated of the knee (Chi-square = 1.569, $p = 0.177$). Primary pharmacological prophylaxis was correctly dosed in the 26.8% of patients operated of the hip, and in 39.0% of patients operated of the knee (Chi-square = 1.032, $p = 0.207$). Out of the 50 patients operated of the knee, 2 of them developed a DVT, while 48 were without DVT. Out of the 50 patients operated of the hip, 2 developed DVT, and 48 remained without this complication (chi-square = 0.021, $p = 0.884$). After knee surgery, 3 patients had EP, while 47 were without this complication. After hip surgery, 2 patients had EP and 48 were without this complication (chi-square = 0.176, $p = 0.674$).

Conclusions: By applying recommendations for diagnosis and treatment of acute and chronic venous disease we can reduce high risk of VTE in patients operated of the hip and knee.

Keywords: primary prophylaxis, venous thromboembolism, orthopedic surgery.

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OUR EXPERIENCE OF REHABILITATION OF PATIENTS WITH SPINE CHORD INJURY**Tatiana Builova**

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Aim. Rehabilitation of patients with chord spine pathology is one of the most actual and important rehabilitation medicine problem. We analyzed our own 20-years experience of rehabilitation of patients with spinal chord injury. We aimed to analyzed the proposed rehabilitation programm results of patients with spinal chord injury.

Methods. In the process of rehabilitation of patients with SCI we use different rehabilitation methods: balance training, gait training, resistans exercises, physical therapy using suspension systems, physical therapy using exercise equipment, multichannel muscle stimulation during the gait, hydrokinesitherapy, occupational therapy, PNF (proprioceptive neuromuscular facilitation) therapy, psychotherapy. The functional evaluation scale for the patients with SCI (Valutazione Fuczionale Mielolesi, VFM) [M.Taricco et all, 2000] was used. We analyzed the results of PNF-therapy and multichannel muscle stimulation during the gait (172 patients with SCI), PNF-therapy and unstable platform training (113 patients) in an age from 18 to 52 years (74% patients had the cervical level injury).

Results. Daily activity profile in patients improved in all patients with SCI. The ADL profile of patients, who received PNF-therapy and unstable platform training during the rehabilitation course, was significantly better than in patients, treated by the standart rehabilitation methods.

Conclusion. Proposed rehabilitation programmms are effective. The PNF-therapy and unstable platform training combination best improve the activity of daily living even in patients with C3-C7 level injury

P371

PREVENTION OF LUMBAR SYNDROME IN PHYSIOTHERAPISTS**Tatjana Salamon**

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Introduction: Lumbar syndrome is pain in the lumbar spine. It occurs in all age groups of the working age population, in the elderly and more often in children. Due to its high frequency, it is considered a modern occupational disease. Due to the nature of the work and insufficient use of protective positions, back pain is very common with physiotherapists.

Objective: To isolate the risk factors that lead to the appearance of lumbar syndrome and when they occur more often, to prevent them and to reduce the absenteeism caused by this problem.

Methodology: 36 physiotherapists, employees of the Health Center Novi Sad, participated in the research. A questionnaire was used as an instrument, which included questions about the occurrence and frequency of back pain, absence from work as well as the frequency of going to physical therapy. The obtained data were processed by the program Statistica 7.0 and central tendency measures were used.

Results: The results of the study showed that back pain is more common in women and younger people. The average pain intensity on a scale of 1 to 5 was 3.24, and the efficiency of the applied physical procedures was 97%.

Conclusion: Lumbar syndrome can be prevented by ergonomic education, adaptation of the work space, regular physical activity and timely therapy.

P372

FUNCTIONAL IMPROVEMENT IN CASE OF THE PATIENT WITH TERTIARY STAGE OF SYPHILIS**Teja Kovacec Hermann**

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Background: The incidence of primary and secondary syphilis is increasing. Due to the availability of effective treatment, the incidence of tertiary syphilis has decreased. In 2018, three men with tertiary syphilis were reported in Slovenia. We present a case with syphilis in lumbar vertebra.

Case presentation: The 58-year-old truck driver with paraparesis and neurogenic bladder had been admitted to rehabilitation institute in 2019 after multiple spine surgeries (L2-L3 spondylodesis in 2016, reoperation in 2017 for removal of screws and Th11-S1 fixation). The thoracic lumbar spine orthosis was made, with an extension for the left leg. Absolute rest was ordered until bone growth of the spondylodesis. The Foley catheter was placed because of neurogenic bladder. At that time of referral, he was able to sit without support, not able to stand or walk, needed help in basic daily activities. Muscle strength was decreased in lower limbs, more pronounced in distal muscles. Consequently, passive range of movement was limited, with contractures in ankles. He had intensive rehabilitation program for six weeks. The bladder function was re-established. At discharge, his muscle strength and passive mobility in the joints of lower limbs were improved. He walked independently with crutches, also up-stairs. The walking speed improved to 0.22 m/s (initial speed at 10 m walk test was 0.59 m/s). The distance in 6-minute walk test was 54 meters longer (144 meters). The De Morton mobility index score improved by 17 points (44/100 points). After discharge, he made further progress at home.

Conclusion: We presented a man with tertiary syphilis, who had undergone multiple surgery in the lumbar spine. In spite of poor functional status at the referral, he was able to gain independence in daily activities and mobility after the intensive rehabilitation program.

P373

EFFECTS OF DIFFERENT EXERCISE INTERVENTIONS ON CARDIOPULMONARY FUNCTION IN BREAST CANCER PATIENTS: A RANDOMIZED CONTROLLED TRIAL**Tetiana Odynets, Valentyna Nechyporenko**

Physical Rehabilitation Khortytsia National Academy, Zaporizhzhia Ukraine

Objective: The aim of the present study was to evaluate the effects of different exercise interventions on cardiopulmonary function in breast cancer patients during 1 year of outpatient rehabilitation. **Method:** A total of 115 breast cancer patients met the eligibility criteria and completed the study. Participants were randomly allocated for the water exercise interventions (group A, n = 45), for the Pilates exercise interventions (group B, n = 40), and yoga exercise interventions (group C, n = 30). The 3 groups attended relevant programs for 1 year and received 144 rehabilitation sessions. Cardiopulmonary parameters were assessed at baseline and after 6 and 12 months of exercise interventions. **Results:** A significant increase in cardiopulmonary function was observed in participants of all groups. Based on the results of the 12-month monitoring, the actual value of forced vital capacity was statistically higher in women of the group A compared with the group B and group C by 0.17 l ($p < 0.001$) and 0.11 l ($p < 0.05$); the forced expiratory volume in 1 second by 0.24 l ($p < 0.001$) and 0.19 l ($p < 0.001$); the peak expiratory flow by 1.03 l/sec ($p < 0.001$) and 0.87 l/sec ($p < 0.001$); the actual value of maximum expiratory flow₂₅ by 0.93 l/sec ($p < 0.001$) and 0.88 l/sec ($p < 0.001$); the actual value of maximum expiratory flow₅₀ by 0.59 l/sec ($p < 0.001$) and 0.27 l/sec ($p < 0.05$), respectively; the actual value of stroke volume by 4.33 ml/beat ($p < 0.05$) and 2.18 ml/beat ($p > 0.05$); cardiac output by 0.55 l/min ($p < 0.01$) and 0.56 l/min ($p < 0.01$); left ventricle work by 0.72 gm-m/beat ($p < 0.001$) and 0.74 gm-m/beat ($p < 0.001$); left ventricular power by 0.33 W ($p < 0.01$) and 0.27 W ($p < 0.01$), respectively. **Conclusions:** It was found that using water exercise intervention is more effective for improving cardiopulmonary function compared with Pilates and yoga interventions. Further research on water interventions for different populations is warranted.



P374

USING A POINT LOADING ROCKER AND NEGATIVE HEEL DESIGN FOOTWEAR COMBINATION IN A CEREBRAL PALSY SPASTIC DIPLEGIA PATIENT WITH GENU RECURVATUM: A CASE REPORT

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A case of 15-year-old-male, diagnosed with Cerebral Palsy Spastic Diplegia, Gross Motor Classification System (GMFCS) III was referred to the Department of Rehabilitation Medicine, Philippine General Hospital for the persistence of the genu recurvatum bilaterally in spite of having a hinge Ankle Foot Orthosis (AFO). This case report focused on the orthotic intervention in addressing the genu recurvatum of the index patient presented. A footwear combination (sole and heel) design was made using a point loader design for the sole and a heel design termed as negative heel. With the added benefits of physiotherapy and pharmacology, the neuromuscular function and gait parameters of children with Cerebral Palsy with genu recurvatum can be further optimized.

The effect of the footwear combination was analyzed in relation to the vertical axis of gait and Ground Reaction Force (GRF) without changing the alignment of the AFO. Kinematic results showed a slight inclination in entry to Midstance (MST) and exit in Terminal stance (TST) and slight decrease of knee extension and hip flexion in stance of the gait cycle. Kinetic results illustrated a slight increase of the total knee muscle power. Furthermore, surface electromyography (EMG) results of the hamstring muscles displayed prolonged activity of the hamstring muscle in stance phase and early activity in swing phase.

