STUDY OF THE PHYSICAL FITNESS OF PRIMARY SCHOOL CHILDREN

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Abstract: *The article presents the results of experimental research on the physical status of children aged 7–10 years within the school education system.*

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At the stage of primary education, the creation of a scientifically based system of school physical education for children acquires particular pedagogical significance.

Monitoring and analysis of the physical status of younger schoolchildren are associated with adaptation to the daily routine, high total academic load, the novelty and complexity of the educational material, and the need to complete teachers' assignments—all of which place increased demands on children's physical and functional capacities.

In this regard, there arose a scientific and practical interest in studying this issue, aimed at identifying the age continuity of the dynamics of motor abilities and the functional tolerance of physical loads in children of the studied age group.

Based on comprehensive studies of the physical status of younger schoolchildren conducted by A.A. Guzhalovsky, the sensitivity factor was identified as the most favorable age period of increased plasticity of all body systems, which is confirmed by literature sources.

Particular interest was directed toward studying the age-related dynamics of physical development of younger schoolchildren living in the Fergana region. Experimental studies of anthropometric data in children aged 7–10 years revealed that the annual increase in body measurements was uneven, both in percentage terms and in the absolute growth of the studied parameters by year of study.

Analysis of body length indicators, as one of the main evaluation factors of children's physical development that reflects the nature of the continuous formation of the child's body, showed a steady progressive increase.

Testing of body length showed that for first-grade boys at the sensitive age of 7 years, the average height was 120.2 ± 0.34 cm, with a subsequent increase of 12.1 cm in second grade. The increase was statistically significant — 9.14% ($t = 5.82$) — reaching an average of 132.3 ± 0.45 cm. A comparative monitoring analysis of average height values in children aged 7 to 8 years revealed a progressive change, which aligns with the

findings of several researchers who obtained similar results when studying younger schoolchildren at the prepubertal stage of physical development (see Table 1).

Analysis of height characteristics in third- and fourth-grade students showed that at the age of 9 years, children had an average height of 134.2 ± 0.76 cm, significantly exceeding second-grade students by 8.85% (t = 4.41). The height of ten-year-old students exceeded that of their nine-year-old peers by 7.66%, with an average of 138.8 ± 0.53 cm (t = 3.26).

The overall difference in body length indicators during the entire primary education period (ages 7 to 10) showed an increase of 8.65%, with a high level of statistical reliability (t = 18.1).

Similar experimental studies were conducted to test body mass indicators among students of the same age group. The average body mass of first-grade boys at the sensitive age of 7 years was 19.5 ± 0.37 kg, with a subsequent increase of 8.91% in second grade (t = 4.92), reaching an average of 27.4 ± 0.52 kg.

Monitoring analysis of body mass results among third- and fourth-grade students revealed that at 9 years, the average body weight was 29.4 ± 0.44 kg, exceeding that of second-grade students by 9.31% (t = 4.47). At 10 years, children's body mass significantly exceeded that of nine-year-olds by 8.61%, reaching an average of 32.6 ± 0.76 kg (t = 4.27).

The average difference in body mass from 7 to 10 years amounted to 13.1%, which is consistent with the conclusions of many researchers who have studied this issue.

When assessing the state of the respiratory system, the chest circumference (CC) indicator is widely used in medical monitoring and physiological examinations of schoolchildren. Among children who began school education at the age of 7, the average CC was 59.4 ± 0.41 cm. By 8 years, this indicator tended to increase and reached 62.8 ± 0.55 cm, showing a 7.45% difference. A further increase in respiratory indicators was observed by 9 years, reaching 65.4 ± 0.58 cm — an increase of 2.45%. By the end of primary education at age 10, the average CC reached 71.1 ± 0.58 cm, with a significant increase of 9.19% (t = 3.2; P < 0.001). The average annual increase over the 4-year period was 7.98 cm (t = 12.1; P < 0.001).

