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Technologies for the development of flexible qualities of children 6-7 years old by means of stretching-static exercises

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Abstract
Purpose: The purpose of our research is to develop technologies for the development of flexible qualities of preschoolers using a set of static-stretching exercises.
Methods: The study uses methods of analysis of scientific and methodological literature, pedagogical testing, pedagogical experiment, self-examination and mathematical statistics.
Results: As a result of the study, it was found that in children 6-7 years old with the help of a set of static-stretching exercises, the quality of elasticity increases by 19%.
Conclusion: Based on the results of the test T-students revealed statistically significant differences between the experimental-test and control groups at the control stage: after processing the statistical data of the study of pelvic floor elasticity, it was found that at the beginning and at the end of the experiment, the respondents of the experimental-test group showed an increase in the dynamics of the development of the quality of elasticity.

Keywords: 6-7 years old, static, stretching, exercises, pedagogical experience, plasticity, physical fitness, physical qualities.

Introduction

To date, priority areas of activity of educational organizations in the field of children's sports development and selection of talented youth have been identified, one of the main tasks of which is to form students' interest in physical culture and sports for physical development and health promotion through physical culture classes in preschool educational organizations(1).
In the practice of preschool physical education activities, stretching exercises are used as a means of educating the quality of plasticity, which can be performed with maximum amplitude. Gymnastic exercises affect mainly the joints of the body (Kholboeva, 2021; Kholboeva et al., 2020).

The problem of educating the quality of plasticity in preschool children is one of the most relevant at the present time, since most of the physical exercises used have an indirect effect on the development of physical qualities, but do not allow achieving the optimal level of development of the quality of plasticity. Studies of Uzbek and foreign scientists investigate the specific impact of stretching and static exercises on the development of flexibility in children (Kachashkin, 2018; Kholodov, 2003). When performing certain static exercises that involve maintaining the body position, there is a smooth and gradual stretching of the muscles, there is a reflex contraction of the muscle (Lyakh, 2009). Performing static exercises in small portions develops balance, which determines the quality of any movement (Table 1). The purpose of the study: to develop a set of exercises consisting of a set of static-stretching exercises for the development of the quality of flexibility in preschool children aged 6-7 years. Research objectives:

- to study the features of the development of the quality of plasticity in children aged 6-7 years.
- to develop and apply in practice the method of static exercises for the development of flexibility of a child of 6-7 years.
- plasticity in the process of performing static exercises in children 6-7 years old to reveal the mechanisms of qualitative improvement and to justify it by experience.

Methods

In the analysis of the literature, special attention was paid to the age-related (physical, anatomical and physiological, psychological, and motor) features of the growing body, the development of elasticity qualities, the impact of regular physical exercises on the child's body, and methods for improving the physical fitness of preschoolers.

Pedagogical testing was conducted to study and assess the level of physical fitness of respondents aged 6-7 years, to determine the effectiveness of a set of strenuous and static exercises.

Somatoscopic examination was used in practice to study and evaluate the physical development of preschool children. Using the method of mathematical statistics, the Student

Table 1. The content of methods and tools at various stages of training in static-stretching exercises.

№	Exercise	Exercise description	Standard
1.	**Triangle**	Starting position: Legs wide apart, hands at the waist. As you exhale, turn the body to the right until the fingers of your right hand touch the toes of your right foot. Turn your face to the left and look at your left palm. Inhale, looking straight ahead, and return to the starting position.	5-10 s
2.	**Double triangle**	Starting position: Legs wide apart, hands at the waist. On the exhalation, the hands are raised up, the fingers are connected, the elbows are raised up. As you exhale, slowly bend forward, touching your head with your knee. Return to the original state.	5-10 s
3.	**Cobra**	Starting position: lying on your stomach, arms bent at the elbows, fingers standing near the shoulders. Inhale slowly, lifting your head. Lift your shoulders and torso, flexing your back muscles. Standing, holding your breath. Slowly exhale and return to the starting position.	5-10 s
4.	**Rabbit**	Starting position: sitting on the heel, forearms bent at the elbows. On the exhalation, raise your hands, on the exhalation, slowly bend forward.	5-10 s
5.	**Camel**	Starting position: legs paired, kneeling. Slowly exhaling, turn the torso back until the palms touch the heels. Wrap your hands around your heels and push the body forward slightly, once again increasing the turns in the spine. Gradually collapse and return to the starting position	5-10 s
6.	**Roller**	Starting position: sitting, leaning on the roller. Back on the exhalation, forward on the exhalation.	5-10 times
7.	**Body rotation**	Starting position: sitting on the floor, legs in an upright position. Place your left leg on it, bending your right leg at the knee and straightening it on the outside of the knee. Accomplishment. turn right and turn your right hand towards the back of your torso. Breathing is performed lying down, leaning on the shoulder. During the exercise, breathing is carried out involuntarily.	5-10 s
8.	**Raven style walk**	Starting position: sitting on your heels, hands on your knees, waist straight. Return to the original position	10-15 s
9.	**Lock**	Starting position: main stance, left hand down, right hand up. Both hands are bent at the elbows behind your back, trying to wrap your fingers around it. Taking the original pose, changing the position of the hands.	5-10 s

Fischer criterion, the data were processed in the Excel program.

