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The Effect of Preschool Children's Participation in Sportive Recreational Activities on Balance and Flexibility Performance

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A B S T R A C T

This study was conducted to compare the developmental status of balance and flexibility, which are the physical fitness parameters of preschool children receiving sportive recreation education. The participant group of the study consisted of a total of 60 children, 30 of whom were experimental and 30 of whom were control groups, who were studying in preschool education between the ages of 4-6. The study lasted a total of 8 weeks and experimental method with control group and pre-test-post-test design was used in the study. While a 40-minute sportive recreation education program was applied to the experimental group 3 days a week for 8 weeks, the control group continued its normal curriculum. In the study, sit and reach test for flexibility and flamingo balance test for balance were used as data collection tools. A normality test was applied to decide on the tests to be applied. Due to the normal distribution of the data, Independent Samples T-Test was used to determine whether the difference between the groups was significant, and Paired Samples T-Test was used to determine whether there was a significant difference between the pre-test and post-test within the group, and the significance value was accepted as $p < 0.05$. After the 8-week sportive recreation education program, there was a advanced significant difference in the pre-test-post-test values of flexibility and balance parameters in the experimental group ($p < 0.001$), while there was no significant difference in the control group ($p > 0.05$). When the experimental group and the control group were compared, a significant difference was found in the flexibility and balance test values in favor of the experimental group after the sportive recreation activity program ($p < 0.001$). As a result, it was observed that the children who participated in preschool sportive recreation education programs had more advanced balance and flexibility development levels compared to the children who received standard curriculum.

Keywords: Sportive Recreation, Preschool, Flexibility, Balance

INTRODUCTION

The concept of recreation means relaxing and entertaining activities that individuals or groups do voluntarily in their free time (Karaküçük, 1999). Recreation is the activities that people voluntarily participate in and enjoy, apart from the behaviors they must do in the limited time that life brings (Hazar, 2003). Recreation is an activity that has a wide range of sports and attracts large masses (Sevil et al., 2012).

Recreational activities that increase our quality of life are among the necessary elements of our lives. In this regard, all people in the world participate in recreational activities that have spiritual, social, and physical benefits (Özer and Çavuşoğlu, 2014). It has been stated that recreational activities are very beneficial for people both mentally and physically.

Sports constitute one of the most demanded sections of recreation. While sports create an effective field of action for people's recreational needs, recreation also plays an important role in the spread of sports to the social sphere and to gain sportive success. Sportive recreation is the type of recreation based on physical exercise or the realization of various sports branches for recreational purposes (Zorba and Bakır, 2004). In this context, sportive recreation activities are activities in which the primary purpose is participation and the subsequent goals are strengthened physical fitness, entertainment and social participation. Participation in sportive recreation contributes positively to preventing or reducing the stress that technology and urbanization will cause on individuals and society, happiness, physical and mental health, social and educational performance. For this reason, sportive recreation is one of the important factors affecting the level of quality of life (Öztürk et al., 2019).

It is observed that the inclusion of technology in the educational process makes learning more fun for children and improves their creative thinking skills (Akpınar, 2005; Arı & Bayhan, 2003; Sivin-Kachala & Bialo, 2000). Although technology provides great support to the development of children, it can also include possible bad effects such as inactivity. Movement is very important for the physical development of the child (Taşçı, 2010). In the preschool period, movement habits should be gained through physical activities that form the basis of sportive recreation (Zorba & Bakır, 2004).At this point, sports and recreational activities are very important for preschool children because childhood is the period when development is the fastest. The skills acquired in this period affect the child's behavior and personality development in the future. Early interventions to support development can have lasting effects on personality development (Bredekamp, 1992). Physical activity and play are important elements in both social and mental development of children (Özer et al., 2006).

Sportive recreation is also beneficial in terms of improving physical fitness parameters. Especially in preschool children whose musculoskeletal system develops rapidly, the harmonious and functional development of these parameters is very important. In this period, balance and flexibility come to the forefront. Balance has been defined as the body's ability to stay in a fixed position or to make stable movements by resisting gravity (Tortop et al., 2014). Even walking, running, sitting skills require balance. Flexibility is defined as the ability of a joint to move freely throughout its entire normal range of motion (Page, 2012; Weerapong et al., 2004). Sportive recreational activities carried out in the preschool period develop these two parameters and enable them to work in coordination with each other.

