SPATIAL ORIENTATION AND BALANCE AT THE 7-9 YEARS GYMNASTS

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Abstract

This study was initiated, starting from the complexity of the gymnastic challenge and from the necessity of the coach to have some evaluation test of the motric skills based on the nervous system: for example, spatial orientation and balance.

We concluded an experiment, with twelve athletes from Sports School Club Brasovia. These subjects were supposed to test for spatial orientation and balance, and we analyzed the results in the test with the results obtained from two competitions, which took place at the end of the experiment. The data obtained demonstrated that the athletes, which practiced spatial orientation and balance, have scored great values for these two abilities, and confirmed with good results in competitions.

Keywords: gymnastics, spatial orientation, balance

1. Introduction

Gymnastics is one of the most complex sports, due to the multitude of specific motor skills and characteristic of competition effort. Training of young gymnasts to participate in tournaments imposes knowledge of specific particularities of this sport, such as, the nature of the effort and the performing conditions.

Gymnastics exercises include "all movements", "educational and sports nature" (Băiaşu, Bârlea, 1972), "natural or created" and resembles as a "poliatlon of 6 or 4 challenges", (Dungaciu 1982).

The technical elements of gymnastics are entertaining, as a consequence, athletes need to master their center of gravity, spatial orientation, a good sense of balance, power of coordination, an overall body mobility, and harmonious distribution of the muscular strength, capability to promptly adapted and accommodate to ever-changing situations (Barna, Gugu-Gramatopol, 2008, Vieru, 1997).

The increasing complexity of the exercises, has led to outlining scientific psychosomatic types of the 7-9 years gymnasts. Most of the authors agree that dexterity and other special skills that requires perception, decision and action of the nervous system, have to be developed and learned since early childhood (Ionescu,C.L., 2014, Mosoi, Gugu-Gramatopol, Botezatu, 2012).

Dexterity, without which the athlete could not perform the specific technical components, is: "a psychomotor quality which is based on the relationship between the central nervous system and skeletal muscle while performing a movement" (Tudor 1999). Other authors define it as the body's ability to perform motric actions, coordinating the whole body or its segments, in terms of balance, accuracy, spatial orientation, amplitude, ambidextrous ability, coordination of limbs and the large muscle groups, differentiation and reproduction of the direction, velocity, amplitude and intensity of muscle contractions (Dragnea 2002, Dungaciu 1982, Epuran, 1982, Vieru, 1997).

L. Picq and P. Vayer, (1972), frame the static and dynamic balance to the basic motric action and spatial orientation in the perceptive-motor structures linked to the intelligence.

The balance depends on kinesthetic sensations, visual perception and the mechanisms of the semicircle canals found in the human ear. Static balance is the ability to maintain corporal control in a stationary posture, while the dynamic balance is a person's ability to maintain moving posture control in different running tasks (Albu 1999, Tudor 1999, Barna, Gugu-Gramatopol 2008).

Spatial orientation includes the following components: the structure, direction, position, guidance, speed, and size (Dragomir, 2007).

Using the gymnastics exercises, the acrobatic elements carried out in an upside down position, jumps on the elastic trampoline have improved the spatial orientation, balance, psychomotor coordination, to the 7-9 years athletes (Tudusciuc 1984, Ionescu Anca şi Gugu-Gramatopol, 2014).

2. Purpose and work hypothesis

In our studies we intend to highlight the influence that the developed of the spatial orientation and balance they have in achieving better results at the 7-9 years gymnasts.

The work hypothesis developed from the assumption that developing and testing the spatial orientation and balance we will track the achievements to the 7-9 years gymnastics competition, depending on the level of the skills.

3. Research development and methods

The experimental research was made on 12 gymnasts from Sports School Club Brasovia, divided into two groups, an experimental one and one control group, conducted by Horvat Mihaela, teacher, during the period: October 15th, 2014 - May 15, 2015.

We measured the spatial orientation by the test **P1 – Go to the flag –** and the balance by **P2 - the balance test**. P1 consists in moving towards the flag blindfolded, a distance of 10 m. Before that, the gymnast saw the marker. We measure the number of centimeters deviated, by the subject, from the correct direction, and the deviation in the left or right side. P2 was made with the *Balance Platform Type PEV07,* produced by OnlineSolutions Media Ltd. The athlete is sitting on the platform and has a screen in front of him. Testing includes four phases; the athlete must adopt a balanced position as follows:

Phase 1: the subject's eyes are open, but he has no information, that the monitor is covered.

