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J11613-001

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MAIN CHANGES OF INDICATORS OF PHYSICAL DEVELOPMENT AND PHYSICAL PREPAREDNESS OF PUPILS OF DIFFERENT TYPES OF EDUCATIONAL ESTABLISHMENTS

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Annotation. The analysis of indicators of physical development and physical preparedness of the senior pupils of comprehensive school and lyceum is presented in the article. The types of build of pupils of different educational establishments with the different levels of the biological maturation are defined. The data of the thorough examination of 15-17 -year pupils of comprehensive school and lyceum make it possible to define the age and sex patterns of changes of physical development and physical preparedness of this group of pupils.

Key words: length of body, weight, type of build, passport age, biological age.

The statement of the problem. The search for efficient forms of educational process, adequate to the requirements of society has led to the emergence of new types of schools such as lyceums and gymnasiums. In this context the revision of curricula is being carried out, their content is changing, the number of subjects is growing.

Unfortunately, the organizational transformation does not affect the physical education in schools of the new type, in which the traditional curriculum of comprehensive school is used that focused on two physical training lessons per week.

The intensive training process on the one hand, and the reducing of physical activity on the other, negatively affect health. They also lower the levels of physical preparedness and mental capacity, which extremely affect the adaptation abilities of pupils' organism.

In this context, the necessity of the scientific argumentation of efficiency of increasing of physical activity of senior pupils is obvious based on multi-level options for physical education in the schools of the new type.

The problem of education is considered by the domestic scientists throughout the period of formation of Ukrainian school. Various aspects of the problem are examined by G.L. Apanasenko, V.G. Aref'yev, L.V. Volkov, V.G. Grigorenko, M.M. Lynets, L.P. Sergiyenko, B.M. Shiyan.

The study of the methods and techniques of optimization of educational process on physical training leads to the conclusion that due to the complexity of the system (the learning process) the optimization problem is multicriterion and the differentiated approach that exists today in physical education, solves the problem of optimizing for single dedicated criterion (only motor actions teaching or just the development of physical qualities) and not provides the transition to multicriterion problems [3, 4, 6, 8].

This conclusion leads to the question of the possibility of integrating approaches and summing their positive qualities.



The aim of our research is to identify main changes of indicators of physical development and physical preparedness of pupils of different types of educational establishments.

The results of the research. The body of senior pupils is in the process of continuous growth and development. These data of the thorough examination of 15-17-year students of comprehensive school and lyceum revealed the age and sex patterns of changes of physical development and physical preparedness of this group of pupils.

The analysis of experimental data was conducted in several stages. At first, the indicators of morph functional development and motor preparedness was analyzed with the help of the statistical parameters (x , σ , m , A , E , ϵ). Further, the research of the relationship of analyzed indicators was conducted. The final stage involved the study of these characteristics by multivariate statistical analysis: the method of constructing of correlation dendrogram was used.

The indicators of boys' length of body are steadily increasing with the age. This regularity is typical for students both of comprehensive schools and lyceums. The age-related changes of indicators of girls' length of body are minor.

The coefficients of variation of body length of the age range of 15-17 years vary from 4.0 to 5.3%, which indicates the homogeneity of distribution of the given indicators.

The boys' and girls' asymmetry coefficients in most cases are higher than the critical indicators that show the asymmetry of the curve distribution of parameters of body length on the ordinate passing through the top.

Mainly the right-side asymmetry of the curve of the distribution of the results is elicited at pupils of both schools ($A = 0.63 - 0.81$). The plain top of the curve of the distribution is traced ($E = 0,51$, $-0,73$), and the indicators of girls' body length are characterized by sharp top of the curve ($E = 1,04$, $1,65$).

The indicators of body weight increase with age. This figure is changing rapidly among the boys of lyceum and comprehensive school at the age of 16 and 17. The coefficients of variation significantly exceed ten percent level. The asymmetric distribution of these indicators is clearly traced among the pupils under research: the boys and girls have mainly right-side asymmetry ($A = 0.55 - 1.02$). The indicators of the excess are mostly positive that characterize the sharp top of the curve of results distribution.

The analysis of physical development of pupils of comprehensive schools and lyceums shows that most of these characteristics have lognormal distribution.

The indicators of physical preparedness also change under the influence of age. The pupils of comprehensive schools have real advantage (compared with students of the lyceum) for indicators of the long jump from the place (3.3%, $p < 0.05$), throwing the ball (5.8%, $p < 0.05$), 6 minute running (6.8%, $p < 0.05$), skipping over the rope (11.5%, $p < 0.05$). The significant intergroup differences are revealed among the girls only in the long jump from their places (9.6%, $p < 0.05$) and pulling up on the low (23.6%, $p < 0.05$).