Results and discussion

A comparative analysis of the indicators characterizing the flexibility of boys in the experimental-test group allowed us to improve the results: spine (tilt, tilt to the side), shoulder girdle, pelvis-hip (sitting leg tilt, splits), the test results of girls in the experimental-test group of 6-7 years also show a significant improvement in the elasticity indicators: exercises for the joints of the spine (forward tilt, tilt), shoulder girdle, hip (sitting leg tilt). It should be noted that the results did not significantly improve in boys and girls in the control groups (Figures 1,2). This is due to the fact that classes in the traditional comprehensive program of physical education of preschoolers are mainly aimed at developing motor skills and do not sufficiently contribute to improving the quality of flexibility. This is evidenced by both the data of the scientific and methodological literature and the results of the conducted studies (Matveev, 2013; Kholboeva et al., 2020;).

During the experiment, in the experimental and test groups, there was a noticeable

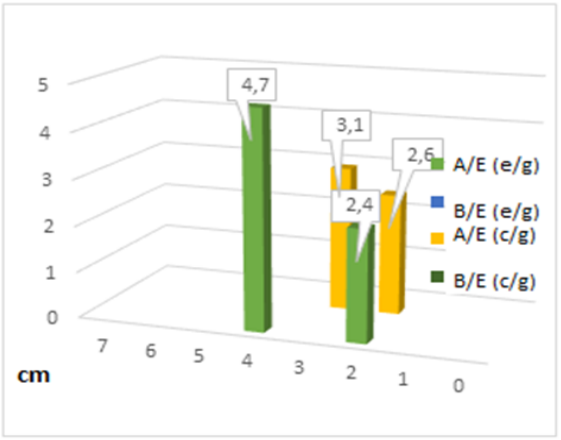


Figure 1. Dynamics of spinal mobility indicators in boys experimental group (e/g) and control group (c/g). Note: B/E - before experiment; A/E - after experiment.

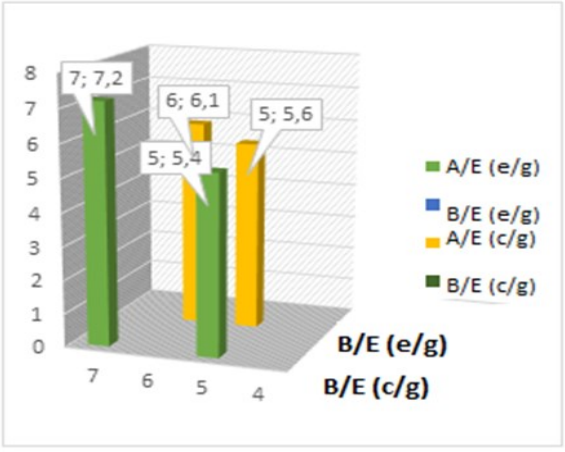


Figure 2. Dynamics of spinal mobility indicators in girls experimental group (EG) and control group (CG). Note: B/E - before experiment; A/E - after experiment.

dynamics of increasing the indicators of spinal mobility more than twice (forward tilt): in boys 6-7 years old-102.6 %, in girls 6-7 years old-52,2 %, and in the control group, the results of spinal mobility with forward tilt: in boys 6-7 years old-12,2%, in girls-5%.

The increase in results compared to the initial level was 44,1% for boys and 20,9% for girls. It was concluded that the mobility of the spine can be easily trained for development when performing side bends (Figures 1, 2).

The effectiveness of the use of static-stretching gymnastic complexes is confirmed by a significant increase in the spine mobility indicators of the respondents of the experimental and test groups. For example, in boys 6-7 years old, the results increased by 27%; in girls by 26.9%; and in the control group, girls by 40% did not have significant changes in the parameters of spinal mobility, the reason is that in training with the control groups, exercises related to the spine were little used in practice.

After analyzing the changes in the parameters of spinal mobility in lateral bends, the results were significantly improved in all experimental and test groups. For example, the improvement in the development of the quality of flexion on average was: 28% in boys; 25.8% in girls; the increase in the elasticity of the spine in boys and girls was only 4.9% and 3.4%, respectively.

Evaluation of changes in the results of the movement of the shoulder joints shows a significant improvement in the indicators in the experimental and test groups. For example, boys improved the result by 11.9%, and girls-by 28.6% (Tables 2, 3).

A comparison of the results describing the mobility of the hip joints when performing leg stretching exercises while sitting shows that

Table 2. Dynamics of plasticity indicators in boys of the control group. Note: B/E - before experiment; A/E - after experiment.

