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PHYSICAL FITNESS DYNAMICS OF SECONDARY SCHOOL CHILDREN*OLGA LUTKOVSKA, REGINA ZIMNITSKAYA***Belarusian state University of physical culture and sports, Minsk, Belarus**

School testing for skills and motor activity development applied to ages from 11 to 17 contained six samples, which showed the gap and mismatch of children's physical preparedness indexes with regulatory measures.

We applied the most common methods used in solving theoretical and methodological problems of physical culture studies. They are characterized by simplicity, reliability, and high information content. They are analysis and synthesis of the literature data, teacher observation, testing, pedagogical experiment and mathematical statistics methods.

The study was conducted at two schools Novopolotsk GUO "high school", SEE "basic school №10" Novopolotsk among students of grades 5 – 11. The study involved 486 students.

Teacher observation was carried out in natural conditions at the monitored physical training classes in the course of motor tasks performance to assess the quality of the exercises, as well as during the holidays. We analyzed the subjective state of children (fatigue sensation, decreased attention, etc.). During the observation there was estimated magnitude of the load, degree of fatigue on a number of external indicators, such as skin coloration, the degree of sweating, quality of movement, attention, concentration and focus. Observation of external signs of fatigue was conducted throughout the training. On teacher's observation the quality of tests execution, as well as the ability to focus and show the best results were evaluated. Teacher observation was conducted in an open way.

During the tests, control exercise was used to assess the physical development, the functional state of ceiling elements and motor fitness.

Testing motor preparedness was conducted using the following tests:

Rapidity:

1. T1 – Running. Start 30 m high, running on the stadium track. The result was determined with an accuracy of up to 0.1 s.

Endurance:

2. T2 – Running for 6 minutes. Start high. Running on the stadium track. The result was determined with an accuracy of up to 1 second.

Flexibility:

3. T3 – The flexibility of the spine. Determined by the degree of seated trunk forward bend. The participant is in position on the floor, leaning forward to the limit without bending the knees. The distance is measured with a ruler in cm from the zero mark to the third finger. If the fingers do not reach zero, the measured distance is indicated with a "minus" (-), and below the zero mark with a "plus" (+).

Endurance training:

4. T4 – Sit-ups with feet anchored. How to perform: Raising the trunk forward from a lying position and back, the legs are fixed, the hands behind the head (number of times) – female. Exercise is performed on a gymnastic mat. Initially the knees bent at an angle of 90°, hands behind head, trunk ascent was made to touch hips with elbows. The test result was the number of rises (times) carried out within 30 seconds. One attempt performed.

Pulling up on a bar (number of times) – male. Performed with overhand-grip with the chin brought over top of a bar. The number of pull-ups measured.

Speed-strength abilities:

5. T5 – Long jump from place with two legs push. The result was determined with an accuracy of up to 1 cm. The participants were asked to perform two attempts with the best score counted.

Coordination abilities:

6. T6 – Shuttle run 4 * 9 m from high start. Two parallel lines are marked 10 metres apart. Two blocks of wood are placed behind Line 2. Student starts behind Line 1. On "Go!", the student runs to Line 2, picks up one block, runs to Line 1 placing block behind Line A, runs back to Line 2 getting remaining block, and runs back across Line 1. Blocks should not be thrown on floor. Scores are recorded to the nearest tenth of a second.

Data obtained in the course of study was subject to mathematical processing. As a result arithmetic average values, standard deviation and error arithmetic mean values, differences between the two arithmetic average values were calculated. The 95% confidence level is considered sufficient. To determine the reliability of the research results T-test was used.

Results and discussion. School testing for skills and motor activity development at the age of 11–17 includes six elements (seated trunk forward bend, shuttle run 4 × 9 m, sit-ups for 1 min (female), pull-ups (male), the standing long jump, 1000 m run, 30 m run).

Linguistics, literature, philology

Examination of physical competence of secondary school children was carried out with the division into groups of male and female.