Phase 2: the subject's eyes are closed, so the suppression of visual analyzer is without information.

Phase 3: subject's eyes are open; the screen has information which indicates the stability of his position.

Phase 4: subject's eyes are open; he must rebalance his position by putting the pressure center on the marker line displayed on the screen. In the end, the graphics of the four phases will be shown on the screen.

4. Results and discussions

Following the initial and final tests, of the two groups, to the P1 test, spatial orientation, we obtained the following statistical data:

P1 – Spatial orientation test:

Table nr.1. The values obtained by the P1 test by the experimental grou

Gymnast	The direction of deviation		Deviation (cm)		Difference
	S	D	Initial testing	Final testing	
1		X	73	35	38
2		X	65	15	50
3		X	64	10	13
4		X	74	29	45
5	X		82	42	40
6		X	96	51	86
Average			75,67	30,33	43,66
The median			73,50	32,00	
The standard deviation			11,94	15,72	

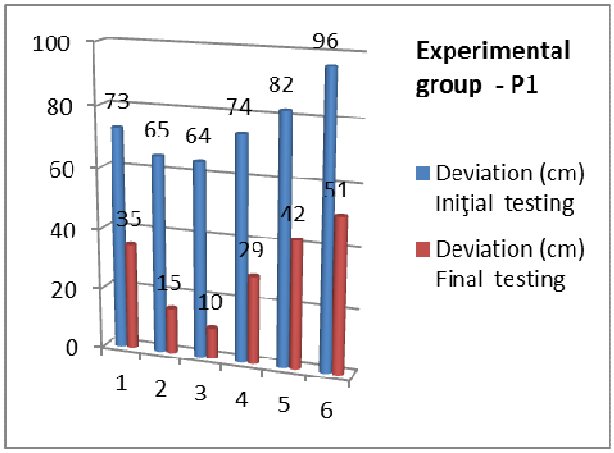


Chart 1. The Histogram at the experimental group, at P1 test

The average to the initial testing, concluded by the experimental group (75, 67), is higher than the control group (73.83) almost two units, which proves that gymnasts deviation from the right direction was quite large, from the both tested groups. Progress made by the experimental group at the final testing is obviously, the average is more than 45 cm lower than the initial testing and more than 26 cm lower than the control group (30,33 – experimental group; 56,67 – control group).

Table nr.2. The values obtained by the P1 test at the control group

Gymnast	The direction of deviation		Deviation (cm)		Difference
	S	D	Initial testing	Final testing	
7	X		90	45	45
8		X	65	56	9
9	X		30	25	10
10	X		95	80	15
11		X	101	84	27
12	X		62	50	12
Average			73,83	56,67	19,66
The median			77,50	53,00	
The standard deviation			26,78	22,25	

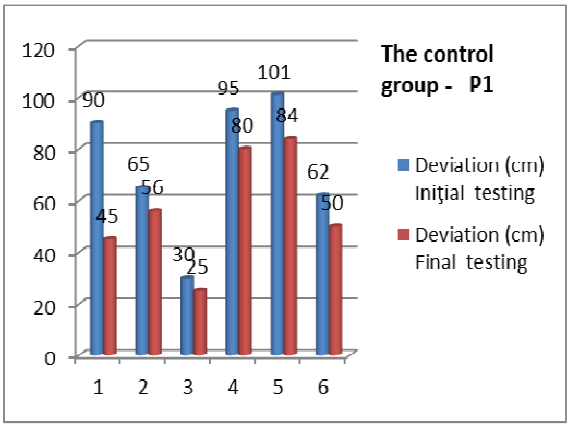


Chart 2. The Histogram at the control group, at P1 test

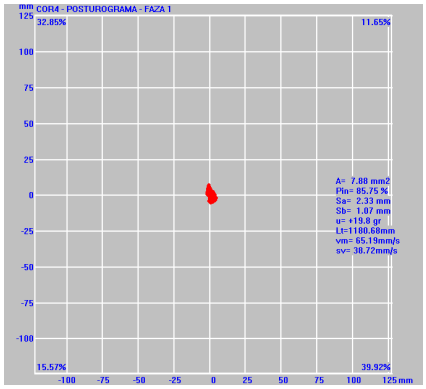
The median value and the standard deviation, initial and final, are lower in the experimental group compared to the control group, which shows a better result, meaning, lateral deviations smaller and a larger homogeneity of the group.