Age and number of respondents	Statistical characteristics	Spine (forward tilt)		Spine (tilts)		Spine (tilt to the side)		Shoulder joint		Twine		Flexing the legs in a sitting position		Flexibility of the knee-hip joint	
		B/E	A/E	B/E	A/E	B/E	A/E	B/E	A/E	B/E	A/E	B/E	A/E	B/E	A/E
6-7 years old 20 people	X	2,33	4,74	0,24	0,32	15,6	20,0	1,88	1,67	0,52	6,51	99,4	108,6	145,4	154,1
	σ	4,28	3,19	0,06	0,04	236	2,3	0,34	0,27	0,03	0,03	10,29	9,66	5,34	3,32
	t	1,05	0,87	0,01	0,01	0,61	0,53	0,07	0,06	0,01	0,01	2,50	2,33	1,28	0,81
	P	<0,05		<0,05		<0,05		<0,05		<0,05		<0,05		<0,05	

Table 3. Dynamics of plasticity indicators in boys of the experimental-control group.
Note: B/E - before experiment; A/E - after experiment.

Age and number of respondents	Statistical characteristics	Spine (forward tilt)		Spine (tilts)		Spine (tilt to the side)		Shoulder joint		Twine		Flexing the legs in a sitting position		Flexibility of the knee-hip joint	
		B/E	A/E	B/E	A/E	B/E	A/E	B/E	A/E	B/E	A/E	B/E	A/E	B/E	A/E
6-7 years old 20 people	X	2,53	2,84	0,28	0,29	14,3	15,1	1,95	2,0	0,51	0,52	108,1	103,1	155,7	158,6
	σ	4,44	3,25	0,07	0,04	2,03	2,06	0,44	0,33	0,60	0,06	10,4	8,05	5,03	3,59
	t	1,22	0,89	0,02	0,01	0,65	0,55	0,12	0,10	0,02	0,02	2,90	2,20	1,37	1,00
	P	>0,05		>0,05		>0,05		>0,05		>0,05		>0,05		>0,05	

Table 4. Dynamics of plasticity indicators in boys of the experimental-control group.
Note: B/E - before experiment; A/E - after experiment.

Age and number of respondents	Statistical characteris-tics	Spine (forward tilt)		Spine (tilts)		Spine (tilt to the side)		Shoulder joint		Twine		Flexing the legs in a sitting position		Flexibility of the knee-hip joint	
		B/E	A/E	B/E	A/E	B/E	A/E	B/E	A/E	B/E	A/E	B/E	A/E	B/E	A/E
6-7 years old 20 people	X	5,32	8,11	0,26	0,33	15,1	19,0	1,71	1,32	0,50	0,46	108,7	126,1	150,6	155,6
	σ	1,51	1,83	0,04	0,02	3,95	3,97	0,29	0,55	0,04	0,04	13,0	12,7	7,25	5,83
	t	0,50	0,62	0,01	0,01	1,32	1,32	0,10	0,18	0,01	0,01	4,33	4,23	2,42	1,91
	P	<0,05		<0,05		>0,05		<0,05		<0,05		<0,05		<0,05	

Table 5. Dynamics of plasticity indicators in boys of the experimental-control group.
Note: B/E - before experiment; A/E - after experiment.

Age and number of respondents	Statistical characteris-tics	Spine (forward tilt)		Spine (tilts)		Spine (tilt to the side)		Shoulder joint		Twine		Flexing the legs in a sitting position		Flexibility of the knee-hip joint	
		B/E	A/E	B/E	A/E	B/E	A/E	B/E	A/E	B/E	A/E	B/E	A/E	B/E	A/E
6-7 years old 20 people	X	5,10	5,23	0,26	0,19	13,6	14,1	1,86	1,94	0,50	0,51	104,1	105,0	158,3	169,1
	σ	6,17	5,28	0,04	0,02	2,40	2,00	0,40	0,30	0,02	0,02	9,70	8,80	6,10	4,60
	t	1,78	1,48	0,01	0,01	0,68	0,57	0,11	0,09	0,01	0,01	2,72	2,45	1,64	1,35
	P	>0,05		>0,05		>0,05		>0,05		>0,05		>0,05		>0,05	

the results in the experimental-test group improved in boys by 4%, and in girls-by 6.3%; the results for girls in the control group remained unchanged.

An increase in hip joint mobility indicators when performing control exercises with legs spread was observed in all experimental and test groups with the following results: in boys-by 10.2%, in girls-by 8.3%; (Tables 4, 5). The indicators of hip joint mobility in the control groups compared to the experimental control groups were slightly increased: in boys-1.7%, in girls-0.7%.

Conclusion

A study of the dynamics of elasticity indicators in respondents aged 6-7 years of preschool age showed that the vast majority of children have significantly lower indicators of elasticity quali-

ty development.

The corresponding ratio of exercise blocks for the development of the quality of flexibility in various joints and muscle groups is determined:

- forward bends, exercises for the spine muscles-25%;
- back bends, exercises for the spine muscles-25%;
- rotation of the torso, turns and tilts it to the side, exercises for the muscles of the spine-25%;
- exercises for the shoulder girdle muscles -10%;
- exercises for the pelvic and leg muscles-10%; and various movement patterns (static, dynamic, mixed) were used.

The study proved the effectiveness of an experimental program aimed at developing the quality of flexibility through static exercises. The result of using a set of exercises was expressed in significant differences between the experimental-test and control groups and proved compliance with the age of children.

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