

INITIAL STATE OF MOTOR SKILLS IN SPORTS GYMNASTICS AMONG STUDENTS AT FACULTY OF KINESIOLOGY

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Abstract

The main aim of this study was to test the prior knowledge of basic gymnastic elements among the second-year students, as the basic guidelines for the (conduction of) Gymnastics course at the Faculty of Kinesiology in Zagreb. An additional goal was to determine the differences among the three tested generations. The research was conducted on a sample of 153 students from (of) three different studying generations at the (of) Faculty of Kinesiology, the University of Zagreb. The technique of eight gymnastic elements that is (are) an integral part of the (curriculum of) physical education curriculum for primary school children was estimated: a forward roll, a backward roll, the right cartwheel, the left cartwheel, a handstand (beside) against vertical surface (handstand), pullover, a forward walk on the balance beam (forward walk) and a safety walk on the balance beam (safety walk). We have found significant differences among the (between) groups in some variables. Group(s) 1 and Group 2 differ significantly (differ) in three basic (elements of) gymnastic(s) elements: a handstand, the right cartwheel and the left cartwheel ($p < 0.01$), while significant differences in the remaining elements (significant difference) (has) have not been established. There have been (Groups 1 and 3 have) statistically significant differences between Group 1 and Group 2 in five rated elements: a forward roll, a handstand, the right cartwheel, the left cartwheel ($p < 0.01$) and a pullover ($p < 0.05$), while statistically significant differences between Group 2 and Group 3 (significantly statistical differences are) have been minimal and have been manifested (only) in only one element: a handstand ($p < 0.01$). It can be concluded that the second-year students of (the second year in) the Faculty of Kinesiology, during their primary school, did not gain practical information about gymnastics (acquire a sufficient number of information) (fundamental movement skills) (from the sports of gymnastics), and that their knowledge about (of) the artistic gymnastics is at the insufficient level, based on the eight fundamental gymnastic movement structures.

Key words: artistic gymnastics, gymnastic elements, student population

Introduction

Today there are hundreds of gymnastic(s) elements and combinations (Brüggemann, 1994; Prassas, 1999), and their number continuously increases. It is not unusual for the gymnastics in schools to be identified (identify) with top-level, competitive gymnastics that we see on television. To be identified with (a) very heavy, complicated, challenging and complex sport movements that are unknown to most people and cause (them) fear, means that the attention and caution of (for) girls and boys who perform (carry) them, (are) needed. Even when students of a specialized sports college begin a gymnastics course, they have a pre-rooted fear of and respect for this sport, especially if they have never previously done the sport (met with them). However, sports gymnastics has a great number of applied programs that are modified and adjusted as to its objectives, tasks, and their primary purpose. Gymnastics is included in all curricula of physical education, at each level of education, in a way that the selection of objectives, content and knowledge standards are adapted to the level of students' development, in the curriculum for primary schools (Ministry of Science, Education and Sports, 2006). In addition, due to the technical foundation and current scientific and theoretical knowledge, artistic gymnastics is represented in a large number of

educational topics. Of course, a large amount of gymnastic elements in the school curriculum is the reason of its numerous effects on the children's health and development and also its contents largely satisfy the general and targeted objectives of physical education. An important fact that influences the importance of gymnastics in the curriculum is that it is particularly suitable for the adoption of essential, basic movement structures that are stored in the motor base in the form of motor fundamentals necessary for a harmonious and efficient movement and their application in everyday life (Novak, Kovač, & Čuk, 2008). For this reason, (it is the most common in elementary schools where) the majority (largest number) of fundamental gymnastic exercises (movements) is being taught (thought) in elementary schools. (Throughout the entire primary school education,) Of the total number (205) of teaching topics and (units of) physical education units, the presence of gymnastic themes in relation to the remaining sports facilities during the entire primary school education is 33% (67) and 38% (77) among male (pupils) and (38% (77) among) female pupils, respectively. (Živčić Marković, 2010). Of course, a great representation of gymnastic facilities in school PE programs is the reason of its impact on the healthy growth and development of children and also its contents largely meet the general and targeted objectives of physical education.