P2 - The balance test

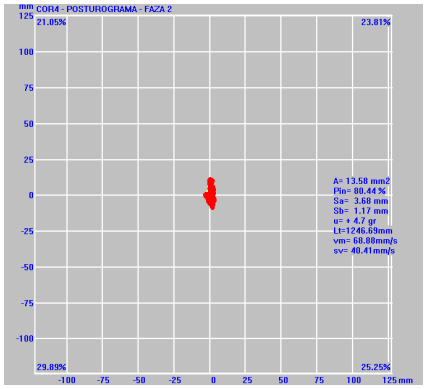
The tests conducted on the balance board, of the experimental group are expressed in the following charts:

Subject 1

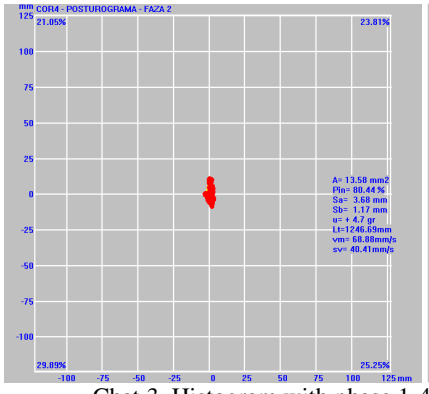
Phase 1



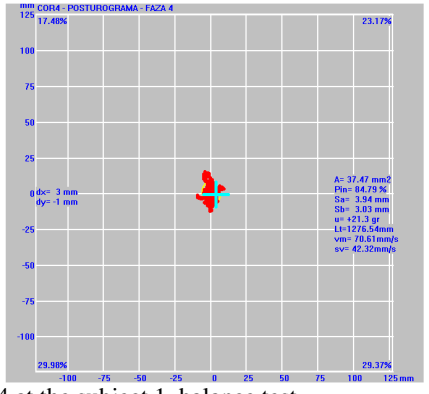
Phase 2



Phase 3



Phase 4

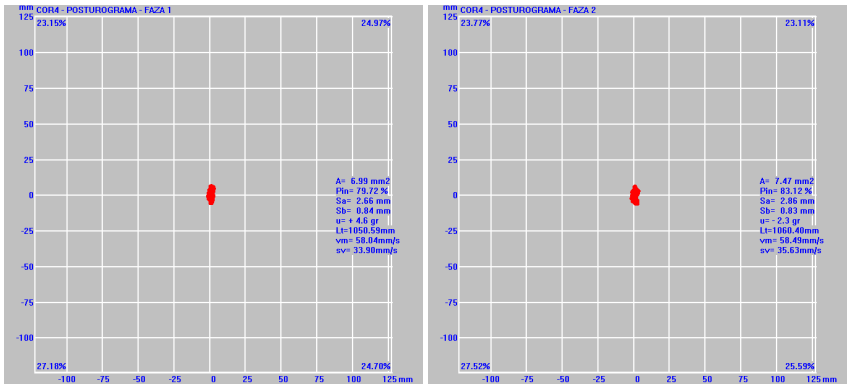


Chat 3. Histogram with phase 1-4 at the subject 1, balance test

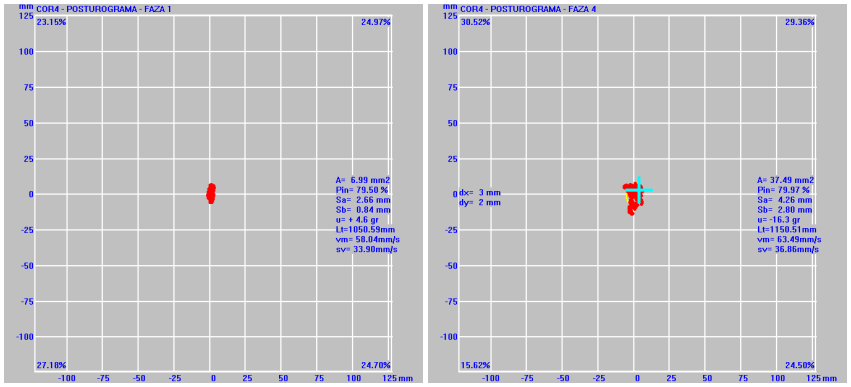
Overall we can say that subject 1 has a balancing and rebalancing capacity relatively good, coordinative qualities and neuromuscular control, medium towards good. He made a small area in phase 1 by not receiving any kind of information, so it has good motric skills, but not put them in action. When he receives the information, phase 3, the ability to dominate and control is good. The correction movements are above average.