P375

MARCHIAFAVA-BIGNAMI DISEASE – AN ENIGMATIC AND UNPREDICTABLE ENTITY**Tiago Serra, Ana Cunha e Melo**

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Introduction -Marchiafava-Bignami disease (MBD) is a very rare disorder characterized by demyelination and necrosis of the corpus callosum and adjacent subcortical white matter that occurs predominantly in malnourished alcoholics. The development of brain imaging techniques allowed the diagnosis in early stages of previously fatal disease, inciting early treatment and better outcomes.

Objective -To describe the clinical presentation, helpful diagnostic features and clinical outcome after medical treatment and rehabilitation regime.

Method - Report of two cases from our Institution and review of the relevant literature concerning this subject.

Results -Case one: A 55-year-old woman, with history of alcohol abuse and malnutrition, presents to the emergency department with altered mental state, dysarthria, impaired walking, seizures and ophthalmoplegia. Brain Computed Tomography (CT) showed no apparent acute lesions. Lumbar Puncture (LP) was unremarkable. Given the patient background, supplementation with thiamine, folate and vitamin B complex was initiated. A rehabilitation regime was implemented, with clinical improvement. Magnetic Resonance imaging (MRI) revealed T2-FLAIR hyperintensity along the genu, body and splenium of the corpus callosum, consistent with MBD.

Case two: A 77-year-old man had a first contact with emergency department with altered mental state and impaired memory. He was discharged to a follow-up medical consultation with the diagnosis of dementia. Five days later, he returned with worsening of symptoms plus ataxia, dysarthria, and incontinence. He was also history of alcohol abuse and malnutrition. CT and laboratory workup were unspecific. Supplementation with thiamine, folate and vitamin B Complex was initiated as well as a rehabilitation regime, with poor clinical course. MRI revealed findings compatible with MBD.

Conclusions: The MBD is an extremely rare disease, difficult to diagnose and manage. Best treatment is still unclear, but aggressive parenteral vitamin supplementation, especially with thiamine, is recommended. A multidisciplinary approach improves the outcome but the prognosis is still very unpredictable.

P376

THE RECOVERY OF SENSORY-MOTOR COHERENCE IN FACIAL PARALYSIS: A NOVEL REHABILITATIVE PROGRAM**Teresa Paolucci¹, Andrea Bernetti², Marco Paoloni², Francesco Agostini², Massimiliano Mangone², Valter Santilli²**Departement of Oral Medical Science and Biotechnology- Unit, University G. D'Annunzio of Chieti Pescara, Chieti¹, Sapienza University of Rome², Italy

Introduction Peripheral facial nerve palsy (FNP) can be a complication after surgery for acoustic neuroma and need a specific rehabilitation program. Also, psychological and functional implications present a devastating management problem to patients afflicted because their face have an important challenge of facial muscles that are fundamental also for affective communication. Using the motor imagery (MI) with mirror therapy (MT) in the rehabilitation the exercise becomes "knowledge and perception" for the patient with an "emotional meaning" and not simply an action

Objective The purpose of this research was to determine the effects of a neurocognitive rehabilitative approach through MT and MI in the recovery of FNP.

Method A double-blind, randomized, controlled trial was performed and twenty-two patients were randomized into two groups: 1) experimental group through MT and motor imagery MI and 2) traditional rehabilitative group. Outcome assessments were performed at T0=baseline, at the end of the first month of rehabilitative treatment (T1= 10 sessions twice for week), after the second and third months of rehabilitative treatment (T2= 10 sessions twice for week plus 5 sessions of MT in the TG one for week and T3=10 sessions twice for week plus 5 sessions of MT 1 for week in the TG), and at the 4-week follow-up (T4=follow-up, after 2 months). The House-Brackmann Scale, the FACE Scale and the Beck Depression Inventory Scale were administrated.

Results There was a significant difference in House-Brackmann Scale between T0 and the follow-up in favor of the experimental group ($p < 0,001$). For the FACE scale, social function improved in both groups from T0 to T3 but better in the experimental group ($p < 0,05$)

Conclusions The novel rehabilitative program with MI and MT proved effective in improving facial physical function stemming the psycho-emotional distress.

P377

THE EFFECTS OF THE SWEDISH MASSAGE COURSE INTENSITY ON THE MUSCLE STRENGTH OF UPPER EXTREMITIES OF HEALTHY INDIVIDUALS**Una Veseta**

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Introduction

The massage reduces muscle tension, thus improving muscle flexibility and strength [Fritz S., 2015, Crommert M.E., 2015].

Objective of the research is to compare effects of the Swedish massage on the muscle strength of upper extremities of healthy individuals depending on the course intensity.

Method

The study subjects were 30 healthy young women. The subjects were randomly assigned into 2 groups (Group A and Group B). Subjects are received 10 Swedish back massage (25-minute-long procedure using specified massage protocol) sessions each. In the group A the subjects received a massage twice a week (5 week course), in the group B - once a week (10 week course). Measurements of the muscle strength of upper extremities in kilograms, as a unit of measure, were performed by the hydraulic hand dynamometer Jamar before and after each massage session during the study. The collected data was analyzed using methods of mathematical statistics.

Results

Baseline characteristics of the study participants: age of group A 25.0 ± 5.3 and group B 23.7 ± 5.3 ; BMI $21.7\% \pm 2.2$ and $22.6\% \pm 1.2$. There was no significant difference between the two groups (PA and B): right arm $35.5 \pm 6.5\text{kg}$ and $34.0 \pm 5.7\text{kg}$; after $41.2 \pm 8.3\text{kg}$ and $46.6 \pm 8.2\text{kg}$, left arm $31.5 \pm 6.7\text{kg}$ and $30.3 \pm 3\text{kg}$; after $37.2 \pm 7.5\text{kg}$ and $40.1 \pm 6.4\text{kg}$.

Conclusions: The result demonstrated by both hands in both groups before the massage were better than after the massage, but a general trend of an increase in muscle strength was also observed. The analysis of the research data has led to the conclusion that the muscle strength of the upper extremities increases under the influence of back massage. Larger scale research is required to determine the retention of muscle strength and the influence of the dominant side on the results.



P378

APNEA AND SCUBA SPORT DIVING AS A NEW SPORT FOR PEOPLE AFTER SPINAL CORD INJURY

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Introduction:Water is the environment where people after spinal cord injury (SCI) can be independent and use the same equipment as able-bodied divers. Apnea and SCUBA diving can be a part of rehabilitation and/or recreation, competitive sport activity and even occupation (Certified Apnea/SCUBA diving instructor).

Objective:To introduce and evaluate the effect of Apnea and SCUBA diving on people after SCI.

Methods and Results:In 18 years we developed an educational method for therapeutic, recreational and competitive Apnea and SCUBA diving for people after SCI. We collaborate with medical doctors, physiologists, SCUBA and Apnea diving instructors on a field and in a laboratory. Researches on rehabilitation, thermoregulation, decompression sickness and autonomic heart regulation on divers with SCI have been done and the benefits of underwater activities are shown.

P379

THE EFFICACY OF COMPLEX KINESIOTHERAPY IN WEIGHT LOSS AND IMPROVING OF CARBOHYDRATE METABOLISM IN OBESITY PATIENTS**Valeria Vasileva**

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Aim of the study was to estimate the effect of complex 3-week treatment with 4 kinesiotherapy methods on body weight loss and carbohydrate metabolism in patients with obesity.

Material and methods. 80 people were enrolled in the study. 40 people in the first group (G1) -26-69 years old with alimentary obesity (mean age 53.7 ± 11 years, weight 106.8 ± 25 kg, BMI 38.3 ± 7.4 kg/m², waist circumference WC 110.6 ± 16 cm, hip circumference HC 121 ± 15.3 cm). 40 people in the second group (G2) 21-68 years old with alimentary obesity (mean age 51.3 ± 11 years, weight 112.7 ± 25 kg, BMI 41.8 ± 8.2 kg/m², WC 113.6 ± 16 cm, HC 126.3 ± 15.1 cm). Complex kinesiotherapy administered daily for 3 weeks and included interactive sensorimotor training on double platform, a special complex of physical exercises in the gym and ergocycle trainings. In addition, in 2 gr. patients additionally included kinesiohydrotherapy in a pool. Weight, WC, HC, carbohydrate tolerance test (TT HC), insulin last 3 weeks was measured at baseline and after the treatment was completed. Evaluation of the results were performed at baseline and in 3 weeks.

Results. There was a significant improve in body weight in two groups (110 ± 24 kg at baseline vs 107 ± 22.5 kg in 3 weeks; $p = 0.000$), BMI (40 ± 8 vs 39 ± 7.6 kg/m²; $p = 0.000$), WC (112 ± 15.9 vs 108.1 ± 15 cm; $p = 0.000$), HC (123.4 ± 15.4 vs 119 ± 14 cm; $p = 0.000$) in treated obese patients. After 3 weeks, we registered statistically significant elevation in insulin levels of G2 vs to G1. With $Z = 2.63$ in G1, $p = 0.003$ and $Z = 1.96$, $p = 0.002$ in G2, and $Z = 2.87$ when assessing the significance elevation between G1 and G2, $p = 0.023$. Significantly improved performance of TT HC in 1 g. $Z = 2.02$, $p = 0.04$, in 2 g. $Z = 3.004$, $p = 0.002$. When assessing the significance of differences between G1 and G2 after treatment, $Z = 2.3$, $p = 0.017$.