Teaching topics and units are divided concerning the essential characteristics of certain postures and body parts and sports movements (techniques) in several groups (walking and running, jumping, throwing, catching and shooting, rolling, climbing and crawling; rise in, pointing, drawing and suppression; rhythmic structures and games). In most of these groups a number of topics that are related to the gymnastics (sports) were found. Their role and significance, particularly in the development of motor skills and movement skills to create the database, is in accordance with the main characteristics of gymnastics and sports related discipline (him). In primary schools gymnastic(s) facilities are designed in accordance with the fundamental rules of teaching movement structures. Thus, (learning) exercising begins (starts) with overcoming simple movement tasks and those motions that affect the body sense acquisition (of a sense of his own body) in various positions and movements, making them easier to conduct. (After that, it) The process continues with teaching (the knowledge of) complement and extend movement demands and complex structures that are running in different directions and planes, at different speed(s), teaching the auxiliary apparatus and finally ends with (the) teaching the gymnastic apparatus. At (In) the Faculty of Kinesiology in Zagreb, the (course of) gymnastic(s) exercises were (is) conducted by (in) the second year students (of study). The sports basics (of the sport are) were being learned during (by) the two semesters (of one school year). (Certainly) We can certainly assume that students were already familiar with the basics of gymnastics from their (in) previous studies, and at that level (in this part) of their training, focus was (relies) on the main concepts, ways, methods and various acquisition implementation process (of various processes of learning) and on the examination (exploring the role) of artistic gymnastics role in the training implementation (of training) - educational teaching objectives (of teaching) in elementary and secondary schools in terms of applying knowledge gained in educating others, their future students. Therefore, the main aim of this study was to test the prior knowledge of basic gymnastic elements among the second-year students, as the basic guidelines for the (conduction of) Gymnastics course at the Faculty of Kinesiology in Zagreb. An additional goal was to determine the differences among the three tested generations.

Methods

The research was conducted on a sample of 153 students from (of) three different studying generations of the Faculty of Kinesiology, University of Zagreb: 49 students of the class (school year 2008/) of 2009 (1), 48 students of the class (school year 2009/) of 2010 (2) and 56 students of the class (school year 2010/) of 2011 (3). The (testing of) basic motor skills testing of school gymnastics was done in the first year (class) of the Gymnastics course. The technique was judged by the expert team (4 gymnastics judges).

The technique of eight gymnastic elements that are an integral part of the (curriculum of) physical education curriculum for primary school was estimated: a forward roll, a backward roll, the right cartwheel, the left cartwheel, a handstand against (beside) vertical surface (handstand), a pullover, a forward walk on the balance beam (forward walk) and a safety walk on the balance beam (safety walk) (Živčić, 2007; Novak, Čuk & Kovač, 2008; Živčić Marković & Breslauer, 2011). The technique of the gymnastic elements was rated with (school) marks, on a scale from 0-5. Data processing was performed by the statistical package SPSS version 11.5. Basic descriptive statistical parameters (mean, standard deviation, range, minimum and maximum scores, and flattening the curvature distribution) were calculated for all the variables. The frequencies of class and frequency histograms were also calculated. The Kolmogorov-Smirnov (K-S) test was used to show that data were normally distributed. (Normality of distribution was checked by Kolmogorov-Smirnov (K-S) test.) To determine the statistical significant difference and the differences in the rated elements among (between) the three generations of students, (it was used) the Kruskal-Wallis one-way analysis of variance and Mann-Whitney's nonparametric test were used, respectively (and with the aim of determination of differences among the three generations on the basis of rated elements it was used Mann-Whitney's nonparametric test). (The level of significance was calculated with) Bonferroni correction was used to show the level of significance.

Results

The K-S test has shown (ed) that data were not normally distributed. Comparing the basic descriptive parameters (Table 1) among the three generations of students of the Faculty of Kinesiology in Zagreb, it can (could) be seen that the test score results (of the tests) are (in areas of) low(er values) (0-1) in most of the measured fundamental movement skills in gymnastics, especially in (for the) Group 3. In Group 1 the average test score results are between (moving in the zone of) the values (from) 1.51 and (to) 3.37 with a standard deviation from 1.06 to 1.19. Slightly lower values are also seen in (the) Group 2 (Mean 0.67 to 2.77) and Group 3 (Mean 0.13 to 2.95) while the standard deviations are of similar values (SD = Group 2: 1.11 to 1.53, group 3: 0.71 to 1.17). Analyzing the frequencies (Table 3) of (for) the number of students assigned to specific groups, (and) we can confirm that the assessment of the measured variables is low according to the marks obtained for the performance of certain gymnastic technical elements. (of gymnastics, we can confirmed that a number of assessment is situated in a level of lower values). In all the measured variables, students have obtained low and very low scores (0-2). (The variable forward roll has) 44.4% of students were rated with a grade 0 and 1 in the forward roll variable, 73.3% could not perform the right cartwheel, and 77.8% the left cartwheel.