Subject 2

Phase 1 Phase 2



Phase 3 Phase 4

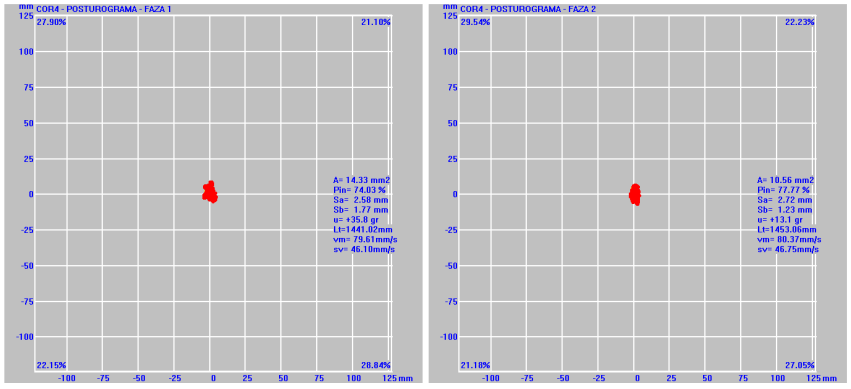


Chat 4. Histogram with phase 1-4 at the subject 2, balance test

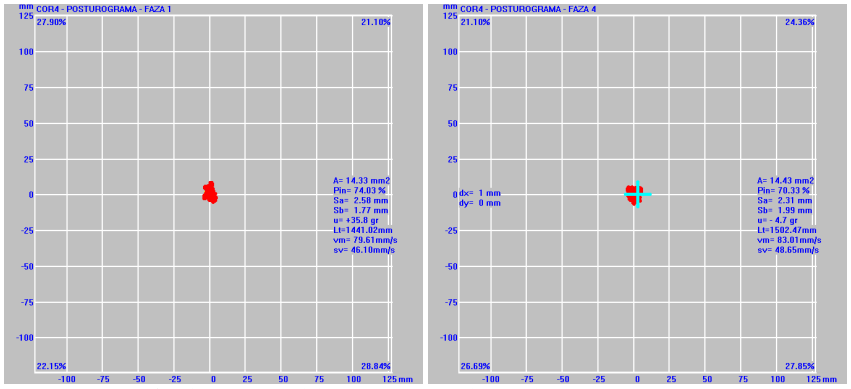
Subject 2 has a very good result in the first three phases of balance test evaluation; the area is reduced, indicating good native skills, capacity of power, and good control. The fourth phase is a slightly larger area, so it is uncertain for him to rebalance. Through the constant results from the three phases, the athlete demonstrates a good fine motor learning ability, which is gratifying for a gymnast.

