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DYNAMICS OF STRENGTH DEVELOPMENT IN MIDDLE SCHOOL STUDENTS

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Annotation: This study focuses on examining the dynamics of strength development in middle school-aged children from 13-14 to 14-15 years old. Control exercises used in the study included torso lifting and lowering for girls and push-ups from a plank position for boys. The research was conducted during the 2022-2023 academic year among 8th-grade students (7 girls and 8 boys) at Secondary School No. 5 in Bukhara. Results were recorded in September and April and analyzed using statistical methods. The findings revealed that both girls and boys showed positive dynamics in strength ability over the school year. In girls, the average score in the torso lift and lower test increased from 45 to 48, while in boys, the push-up test scores improved from 31 to 36. The study demonstrates that the rapid development of the muscular system and the proper organization of physical exercises positively influence the growth of strength ability in children of this age.

Keywords:middle school age, strength ability, physical education, muscular system, posture, control tests, statistical analysis, dynamics of strength development, individual approach, physical preparedness.

Introduction:

The middle school age (10-15 years) is characterized by intensive growth and significant increases in body size. According to scientists, the most favorable period for the development of strength in boys is from 13-14 years to 17-18 years, while in girls it lasts from 11-12 years to 15-16 years. During this period, the muscular system develops rapidly, and particularly from the age of 13, muscle mass increases sharply. This growth is mainly related to the thickening of muscle fibers. However, some muscles develop later than others, which can lead to improper formation of the spine. Therefore, it is crucial for children at this age to maintain correct posture and develop muscles in a balanced way during physical exercises.

One of the main tasks of physical education in schools is to improve the physical development and preparedness of children. In this process, special attention should be given to physical qualities such as strength. Strength refers to the ability of muscles to overcome or resist external resistance.

The aim of this study is to examine the dynamics of strength development in middle school-aged children from 13-14 to 14-15 years.

Methodology: The following control exercises (tests) were used in the study:

• **For girls**: Lifting and lowering the torso for 1 minute while lying on the back on a gymnastics mat.

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• **For boys**: Push-ups from a plank position.

The study was conducted in the 2022-2023 school year among 8th-grade students (15 individuals: 7 girls and 8 boys) of secondary school No. 5 in Bukhara. The results were recorded in September and April. The collected data were analyzed using statistical methods. The average arithmetic (x), average square deviation (σ), and coefficient of variation (V) were calculated.

Results:

The results of the study are presented in the following table:

Control exercises (test)	**Statistical parameters**	**Girls (September)**	**Girls (April)**	**Boys (September)**	**Boys (April)**
Flexion and extension of the torso	x (Average)	45	48	-	-
	σ (Standard deviation)	9,8	15,5	-	-
	V(Changes)	21,8%	32,3%	-	-
Bending and straightening of the arms	x (Average)	-	-	31	36
	σ (Standard deviation)	-	-	12,5	9,8
	V (Changes)	-	-	40,3%	27,2%

As can be seen from the table, the strength ability of both boys and girls showed positive dynamics throughout the school year. In girls, the average score in the torso lift and lower test increased from 45 to 48, while in boys, the push-up test saw an increase from 31 to 36.

Recommendations:

Balanced muscle development: To prevent uneven muscle development in children, exercises that involve different muscle groups should be used.

Posture formation: Special attention should be paid to postural exercises to prevent spinal curvature.

Individual approach: Develop individual exercise plans based on each child's level of physical development.

Regular monitoring: Regularly monitor the dynamics of children's strength ability and adjust exercise plans based on the results.

Conclusion

The research results show that strength ability significantly increases in middle school-aged children from 13-14 to 14-15 years old. This growth was observed in both girls and boys, though the dynamics were notably higher in boys. The rapid development of the muscular system and the correct organization of physical exercises positively affect the growth of strength ability in children of this age.

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