Conclusions. Complex treatment with 4 methods of kinesiotherapy helps to reduce body weight, reduce WC, HC, insulin, TT HC in obesity. However, patients who additionally received kinesiohydrotherapy in a pool showed more significant improvements in carbohydrate metabolism.

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KINESIOTHERAPY IN WEIGHT LOSS AND MUSCLE FUNCTION IMPROVING IN OBESITY PATIENTS**Valeria Vasileva**

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Aim of the study was to estimate the affect of complex 3-week treatment with 4 kinesiotherapy methods on body weight loss and muscle function in patients with obesity.

Material and methods. 80 men and women aged 21-69 years old with alimentary obesity were enrolled in the study (mean age 52.4 ± 11 years, weight 111.3 ± 24.5 kg, BMI 40.3 ± 8.1 kg/m², waist circumference WC 113.4 ± 16 cm, hip circumference HC 124.2 ± 16 cm). The complex kinesiotherapy administered daily for 3 week and included interactive sensorimotor trainings on double unstable platform, kinesiohydrotherapy in a pool, special complex of physical exercises in a gym and ergocycle trainings. Weight, WC, HC, fall number for last 3 weeks were measured at baseline and after the treatment was completed. Muscle strength and walking speed functional tests results assessment (10-meters-walk test, Up-and-go test, 4 special tests for back and abdomen muscle endurance to static and dynamic loading) were performed at baseline and in 3 weeks.

Results. There was a significant reduction in body weight (111.3 ± 24.4 kg at baseline vs 107.9 ± 23.1 kg in 3 weeks; $p=0.000$), in BMI (40.3 ± 8.1 vs 39.1 ± 7.7 kg/m²; $p=0.000$), in WC (113.4 ± 15.9 vs 109.2 ± 15.1 cm; $p=0.000$) and in HC (124.1 ± 15.5 vs 119.7 ± 14.1 cm; $p=0.000$) in treated obese patients. 10-meters-walk speed increased from 0.84 ± 0.15 m/sec at baseline to 0.88 ± 0.17 m/sec in 3 weeks ($p=0.000$). Up-and-go test results improved from 8.4 ± 2.1 to 7.9 ± 2.09 sec ($p=0.000$). We registered statistically significant elevation of the endurance to static loading in abdomen muscles from 13.1 ± 9.7 to 16.49 ± 12.8 sec ($p=0.000$) and in back muscles from 14.8 ± 11.9 sec to 18.6 ± 14.9 sec ($p=0.000$). The endurance to dynamic loading increased in abdomen muscles from 29.9 ± 11.2 to 34.84 ± 11.93 times ($p=0.000$) and also in back muscles from 9.1 ± 7.4 to 12.2 ± 9.2 times ($p=0.000$). Fall number markedly decreased from 0.14 ± 0.34 at baseline to 0.0 (95%CI: 0.02; 0.25) after completion of treatment.

Conclusions. Investigated complex treatment with 4 kinesiotherapy methods promotes body weight loss, WC and HC reduction in obesity. 3-week special training of obese patients is associated with increasing in gate speed and lower extremities muscle strength, and it also causes improvement in static and dynamic loading endurance of back and abdomen muscles. Those changes may probably improve balance function and decrease risk of falling in obese patients.

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FRACTURE OF PATELLA (CASE REPORT)**Vasileios Tragoulias, Nikolaos Ananidis, Paraskevi Tsingeli, Nikolaos Koutsogeorgis, Ioannis Kapralos, Nikolaos Groumas**

1st Department of PRM, National Rehabilitation Center –EKA, ATHENS, GREECE A 70 year old male patient suffered from a left patella fracture, due to a fall (8-10-2018) and underwent a surgical internal fixation (needles and tension band wiring). On October 19-2018 he was discharged from the orthopedic clinic and went home (instructions unknown).

Patella fractures represent 1% of all fractures and are mostly suffered by individuals of more than 20 years of age. Males suffer twice the number of incidences than females.

Post-operative: In terms of rehabilitation a functional knee brace is used, primarily fixed at full knee extension (0 of flexion), in order to protect the fractured region from any tension exerted by the quadriceps muscle.

After two weeks, or even sooner, the patient is able to walk with the use of underarm crutches or of a walker while the healthy foot is elevated by 2-3 cm, in order to facilitate the swing phase of the injured leg, which can gradually bear up to 15 kgs of his body weight.

After 4 approximately weeks the range of movement allowed is up to 60° of flexion. The brace remains until active flexion reaches 90°.

The patient was admitted to the 1st physical medicine and rehabilitation clinic of the national center of rehabilitation in Athens on december 5, 2018 wearing a knee brace that allowed up to 90° flexion.

X-ray showedolisthesis of the fractured parts of the patella (material failure?)

The patient was referred to an orthopedic clinic for evaluation and possibly a revision of the internal fixation that never took place.

Consequently the patient was discharged being able paradoxical to walk without wearing the knee brace using a walker.

P382

EARLY REHABILITATION IN PATIENTS WITH TRAUMATIC BRAIN INJURY (TBI)

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The progress-outcome in patients with traumatic brain injury, is a combination of the severity of the brain injury and the initial GCS score.

Objective: Our objective is to investigate the significance of the implementation of an early rehabilitation program to the final outcome of the patient.

Method: Our study involved 85 patients with severe traumatic brain injury, 53 of whom were male (62,35%) and the rest of them, 32 female (37,65%). Their average age was 26,4 years old. The causes of the brain injury were: car accident 82,5%, fall 17,5%. Upon admission to our hospital, which occurred 1-3 months after the trauma, the GCS score was: in 38 cases (44,70%) 7-8, in 33 cases (38,8%) 5-6, in 14 cases (16,47%) 4-3.

All our patients followed their rehabilitation program on a daily-routine.

This program included: 1)physiotherapy, 2)occupational therapy, 3) coping skills training (self-help), 4)speech therapy 5)neuropsychological support.

In order to evaluate the mental functions we used the MMSE scale, in order to evaluate their motor-skills we used motricity index and the evaluation of their functional ability was based on Modified Barthel.

Results: After six months of applying the rehabilitation program, remarkable progress was noticed to all our patients regarding the motor-skills, the ability to help themselves, the speech and their communication skills.

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TRAUMATIC BRAIN INJURY RELATED BONE LOSS**Vasileios Tragoulias, Yannis Dionyssiotis, Christina Papanastasiou, Maria Papadatou, Despoina Psillaki, Nikolaos Groumas**

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Introduction: Traumatic Brain Injury (TBI) leads to immobilization and increased bone loss.

Objective: The aim of our project is to highlight the problem of bone loss in TBI subjects as well as its approach and treatment.

Methods: Our study involved 32 TBI subject hospitalized in our clinic during a 3 years period, 21 of whom were male and 11 females. Their average age was 30.2 years old, without any history of previous hormonal problems. The evaluation of the patients was based on clinical examination and medical history information and included: 1) x-rays of the hip bones, pelvis, lumbar spine, thoracic spine, 2) measurements of calcium, Alkaline Phosphatase (ALP) and parathyroid hormone (PTH) in the blood, as well as calcium and hydroxyproline (24-hour) urine levels and 3) medication related to bone loss. All our patients underwent measurement of their bone density through DXA (this measurement took place either in hips or in lumbar spine depending on where ectopic bone formation or degenerative alterations of the spine appeared, in order to avoid biased results.)

Results: Fourteen out of 32 patients had osteoporosis according WHO definition, 9 out of the 14 had been hospitalized in ICU from 5 to 8 months (average stay=160 days) and the rest 5 of them had been hospitalized in ICU from 2 to 5 months (average stay=82 days).

Conclusions: These results suggest that the duration of immobilization may not be the only factor that participates in the pathogeny of bone loss suggesting an effect by a neurogenous factor.

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CASE REPORT OF A CHILD WITH MAJEWSKI SYNDROME - THE POSSIBILITY OF EARLY DIAGNOSIS**Danijel Mikulic¹, Valentina Matijevic², Josipa Maric Sabados², Marija Markota², Daniela Kovacic²**

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The Majewski syndrome or short rib-polydactyly syndrome (SRPS) type II is a lethal skeletal dysplasia characterized by severe IUGR (intrauterine growth restriction) and dysmorphic face, polydactyly, relatively proportionate head size at birth with later progression to microcephaly.

It's an extremely rare disease, inherited autosomal recessively and obtained by mutation of the PCNT gene on the 21q22 chromosome encoding the protein pericentrin. Pericentrin is crucial in the formation of the spindle and its mutations in the cell division / cell cycle disorder stages. The most serious comorbidity associated with MOPD II is the early onset of cerebrovascular disease, most commonly in terms of occlusive arteriopathy (Moya Moya) or cerebral aneurysms, which can compromise otherwise orderly intellectual development and, as a last resort, lead to stroke.

