

AGE-RELATED FEATURES OF THE MOTOR ABILITIES DEVELOPMENT OF 8-17-YEAR-OLD SCHOOLCHILDREN WITH INTELLECTUAL DISABILITY

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Abstract. Introduction. The process of developing motor abilities of students with intellectual disability is characterized by: lagging in the development of motor qualities from the “norm”; uneven development of motor abilities of children with intellectual disability; the specifics of the adaptive physical education methodology; the influence of sports for people with intellectual disability. **Methods.** To investigate age-related peculiarities of motor skill development in 8-17-year-old children with intellectual disabilities we used the following methods: testing and estimation of motor skill development of the students, pedagogical experiment, and math-and-stats methods. **Results.** We have identified positive age-related changes in the development of basic physical abilities of children and adolescents with intellectual disability. **Conclusion.** The identified age-related patterns may serve as a base for the development of additional comprehensive programs for adaptive physical education, as well as sports training programs for adaptive sports disciplines in compliance with the requirements of the Federal Standard of sport for people with intellectual disability. **Keywords:** schoolchildren with intellectual disability, motor abilities, physical qualities, motor tests, age-related features, grow rates.

Introduction. The process of long-term physical training of schoolchildren is due to a vast number of factor, one of which are specific features of the development of motor abilities. Knowledge and consideration of the general patterns of the development of motor abilities in schoolchildren from special (correctional) schools will allow the teacher of additional education, the trainer-teacher of adaptive physical education and sports to develop control standards, to determine the proper level of physical fitness of students at various stages of long-term training. These data will help to optimally select the ways and methods of pedagogical influence in the system of sports training in the disciplines of the sport for people with intellectual disability.

It was approved experimentally that chosen and directed pedagogical influences, coupled in time with the periods of accelerated age development of a certain motor physical quality, are accompanied with statistically reliable increase in growth rates of the indicators in tests used for its description and assessment. The long-term effect of these measures is manifested in the preservation of the achieved advantages over a two-year period and in higher rates of ontogenetic development of motor abilities [1].

The development of motor abilities of schoolchildren with intellectual disabilities is due to a number of interconnected factors. Among

them the following are noted: lagging behind the “standard” in the indicators of motor qualities development [2-5]; uneven development of functional systems and motor abilities of children with intellectual disability [3-5]; influence of environmental and social factors [6-7]; features of the adaptive physical education methodology [8-9]; influence of sports activities of people with intellectual disability [9-11].

Aim of the study – to examine age-related features of the motor abilities development of 8-17-year-old children and adolescents with intellectual disability studying in a special (correctional) school.

Methods and organization. We used the following methods: testing and assessment of the level of development of motor abilities of hearing-impaired schoolchildren, pedagogical experiment, math-and-stats methods.

To identify the level of motor abilities development and physical fitness of children and adolescents with intellectual disabilities, we conducted a pedagogical testing of 8-17-year-old schoolchildren from the Special (Correctional) Private School No. 11 located in Shadrinsk (84 were examined in total).

When selecting testing methods, we were guided by the following criteria: the tests had to be reliable, accessible in terms of the content of motor tasks for students with intellectual

disability, and, especially, easy to apply in practice.

In order to solve the objective, we applied the following motor tests. To study the features of speed qualities development we used the “30-meter run” test. We also studied the features of the development of speed and strength qualities using the tests “sit-ups in 20 seconds”, “standing long jump”, “overhead shot of a 1-kilogram stuffed ball while sitting”. Determination of the endurance development features was carried out with the “300-meter run” test – the time of passing the distance in seconds was measured. To assess flexibility, the subjects were also offered the “torso forward tilt while standing on an elevated surface” test.

The statistical data processing of the results was carried out in Microsoft Excel, Statistica 13.0 software packages. The reliability of differences in the results obtained was assessed with the Student’s t-test, the normalcy of distribution – with the Shapiro-Wilk test. The growth rates of the indicators were calculated with the S. Brody’s formula. For each of the studies indicators we calculated the arithmetic mean (M) and mean square deviation (σ). The statistical data processing of measurement results was carried out taking into account gender and age (for each

of the following age groups: 8-9, 10-11, 12-13, 14-15, 16-17 years).

Results and discussion. In the course of the study, we have found that in most cases average values of the studied indices in boys and young men with intellectual disability improve visibly. The highest growth rate was registered in the “overhead shot” test – 94%. In the “sit-ups for 20 seconds”, “standing long jump”, “30-meter run”, “300-meter run” tests, the growth rate amounted from 30 to 45%.