It is very important that the need for recreational activities of preschool children, who spend most of their time playing, is met with a sportive recreational activity program and that children, who have the opportunity to experience many different branches with the recreational application of various sports branches, can learn new and complex skills in the preschool period. This study can offer a original approach to the literature in terms of the evaluation of preschool children, a group in which sportive recreational activities are not sufficiently applied in the literature. The main aim of the study was to examine the effects of preschool children's participation in sportive recreational activities on balance and flexibility performance. It was hypothesized that sportive recreational activities applied to preschool children would improve balance and flexibility performance.

METHOD

Experimental design

The research was carried out during the education period of a private kindergarten institution in Sakarya. The study lasted a total of 8 weeks and a quasi-experimental method with a control group and pre-test-post-test design was used in the study. The working group was composed of 30 children between the ages of 4-6 who attended a private preschool. The control group was comprised of 30 children of the same age range who attended a different private preschool in the same province. While a 40-minute sportive recreation education program was applied to the experimental group 3 days a week for 8 weeks, the control group continued its normal curriculum. In the study, sit and reach test for flexibility development and flamingo balance test for balance development were used as data collection tools.

Participants

The working group of the study consisted of 15 boys (age: 5 ± 0.83 years; height: 1.12 ± 4,12 cm; Body weight: 19.6 ± 1,94 kg) 15 girls (age: 5 ± 0.67 years; height: 1.10 ± 6,48 cm; Body weight: 19.15 ± 2,60 kg) with a total of 30 students. Similar to the working group, the control group of the study

consisted of 15 boys (age: 5 ± 0.91 years, height: 1.14 ± 5,81 cm, body weight: 20.2 ± 3,19 kg) 15 girls (age: 5 ± 0.70 years; height: 1.10 ± 6,04 cm; Body weight: 18.65 ± 2,76 kg) a total of 30 students.

Before the study, the participants and their parents were informed about the tests to be applied. Parents were told about the risks of disability during the tests and that their children could leave the study at any time. Parents signed the informed consent form for the study. The Helsinki Declaration was adhered to at every stage of the study. During the study, no injuries were found in the students.

Procedure

Measurement of height and body weight

The height of the preschool children participating in the study was measured with a height scale with a sensitivity of 0,1 cm, with bare feet and heel of foot side by side, eyes looking straight ahead, head upright, and back straight. The outputs obtained are recorded in cm. A smart scale with an accuracy of 0,1 kg was used for body weight measurement. The children participating in the study were asked to climb on the scale without shoes in sportswear that would not weigh them down, and the test output was recorded in kg (this protocol was applied in both the pre-test and post-test).

Flamingo balance test

The flamingo balance test (FDT) is a test used to measure balance on a Eurofit test battery (Adam et. al., 1988). As equipment, a beam 50 cm long, 4 cm high and 3 cm wide and a stopwatch were used. (Şimşek et al., 2020). During the test, the participant was instructed to stand on the board with his non-dominant foot, lift the other foot off the ground and bring the knee to maximum flexion with the same hand (Figure 1). During the measurement, the participant was asked to focus and look at a point at eye level. As soon as the participant left the hand of the practitioner from whom he received support, the stopwatch was started and the measurement was started. The stopwatch is stopped if the participant drops their foot or if any part of their body touches the ground. Following each balance breakdown, the practitioner helped the participant to take himself into the correct position. A total of 3 tests were applied and the highest value was recorded. The number of errors made over the course of 1 minute was recorded. (Şimşek et al., 2020; Çakır and Özbar, 2019). This protocol was applied in both pre-test and post-test.