An 8-month-old boy with MOPD-typical phenotypic traits: intrauterine growth arrest and post-natal growth retardation, microcephaly, typical facies, maris cutis, bone dysplasia (short upper arms and forearms), and farsightedness, dentition disorders can be expected in the long run, skin pigmentation, scoliosis, joint dislocation, most commonly hips and knees, and insulin resistance.

Further multidisciplinary and multiconsular monitoring is necessary to detect in a timely manner the possible complications characteristic of MOPD II.

KEYWORDS: rare syndromes; Majewski syndrome; Moya Moya; lethal skeletal dysplasia; early diagnosis; multidisciplinary rehabilitation

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RARE DISEASES AND SYNDROMES – WHY MULTIDISCIPLINARY APPROACH IS IMPORTANT; CASE REPORT**Matijević Petra, Mikulić Danijel, Markota Marija, Škegro Bernarda, Matijević Valentina**

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Marden Walker syndrome (MWS) is a connective tissue disorder whose underlying pathological mechanism has not been clearly established yet. The main characteristics are blepharophymosis, congenital joint contractures, micrognathia, kyphosis/scoliosis. Less than 60 cases have been described so far.

Rare diseases and syndromes are often chronic and very complex, and require different specialised health services. Children (and their parents) living with them face the challenges including diagnostic delays, troubles in finding the appropriate health services, lack of appropriate treatments.

A 13-year-old girl with MWS, included into psychomotor stimulation since her third month. At the age of two, she could not sit, walk, talk, and swallow. She had dysfunction fists and was incontinent. Due to the small jaw and the difficulty of the bite, the girl is under the regular control of the dentist.

Early psychomotor stimulation included doctor specialist in physical medicine and rehabilitation for children, medical gymnastics, ophthalmologist, speech therapist and physiotherapist. The provision of multidisciplinary services for children (and their families) with rare disorders and syndromes is essential, with perceived benefits as maximizing the quality of child's life, better treatment adherence and improved patient and parent satisfaction.

Key words: rare diseases; Marden Walker syndrome; multidisciplinary team; early rehabilitation

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THE IMPORTANCE OF FACET SYNDROME IN DAILY CLINICAL PRACTICE**Valerija Klem¹, Gordana Devečerski², Grigorije Jovanovic¹, Marija Kačar¹, Milana Despenic¹, Kristina Terzic**Artos, Privace praxis¹, Clinical centre of Vojvodina Novi Sad², Novi Sad, Serbia

Introduction: The term facet syndrome includes a heterogenous group of disorders of the apophyseal joints of all parts of the spinal column. The most frequent them are degenerative disease of the facet joint itself, like osteoarthritis, or intervertebral disc pathology (protrusion). The less common causes are injury, infection and rheumatic diseases. Clinical manifestations of the degenerative processes of the apophyseal joints are frequently identical to those of the intervertebral disc protrusion, and are treated identically, with a diagnosis of low back pain. Facet joint pathology causes: TOS, vertigo, sleep apnea, intercostal neuralgia and spinal nerve compression. An accurate diagnosis, as prerequisite of adequate therapy, is made clinically and radiographically, if needed. Facet syndrome therapy comprises drug therapy, manipulation, physical therapeutic modalities and kinesitherapy. If these prove inefficient invasive methods are used.

Objective: To determine the effectiveness of the available therapeutic options in the treatment of facet syndrome.

Methodes: Retrospective study, which included patients of both genders, from 20 to 70 years of age, treated in the period from 1/1/2017 to 31/10/2019 in the private praxis „Artos”, who were clinically diagnosed with facet syndrome and the diagnosis was confirmed radiographically.

Results: According to the main cause of impairment, 93 patients were divided in two groups: traumatic (19 patients) and non-traumatic (74 patients). After the physical therapy was performed in the group of traumatic patients, there was 1 patient without symptoms, 5 patients had reduced symptoms, and 13 patients with no improvement. After the physical therapy in the group of patients with non-traumatic etiology, there were 66 patients with no symptoms, 8 patients with reduced symptoms, and 0 patients without any improvement.

Conclusion: An accurate and timely diagnosis and appropriate therapy selection may lead to a reduction or elimination of symptoms of facet syndrome.

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WEIGHT LOSS AND MUSCLE FUNCTION CHANGE IN OBESITY PATIENTS USING EFFECT OF KINESIOTHERAPY**Valeriia Vasileva**

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Aim of the study was to estimate the affect of complex 3-week treatment with 4 kinesiotherapy methods on body weight loss and muscle function in patients with obesity.

Material and methods. 80 men and women aged 21-69 years old with alimentary obesity were enrolled in the study (mean age 52.4 ± 11 years, weight 111.3 ± 24.5 kg, BMI 40.3 ± 8.1 kg/m², waist circumference WC 113.4 ± 16 cm, hip circumference HC 124.2 ± 16 cm). The complex kinesiotherapy administered daily for 3 week and included interactive sensorimotor trainings on double unstable platform, kinesiohydrotherapy in a pool, special complex of physical exercises in a gym and ergocycle trainings. Weight, WC, HC, fall number for last 3 weeks were measured at baseline and after the treatment was completed. Muscle strength and walking speed functional tests results assessment (10-meters-walk test, Up-and-go test, 4 special tests for back and abdomen muscle endurance to static and dynamic loading) were performed at baseline and in 3 weeks.

Results. There was a significant reduction in body weight (111.3 ± 24.4 kg at baseline vs 107.9 ± 23.1 kg in 3 weeks; $p=0.000$), in BMI (40.3 ± 8.1 vs 39.1 ± 7.7 kg/m²; $p=0.000$), in WC (113.4 ± 15.9 vs 109.2 ± 15.1 cm; $p=0.000$) and in HC (124.1 ± 15.5 vs 119.7 ± 14.1 cm; $p=0.000$) in treated obese patients. 10-meters-walk speed increased from 0.84 ± 0.15 m/sec at baseline to 0.88 ± 0.17 m/sec in 3 weeks ($p=0.000$). Up-and-go test results improved from 8.4 ± 2.1 to 7.9 ± 2.09 sec ($p=0.000$). We registered statistically significant elevation of the endurance to static loading in abdomen muscles from 13.1 ± 9.7 to 16.49 ± 12.8 sec ($p=0.000$) and in back muscles from 14.8 ± 11.9 sec to 18.6 ± 14.9 sec ($p=0.000$). The endurance to dynamic loading increased in abdomen muscles from 29.9 ± 11.2 to 34.84 ± 11.93 times ($p=0.000$) and also in back muscles from 9.1 ± 7.4 to 12.2 ± 9.2 times ($p=0.000$). Fall number markedly decreased from 0.14 ± 0.34 at baseline to 0.0 (95%CI: 0.02; 0.25) after completion of treatment.

Conclusions. Investigated complex treatment with 4 kinesiotherapy methods promotes body weight loss, WC and HC reduction in obesity. 3-week special training of obese patients is associated with increasing in gate speed and lower extremities muscle strength, and it also causes improvement in static and dynamic loading endurance of back and abdomen muscles. Those changes may probably improve balance function and decrease risk of falling in obese patients.

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OVERVIEW OF POSTOPERATIVE SPLINTING PROTOCOL FOR EXTENSOR TENDON REPAIR OF THE HAND AT THE UNIVERSITY MEDICAL CENTER MARIBOR IN 2018**Vida Bojnec¹, Dragana Markovic Djordevic², Breda Jesenšek Papež¹, Jerneja Vidmar³**¹Institute for Physical and Rehabilitation Medicine, University Medical Center Maribor, Maribor, Slovenia²General Hospital Murska Sobota, Department for Physical and Rehabilitation Medicine, Slovenia³Department of Plastic and Reconstructive Surgery, University Medical Center Maribor

Introduction: The protocol of postoperative splinting after extensor tendon injuries in the hand varies according to the extensor tendon zone that is injured.

Objective: The purpose of our study was to assess the usual splinting method used at the University Medical Center Maribor (UMC Maribor) following a simple dissection of the extensor tendons of the hand.

Methods: The data was collected retrospectively from medical records of the Emergency center UMC Maribor from January 2018 to December 2018. The search strategy was applied by using the ICD-10 code S663 (injury of extensor muscle, fascia and tendon of other and unspecified finger at wrist and hand level), and the word "extensor" in diagnosis and text.

Results: The total number of patients with extensor tendon injury of the hand was 101, of which 20 were thumb extensor injuries and 79 were affecting the 2nd to 5th finger, in two cases the region of injury could not be identified from medical records. The average age of patients was 48 (9–89), patients were predominantly male (88%). 79% of patients were referred to a plastic surgeon and only 30% of patients to a PRM specialist. On average, the time lag from injury to the first visit at plastic surgery was 9.5 days and on average 36 days post injury was the patient seen by a PRM specialist. The most frequently injured zones in the 2nd to 5th finger were zones 1 and 3 (both in 25%), followed by zones 4 and 6 (15% and 14%, respectively), zone 2 in 10%, zone 5 in 8% and zone 7 in 3%.

