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PHYSICAL EDUCATION LESSONS AND ANNUAL GROWTH OF FUNCTIONAL STATUS INDICES IN 14-15 YEARS OLD STUDENTS BODY

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Abstract. *The ninth grade physical education lessons, organized according to the method of play and the competition, helps to improve the functional status of the adolescents' organism in the dynamics of education year, which is expressed by reducing HRF in rest state, lengthening the retention of breath during inspiration and vital lung capacity, a significant increase in cardiopulmonary Skibinski index and results of tapping – test.*
Keywords: *pupils, physical education lessons, functional status indices of body, annual dynamics.*

Actuality. One of the main objectives of school physical education lessons consists in preserving and strengthening the health of students. Namely within these lessons held twice a week, students can grasp fully the joy and freedom of movement, can develop their motor and volitional potential, physical vigor, which is the foundation and at the same time, support the work of intellectual and moral activity, necessary forming an integral, creative and autonomous personality[1,7]. Through its contents, physical education should contribute to physical and mental development of the students, enabling them to effectively adapt to the environmental conditions of existence [7.6] and the normal functioning of organs and vital systems is an important condition in this respect [4]. Functional status of the organ systems is a health criterion [6]. Thus, if all body functions is within physiological age and sex limits, then we conclude that the health of the individual is good and physical education lessons in which students participate systematically make their contribution to preserve their health.

On the basis of specialized bibliography we have established that the efficiency of the lessons of physical education in preserving the health of students depends on the methods and means used in them, and the method games and competitions can be an attractive one not only for the pupils in primary education, but also for teenagers because they improve the emotional background and atmosphere to conduct the educational process [5] increases the number of individual locomotion on field. [8]

Hypothesis: I assumed that physical education lessons in ninth grade, organized by the method of play and competition, will contribute to improving the functional status of the major organ systems of adolescents.

The purpose of the work*:* assessing the functional status of the annual growth indices of key organ systems of the 14-15 years old adolescents' body and drawing conclusions.

Organization of study. The scientific studies were conducted in TL "Pro Success", municipality Chisinau, in the dynamics of the academic year 2015-2016. Students in the experimental group participated in physical education lessons organized by the method of play and competition, while those in the control group - lessons organized in accordance with the curriculum subject "physical education" for 9th grade. At the beginning of the school year, but also at the end, in the "student health passport" they were enrolled main indices reflecting health status, test results and evaluation of their pedagogical motive. Being analyzed in annual dynamics these indices presents valuable information for assessing the influence of physical education lessons on health students. Therefore, the main indices used by us to assess the functional status of the 14-15 years old adolescents' organism were taken from "health passport" and in some cases were carried out further research in this regard.

Research methods. In assessing the cardiovascular system activity we used data on *heart rate*

frequency (HRF). It was determined by palpation for 15 sec, restating one minute, and the blood pressure, according to the method Korotkov (mmHg).

Vital capacity of the lungs (VCL) was established with the spirometer in three attempts, setting the maximal result in ml.

Stange test it was used to investigate the use of anaerobic capacity of the body and obtained indices for the assessment of body oxygen supply. In the view of scholars L.P. Matveev and A.D. Novikov [2] highly effective development of the aerobic opportunities is anaerobic work, executed in the form of short repeats separated by small intervals of rest.

Skibinski cardio-respiratory index (SCRI) was calculated according to the formula:

SCBI = VVP x time of breath retention /100 : HRF/min.

SCBI offers the opportunity to appreciate in a complex way the cardiovascular and respiratory function, the oxygen degree supply of the body. The results of the students' research is assessed as follows: up to 60 – excellent, 60-31 – good, 30-11 – satisfactory; 10-5 – unsatisfactory, 5 – very bad.

Tapping - test is one of the integral clues that demonstrate the readiness of the nervous system for the performance of an effort, and in case of emotional states reflects the readiness of all body systems [3].

The research results. *Heart rate frequency (HRF)* at the initial testing of boys in the control group averaged 74.33 ± 1.25 beats / min and truthfully was not different (t = 0.87;> 0.05) by the value recorded at those experimental group, which was 72.67 ± 1.45 beats / min. At the final testing data that index average value of 71.41 ± 2.11 touch beats / min, with a slight decrease from the original figures (t = 1.78, P> 0.05).