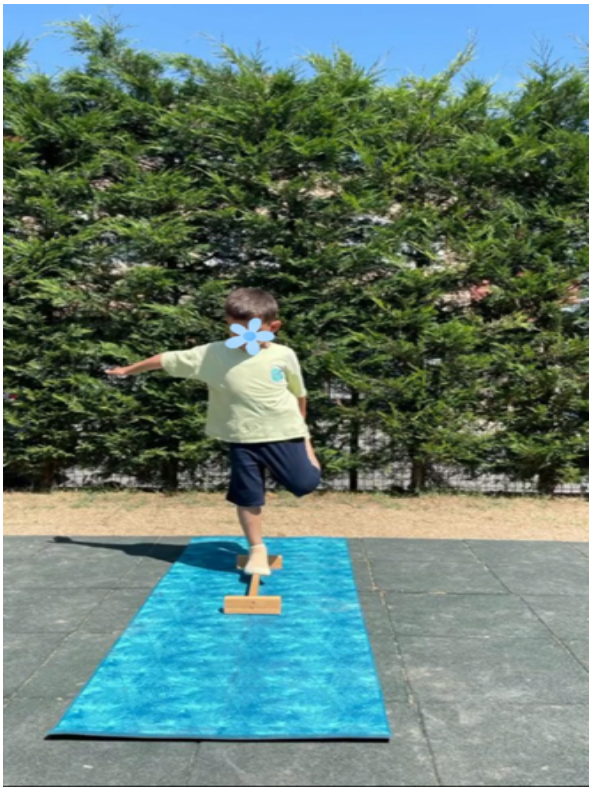

Figure 1. Application of flamingo balance test

Sit-and reach test

The Sit and Reach Test was used to measure flexibility. The sit and reach box used for flexibility measurement is within the standards set by AAHPERD. Before the test, the test protocol was explained to the participants practically. Participants were asked to sit down, rest the soles of their feet on the box, stretch their arms forward without bending their knees, and stretch their torso as far forward as possible. The best test result was recorded by repeating the test twice to the participant who tried to stay still at the farthest point he could stretch and did not make any intermittent stretching forward. During the test, the practitioner sat next to the participant and warned him to keep his knees in a straight (extension) position. The test result was determined as the farthest point that the participant could reach with his fingertips, and the participant was asked to maintain the position for 1-2 seconds at the farthest point he could reach (Figure 2). As a result of two attempts, the best result was taken as a score in cm.

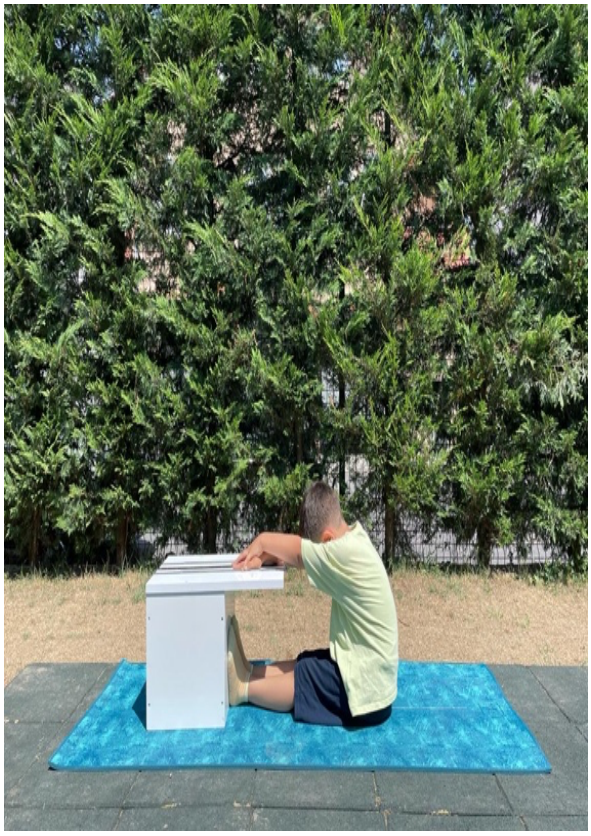

Figure 2. Application of the sit-and-reach test

8-week sportive recreation activity program applied to improve balance and flexibility