The excursion of the chest in children of primary school age tends to show a slight increase with age. Thus, at the age of 7, the studied indicator among boys averaged 5.1±0.15 cm; by the age of 8, the average increase was 8.79% (t=2.5; P<0.05). At the age of 9, the average chest excursion increased by 9.51% (t=2.16), reaching an average value of 6.1±0.11 cm, and by the age of 10, the indicator increased to 6.8±0.13 cm, with an annual growth rate of 8.29% (t=4.6; P<0.05).

In the school education system, the most accessible test for assessing the characteristics of the respiratory system is the measurement of vital lung capacity (VLC),

which, according to many researchers, is considered a highly informative indicator in physical education practice for assessing functional capacity and performance potential.

During the study of this physiological parameter in children of primary school age, fluctuation factors were identified, reflecting natural variability. Analysis of the obtained data showed that the average VLC among boys at the age of 7 was 1231.5±80.45 cm^3; by the age of 8, in second-grade students, it increased to 1948.4±81.15 cm^3. The rate of growth continued, and by the age of 9, the average VLC reached 2420.6±84.1 cm^3, while at 10 years old, this indicator was 3232.2±77.73 cm^3, showing a difference of 9.18%.

The annual dynamics of VLC growth among first graders over a four-year period of study amounted to 200.7 cm^3, with a progressive difference of 19.18% ($t=4.1$; $P<0.001$).

Analysis of the statistical data on the growth rates of anthropometric indicators in children aged 7–10 showed that body length and mass increase at a rate typical for this age group. It was also found that the VLC indicator develops most noticeably between the ages of 7 and 8, but then the rate of improvement in the examined children stabilizes at an average statistical level by the ages of 9–10. This provides grounds to assume the interrelationship between this factor and the level of motor ability development.

It is well known that there is a close relationship between physical development indicators and motor abilities, which served as the basis for conducting pedagogical testing of the physical fitness of children of primary school age.

To address this important pedagogical problem, testing of motor abilities was conducted among children aged 7 to 10 years. The test battery included: standing and running long jumps, 30 m and 300 m runs, shuttle run, tennis ball throw for distance, and multiple jumps.

To study the level of motor preparedness of younger schoolchildren, the method of pedagogical testing was applied to measure key indicators of physical fitness: 30 m, 300 m, and 1000 m running, standing and running long jumps, tennis ball throw for distance, general flexibility, pull-ups on a horizontal bar, and push-ups.

Considering that younger schoolchildren are not yet familiar with many technically complex exercises, the experiment offered them well-known motor actions typically mastered by children as early as first grade. These tests are recommended by many authors for pedagogical assessment of physical abilities in younger schoolchildren and are included in the “Salomatlik” (Health) fitness test standards.

The results of the study showed that 7-year-old boys achieved an average result of 7.57 s in the 30 m sprint, with individual variations ranging from 9.2 s to 6.6 s ($t=9.2$; $p<0.001$). By the age of 8, sprint performance improved by 4.35%, reaching an average of 7.24 s, with a range of 8.6 s to 6.3 s ($t=9.2$; $p<0.001$). At 9 years, the average result was 6.83 s, ranging from 7.5 s to 6.0 s, showing a significant improvement of 5.66% ($t=2.34$; $p<0.05$). At 10 years, the average time in the 30 m run was 6.34 s, with

individual values ranging from 7.3 s to 5.5 s, and a total improvement of 7.17% (t=2.34; p<0.05).

Monitoring of test results showed that the changes in short-distance running performance, included in the "Salomatlik" test standards, occur unevenly. Significant improvements were observed from 7 to 8 years, while in later years, the growth rate slowed down significantly. This fact indicates that by this age, the structure of sprinting ability becomes more developed, and further improvement occurs mainly due to enhancement of physical qualities.

When evaluating the dynamics of speed development in children aged 7–10, it was found that progress in the 30 m sprint amounted to 9.77%, and by 10 years, the average result was 6.34±0.05 s, showing an overall improvement of 7.17% (see Table 2).