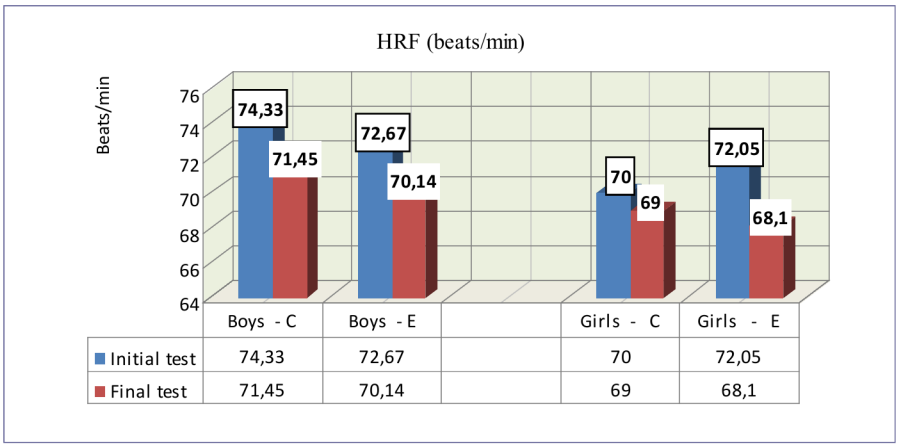

Fig. 1. The annual growth rate of HRF values at the 14-15 years old adolescents, beats/min

A similar situation is also characteristic for the HFR values of boys in the experimental group (Figure 1), which constituted at initial testing 72.67 ± 3,51 beats / min, and at the end decreased slightly (t = 1.46; P> 0.05) to 70.14 ± 2,23 beats/ min. It is worth to specify that the individual values of HFR in adolescents from both groups varied in a large area, being unstable in time.

At the girls in the control group (Figure 1), the annual growth of HRF is rendered weakly, constituting at the initial testing 70.0 ± 1.25 beats / min, and the final - 2.11 ± 69.0 beats / min, the difference is insignificant from the point of view mathematical-statistical (t = 0.63, P> 0.05). At the experimental group the HRF reduction occurs in the final testing, compared with the initial average values being respectively 72.05 ± 1.45 beats / min and 68.10 ± 2.23 beats / min (t = 2, 28; P <0.08), which demonstrates a positive dynamics of the adaptation of the heart to exercise, which is not specific and to the control group neither.

Vital capacity of the lungs (VCL). Initial test-

ing of adolescents group average values of this index (Figure 2) constituted at the control groups 52,12ml ± 2680.11 and 2695.15 ± 31,29ml in the experimental, the differences being statistically insignificant (t = 0.12; P>0.05), which demonstrates that consignments were homogeneous in terms of the development of the lungs and respiratory system regulating autonomic activity. The average results for group registration at the end of year of study grow truthful compared to initial figures, reaching 2753.37 ± 2795.21 34,32ml in the control group and in the experimental ± 29,95ml, materiality P<0.05, respectively, P<0.01.

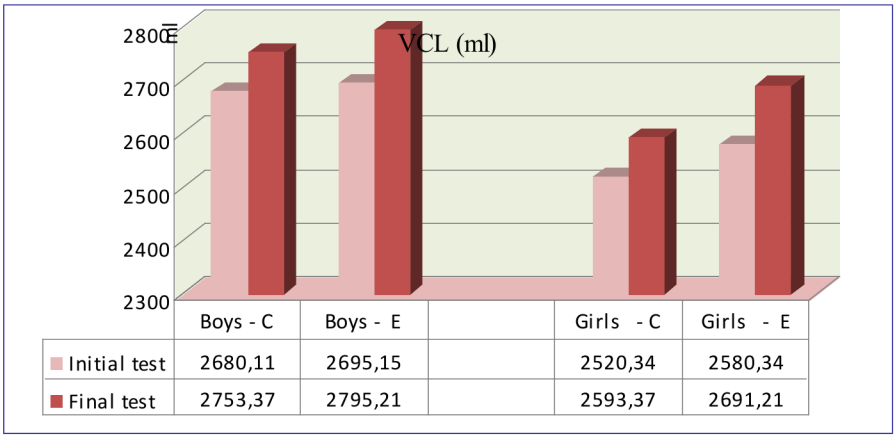

Fig. 2. The annual growth rate of VCL indices in 14-15 years adolescents in experimental and control groups, ml

In girls group the average values that were recorded in the two groups at initial testing did not show any essential differences, following the limit of physiological age (Figure 3.10). At the final testing results determined in both groups, increases significantly compared to initial data, reaching values of 2593.37 ± 28.32 ml in the control group and 25.95 ± 2691.21 ml in the experimental group. Final test result indicates a significant improvement in the respiratory system activity to girls in the experimental group, as compared with baseline (t = 3.64; P<0.01) as well compared with values recorded in the control group (t = 2 55; P<0.05).