The other characteristics of preparedness vary unreliable.



We also revealed the decreasing of specific indicators of preparedness with age. These indicators become apparent in skipping among the boys of comprehensive school and in the body bending forward among the students of the lyceum. If talk about the girls, we can say that these indicators become apparent in the 6-minute run, lifting the body, pulling on a low crossbeam, skipping. These indicators have changed unreliable.

Many of the analyzed indicators of physical preparedness are asymmetric distribution of results and the coefficient of excess do not fall in the threshold of criterion. Most indicators of physical preparedness are variable, especially in the body bending forward among the guys ($V = 44,5 - 51,9\%$), pulling on the low crossbeam ($V = 30,3 - 31,7\%$), skipping ($V = 29,2 - 33,0\%$). It should be noticed the most variable indicators of the body are bending forward ($V = 48,6 - 51,0\%$) and pulling on the low crossbeam ($V = 24,5 - 32,0\%$).

The comparison of physical preparedness of pupils of different schools shows that on certain characteristics of physical abilities it is traced the advantage of comprehensive school pupils.

Among the pupils of comprehensive school which are under study it were found that 30 girls (51.7%) and 28 boys (53.8%) were put into thoracic body type. The number of people with muscular body type among the boys is 12 people (23.1%) and the girls - 7 (12.1%). About 15.4% boys and 20.7% girls belong to astenoyidnyy type and 7.7% and 15.5% of contingent belong to dyhestyvnyy type. The analogic pattern of correlation of the contingent by body is traced among the pupils of the lyceums but there is only a smaller number of pupils which belong to a muscular body type.

The analysis of the correlation of the contingent of 15-17 years pupils showed that the majority of the boys (comprehensive school - 57,7%; lyceum - 49,0%) and the girls (secondary school - 74,1%; lyceum - 68,5%) which the passport age meets the biological age. The second place for number of contingent of boys and girls occupy the pupils, which passport age ahead of the biological age (comprehensive school - 26,9%; lyceum - 27,5%) as the girls (comprehensive school - 15,6%; lyceum - 18,5%) .

The prevalence of body types was studied on the contingent, and it was determined the level of their biological maturation (Table. 1).

The table shows the type of body that meets with the pupils with different levels of biological maturation.

Table 1.

The types of the body of the pupils of different educational establishment with different levels of biological maturation

Types of educational establishments	Levels of maturation of organism	Sex	Quantity	Part of pupils with given level of maturation %	Part of pupils with given level of maturation depending on type of body %			
					Thoracic	Muscle	Astenoyidnyy	Dyhestyvnyy
Lyceum	Behind	M	12	23,5	7	-	5	-



m		F	7	13,0	2	-	5	-
	Correspond	M	25	49,0	17	1	3	4
		F	37	68,5	24	1	7	5
	Ahead	M	14	27,5	2	6	1	5
		F	10	18,5	1	4	1	4
	Total	M	51	100,0				
F		54	100,0					
Comprehensive school	Behind	M	8	15,4	5	-	3	-
		F	6	10,3	3	-	3	-
	Correspond	M	30	57,7	25	2	5	-
		F	43	74,1	27	2	9	5
	Ahead	M	14	26,9	-	10	-	4
		F	9	15,6	-	5	-	4
	Total	M	52	100,0				
		F	58	100,0				

Thoracic and astenoyidnyy body types are typical for boys and girls, which biological age is behind the passport age. The pupils with muscle and dyhestyvnyy types were not found in any age group that is lagging behind for the level of body maturing.

It was found out the correlation of passport and biological age of the pupils of all body types, but most among the people of thoracic type (boys - 59,0-61,1% girls - 61,1-67,7%). The boys, of which the biological age is ahead of the passport age, have typical muscular body type (57.1 - 75.0%), and the dyhestyvnyy type was often met.

The correlation between levels of biological maturation and body types specific to girls were observed among the boys. The tendency of accelerated maturation of girls is strongly pronounced, especially of muscle and dyhestyvnyy types.

The conclusions. Thus, the results of the research show that the rate of maturation age and body type are important characteristics of physical development of pupils, which are closely linked to the whole organism. In our opinion, the type of body that is formed may be like the diagnostic test to determine the age of speed of age development. In high school age the rate of maturation lose the meaning, and body type as an indicator of physical development is one of the leading indicators of morphological individuality.

The results of the research have the perspective for further use in the preparing of curriculums on the organization of physical education in schools of a new type, as well as students teaching during teaching practice in schools, retraining and advanced training of teachers of physical culture, engaged in these sectors.

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