Table 1. Descriptive Statistics (mean ± SD)

Variables	N	Forward roll	Backward roll	Handstand	Right cartwheel	Left cartwheel	Pullover	Forward walk	Safety walk
GROUP 1	49	2.71±1.40	1.96±1.26	1.51±1.06	1.90±1.36	1.78±1.28	2.55±1.29	2.84±1.19	3.37±1.32
GROUP 2	48	2.12±1.36	1.69±1.19	0.67±1.19	0.98±1.31	1.00±1.11	2.02±1.34	2.56±1.49	2.77±1.53
GROUP 3	56	1.84±1.30	1.55±1.46	0.13±.71	0.88±1.23	0.73±1.17	1.62±1.37	2.23±1.65	2.95±1.41

Table 2. Frequencies

MARKS	Forward roll		Backward roll		Handstand		Right cartwheel		Left cartwheel		Pullover		Forward walk		Safety walk	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
0	3	1.9	18	11.8	87	57.0	53	34.7	49	32.0	27	17.7	8	5.20	1	0.7
1	65	42.5	69	45.1	42	27.5	59	38.6	70	45.8	18	11.7	41	26.80	32	20.9
2	29	19.0	30	19.6	12	7.8	15	9.8	14	9.2	61	39.9	30	19.60	22	14.3
3	23	15.0	18	11.7	5	3.3	10	6.5	8	5.2	26	17.0	28	18.30	35	22.9
4	19	12.4	9	5.9	3	2.0	10	6.5	6	3.9	10	6.5	28	18.30	33	21.6
5	14	9.2	9	5.9	4	2.6	6	3.9	6	3.9	11	7.2	18	11.80	30	19.6
TOTAL	153	100	153	100	153	100	153	100	153	100	153	100	153	100	153	100

Table 3. Kruskal-Wallis one-way analysis of variance for the differences among three groups

	Forward roll	Backward roll	Handstand	Right cartwheel	Left cartwheel	Pullover	Forward walk	Safety walk
Chi-Square	10.844	3.836	80.923	25.801	29.875	10.001	5.446	4.386
p	.004 [*]	.147	.000 [*]	.000 [*]	.000 [*]	.007 [*]	.066	.112

Table 4. Mann-Whitney's nonparametric test for the differences among the three generations on the basis of rated elements

Group 1-2	Forward roll	Backward roll	Handstand	Right cartwheel	Left cartwheel	Pullover	Forward walk	Safety walk
Mann-Whitney U	898.00	1000.50	503.00	646.00	729.50	950.00	1041.00	909.50
Wilcoxon W	2074.00	2176.50	1679.00	1822.00	1905.50	2126.00	2217.00	2085.50
Z	-2.08	-1.43	-5.18	-4.00	-3.52	-1.70	-.99	-1.97
p	.037 ¹	.154	.000 ²	.000 ²	.000 ²	.089	.319	.049 ¹
Group 1-3	Forward roll	Backward roll	Handstand	Right cartwheel	Left cartwheel	Pullover	Forward walk	Safety walk
Mann-Whitney U	893.50	1106.50	114.00	672.00	593.50	895.50	1017.50	1136.50
Wilcoxon W	2489.50	2702.50	1710.00	2268.00	2189.50	2491.50	2613.50	2732.50
Z	-3.201	-1.76	-8.91	-4.79	-5.36	-3.15	-2.33	-1.55
p	.001 ²	.078	.000 ²	.000 ²	.000 ²	.002 ²	.020 ¹	.122
Group 2-3	Forward roll	Backward roll	Handstand	Right cartwheel	Left cartwheel	Pullover	Forward walk	Safety walk
Mann-Whitney U	1176.50	1218.00	953.00	1319.50	1069.00	1149.00	1153.50	1245.50
Wilcoxon W	2772.50	2814.00	2549.00	2915.50	2665.00	2745.00	2749.50	2421.50
Z	-1.17	-.86	-3.87	-.17	-1.95	-1.35	-1.27	-.66
p	.243	.389	.000 ²	.862	.052	.178	.203	.511