We explain these results through the systematic participation of girls in motor activities carried out in the lessons of physical education, especially in games of movement, individual and group competition, those efforts being accompanied by increasing the number of functional alveoli and open of small and medium bronchioles that have streamlined external breathing and contributed to increased vital capacity of the lungs.

Stange sample. At the initial testing, the average group of adolescents averaged 52.57 ± 4,48sec for boys in the control group (Figure 3) and 53.27 ± 3.14 sec for the experimental group, the differences between them are insignificant (P>0.05). In the final testing, the length of retention of breath during inspiration increased truthful at boys in the experimental group as compared with the initial test result, reaching 61.23 ± 2,23sec (t = 3.25; P <0.01) and for the results of the final testing of the control group, which accounted for 54.00 ± 2,12sec, the differences being truthful to materiality mathematical and statistical t = 2.35; P<0.05.

Anaerobic capacities of girls in the experimental group were significantly increased in annual growth, from 51.92 to 57.83 ± ± 2,14sec 3,53sec (t = 2.16; P <0.05) and final test results of the control group (Figure 3) have not changed truthfully in the meantime (t = 0.62; P>0,05), which expresses the opinion that the positive role of the new methodology developed in the physical education girls. According to literature, motion games, which usually takes place in mixed, anaer-

obic capacity are favorable for the development of the body and provides resistance improving the overall body exercise.

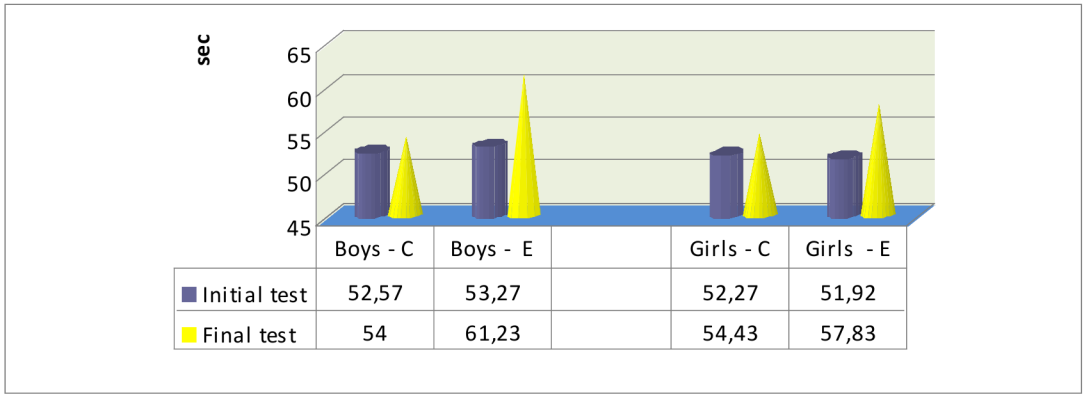

Fig. 3. The annual growth rate of breathing residence time (sample Stange) in girls and boys in the experimental and control groups, sec

Skibinski cardio-respiratory index (SCRI) as integral index of the functional state of the organism, has experienced positive annual growth in the experimental groups of students (Figure 4), the highest value being set in the group of boys, the average values of the group have reached united 24.41 level. This level can be considered as "sufficient" for this qualification although the range varies between 11-30.

At the final test the average result of the girls in the experimental group, although it is lower than that of boys in the group, exceeds the control group value and initial average value registered in their group (Figure 4), which expresses the formation of cardiopulmonary functional system which ensures that effective adaptation of schoolgirls at physical efforts.

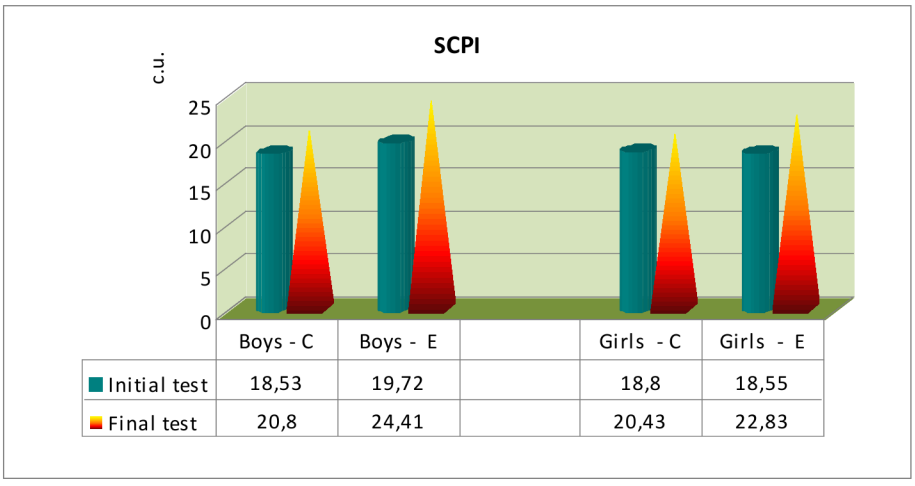

Fig. 4. Annual growth of SCRI in 9th grade boys and girls, experimental and control groups, c.u.