The most frequent postoperative splinting method was immobilization, in two patients with injuries in zones 4–6 a relative motion extension splint (RME) was used. None of the patients received dynamic extension orthosis (DEO).

Conclusion: At UMC Maribor, common postoperative splinting of extensor tendon injuries in the hand is immobilization. Only 30% of all patients with hand extensor tendon injury were sent to rehabilitation.

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CLINICAL AND REHABILITATION APPLICATIONS OF A NEW TRUNK EXOSKELETON**Vincent Tiffreau¹, Fahed Zairi², Melissa Moulart³, Charles Pradeau⁴, André Thevenon¹**¹Physical Medicine and Rehabilitation Dpt, University Hospital of Lille, Lille, France²Department of neurosurgery, HôpitalPrivé le Bois, Ramsay Général de santé, Lille France³Japet Medical Device, Lille France⁴Physical Medicine and rehabilitation Unit, University Hospital of Strasbourg

We present the clinical applications of a new trunk exoskeleton. The device is made of two braces (pelvic and thoracic) joint by two sets of motorized actuators which generate traction forces on the lumbar spine. The device reduces pressure in the lumbar spine while preserving mobility.

Material and methods: Three clinical applications are presented

Reducing intradiscal pressure and low back pain:

Reduction of intradiscal lumbar pressure was measured with a sensor in a transcutaneous Jamshidi needle, inserted in the L3-L4 and L4-L5 disc of a full cadaver wearing the device.

Reduction of pain was assessed in patients with chronic low back pain, who were admitted in a rehabilitation unit. preventing low back pain at work

The device was delivered in a group of workers who are exposed to spinal mechanical stress, pain was assessed during and after work.trunk reconditioning

A trunk muscle strengthening interactive program was designed with the exoskeleton

Results: Intradiscal pressure decreased up to 40% in the middle part of the disc of the cadaver when actuators were activated.Thepreliminary results on 19 patients with low back pain showed significant pain release while wearing the device during 1 hour. Description of clinical and working conditions of a sample of workers are presented. We present a feasibility study protocole on a small sample of patients with chronic low back pain : a trunk muscles strengthening program using the exoskeleton with exercises elaborated with the help of physiotherapists.

Conclusion: This new trunk exoskeleton is promising. Further results should help to identify the best indications and benefits of such a device.

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EFFECTS OF PULSED HIGH INTENSITY ELECTROMAGNETIC FIELD THERAPY AND ULTRASOUND THERAPY ON PATIENTS WITH CHRONIC LUMBAR PAIN THROUGH DISC HERNIATION**Viorela Mihaela Ciortea^{1,2}, Anca Purcar-Popescu², Ileana Monica Borda^{1,2}, Rodica Ana Ungur^{1,2}, Alina Deniza Ciubean¹, Laszlo Irsay^{1,2}**¹ "Iuliu Hatieganu" University of Medicine and Pharmacy, Cluj- Napoca, Romania² Rehabilitation Clinical Hospital, Cluj- Napoca, Romania

Introduction: Low back pain (LBP) is the most common musculoskeletal pain disorder. Most available interventions for chronic low back pain have modestly beneficial outcomes. The technological revolution of recent years had created new medical treatments based on the pulsed high intensity electromagnetic field; the therapy being used in medical rehabilitation for pain control in both acute, subacute, but also in chronic conditions. The application of pulsed high intensity electromagnetic fields also determines the acceleration of fracture healing, myostimulation, improvement of spasticity in patients with strokes.

The aim of the study is to compare the efficacy of pulsed high intensity electromagnetic field therapy (super inductive system SIS) with ultrasound therapy (UUS) in the treatment of patients with chronic low back pain through disc herniation.

Methods. Thirty patients, males and females, were randomized into either the electromagnetic group (SIS and therapeutic exercises) or ultrasound group (UUS and therapeutic exercises). Primary outcome measures were pain intensity on the 10-point Numeric Pain Rating Scale and disability measured by the Oswestry Disability Index (ODI). The patients were assessed at baseline and after two weeks of treatment (day 12). Patients with contraindications to physiotherapy were excluded.

Results: The analysis showed a significant improvement in the pain intensity and disability scores in both groups, but patients who received SIS therapy had better, statistically significant progress.

Conclusions: Both electrotherapy treatments have proven to be effective in improving the pain and mobility of patients with low back pain through disc herniation.

Patients treated with pulsed high intensity electromagnetic field (SIS) had better therapeutic results in terms of pain, mobility and activity daily living (ADL).

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MULTIPROFESSIONAL APPROACH TO THE REHABILITATION OF PATIENTS WITH LUMBOSACRAL RADICULOPATHY BASED ON ICF IN UKRAINE**Vitalii Gubenko, Alla Tkalina Shupyk, Valeriia Soloviova Shupyk**

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Introduction: The low back pain is the main cause of disability. Due to the prevalence of the low back pain, especially among young and middle-aged people who work, this problem is of great socio-economic importance.

Objective: The aim of this study is to improve the outcome after the complex rehabilitation of patients with lumbosacral radiculopathy based on the ICF.

Method: Thirty-one patients with the large herniated disk (extrusion) with a chronic back pain were enrolled into this study. The Oswestry Disability Index (ODI) was used to measure the outcome. The intensity of pain was assessed with the use of the visual analogue scale (VAS). Patient's psychological traits were assessed with Cattell's 16PF test and the Mini-Mult scale, and anxiety was assessed as to the Spielberg-Hanin's scale. The brief ICF core LPB set was used to determine a patient's functional profile before and after rehabilitation interventions and short and long-term goals were set. All patients underwent magnetic resonance imaging. The rehabilitation program included physical modalities (electrical stimulation of muscles and magnetic laser therapy), traction, massage, manual therapy, kinesiotherapy, postisometric relaxation technique, chemonucleolysis, and psychological interventions.

Results: Comparison of scoring ODI forms before and after two courses of complex rehabilitation showed a positive dynamic. After the rehabilitation, the reduction in the intensity of pain was also observe ($p < 0,05$). The data of MRI, conducted after 1 year, and after two courses of complex rehabilitation, showed the reduction in the average size of extrusion in patients ($p < 0.05$) which was a criterion of effectiveness. Rehabilitation goals were achieved.

Conclusions: To sum it up, use of ICF in the complex multiprofessional rehabilitation of patients with lumbosacral radiculopathy with improved outcome measure decreased disability and it is more effective than usual interventions.

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INTRATHECAL BACLOFEN IN HEREDITARY SPASTIC PARAPARESIS: A REVIEW OF LITERATURE**Vitor Costa Pereira, Sónia Tomé, Gonçalo Engenheiro, Inês Taboas, Jorge Moreira, Catarina Aguiar Branco**

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Introduction: Hereditary spastic paraparesis (HSP) constitutes a group of neurodegenerative disorders manifested predominantly by progressive spasticity and lower limb weakness. Treatment is exclusively symptomatic and oral anti-spasticity drugs as well as botulinum toxin effectiveness is often limited in this condition. Therefore, intrathecal Baclofen (ITB) has emerged as an option to treat refractory spasticity.

Objective: This review aims to reflect on the literature evidence regarding the use of ITB in HSP.

Method: We used the Pubmed, Scopus and Google Scholar databases to find relevant studies, published between 1990 and 2019. We analyzed 8 studies that met our inclusion criteria.

Results: The analyzed literature point to a significant reduction in lower limb spasticity and an improvement of gait function, in HSP patients submitted to ITB device implantation. However, studies show very different follow-up and disease duration periods, which makes it difficult to know about the best timing to start ITB treatment and its long-term effects. The largest series is a prospective study with 14 patients that indicates a possible benefit from early, aggressive spasticity treatment. A retrospective study, with a mean of follow-up time of 15 years, suggest that ITB may postpone the course of the disease for a decade. Furthermore, although most studies have advocated an ITB bolus-infusion test, 1 study point to the benefit of continuous ITB test-infusion, which seems to provide less side-effects and enough time to explore the effects of ITB on the patient.

Conclusions: ITB therapy in patients with HSP is challenging and often requires a compromise between decreased spasticity but preserved muscular strengthening. According to the existent literature, ITB is a safe and effective option to treat resistant spasticity in HSP. However, well-designed randomized control trials are needed to clarify the best timing to initiate ITB treatment, its long-term effects and the best ITB testing methodology.

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ASSESSMENT OF APPLICATION OF DIFFERENT PROTOCOLS OF TRANSCRANIAL DIRECT CURRENT STIMULATION IN MOTOR FUNCTION RECOVERY IN PATIENTS AFTER STROKE**Vladislava Krachunova, Polyana Lambeva, Stoyan Bozhinov, Plamen Bozhinov**

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Objective: To assess the effect different protocols of transcranial direct current stimulation (tDCS) on motor function recovery in stroke patients.