Subject 3

Phase 1 Phase 2



Phase 3 Phase 4

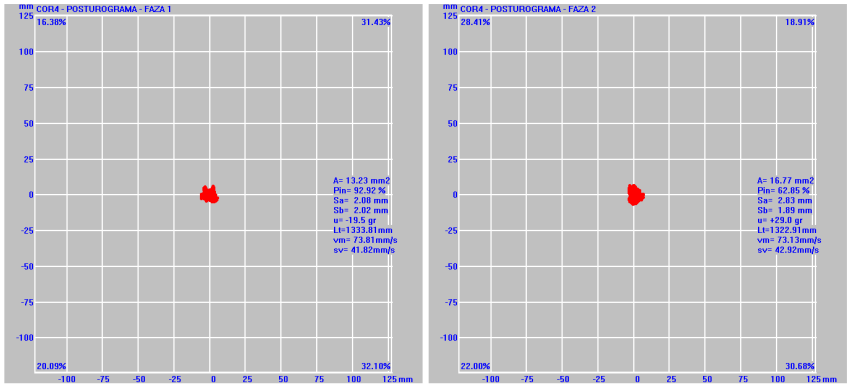


Chat 5. Histogram with phase 1-4 at the subject 3, balance test

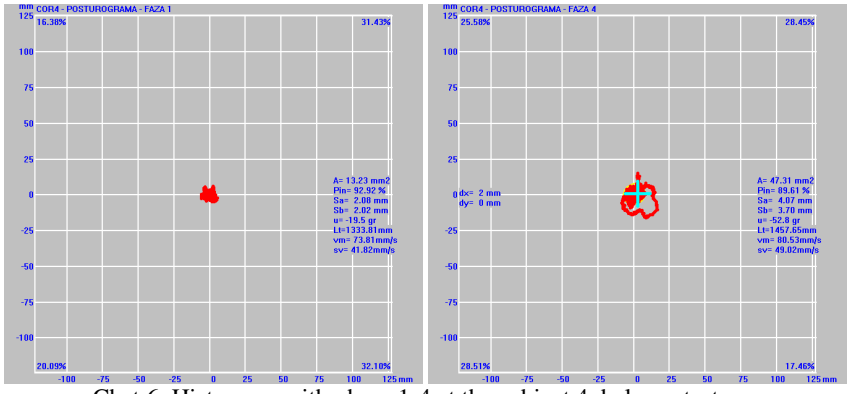
Subject 3 shows a very good consistency at all four phases of the sample, also presented in the contest. The subject presents good native skills, ability mastery, self-control and rebalancing capacity good to very good. The athlete is dedicated to the team; it can be count on, with a high progress that registered at the spatial orientation test as well.

Subject 4

Phase 1 Phase 2



Phase 3 Phase 4

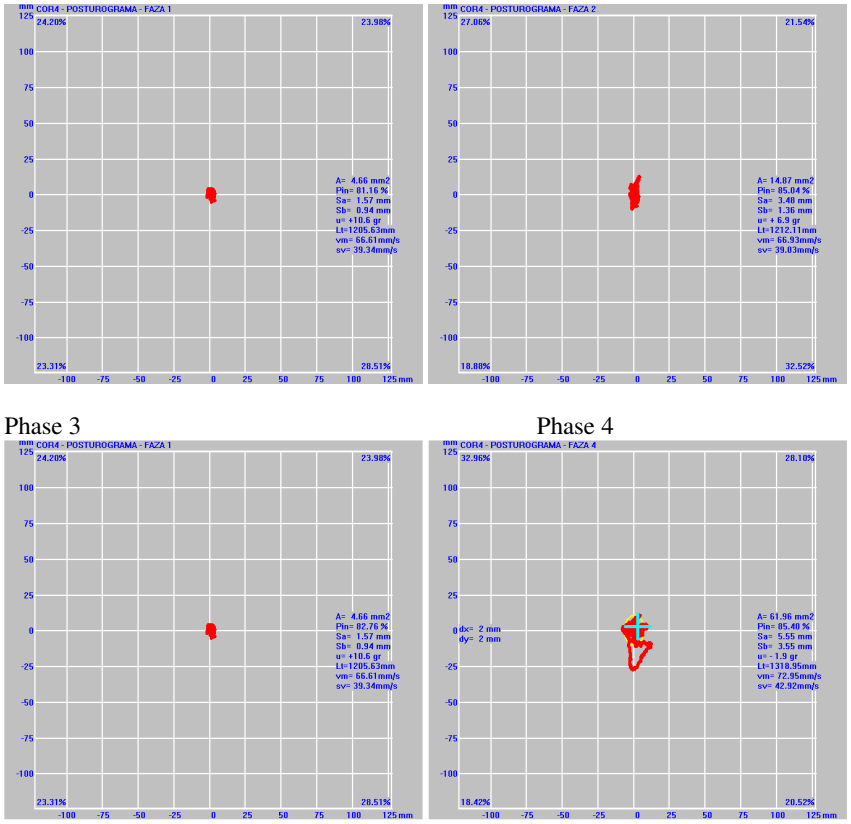


Chat 6. Histogram with phase 1-4 at the subject 4, balance test

Subject 4 has a better result in the third phase, when he receives the information. He is a gymnast who can easily follow the indications of the coach. It shows neuromuscular control medium to good, but the fourth stage is the weakest, so he has no rebalancing capacity. For this athlete it is difficult to revert, to correct, he must learn correct from the beginning, then practice to get used with the right way.