Tapping – test, that is, in fact, mobility of nerve processes, and functional status of the body's neuromuscular apparatus, provided us with objective information about the number of repetitions performed by the subjects for 30 sec. Thus, initial testing students in the control group experienced on average 70.23±2.21 points, while the experimental group -70,33,57±3.89 points, the

difference was statistically insignificant (t=0.43, P>0.05).

In boys from the experimental group, the average values had a positive annual growth, the average result following the results of pedagogical experiment 82.23 ± 2.12, which is 17% more than at the beginning of the school year, outperforming 9% while average values of their peers in the control group at the end of the school year, which means improving the functional status of the neuromuscular system of the boys involved in teaching experiment.

At the girls in the control group, the average values group have not changed truthfully regarding the annual growth (Figure 5), the difference between them being insignificant in terms of mathematical-statistical (t=1.70, P>0.05). In the experimental group, the average values of the group increased from 76.33 ± 2.89 to 82.23 ± 2.12 points, the difference being truthful to materiality t=2.55; P<0.05. The mentioned facts confirm that organized physical education lessons by joining the game method with the competitive one gives a beneficial influence over the girls' neuromuscular state system.

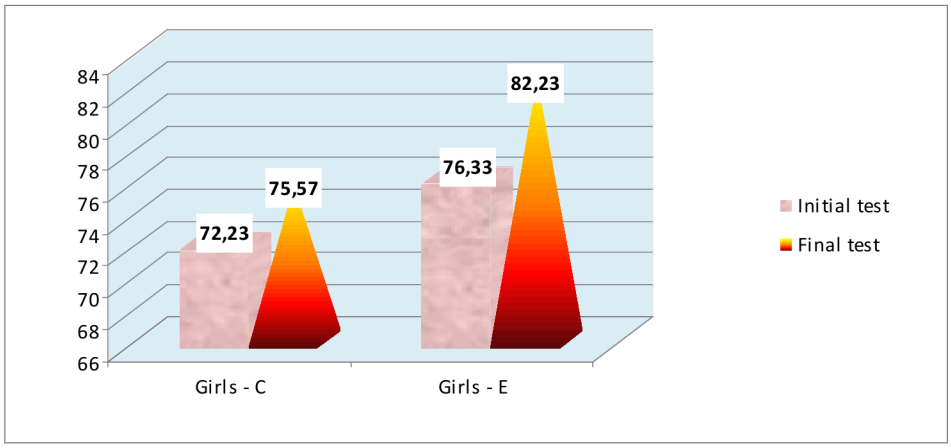

Fig. 5. Annual growth of the results recorded at girls in the control and experimental groups at tapping – test, points

Generalizing information on changes in the functional status of the main vital systems of boys in the experimental group who participated in the course of learning the lessons of physical education organized by joining play and competition method, we find that at the end of the school year they have a good capacity adaptation to exercise, expressed through increased VCL and duration of respiratory arrest during inspiration, improving neuromuscular system activity and creating functional system during cardiopulmonary exercise.

In girls from the experimental group, the concerned lessons organized during the school year, have reduced the HRF in stand position, the increasing of VCL and residence time breathing during inspiration, improvement of activity of neuromuscular apparatus and cardiopulmonary system formation that ensures efficient supply of the body with oxygen during physical activity.

Conclusions:

1. The physical education lessons in 9th grade, organized throughout the year according to the method of play and competition, exerts a positive influence on the body's functional status of 14-15 years old adolescents.

2. Improving the functional status of students' organisms who participated systematically in physical education lessons, organized according to the method of play and competition, the annual growth rate is expressed by:

a) reduction of HRF values, both compared to the original figures from early education, and in comparison with control group;

b) increase of the breath retention duration during inspiration of adolescents;

c) high values of the Skibinski cardio-respiratory index;

d) a significant increase of vital capacity of the lungs;

e) improving the mobility of nerve processes and functional state of neuromuscular apparatus.

3. It is recommended to organize the lessons of physical education by combining the method of play and competition to improve the health of 14-15 years old adolescents.

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