Methods: tDCS is a noninvasive method for modulating cortical excitability in which a direct current stimulation supplied at low amperage (0.5-2 mA) through one or more active electrodes (anode) is propagated through the head and returned through the reference electrode (cathode). The conducting of weak current through the brain is known to cause changes in electric activity in both the neuron and the neural networks, causing changes in the resting membrane potential and subsequently altering the synaptic connectivity between neurons. Unlike the other technique used – transcranial magnetic stimulation (TMS), the applied current in tDCS is too low to elicit an action potential. In this stimulation method, membrane excitability is maintained at sub-threshold levels in order to improve cortical excitability. Nitsche et Paulus (2011) have experimentally demonstrated that tDCS increases cortical excitability in the motor area below the active electrode (anode) and inhibits the area underlying the cathode.

Results: We use three different protocols of tDCS in the post-stroke rehabilitation of motor function: 1. Anodal stimulation of the affected motor area, which aims to increase the activity of neurons from the surrounding intact brain tissue. In this method, the anode is placed on the primary motor area in the affected hemisphere and the cathode is placed over the contralesional fronto-orbital cortex; 2. Cathodal stimulation of the intact motor area - the reference electrode is placed on the fronto-orbital cortex ipsilateral to the affected area. This method is based on the hypothesis that the unaffected hemisphere is inhibited by tDCS, and thus activates the affected hemisphere. 3. Double stimulation - the anode is placed over the affected motor area and the cathode over the contralesional unaffected motor area.

Conclusion: The use of tDCS for motor function recovery in patients with acute and chronic cerebrovascular diseases is a promising technique that significantly expands the neurorehabilitation potential in terms of its safety, practicality and home use capabilities.

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COMPARATIVE EFFICACY OF THE DIFFERENT REGIMES OF REHABILITATION IN CHILDREN WITH PALSY**Vladislav Voitenkov¹, Irina Cherkashina¹, Evgenia Ekusheva², Bogdan Shchurik¹**Clinical physiology Pediatric Research and Clinical Center for Infectious Diseases, Saint-Petersburg¹, Academy of postgraduate education under FSBU FSCC of FMBA of Russia²

Our goal was to compare the efficacy of different regimes of neurorehabilitation in children with palsy.

Materials and methods. 110 children (80 boys and 30 girls, average age 10.4 ± 6.2 years) were enrolled in the study. Leading syndrome in all cases was lower paraparesis. All patients underwent treatment on HP-Cosmos system (treadmill with biofeedback, robowalk system and verticalisers), 4 courses 10 days each. Group was subdivided on 2 subgroups: those receiving only treadmill treatment ($n=59$) and those who also received botulotoxin injections in target muscles ($n= 51$) to resolve spasticity. Subgroups were compared before and after the treatment by the GMFCS score and the following data obtained from the system: stability parameters (average force), walking parameters (step time) and pressure center (length of the rolling line).

Results. Patients who received treadmill therapy + botulotoxin injections were significantly different from those taking only treadmill by the parameters of average force (56 ± 2.14 & $48,57 \pm 3.11$, respectively), step time (1.64 ± 0.5 & 2.11 ± 0.31 , respectively) and the rolling line length (158.54 ± 15 & 191 ± 17 , respectively). Also among first subgroup GMFCS scale reduction on 1 point was seen in 73% of the patients ($n=37$) and in second subgroup - in 30% ($n=18$).

Conclusion. Thus, treadmill and biofeedback therapy in children with palsy is more effective if botulotoxin injections for target muscles spasticity reduction are added in the course of treatment.



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PRESENTATION OF THE CASE OF PROFESSIONAL REHABILITATION OF THE PATIENT WITH ABOVE-THE-KNEE AMPUTATION OF LOWER EXTREMITIES

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The objective of this paper is to prove that by sending a disabled person to a space mission to conquer the space, we provide the opportunity to the disabled person not only to be equal, but also to have a certain advantage over non-disabled persons.

The method is mental simulation with real persons.

D.S., of age 45, got injuries during the war in BiH 1993, by stepping on a mine explosive device, and his both legs were amputated above the knee.

He moves by using a wheelchair, he drives adjusted vehicle, and he is engaged in auto mechanic activities, he is of good psychological and physical health, married, father of two.

After psychological and physical checks and training, he is referred to the mission at the International Space Station, where he successfully participated in replacement of the antenna on the space station, which required the exit into the open space.

In zero gravity, D.S. moved equal as the other cosmonauts, and his disability disappeared, and due to his disability he used less space and he had less weight, which allowed him to bring more equipment to the spacecraft, because of which he was in a certain advantage compared to the others.

During the acceleration and deceleration, he had some minor painful sensations in the stumps and injured forearm of the right hand, but he also had minor oscillations in his cardiac output compared to other cosmonauts, due to the reduced drop in hydrostatic pressure, and due to the lack of large blood vessels of the lower extremities.

Conclusion: To be equal with others is the pinnacle, but to have an advantage over others is the triumph of professional rehabilitation of disabled persons, and this is exactly what offers us the conquest of the universa.

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COGNITIVE MOTOR DISSOCIATION DIAGNOSIS IN PATIENTS WITH CHRONIC DISORDERS OF CONSCIOUSNESS**Vladimir Belkin**

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Introduction: Development and implementation of cognitive trace diagnosis methods in patients with chronic disorders of consciousness (DoC) conducted identification of the new category of patients. Behaviorally these patients are corresponding to unresponsive wakefulness syndrome, but instrumental diagnostics findings in these patients show signs of preserved consciousness. This state can be characterized as a functional 'locked-in' syndrome, and it is called cognitive motor dissociation (CMD).

Objective: Identification of CMD patients emphasizes relevance of routine diagnostics of the covert consciousness.

Methods: 39 DoC patients with defined outcomes participated in this catamnestic study in a period between 2016 and 2019. This heterogenic group included 22 men and 17 women with chronic DoC aged from 19 till 71 year survived after severe acute cerebral damages (traumatic, anoxic, stroke) in various terms (from 32 to 2431 days). The research design implicates clinical assessment using CRS-R, navigated brain stimulation (NBS) and level of consciousness reassessment in 6 months period. Only those cases in which the outcome was defined were included. 10 (26%) patients were excluded before the expiration of 6-month term due to a lethal outcome. Outcomes assessment was carried out using Glasgow Outcome Scale (GOS).

Results: The obtained data confirmed realization of the positive prognosis for level of consciousness increasing in 10 (66%) patients, who showed activation of motor centers in response to the auditory instruction (NBS+); in patients without activation of correlative centers (NBS-) increase in level of consciousness was noted only in 3 (12.5%) cases.

Conclusions: Data indicate clearly more favorable outcomes in NBS+ group in 6 months period. Complex assessment of consciousness (a combination of clinical assessment and event-related potentials) can improve identification of DoC patients with the capability to raise their consciousness level after active rehabilitation treatment and promote laudable long-term outcomes.

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THE EFFECT OF MOTOR IMAGES IN PATIENTS AFTER A STROKE ON THE EFFECTIVENESS OF BCI TECHNOLOGY**Yulia Bushkova¹, Galina Ivanova¹, Maria Bulatova¹, Boris Polyayev¹, Alexander Frolov²**Medical rehabilitation department Federal Center for Cerebrovascular Pathology and Stroke, Moscow – Select State – Russia¹, Institute of Higher Nervous Activity and Neurophysiology²

Currently, in the rehabilitation of patients after a stroke, neurobiological feedback technologies based on neurocomputer interfaces (BCI) are widely used (Yekutieli M, 2000; Ang K.K., 2015; Frolov A.A., 2018). The basis for successful interaction with BCI is the ability of patients to qualitatively solve mental problems in motor imagery (MI) (Chholak P. 2019). The kinesthetic method of MI by patients is more strongly associated with BCI's ability to interact successfully (Marchesotti S. 2016; Braun SM, 2006).

Purpose. To identify a correlation between the ability of patients to MI (MIQ-RS) and the effectiveness of interaction with BCI.

Methods. The study used BCI, based on the analysis of EEG patterns and recognition of the synchronization / desynchronization response of the sensorimotor (μ) rhythm of patients with MI hand movements. MI recognition results were presented to the patient by visual and kinesthetic feedback. In case of successful recognition by the classifier of the task corresponding to the presented instruction, the exoskeleton extended the fingers of the hand. The study recruited 24 patients (14 men and 10 women) aged 51 to 62 years with a solitary supratentorial stroke lesion. The lesion was left-hemispheric in 11 (45.6%) patients. Time elapsed from stroke was 4.0 months (3.0; 12.0). with post-stroke arm paresis 3.0 (2.0; 4.0) according to MRCWS. The median MoCa score was 25.0 (23.0; 27.0). The rehabilitation course BCI consisted of 9.5 sessions (8.0; 10.0). Patients were divided into 2 groups depending on the possibilities of ideomotor presentation on MIQ-RS.

Results. We established a significant moderate correlation between MI performance (the MIQ-RS score) and the efficacy of patient-BCI interaction. Patients with high MIQ-RS scores (47.5 (32.0; 54.0) achieved a better control of the BCI-driven hand exoskeleton (63.0 (54.0; 67.0), $R = 0.67$; $p < 0.05$).

Discussion. To increase the effectiveness and personalization of BCI technology, it is necessary to conduct a preliminary screening for the possibility of patients solving MI after a stroke, as well as, if necessary, preliminary training on the imagination of movements.