The lowest results were obtained at the handstand variable. (handstand, where) 92.3% of students could not keep their body on (by) their hands against (with the support along) a vertical surface. The second-year students (of the second year) of the Faculty of Kinesiology (76.5%) have passed the backward roll, with (range from) grades ranging from 0 to 2. There are (is) also a large number of lower values for the basic (variant of) movement variant along the narrow area (forward walk). (where) Over one half of the students (them) (79) were unable to (safely) perform (a) the task safely (scores from 0 to 2). Considering the fact that the analyzed values had a positive asymmetric distribution (Table 1), Kruskal-Wallis one-way analysis of variance was applied (for the determination of) to determine statistically significant differences (between groups Kruskal-Wallis one-way analysis of variance was applied.) Table 3 shows that there are significant differences between the groups in some variables.

A statistically significant difference was found in the following variables: a forward roll, a handstand, the right cartwheel and the left cartwheel ($p < 0.01$). Analyzing the results based on the rated gymnastic elements, Table 4 shows statistically significant differences among the (between) groups. Group(s) 1 and Group 2 significantly differ in the performance of the three basic gymnastic elements (of gymnastics): a handstand, the right cartwheel and the left cartwheel ($p < 0.01$), while in the remaining elements, significant difference has not been established. There are statistically significant differences between Group(s) 1 and Group 3 (have statistically significant differences) in five rated elements: a forward roll, a handstand, the right cartwheel, the left cartwheel ($p < 0.01$) and a pullover ($p < 0.05$), while between Group 2 and Group 3 statistically significant (ly statistical) differences are minimal and are manifested only in one element, a handstand ($p < 0.01$).

Discussion and conclusions

Based on the analysis, it could be stated that there are sufficient facts that determine the differences among the three groups of students based on the eight basic assessment techniques of gymnastic elements. In addition, the descriptive statistical parameters have shown that the students' Gymnastic course scores (ratings of individual elements) are low, with grades 0, 1 and 2. This indicates that their basic knowledge acquired during the (in) elementary and secondary education (system) is not satisfactory or it is without the complete movement structure (of the movement). The highest grades 4 and 5 (for the assessment of the technique were found among) obtained only a very small number of students. It should be noted that (in all three generations) a certain number of students from all three generations had (were) previously been involved in the systematic physical training in gymnastics, as well as in the related sports and recreational activities (rhythmic gymnastics, various types (kinds) of dance, synchronized swimming and figure skating). Analyzing the differences in the individual technique elements (of technique) among (between) the three groups of students, it is evident that there was no discrimination on grounds (the basis) of all measured variables, but only on grounds of age. (according to differences in generations.) Thus (So), (in the variables forward walk and safety walk) students are largely tested in the forward walk and safety walk variables (estimated) from the higher grades. (where it can be seen that) 48.4% received a score from (of) 3-5, and even more than half of the students (67.1%) were able to successfully and safely keep (maintain) the equilibrium position while (during) moving on the balance (high) beam. These data suggest that most of them are familiar (has met) with these types of skills (this kind of skills) in PE (teaching), in sports training or in everyday life and thus have managed to develop a particular stability (type of surety) while moving along the narrow, elevated area.

According to this, there was no discrimination on grounds of measured variables (did not significantly discriminated measures in) among the three groups. It can also be noted that the pullover variable (pullover) has not statistically significantly affected (in all three generations impact) the difference between Group 1 and Group 2 ($p = 0.89$) from all three generations, while there were statistically significant differences in the above variable ($p < 0.01$) between (the) Group(s) 1 and Group 3. (had statistically significant differences in the above variable ($p < 0.01$).) (In this variable) 70.6% of students have obtained a passing grade (received a positive evaluation of) for their performance in the Gymnastics course, (for this gymnastic element) where the(y) average scores (ratings) ranged from 1.62 (3), 2.02 (2) to 2.55 (1). The basic explanation can (could) be found in the fact that the class (generation) of (the school year 2008/) 2009 has enrolled (in the faculty) (following (in) the classification procedure).