Table 1 – Assessment of physical fitness of secondary school children (male)

| Form | Statistical indicators | Seated forward bend, see | Shuttle run 4×9 m | Pulling up (number of times) | Standing long jump, see | 1500 m run | 30 m run, c |
|--------------------------------|------------------------|--------------------------|-------------------|------------------------------|-------------------------|-------------|-------------|
| 5 th forms (n=42) | $\bar{X} \pm S_x$ | 4,12 ± 0,43 | 10,99 ± 8,53 | 2,21 ± 3,29 | 1,72 ± 2,10 | 3,71 ± 0,10 | 5,73 ± 0,12 |
| 6 th forms (n = 45) | $\bar{X} \pm S_x$ | 5,51 ± 0,57 | 10,35 ± 2,28 | 5,42 ± 0,54 | 1,78 ± 0,03 | 4,49 ± 0,11 | 5,51 ± 0,06 |
| 6 th forms (n =30) | $\bar{X} \pm S_x$ | 5,51 ± 0,65 | 10,58 ± 0,15 | 5,07 ± 0,72 | 1,75 ± 0,03 | 4,73 ± 0,13 | 5,56 ± 0,07 |
| 7 th forms (n=28) | $\bar{X} \pm S_x$ | 7,04 ± 0,69 | 9,89 ± 0,11 | 7,18 ± 0,57 | 1,83 ± 0,04 | 4,44 ± 0,16 | 5,13 ± 0,08 |
| 7 th forms (n =28) | $\bar{X} \pm S_x$ | 7,04 ± 0,69 | 9,89 ± 0,11 | 7,18 ± 0,57 | 1,83 ± 0,04 | 4,44 ± 0,16 | 5,13 ± 0,08 |
| 8 th forms (n =27) | $\bar{X} \pm S_x$ | 6,0 ± 0,83 | 9,79 ± 0,10 | 5,96 ± 0,87 | 2,05 ± 0,04 | 4,18 ± 0,08 | 5,13 ± 0,08 |
| 8 th forms (n =27) | $\bar{X} \pm S_x$ | 6,0 ± 0,83 | 9,79 ± 0,10 | 5,96 ± 0,87 | 2,05 ± 0,04 | 4,18 ± 0,08 | 5,13 ± 0,08 |
| 9 th forms (n =27) | $\bar{X} \pm S_x$ | 10,07 ± 0,57 | 9,98 ± 0,07 | 9,52 ± 0,42 | 2,20 ± 0,04 | 5,99 ± 0,07 | 5,03 ± 0,06 |
| 9 th forms (n =27) | $\bar{X} \pm S_x$ | 1 0,07 ± 0,57 | 9,98 ± 0,07 | 9,52 ± 0,42 | 2,20 ± 0,04 | 5,99 ± 0,07 | 5,03 ± 0,06 |
| 10 th forms (n= 25) | $\bar{X} \pm S_x$ | 7,08 ± 1,50 | 10,75 ± 0,47 | 9,4 ± 0,86 | 2,35 ± 0,03 | 5,49 ± 0,09 | 4,31 ± 0,03 |
| 10 th forms (n= 25) | $\bar{X} \pm S_x$ | 7,08 ± 1,50 | 10,75 ± 0,47 | 9,4 ± 0,86 | 2,35 ± 0,03 | 5,49 ± 0,09 | 4,31 ± 0,03 |
| 11 th forms (n =25) | $\bar{X} \pm S_x$ | 12,42 ± 1,43 | 9,89 ± 0,37 | 10,52 ± 1,02 | 2,26 ± 0,06 | 5,38 ± 0,09 | 4,34 ± 0,03 |

The data of different indicators (table 1) show the results growth in seated forward bend in the 7th form, shuttle run 4×9 m in the 8th forms, pull-ups in the 7th forms, standing long jump in the 5th form, 1500 m run in the 5th forms, 30 m run in 7–8th forms. This is due to the fact that the most intense pace of growth occurs with boys of 13–14 years old, when there's body length growth by 7–9 cm in a year. Muscle mass build up is particularly intense in boys of 13–14 years old. During puberty period the volume of cal increases almost twice, respiratory minute volume increases significantly until the vital capacity exponent (VC): boys – 1970 ml (12 years old) to 2600 ml (15 years).

The data of different indicators (table 2) show the results growth in seated forward bend in the 6th form, shuttle run 4×9 m in the 7th forms, sit-ups for 1 min in the 7th forms, standing long jump in the 8th form, 1000 m run in the 5th form, 30 m run in the 7th form. This is due to intense increase in growth at the age of 11–12 years old by an average of 7 cm. Muscle mass is built up with particular intensity in girls of 11–12 years old. Respiratory minute volume significantly increases up to vital capacity exponent (VC): girls – from 1900 ml (12 years old) to 2500 ml (15 years).

Thus, the lowest level of physical fitness among all age groups was observed in terms of seated forward bend, standing long jump, and 30 m run with both male and female. The test results may indicate lack of physical exercise application aimed at developing self-speed and power-speed. Therefore, there is a question of search and development of tools compensating for this problem and, above all, of extra-curricular activities and relaxation.