Conclusions. This study has established a correlation between the ability of patients for MI inferred from the MIQ-RS scale and the efficacy of patient-BCI interaction.

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THE IMPACT OF PREVENTIVE COUNSELING WITH REMOTE SUPPORT VIA E-MAIL ON ILLNESS PERCEPTION IN PATIENTS WITH PAROXYSMAL ATRIAL FIBRILLATION AFTER CATHETER ABLATION**Yulia Yufereva¹, Nana Pogosova¹, Anastasia Telegina², Olga Sokolova¹, Karapet Davtyan³, Artur Arutyunov¹**¹Preventive cardiology department, Federal State Budget Organization "National Medical Research Center of Cardiology, Moscow, Russia²Federal State Budgetary Institution "Diagnostic and Treatment Center" of the Ministry of Defense, Russia³Federal State Institution "National Medical Research Center for Preventive Medicine", Moscow, Russia

Introduction: Illness perception (IP) is a specific set of cognitive representations that have been shown to predict health-related outcomes. Our knowledge on IP in atrial fibrillation (AF) patients after catheter ablation (CA) is scarce.

Objective: To assess the impact of preventive counseling on IP in pts after catheter ablation (CA) performed for paroxysmal AF.

Method: A prospective randomized controlled study with 2 parallel groups of pts with paroxysmal AF after CA (radiofrequency or cryoablation). Pts were randomized (1:1) into 2 groups. Before discharge, both groups received 1 preventive counseling session with focus on their individual risk factors profile. After discharge pts from intervention group received 6 sessions of biweekly remote preventive counseling via e-mail over the first 3 months. Control group received usual care. IP was assessed using The Brief Illness Perception Questionnaire (BIPQ) at baseline and 12 months after CA.

Results: A total of 90 pts aged 35 to 80 years were enrolled (mean age 57.4 ± 9.9 years, men, 52.2% men). At 1 year of follow-up pts from intervention group experienced significant improvement of the overall IP score (Δ , Me [25%; 75%] -33.3 [-42.5; -17.1]) vs control (-18.4 [-26.4; -7.5]), $p < 0.001$. This improvement was driven by decrease of consequences (-22.5 [-59.3; 0] vs -10.5 [-20.0; 0], $p < 0.002$) and identity of the disease in intervention group (-25.0 [-58.6; 0] vs 0 [-20.0; 0], < 0.001). Other subscales remained unchanged.

Conclusions: Preventive counseling with remote support via e-mail improves IP in AF pts after CA.

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TRAUMATIC SPINAL CORD INJURY WITHOUT ABNORMAL FINDINGS ON MRI**Young-Soon Yoon**

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Introduction: Traumatic spinal cord injury can manifest as a wide variety of clinical syndromes resulting from damage to the spinal cord or its surrounding structures. Magnetic resonance imaging (MRI) has become the gold standard for imaging neurological tissues including the spinal cord due to high sensitivity for detection of acute soft tissue and cord injuries. MRI contributes to assessment of vertebral injury, ligamentous disruption, associated disc protrusion as well as the exact site of maximal canal stenosis and nature of the cord injury.

Case reports: A 34-year-old female patient presented to our clinic with symptoms of both upper and lower limbs weakness, hypoesthesia below the C4 dermatome level and voiding difficulty about 2months after car accident. At that time of the accident, she was in the passenger seat and collided with the vans. She was pregnant and had an abortion with vaginal bleeding after the accident. Cervical spine MRI, lumbar spine MRI and whole spine T2 saggital MRI revealed no abnormal findings with the exception of C6-C7 central disc protrusion and L4-L5 central spinal stenosis. Brain MRI was performed, but it did not reveal any abnormal findings. Voiding cystourethrography and urodynamic tests were also performed owing to subjective reports of persistent dysuria. Hyposensitive, hypotonic, and areflexic bladder findings were confirmed and clean intermittent catheterization regimen was prescribed to promote optimal bladder emptying. Electromyographic findings were confirmed by Left C7,8, L5 and S1 dermatome somatosensory pathway dysfunction. The patient's deep tendon reflex was hyperreflexic and the symptoms of motor weakness and hypoesthesia gradually worsened, especially on the left side. International standards for neurological classification of spinal cord injury by American Spinal Injury Association/International Spinal Cord Society(ASIA/ISCOS) revealed a neurologically incomplete spinal cord injury. ASIA impairment scale was D and neurological level of injury was C4. The presenting clinical signs were suspicious of an underlying traumatic spinal cord injury. However, there were no objective evidence of spinal cord injury on MRI.

Discussion: The patient's symptoms were more severe on the left side than on the right side, suggesting that there was more damage in the left side of spinal cord. MRI has become a valuable diagnostic tool in patients with spinal cord injury because of its superior ability to identify soft tissue lesions such as cord edema, hematomas and transections, and discoligamentous injuries that may not be visualized in plain radiographs and computed tomography(CT). However, despite the lack of any evidence of spinal cord injury on MRI, injury cannot be completely ruled out.

Conclusion: We observed a patient who was suspected to have a traumatic onset cervical level spinal cord injury following a motor vehicle accident. There were no abnormal findings on MRI to support our clinical suspicion. Despite the negative test results by imaging, we concluded that an underlying spinal cord injury should not be ruled out strictly by the lack of abnormal findings on MRI.

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EARLY DIAGNOSIS OF THE PATIENT WITH PROGRESSIVE BULBAR PALSY THROUGH NERVE CONDUCTION STUDY AND ELECTROMYOGRAPHY**Young Jin Ko, Soyeon Jun**

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Introduction: Progressive bulbar palsy (PBP) is a disease involving the nerves of bulbar muscles. Although rare patients can exhibit reduced gag reflexes, weak palatal movements, fasciculation, and weak movement of the bulbar muscles. Here, we introduce a case report of the patient with the symptoms including dysarthria and dysphagia.

Case report: A 75 year old woman visited our clinic referred for dysphagia with dysarthria started a year ago. In physical exam, she showed intact gag reflex but sometimes showed drooling. In VFSS, the penetration aspiration score was 2 on the exam with semisolid, solid and liquid with minimal remnants in vallecular fossa. In blink reflex, delayed latencies of R1 responses and no response of ipsilateral & contralateral R2 response in both supraorbital stimulations. Delayed latencies of sensory evoked potentials was showed in bilateral trigeminal nerves. In need EMG study, No abnormal spontaneous activities at rest in all sampled muscles. Giant amplitudes of motor unit action potential on minimal volition in right nasalis and masseter muscles. Single to reduced interferential patterns on maximal volition in right nasalis, master, and tongue muscles. Above electrodiagnostic findings are suspicious of progressive bulbar palsy, which is confined to bilateral corticobulbar tracts. As a result, the patient was diasnosed as the progressive bulbar palsy. She still shows that symptoms include dysphagia, and we check her up in outpatient department.

Conclusion: These patients with PBP are commonly incorrectly diagnosed, and many undergo exhaustive ear, nose, and throat or gastrointestinal evaluations looking for the cause of dysarthria or dysphagia. In this case, we early detect the disease through blink reflex test and EMG. PBP is aggressive and relentless, and there were no treatments for the disease. However, early detection of PBP is the optimal scenario in which doctors can map out a plan for management of the disease.

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COMPARISON OF THE SIMULTANEOUS HEAT AND MASSAGE PROGRAM AND PHYSICAL THERAPY IN SPINAL PAIN**Yongsoon Yoon¹, Il-Young Cho², Soon-Kwon³, Jeong-Sook⁴, JunHyun Choi¹, Seok Bong Yun¹**

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Introduction: There are variety of methods for management of spinal pain outside the clinic. These managements require a medical assessment of safety and effectiveness.

Objective: To investigate the effect of household programs on heat-massage program on the spinal pain as compared to physical therapy.

Methods: 43 subjects (14 males and 29 females, 52±15 years) with spinal pain, which are neck (n=20) and low back pain (n=23), were allocated randomly to heat-massage group (HMG, n=22) and to physical therapy group (PTG, n=21). The HMG received heat-massage simultaneously on the device(CGM MB-1401, Ceragem, South Korea) in supine posture. The PTG received hot pack, ultrasound, and TENS, and both groups received for 40 minutes treatment, once a day for 4 weeks, 5 times a week. Cortisol, epinephrine, and norepinephrine were evaluated by blood sampling. Outcome was measured by Pain numeric rating scale (PNRS), Pain disability index(PDI), Multidimensional Fatigue Inventory(MFI-20), Korean Occupational Stress Scale (KOSS), Stress Response Inventory (SRI), Beck Depression Inventory(BDI), Surface EMG (S-EMG), Thermography, and Sympathetic skin response(SSR) at pre-treatment, after 2 weeks, and 4 weeks later.

Results: There was no changed the cortisol level, but epinephrine and norepinephrine were decreased in both groups after 4 weeks later. PNRS, PDI, MFI-20, KOSS, and SRI were improved in both groups. BDI was improved in both groups but better improved in HMG compare to PTG after 4 weeks. RMS ratio of the spinal extensor was higher in PTG than HMG. There was no changed in thermography finding and the latency of SSR was decreased in both group after 4 weeks.