And was tested in the pullover exercise, which had been used as the gymnastic skill test for the past ten years. Thus, the potential (future) students had prepared (were preparing) and (have) had partially improved (overcome) the technique, which resulted in satisfactory scores (values) with (by a larger number) a lot of passing grades. Low score values on the (for) individual assessment (of) techniques (from) for multiple gymnastic elements indicate a lack of primary motor skills acquisition (information from the sports of) in primary gymnastics (in primary school), which is not understandable for several reasons. In the (Curriculum of) Physical Education Curriculum learning (the) a forward roll begins as early as the first grade, and the technique is further improved through thematic units in the remaining seven grades (classes). The learning of a backward roll starts (at) in the second grade (class) and the technique is also improved in (through) the remaining grades (classes). A cartwheel (the right cartwheel and the left cartwheel) is being learned through a methodical process entirely in the third grade (class) and through a variety of treatments especially in the 7th and the 8th grade. A cartwheel (the right cartwheel and the left cartwheel) is a major theme in the 5th grade, and (previous are) is taught through various (forms of) preparation forms and methodical exercises in the early grades. Starting from the fact that the gymnastics requires certain material conditions and a very good knowledge of basic principles, (and) teaching methods (of teaching) and (learning) acquisition implementation process (of implementation) itself (gymnastic elements) (student safety), it is possible to assume that some schools do not have favourable conditions and thus are not able to spend more instructional themes in artistic gymnastics (Trusić, 2007; Bučar Pajek, Čuk, Kovač, & Turšič, 2010). However, it is not logical that the results of learning the basic gymnastic elements were based on (the facts of their) low (quality of some) knowledge of gymnastic movement structures. With many sports and additional structures (, in the curriculum of primary schools (Ministry of Science, Education and Sports, 2006) it has been noticed) a large number of gymnastic(s) elements has been noticed in the primary school curriculum (the Ministry of Science, Education and Sports, 2006), which indicates their significance and applicability in the realization of basic and special educational and anthropological tasks of school children. Based on the (that) fact, we can say that exercise has an important role in students' training (of students) because it enhances life quality (for the enhancement of quality of life,) thus effectively changing the properties and developing skills which would directly provide health promotion as an irreplaceable factor in all human activities, and define the main objective of physical education (Findak, Prskalo & Pejčić 2003). Based on our analysis, there is a disturbingly low level of the prior knowledge of (in the sport of) gymnastics, which dictate the way of thinking about it, and access to all of its (their) implementation in primary and secondary school children (youth) in the Republic of Croatia.

The same could be stated for the candidates who are focused on Physical Education because it is well known that the sports gymnastics is one of the main sports that has (have) multiple effects on the motor skills development (of motor skills), especially on coordination, as one of the important factors in learning and mastering the new movement structures. For this reason, and based on the data obtained, it can be concluded that during the primary education, the students at (in) the Faculty of Kinesiology did not have enough motor skills information of (from (the sport) gymnastics. Gymnastics is a sport that contains a large number of movement structures, from simple to very complex. It also contains a large number of methods and modes, and its' training is verified through a long historical tradition, conventionality and numerous gymnastic experience and pedagogical experts. There is also an opinion that a large number of top athletes (at early age) were engaged in gymnastics at an early age and (also have) also did (used) gymnastics as an additional sports training (in their sports). Gymnastics, with its impressive number of different content (Gaverdovski & Smolevski, 1979) points to the significance and applicability in the realization of basic and special educational and anthropological tasks of school children. Gymnastics has an important role in preparing students for independent practice to enhance life quality (of life), effectively changing properties and developing

skills, which directly provides health promotion as an irreplaceable factor in all human activities (World Health Organization, 2004). Therefore, (it is completely unjustified and incomprehensible) its absence in the educational system is completely unjustified and incomprehensible, having in mind the analysis conducted on the specific population, the students of Faculty of Kinesiology.