Table 1. Balance and flexibility program

Eight-Week Sportive Recreation Activity Program			
Activities	Weeks	Loading Duration	Exercise Duration
Warming up with music	1 Week	3 minutes	40 Minutes
Jogging		3 minutes	
Running with knees pulled to the abdomen		2 minutes	
Running with hands behind back and feet touching hands		2 minutes	
Bear walk		4 meters x 4 rounds	
Double leg jump		4 meters x 4 rounds	
Single leg jump		4 meters x 2 rounds	
Running zig-zag through the kukas		2 minutes	
Stretching from head to toe		10 minutes	
Breathing exercises		3 minutes	
Warming up with music	2 Weeks	3 minutes	40 Minutes
Accelerated running until reaching a moderate pace		3 minutes	
Bear walk		4 meters x 4 rounds	
Frog walk		4 meters x 4 rounds	
Front flip		3 rounds	
Walking on a thick rope		2 meters x 2 rounds	
Carrying a ball through obstacles (basketball)		4 meters x 2 rounds	
Stretching from head to toe		10 minutes	
Stretching in the cat position		2 x 10 seconds	
Breathing exercises		3 minutes	
Warming up with music	3 Weeks	3 minutes	40 Minutes
Front flip		2 rounds	
Lame dog walk		2 meters x 2 rounds	
Run (in place)-run fast-when the whistle blows, touch the ground and jump		2 rounds	
Multi-skill parkour racing		2 rounds	
Walking forward by stretching one leg		2 rounds	
Plank		2x10 seconds	
Reverse plank		2x10 seconds	
Butterfly pose		2x10 seconds	
Stretching from head to toe		15 minutes	
Warming up with music	4 Weeks	3 minutes	40 Minutes
Musical balance game on one leg (right and left leg)		3 minutes	
Two feet in two feet out ladder drill		2 rounds	
Multi-skill parkour training		1 round	
Throwing a hoop to the target while standing on the balance board		1 round	
Right-left foot glider stance (in order)		2 x 30 seconds	
Walking with tip toes		5 meters x 1 round	
Jogging		1 round	
Zumba		4 minutes	
Stretching from head to toe		10 minutes	
Warming up with music	5 Weeks	3 minutes	40 Minutes
Musical balance game on one leg (right and left leg)		3 minutes	

Zig zag running with resistance band		5 meters x 1 round	
Relay race		1 round	
Jogging		1 round	
Lame dog walk		5 meters x 1 round	
Right-left foot glider stance (in order)		2x30 seconds	
Walking straight on a high balance board		1 round	
Zumba		4 minutes	
Stretching from head to toe		10 minutes	
Warming up with music	6 Weeks	3 minutes	40 Minutes
Musical balance game on one leg (right and left leg)		3 minutes	
Balancing with right and left foot with eyes closed		2x30 seconds	
Counter movement jump (hands on hips)		5 meters x 2 rounds	
Single leg standing jump		1 round	
Multi-skill parkour training		1 round	
Jogging		1 round	
Breathing exercises		2 minutes	
Zumba		4 minutes	
Stretching from head to toe		10 minutes	
Warming up with music	7 Weeks	3 minutes	40 Minutes
Musical balance game on one leg (right and left leg)		3 minutes	
Balancing with right and left foot with eyes closed		30 seconsd	
Multi-skill parkour training		2 rounds	
Passing over and under complex obstacles		2 rounds	
Walking with 250 gram (total) hand weights on a thick rope		2 meters x 4 rounds	
Walking on a thick rope by closing eyes		2 meters x 1 round	
Standing on wooden balance board with resistance band		2 rounds	
Breathing exercises		2 minutes	
Stretching from head to toe		10 minutes	
Warming up with music	8 Weeks	3 minutes	40 Minutes
Musical balance game on one leg (right and left leg)		3 minutes	
Balancing on right and left leg with eyes closed		1 minutes	
Multi-skill parkour training		2 rounds	
Standing on the balance board with 250 gr hand weights and throwing a ball to the target		2 rounds	
Carrying the ball to the target by walking on the balance board		2 rounds	
Two feet in two feet out ladder drill		2 rounds	
Stretching from head to toe		10 minutes	
Standing hamstring stretch (both legs)		2 x 10 seconds	
Tree pose (both legs)		2 x 30 seconds	
ALL SPORTIVE RECREATIONAL ACTIVITIES WERE DONE WITH THE CLASS			

Statistical analysis

Statistical analyses of this study were carried out with SPSS 22.0 (Statistical Package for Social Sciences) package program. In the study, arithmetic mean, standard deviation, minimum and maximum values were used to determine the descriptive statistics of the participants. It was determined that the data were normally distributed, so parametric tests were used. Independent Samples T-Test was applied to determine whether the difference between the groups was significant, and Paired Samples T-Test was applied to determine whether there was a significant difference between the intra-group test-re tests, and the significance value was accepted as $p < 0.05$.