Standing long jump, as a speed-strength exercise, is considered a universal test that reflects the degree of mastery of motor skills and physical qualities among younger schoolchildren and holds an important place in their physical activity.

In the course of studying the speed-strength abilities of younger students, it was found that in the standing long jump, 7-year-old children had an average result of 95.8±1.81 cm, with individual scores ranging from 130 cm to 71 cm. By 8 years, the results significantly improved by 19.36% (t=4.9; P<0.01), reaching an average of 118.8±1.56 cm, with the best result in this age group being 140 cm and the lowest being 100 cm.

Students aged 9 years demonstrated an average jump of 127.2±1.10 cm, with individual variations between 145 cm (maximum) and 105 cm (minimum). At 10 years, the average standing long jump result increased to 138.4±1.07 cm, with values ranging from 158 cm to 120 cm.

It was found that the progressive increase in speed-strength abilities of students, measured by the standing long jump test, over the age period from 7 to 10 years amounted to 24.68%. A similar indicator of speed-strength abilities was evaluated using the running long jump test, which involves a complete motor act, where the effectiveness of performance depends on the children's ability to execute several sequentially coordinated complex technical movements and requires the development of certain coordination skills.

At 7 years, boys in the first grade achieved an average result of 156.6±1.76 cm in the running long jump, with individual values ranging from 123 cm to 195 cm. By 8 years, students' results significantly exceeded initial values, averaging 198.4±1.91 cm, with extremes of 138 cm to 220 cm, representing a 21.0% improvement (t=12.3; p<0.01). At 9 years, boys jumped an average of 210.5±1.21 cm, with the best performance at 230 cm and the lowest at 187 cm. By 10 years, fourth-grade boys demonstrated a significant increase to 241.1±1.42 cm, with an annual progressive gain of 12.69% (t=4.22; p<0.01).

Thus, the cumulative growth in running long jump results from 7 to 10 years reached 35.04%.

In the school system, throwing exercises are considered technically complex, requiring physical qualities and technical preparedness. These exercises are vital practical physical activities included in all normative documents.

Strength abilities were evaluated using the tennis ball throw for distance. Seven-year-old students averaged 11.41±0.23 m, and by the next age period, results increased by 5.70% ($t=9.67$; $P<0.001$), reaching an average of 12.10±0.19 m. Nine-year-old boys achieved 14.98±0.35 m, and ten-year-olds averaged 23.16±0.29 m, representing a 50.7% overall improvement ($t=12.14$; $P<0.001$).

The speed-strength qualities of younger schoolchildren, assessed through the standing long jump, showed that first graders averaged 95.8±1.81 cm, increasing to 118.8±1.56 cm by 8 years, a difference of 19.3%. Third-grade students aged 9 averaged 127.2±1.10 cm, with individual variations from 105 cm to 145 cm, and 10-year-olds averaged 138.4±1.07 cm, with an annual gain of 8.09% ($t=3.4$; $P<0.01$). The cumulative increase in standing long jump results over the age period was 24.68%.

Similar results were observed in the running long jump test. The effectiveness of this test largely depends on the ability of children to perform complex coordinated movements.

At 7 years, first-grade boys averaged 156.6±1.76 cm. By 8 years, the average increased to 198.4±1.91 cm, representing a 21.0% improvement ($t=12.3$; $p<0.01$). At 9 years, boys averaged 210.5±1.21 cm, and by 10 years, a significant increase to 241.1±1.42 cm was recorded, with an annual gain of 12.69% ($t=4.22$; $p<0.01$). The cumulative increase in running long jump results from 7 to 10 years was 35.04%.

The analysis of experimental results revealed an uneven increase in physical fitness indicators among children aged 5–8 years. Experiments showed that the greatest gains were observed in tests associated with speed-strength abilities (30 m sprint, running long jump), predominantly occurring between 6 and 7 years, likely due to sensitive positive functional changes and growth in coordination abilities in children of this age group.

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