Conclusions: The simultaneous thermal massage management has a relaxation effect and can be a good device to reduce the spinal pain.

P402

COPING STRATEGIES, DISABILITY AND CHRONIC POSTSURGICAL PAIN IN REHABILITATION**Zaiga Kalnberzaribule, Anna Millere , Liana Deklava, Inara Logina, Anda Nulle, Inga Millere**

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Introduction. Studies have shown that factors involved in the development and chronification of low back pain includes psychological, biological, social, and environmental influences, as well as strategies used to cope with chronic pain plays important role in the adjustment to the illness and its effects like depression, emotional distress, and decline in quality of life. These coping strategies have been shown to significantly predict pain, functional capacity, and chronification of low back pain.

Identification of pain coping strategies of low back pain patients is important for the development and implementation of timely psychological interventions with disengagement from struggling with pain, to promote realistic approach to pain management which is a part of multidisciplinary approach of rehabilitation.

Objective. To examine disability and coping strategies of postoperative patients with low back pain in rehabilitation practice in Latvia.

Methods. A demographic questionnaire, Visual analogue scale, modified Oswestry Low Back Pain Disability Questionnaire (MODQ), Coping Strategies Questionnaire-revised (CSQ-R) were used. Cronbach's alpha for CSQ-R was 0.90, whereas for MODQ - 0.85.

Results. In this study 50 postoperative patients participated, aged from 23 to 81 years with median age 53. According to modified disability questionnaire 40% of postsurgical patients were with moderate disability, 26% minimal disability whereas 24% severe disability and 10% crippled. Results showed statistically significant correlation between disability and pain intensity ($p < 0.01$), maladaptive coping strategies ($p < 0.05$), such as praying and catastrophizing ($p < 0.01$).

Conclusion. The obtained results point out the importance of coping strategies in determining disability. It is very important to use results for adapting biopsychosocial pain management model in rehabilitation practice. However, it is necessary to continue research work to identify all possible aspects of postoperative low back pain multidisciplinary care and cure for better target interventions.

P403

REHABILITATION IN GERIATRICS AFTER NON-SURGICAL TREATMENT OF HIP FRACTURES – Case report**Zaklina Stankovic, T. Matejevic, Z. Dinic, D. Veljkovic, Lj. Velimirovic**

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Introduction: The incidence of hip fractures increases exponentially with age and is associated with common falls. Falls in the elderly are predisposed and determined by two groups of factors: intrinsic and extrinsic factors .

Objective Each fracture requires an individual approach in the choice of treatment method. The goal of treatment is rapid verticalization of patients and early recovery of walking which could be achieved by non-surgical and surgical treatment. Patients who cannot be operated on due to age and comorbidity are treated non-operatively, and in these situations the fracture is neglected and the patient is empowered to walk after a short period of lying down.

The main aim of our work is to show the improvement of the level of functionality of the geriatric patient with tendency to achieve the optimum level in performing activities of daily living and quality of life in general.

Method – Results: This poster presentation presents a male born in 1916. L.J.M. who, has a transtrochanteric fracture of the femur following a fall, was treated non-operatively at the Orthopedics OB in Krusevac and subsequently undergo medical rehabilitation at Ribarska Spa Special Hospital for 36 days. The results of treatment along with the monitoring of the extent of the movement in the injured hip are presented in this paper, the muscle strength of the DE evaluated by MMT with complete physiological status at admission and after the completion of balneo-physical treatment.

Conclusions. Medical rehabilitation is a necessary process in the treatment of geriatric patients. The success of rehabilitation depends on the patient's general condition and the condition of the locomotor system. Continuous physical therapy after hip injury and non-operative treatment leads to an improvement in the patient's general and physical condition, and thus to a better level of autonomous functionality and a better quality of life.

Keywords: geriatrics, rehabilitation of the elderly, trochanteric fractures, non-surgical treatment of hip fractures

P404

THE EFFECT OF ACTIVATION OF THORACOLUMBAR FASCIA ON THE THICKNESS OF ABDOMINAL MUSCLES; AN ULTRASONOGRAPHIC STUDY**Zeynep Turan, Ozden Ozyemisci Taskiran**

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Introduction: Spinal stabilization is crucial in maintaining healthy posture. Core muscle activation could be enhanced by using thoracolumbar fascia (TLF) for this stability.

Objective: The aim of this study was to evaluate the changes in the thickness of abdominal muscles during activation of TLF through contracting the gluteus maximus (GMax) and latissimus dorsi (LD) muscles. We hypothesized that the thickness of transversus abdominis (TrA) and internal oblique (IO) would show greater increase when abdominal contraction was performed with simultaneous contraction of GMax and LD (bridge with arm extension) than that of abdominal contraction alone (abdominal hollowing) or abdominal contraction with simultaneous activation of only GMax (bridge).

Method: Thirty healthy subjects (15 women, 15 men) were enrolled in the study. Thickness of TrA, IO, and external oblique (EO) muscles were evaluated using ultrasound at rest and during abdominal hollowing, bridge, and bridge with isometric arm extension.

Result: Mean±standard deviation values for age, height, weight and body mass index of the subjects were 28.8±8.1 years, 170.2±10.3 cm, 69.2±14.1 kg, and 23.8±4.1 kg/m² respectively. The thickness of all muscles were significantly increased during all of the exercises except for EO during both bridge positions ($p<0.001$). The thickness of TrA and IO muscles during bridge with arm extension was greater than during abdominal hollowing and bridge (for TrA; $p=0.003$, $p<0.001$ and for IO; $p<0.001$ and $p=0.002$, respectively). Thickness of TrA and IO muscles did not differ between abdominal hollowing and bridge ($p>0.05$).

Conclusion: Co-activation of LD and GMax during abdominal muscle contraction increases the thickness of IO and TrA muscles greater than abdominal muscle contraction alone or with co-activation of only GMax. These findings suggest that simultaneous isometric contraction of LD enhances abdominal muscle function through TLF.

P405

SPINAL DEFORMITIES IN CHILDREN AND COMPETITIVE SPORT**Zdeslav Milinkovic, Danko Milinkovic**

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The aim of this retrospective study was to determine the importance and impact of competitive sport activities in children with spine deformities undergoing an orthopaedic treatment.

The study population was divided into two groups. First group consisted of 43 patients treated between 1984. and 1998, while the second group included 31 patient treated between 1999. and 2009, with different spine deformities.

All the patients were children aged between 9 and 18 years (mean 13.5 years) treated and followed up in our practice in Spinal Center of Institute „Banjica“, Belgrade. Spinal deformities were classified according to the etiology and type of the deformity. All patients were actively involved in competitive sports, either on school or national level, as members of different teams. Sport activities and competition did not influence orthopedic treatment of spine deformities.

Children involved in competitive sport monitored in this study proved to be more satisfied with their final outcome at the end of the treatment.



P406

EFFECTS OF HABILITATION TREATMENT ON NEURODEVELOPMENTAL OUTCOME OF PRETERM INFANTS

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Introduction: Preterm infants are at increased risk of neurodevelopmental delay. Timely diagnosis is of great importance for proper inclusion into habilitation program.

Objective: Aim of our study was to evaluate the habilitation treatment outcome on neurodevelopmental delay in preterm infants.

Methods: The study included 61 preterm infants with expected or delayed in different degree neurodevelopmental status. The clinical examination was done on 3 occasions: at admission, 12 and 24 months of life respectively. Neurodevelopmental status was categorized into 3 groups: normal, delay of moderate degree and delay of severe degree.

Results: On admission there were 16 (26.23%) infants with normal neurodevelopmental status, 35 (57.38%) with moderate degree of delay and 10 (16.39%) with severe degree of neurodevelopmental delay. Infants with moderate degree of delay showed improvement by almost 20% after 12 months, while more than half of them at 12 months showed improvement at 24 months of age. For those with severe degree, there was only slight decrease in proportion after 24 months (16.39% vs. 13.11%).

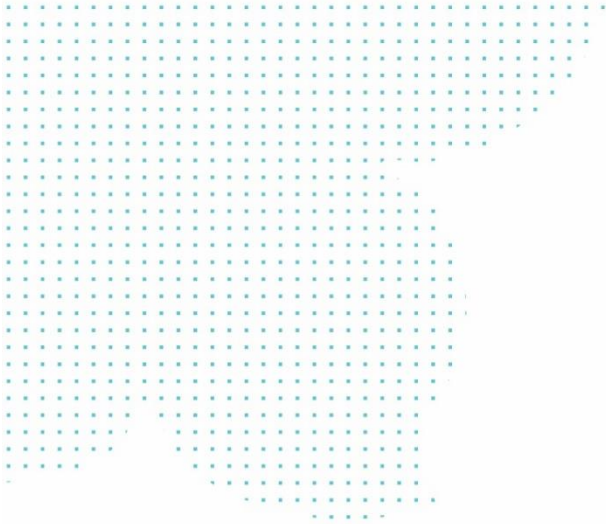
Conclusion: Early inclusion into habilitation treatment of preterm infants that are at risk of neurodevelopmental delay is effective particularly for those with moderate degree of delay. Parents education for habilitation is also cornerstone for successful outcome.



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