RESULTS

The results of the analysis of the experimental and control groups are given in this section

In-Group Test-Re Test Paired Samples T-Test Results

Table 2. In-group t-test results for pre-test and post-test

		N	X	SD	p
Working Group	Weight Pre-Test	30	19,5033	2,28299	,121
	Weight Posttest	30	19,7383	2,53584	
	Height Pre-Test	30	111,4833	5,51875	,000**
	Height Final Test	30	112,7067	5,44711	
	Flamingo Pre-Test	30	33,4000	4,39906	,000**
	Flamingo Posttest	30	19,0000	3,69529	
	Sit and Reach Pre-Test	30	23,6500	3,26726	,000**
	Sit and Reach Access Final Test	30	30,5000	2,91252	
Control Group	Weight Pre-Test	30	19,9283	2,98882	,036*
	Weight Posttest	30	20,2500	3,14985	
	Height Pre-Test	30	111,4167	5,96987	,000**
	Height Final Test	30	111,9667	6,11377	
	Flamingo Pre-Test	30	32,9333	4,48702	,514
	Flamingo Posttest	30	33,4333	4,46197	
	Sit and Reach Access Pre-Test	30	27,2833	2,48334	,145
	Sit and Reach Access Final Test	30	26,9500	2,36114	

N: Participant, X: Arithmetic Mean, SD: Standard Deviation P: Significance Value **: p<0.001

Looking at Table 2, when the comparison of the pre-test and post-test of the working group was examined, there was no significant difference in weight values ($p > 0.05$), but a significant difference was found in height values when the comparison of pre-test and post-test was found ($p < 0.001$).

When the pre-test and post-test comparison of the control group was examined, a significant difference was found in weight values ($p < 0.05$), and a significant difference was found in height values when the pre-test and post-test were compared ($p < 0.001$).

When the working group flamingo pre-test and post-test comparison was examined, a significant difference was found at an advanced level ($p < 0.001$). Similarly, it was observed that there was a significant difference in the comparison of sit and reach pre-test and post-test ($p < 0.001$).

When the control group flamingo pre-test and post-test comparison was examined, there was no significant difference between the values ($p > 0.05$). Similar results were found in the comparison of pre-test and post-test, and no significant difference was found between the values ($p > 0.05$).

Intergroup Test-Re Test Independent Samples T-Test Results

Table 3. T-test results for pre-test and post-test between groups

		N	X	SD	p
Weight Pre-Test	Working Group	30	19,5033	2,28299	,538
	Control Group	30	19,9283	2,98882	
Weight Posttest	Working Group	30	19,7383	2,53584	,491
	Control Group	30	20,2500	3,14985	
Height Pre-Test	Working Group	30	111,4833	5,51875	,964
	Control Group	30	111,4167	5,96987	
Height Posttest	Working Group	30	112,7067	5,44711	,622
	Control Group	30	111,9667	6,11377	
Flamingo Pre-Test	Working Group	30	33,4000	4,39906	,686
	Control Group	30	32,9333	4,48702	
Flamingo Posttest	Working Group	30	19,0000	3,69529	,000**
	Control Group	30	33,4333	4,46197	
Sit and Reach Access Pre-Test	Working Group	30	23,6500	3,26726	,000**
	Control Group	30	27,2833	2,48334	
Sit and Reach Access Posttest	Working Group	30	30,5000	2,91252	,000**
	Control Group	30	26,9500	2,36114	

N: Participant, X: Arithmetic Mean, SD: Standard Deviation P: Significance Value **: p<0.001

When Table 3 was examined, there was no significant difference in the comparison of pre-test height and weight values of the working group and the control group (p> 0.05). Similar results were seen in the post-test comparison and there was no significant difference between the groups in height and weight values (p> 0.05).

When the flamingo pretest values of the working group and the control group were examined, no statistically significant difference was found (p> 0.05). However, the flamingo posttest values of the working group and the control group were found to be significantly different in favor of the working group (p <0.001)

Finally, when the sit and reach pre-test values of the working group and the control group were examined, a significant difference was found in favor of the control group (p <0.001). However, when the post-tests of the working group and the control group were examined, a significant difference was found in favor of the working group (p <0.001) (Table 3).