Analysis of the age-related changes in the growth rate of boys and young men with intellectual disability indicates an uneven development of indicators characterizing motor qualities. Thus, in the “300-meter run” test, which assesses the endurance development, the highest growth rates were recorded at the age of 9-10 years. In the tests characterizing the development of speed and strength qualities, the greatest increase was also found at the age of 9-10 years, although in the test with overhead shot the increase in results is almost the same in all age groups. In the “standing long jump” test ($p < 0.05$), a significant increase in results was also identified at the age of 15-16 years. The endurance index has the greatest increase at the age of 9-10 and 15-16 years.

Table 1
Age-related dynamics of motor abilities development of 8-17-year-old boys and young men with intellectual disability, $M \pm \sigma$

Test	Age groups/indices				
	8-9 years	10-11 years	12-13 years	14-15 years	16-17 years
30-meter run, s	7.1 $\pm$ 0.7*	6.1 $\pm$ 0.7*	5.6 $\pm$ 0.6*	5.4 $\pm$ 0.4*	5.0 $\pm$ 0.5*
Overhead throw while sitting, cm	200.2 $\pm$ 51.0*	273.2 $\pm$ 43.2*	357.3 $\pm$ 67.3	425.0 $\pm$ 101.9*	552.7 $\pm$ 98.4*
Sit-ups for 20 s, number	9.6 $\pm$ 2.9*	12.8 $\pm$ 2.9*	14.9 $\pm$ 3.2*	12.3 $\pm$ 2.6	15.1 $\pm$ 2.4*
Standing long jump, cm	118.8 $\pm$ 21.9*	146.5 $\pm$ 17.6*	161.6 $\pm$ 19.2*	171.2 $\pm$ 23.0*	200.2 $\pm$ 23.0*
Forward tilt on an elevated surface, cm	1.4 $\pm$ 6.0	2.7 $\pm$ 5.3	1.9 $\pm$ 7.7	3.1 $\pm$ 8.2	4.1 $\pm$ 4.9
300-meter run, s	90.6 $\pm$ 16.2*	74.5 $\pm$ 10.4*	69.2 $\pm$ 9.0*	65.4 $\pm$ 7.1*	58.8 $\pm$ 7.2*

Note: * – reliability of differences ($p < 0.05$)

For girls and young women with intellectual disability, most tests show a gradual improvement in scores, followed by a trend for scores to remain the same or to decline.

In the development of speed abilities relatively uniform growth of results continues up to 13 years of age, then stabilization and decrease of average values of the studied indicator is observed.

Growth rate of the results describing speed and strength abilities continues until the age of 15, although in the “sit-ups for 20 s” test the decrease of indices begins at the age of 14, and in the “standing long jump” test at the age of 13-14 there

is only a slight increase (3%). The growth of endurance indices continues until the age of 13.

In terms of the age changes of motor qualities development in girls and young women with intellectual disability, it should be noted that the highest growth rates in almost all the tests occur at the age of 11-12 years. The exception is the sit-up test, in which the greatest increase in results is recorded at the age of 9-10 years.

It should be noted that in the flexibility test, both girls and boys with intellectual disability demonstrated a large variability of values ($3\sigma > X$), which did not allow us to identify any age trends in this test.

Table 2

Age-related dynamics of motor abilities development of 8-17-year-old girls and young women with intellectual disability, $M \pm \sigma$

Test	Age groups/indices				
	8-9 years	8-9 years	8-9 years	8-9 years	8-9 years
30-meter run, s	6.9±0.6*	6.6±0.8*	5.9±0.9*	5.9±0.6*	6.3±0.1*
Overhead throw while sitting, cm	196.3±31.3*	223.7±43.1*	331.5±70.0*	394.0±62.7*	368.3±71.4*
Sit-ups for 20 s, number	7.1±3.1*	10.3±2.8*	13.5±3.9*	12.3±2.6*	11.4±1.8*
Standing long jump, cm	112.6±15.8*	126.5±16.5*	153.1±20.9*	158.3±14.7*	149.8±23.8*
Forward tilt on an elevated surface, cm	3.5±5.4	3.3±6.5	7.1±5.4	6.5±8.0	5.9±5.5
300-meter run, s	83.2±17.4*	78.6±11.7*	70.9±12.9*	73.3±10.8*	74.8±14.5*

Note: * – reliability of differences ($p < 0.05$)

Conclusion. The revealed patterns of motor abilities development of 8-17-year-old children and adolescents with intellectual disability can be the base for the development of additional comprehensive programs in the field of adaptive physical education and sport, as well as sports training programs for the disciplines of adaptive

sport according to the requirements of the Federal Standard of sports for people with intellectual disability. It would also allow a more efficient construction of the educational and training process of students with intellectual disability in the disciplines of sport for the studied group.

Conflict of interest. The author declares no conflict of interest.

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