Subject 5

Phase 1 Phase 2



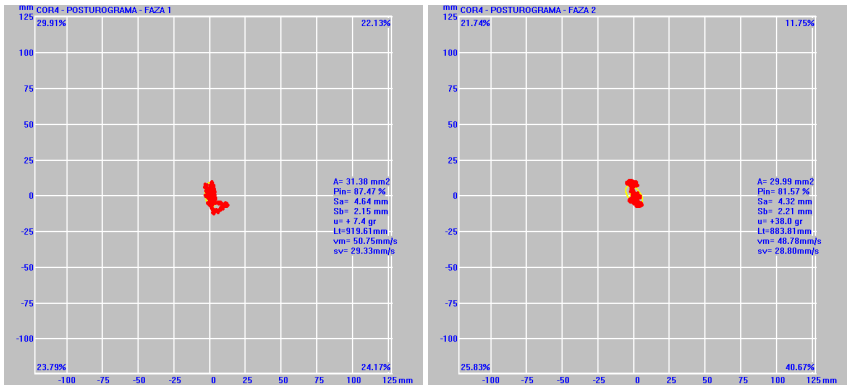
Phase 3 Phase 4

Chat 7. Histogram with phase 1-4 at the subject 5, balance test

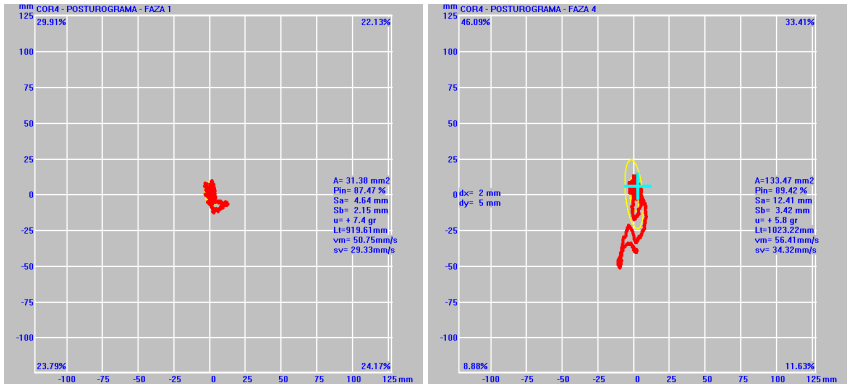
Subject 5 is unsteady, has good results in the first and third phase, and has good native and domination skills. Phase two, without visual analyzer information and in the third one, the one of rebalancing, are medium towards low. The gymnast doesn't present any ability to revert, the smallest distraction, a look stolen anywhere else could make him miss out and never return.

Subject 6

Phase 1 Phase 2



Phase 3 Phase 4



Chat 8. Histogram with phase 1-4 at the subject 6, balance test

Subject 6 has the worst results in all four phases, proves no native skills, no ability to control or rebalance. Also in the spatial orientation test, the athlete had the largest deviations, the results from the competition showing the same thing.

At the end of the experiment, the experimental group gymnasts participated in two competitions, an internal one of verification, and another one was to select athletes for the National Championship. Rankings in the two competitions were converted into points. The order of the standings in the two competitions corresponded to the number awarded symbolic to the athletes.

Conclusion

This study demonstrated us that increased attention allocated to the assignments of the spatial orientation and balance, was proven successful for 7-9 years gymnasts.

Test results have shown us a significant increase in the experimental group in the spatial orientation. The initial testing measurements were close to the control group, but in the end the differences were over 45 centimeters.

Data obtained in balance tests were the same as the results of the contest from the experimental group.

We can say that the first 3 subjects fit the psyhomotric profile of a gymnast; they have good native skills, capability to control their strength, fine motric and neuromuscular control, correction capacity, good balancing and rebalancing, and mastery of movements. They also obtained a homogeneous executions plateau.

For the next three subjects, the skills mentioned above were not as high as the first three subjects; however, they are still above average for the children of their age.

This could be established also from the results of the two tests and from the results of competitions in which they participated.

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