DISCUSSION AND CONCLUSION

The aim of this study is to compare the developmental status of balance and flexibility, which are physical fitness parameters, of preschool children participating in the sportive recreation education program. At the end of the research, it was determined that the balance and flexibility levels of the children who participated in sportive recreational activities in the preschool period improved at an advanced level compared to the children who did not participate in the activities.

In the study, weight (kg) pre and post-test mean results of the research group were not statistically significant (p>0.05) (table 2), but when the height (cm) pre and post-test mean results were analyzed statistically, a significant difference was found (p<0.001) (table 2). Similar results were observed in the study of Özbar et al. (2015). It was reported that the experimental group was positively affected by the movement training program applied to children aged 4-6 years and that there was an improvement in body composition elements and that the movement training program applied in a one-year period positively affected the height development in children. In addition, many studies have shown significant improvements in the height and body weight of children of similar ages who received regular sports training and those who did not receive sports training in favor of those who received sports training (Brehman and Kliegmen 1994; Watts et al., 2003; Kerkez 2006, Kayapınar et al. 2004). Finally, when the working group was compared with the control group, it was observed that in addition to the usual height growth of the

children in both groups, the children who participated in the sportive recreational activities exhibited an extra development.

In the study, it was concluded that the flamingo balance test pre and post test mean results of the working group were statistically significant ($p<0.001$) (table 2). When the flamingo test pre-test data of the study and control groups were compared, no statistically significant difference was found ($p>0.05$), but a significant difference was found in favor of the working group in the post-test data ($p<0.001$). Similar results were observed in the study by Chatzopoulos et al. (2022). With the balance program applied to preschool children, the working group performed better than the control group in both dynamic balance and Flamingo balance tests and a statistically significant difference was reported. Çelebi (2010) investigated the effect of movement training on motor development in children aged 5-6 years and found that there was a statistically significant difference in favor of the working group in terms of single leg balance performance values. Altınkök et al., (2020) reported that the children who participated in the movement program integrated with the coordination method had higher flexibility and balance development than the children who participated in the standard movement program. Kayapınar (2011) conducted a study to evaluate the effect of a movement education program on the balance skills of preschool children aged 5-7 years. It was reported that the significance value of the experimental group and the control group was in favor of the experimental group in the comparison of static balance values.

In the study, it was concluded that the pre-test and post-test mean results of the sit and reach balance test of the working group were statistically significant ($p<0.001$) (table 2). When the pre-test data of the sit and reach balance test of the study and control groups were compared, a statistically significant difference was found in favor of the control group ($p<0.001$), but a significant difference was found in favor of the working group in the post-test data ($p<0.001$). It was observed that the sportive recreational activity program applied contributed positively to flexibility performance in preschool children, where motor skill acquisition and development speed is quite fast. Popovic et al. (2020) conducted a study on preschool children and examined the effect of a structured multi-sport program applied for 9 months on physical fitness components. The main findings of the study were that the structured multi-sport program improved physical fitness. In the study, flexibility, one of the components of physical fitness, was evaluated by sit and reach test. At the end of the program, a significant difference was found between the pre-test and post-test values of the working group and the flexibility component improved more than the control group and a statistically significant difference was reported in favor of the working group ($p<0.0005$). Similarly, Demirel et al. (2016) aimed to examine the effect of the movement training program applied for 8 weeks on some physical fitness parameters. In the study in which the control group was not used, the pre-test post-test values of the children were compared and it was reported that the program was effective on flexibility and there was a statistically significant difference in flexibility measurements, which is one of the parameters in question ($p<0.05$).

As a result, it has been observed that the sportive recreation education program prepared and implemented by the researchers improved the balance and flexibility performance of preschool children. Since the achievements of children at these ages form an infrastructure for the future, it has been seen that it is very important to optimize such sports and recreation programs for children's educational processes.

RECOMMENDATIONS

Recommendations for the results of the study are given below.

The sportive recreation activity program can be developed and made more effective.

Other tests can be applied in addition to or in addition to the tests applied.

Its effectiveness in differentage groups can be examined.

Sportive recreational activity programs can be organized in a way that can be included in the education system, considering the developmental stages of children.

Conflict of Interest

No potential conflict of interest was reported by the authors.

Ethical Approval

For this type of study, formal consent is not required.

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