Table 2 – Assessment of physical fitness of secondary school children (female)

| Forms | Statistical indicators | Seated forward bend, see | Shuttle run 4×9 m | Sit-ups for 1 min, the number of times | Standing long jump, see | 1000 m run, s | 30 m run, s |
|--------------------------------|------------------------|--------------------------|-------------------|--|-------------------------|---------------|-------------|
| 5 th forms (n =42) | $\bar{X} \pm S_x$ | 8,67 ± 0,85 | 11,10 ± 0,17 | 42,84 ± 1,06 | 1,51 ± 0,03 | 3,19 ± 0,09 | 5,88 ± 0,07 |
| 6 th forms (n = 45) | $\bar{X} \pm S_x$ | 12,65 ± 1,0 | 10,70 ± 0,21 | 46,97 ± 0,89 | 1,64 ± 0,03 | 5,22 ± 0,17 | 5,57 ± 0,06 |
| 6 th forms (n = 30) | $\bar{X} \pm S_x$ | 12,65 ± 1,0 | 10,70 ± 0,21 | 46,97 ± 0,89 | 1,64 ± 0,03 | 5,22 ± 0,17 | 5,57 ± 0,06 |
| 7 th forms (n =28) | $\bar{X} \pm S_x$ | 11,67 ± 1,22 | 10,86 ± 0,18 | 47,06 ± 1,10 | 1,63 ± 0,03 | 4,80 ± 0,09 | 5,4 ± 0,07 |
| 7 th forms (n =28) | $\bar{X} \pm S_x$ | 11,67 ± 1,22 | 10,86 ± 0,18 | 47,06 ± 1,10 | 1,63 ± 0,03 | 4,80 ± 0,09 | 5,4 ± 0,07 |
| 8 th forms (n =27) | $\bar{X} \pm S_x$ | 12,53 ± 0,74 | 10,62 ± 0,11 | 46,15 ± 1,22 | 1,68 ± 0,03 | 4,93 ± 0,14 | 5,52 ± 0,07 |
| 8 th forms (n =27) | $\bar{X} \pm S_x$ | 12,53 ± 0,74 | 10,62 ± 0,11 | 46,15 ± 1,22 | 1,68 ± 0,03 | 4,93 ± 0,14 | 5,52 ± 0,07 |
| 9 th forms (n =27) | $\bar{X} \pm S_x$ | 16,06 ± 0,39 | 10,29 ± 0,05 | 49,70 ± 0,53 | 1,81 ± 0,02 | 4,52 ± 0,07 | 5,35 ± 0,04 |
| 9 th forms (n =27) | $\bar{X} \pm S_x$ | 16,06 ± 0,39 | 10,29 ± 0,05 | 49,70 ± 0,53 | 1,81 ± 0,02 | 4,52 ± 0,07 | 5,35 ± 0,04 |
| 10 th forms (n= 25) | $\bar{X} \pm S_x$ | 16,0 ± 1,23 | 10,37 ± 0,18 | 51,75 ± 1,29 | 1,79 ± 0,02 | 4,70 ± 0,08 | 4,94 ± 0,04 |
| 10 th forms (n= 25) | $\bar{X} \pm S_x$ | 16,0 ± 1,23 | 10,37 ± 0,18 | 51,75 ± 1,29 | 1,79 ± 0,02 | 4,70 ± 0,08 | 4,94 ± 0,04 |
| 11 th forms (n =25) | $\bar{X} \pm S_x$ | 18,7 ± 0,97 | 10,02 ± 0,15 | 48,88 ± 1,89 | 1,88 ± 0,03 | 4,60 ± 0,06 | 5,10 ± 0,03 |

Yet, at this stage of physical fitness analysis its main purpose was to determine general trends in the formation of certain physical qualities and "total" evaluation (681 student – 74%). It must be emphasized that our study did not involve students of special medical group (40 students – 4%), exempt from physical training (56 students – 6%), absent from classes (144 students - 16%). It is worth noting that general physical fitness of children at the age of 12–18 is presented in the form of scoring its level. Apparently, there is no need to remind you that this is the most appropriate criterion for assessing the status and optimization of the educational process, allocation of resources, defining the structure of physical training classes, as well as the work on motor functions general biological formation during school sports clubs at different age periods. It is possible that at this stage it is advisable to carry out a simultaneous assessment in scores and individual results of physical health development.

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