The disturbingly low level of the prior knowledge of gymnastics was determined, which dictate the way of thinking about access and implementation in primary and secondary schools (for children) in the Republic of Croatia. Also the same is argued by (disputed in the opinion of) the candidates who are tested (focused) in (on) Physical Education because it is well known that (the) gymnastics is one of the main sports that has (have) multiple effects on the development of movement skills, especially coordination as one of the important factors in learning and mastering the new movement structures. Based on the obtained data, it can be concluded that the second-year students of (the second year in) the Faculty of Kinesiology, during their primary school did not gain practical information about gymnastics (acquire a sufficient number of information) (fundamental movement skills) (from the sports of gymnastics), and that their knowledge about (of) the artistic gymnastics is at the insufficient level, based on the eight fundamental gymnastic movement structures.

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INICIJALNO STANJE MOTORIČKIH ZNANJA IZ SPORTSKE GIMNASTIKE STUDENTICA KINEZILOŠKOG FAKULTETA

Sažetak

Cilj ovoga istraživanja bio je dijagnosticiranje stanja usvojenosti tehnike školskih gimnastičkih elemenata studentica 2. godine, kao jedne od osnovnih smjernica u načinu provođenju nastave iz kolegija Sportska gimnastika na Kineziološkom fakultetu Sveučilišta u Zagrebu te utvrđivanje razlika između tri generacije. Uzorak ispitanika sačinjavale su 153 studentice tri različite generacije Kineziološkog fakulteta Sveučilišta u Zagrebu: 49 studentica školske godine 2008/09 (1); 48, školske godine 2009/10 (2) i 56, školske godine 2010/11 (3). Na prvom satu praktične nastave iz kolegija Sportska gimnastika izvršena je provjera osnovna motorička znanja iz školske sportske gimnastike čiju tehniku je procjenio ekspertni tim (4 gimnastička stručnjaka). Procjenjena je tehnika izvedbe osam gimnastičkih elemenata koji su sastavni dio nastavnog plana i programa Tjelesne i zdravstvene kulture već u osnovnim školama: kolut napred, kolut nazad, desni premet strance, levi premet strance, stoj pored vertikalne površine, uzmah, slobodan hod po gredi te sigurni hod po gredi. Tehnika gimnastičkih elemenata ocjenjen je školskom ocjenom na skali 0-5. Obzirom da su analizirane vrijednosti varijabli pozitivno asimetrično distribuirane, za utvrđivanje statistički značajnih razlika među grupama primjenjena je Kruskal-Wall-ova jednosmjerna analiza varijance. Na osnovu dobivenih podataka uočavaju se statistički značajne razlike između pojedinih grupa. Statistički se značajno razlikuju na osnovu rezultata u većini analiziranih varijabli: kolut napred, stoj pored vertikalne površine, desni premet strance, levi premet strance ($p < 0.01$) kod kojih su u sve tri grupe uočene i najniže vrijednosti aritmetičkih sredina. Analizom frekvencija broja studentica raspoređenih u određene grupe, prema dobivenim ocjenama za izvedbu tehnike pojedinih školskih gimnastičkih elemenata, potvrđuje se da je veći broj ocjena smješten u zonu nižih vrijednosti. Provedenim analizama utvrđeno je zabrinjavajuće niska razina osnovnog predznanja iz sportske gimnastike što nameće razmišljanje o načinu, pristupu i uopće o njihovoj provedbi tijekom osnovnog i srednješkolškog školovanja djece i omladine u R Hrvatskoj. Isto tako ista je i sporna u razmišljanjima o kandidatkinjama koje se usmjeravaju na kineziološki fakultet iz razloga što je dobro znano da je sportska gimnastika jedan od temeljnih spotova koji ima višestruki utjecaj na razvoj svih motoričkih sposobnosti, posebice koordinacije kao jedne od važnih čimbenika u učenju i savladavanju novih kretnih struktura. Iz toga razloga, a na osnovu dobivenih podataka, može se zaključiti da studentice 2. godine Kineziološkog fakulteta, tijekom svoga primarnog školovanja nisu stekle dovoljan broj kretnih informacija (osnovnih motoričkih znanja) iz sportske gimnastike te da je njihovo predznanje iz sportske gimnastike na razini nepoznavanja ili nedovoljnog poznavanja osam temeljnih gimnastičkih kretnih struktura.

Ključne riječi: gimnastika, gimnastički elementi, studentice, znanje

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