

ANALYSIS OF AGE DYNAMICS OF INDICATORS OF PHYSICAL DEVELOPMENT AND PHYSICAL FITNESS OF ADOLESCENTS

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INTRODUCTION, EXTREME, ANALYSIS AND RESULTS

The analysis of the age-specific dynamics of indicators of physical development and strength training allows to divide the contingent of students into two age groups (13-14 years). They differ from each other in terms of quality and require the use of different modes of movement when working with them.

The description of the readiness of adolescents aged 13–14 years suggests the need to find a classifier that categorizes experimental data. The level of biological maturity and body composition in adolescents of this age can be considered as such a description.

A survey of adolescents showed that 24.0% of 13-year-olds and 29.4% of 14-year-olds had a positive attitude towards strength-focused exercise. The number of children who have a negative attitude to such exercises gradually decreases with age (from 26.7% to 18.0%), the share of adolescents who regularly engage in strength training independently increases (at the age of 13 - 13.0%, at the age of 14 - 17.0%). The majority of adolescents aged 13–14 years (81.5%) believe that not enough attention is paid to the development of strength skills in physical education classes.

The majority (53.4%) of adolescents confidently state that strength training has a positive effect on their health, and only some children (15.1%) have the opposite opinion.

As students get older, they become more confident that strength training is beneficial. According to the respondents, the most important motives for strength training are: protection of himself and his friends (27.4%), athletic stature (15.1%), influence on peers (18.5%).

Of all subjects aged 13–14 years, 55.9% of adolescents were found to have a thoracic-type body composition. The number of children belonging to the digestive type is 19.5%, muscle type - 14.4%, asthenoid type - 10.2%. More than half of adolescents (64.3%) have a passport corresponding to a young biological age.

The majority of adolescents whose passport age lags behind their biological age were found to have thoracic (58.9%) and asthenoid (41.1%) body types. Passport and biological age matching were found in children with all types of body composition, but it was more common in children with thoracic type body composition (71.1%).

Muscle (42.5%) and degenerative (37.3%) body types are typical for children whose biological age exceeds the passport age.

The analysis of variance shows that the leading factor in the variability of the discussed indicators of strength abilities in boys aged 13–14 years is their constitutional features (see Table 3.2). The importance of this factor is evident in the change in the claw dynamometer readings (26.6%).

Table 1: Comparative descriptions of the physical fitness of adolescent children

Age	Generalized Indicators	Constitution type				Development type		
		Thoracic	Muscular	Asthenoid	Digestive	Retardangli	normative	Accelerated
Gavdi power, kg								
13	60,73	54,81	76,25	56,33	66,81	52,06	60,82	73,73
14	78,85	75,80	91,50	74,39	80,94	69,15	80,10	89,78
Pulling on a horizontal bar, times								
13	5,74	5,45	10,14	5,13	2,19	3,71	5,50	8,06
14	7,03	7,10	12,92	6,25	3,13	4,13	7,28	10,84

Note: Indicators that differ significantly from the overall description are isolated.

Evaluation criteria for the development of strength skills in adolescents aged 13–14 years were developed (see Table 3.3). In our opinion, the optimal approach to the typological assessment of strength abilities is to be familiar with the constitutional features in 13-year-old students, and the level of maturity of the organism in 14-year-old children. For students with thoracic-type body composition (13 years) and 14-year-olds with normal-type development, a generalized assessment of these indicators is appropriate. For retarded-type learners, it is advisable to move the assessment scale one step to the left, while for accelerated-type learners, it is necessary to move one scale to the right. This approach allows stratification of the scale of assessment of strength abilities of middle school students.

We studied the role of strength capabilities of adolescents belonging to different typological groups in the structure of their physical fitness. The obtained results allow to increase the effectiveness of physical education classes in secondary schools, aimed at the formation of strength skills in adolescents of different contingents.

The specialization of strength exercises, taking into account the typological characteristics of adolescents of secondary school age, allows them to fully realize their mobility in the process of learning activities.

In the organization of the educational process of physical education in secondary schools, information on the interdependence of strength indicators in students with different types of constitutions and levels of biological maturity is very important.

Table 2: The level of development of physical fitness in boys aged 13-14 years
(type of normative development)

Age	The level of development of indicators				
	low	Medium Low	middle	Above average	high
Claw dynamometry, kg					
13	12,3	16,8	19,0-23,5	25,8	30,2
14	136	19,5	22,5-28,4	33,4	37,3
Long jump from standing position, cm					
13	146,0	161,4	169,3-185,0	192,8	208,5
14	151,5	170,2	179,5-198,2	207,5	226,2
Pulling on a horizontal bar, times					
13	0,4	2,6	3,6-7,4	9,3	13,2
14	0,3	3,0	5,0-9,1	11,1	15,2
Throwing a stuffed ball, kg					
13	3,18	4,04	4,47-5,33	5,76	6,62
14	3,55	4,47	4,93-5,85	6,31	7,23
Lifting and lowering the body in 1 minute, times					
13	14,9	25,0	30,1-40,2	45,3	55,4
14	16,4	27,3	32,1-43,6	48,3	57,0
Hanging on a horizontal bar, p					
13	14,3	18,9	22,9-26,5	28,2	31,7
14	16,6	22,2	26,4-30,8	32,9	36,8

In adolescents of the muscular type, strength ability indicators were also systematically demonstrated. The three characteristics that make up the base were distinguished (torso strength, pull-ups on the horizontal bar, lifting and lowering of the body). Eight networks of distribution of results were identified. In adolescents with asthenoid-type body structure, strength indicators were divided into three separate groups, and in children of digestive type - into two groups. In adolescents 13–14 years of age (normative type), the analyzed parameters were systematically demonstrated. The main part was divided into: torso strength, long jump from a standing position, pull-ups on a horizontal bar, lifting and lowering the body.

The strength training descriptions of children belonging to the retardent type were divided into two groups. A similar pattern is observed in adolescents with accelerated-type development.

Strength readiness indicators were systematically demonstrated in adolescents aged 13–14 years, who were typically development-type. The main part was determined: claw strength, torso strength, traction indicators on the horizontal bar. These descriptions generated five networks of results. Basically, they were divided into two groups of indicators of strength training of adolescents of the complex, retardant type. A total of 31 reliable correlations were identified among the strength training indicators. Strength readiness indicators in boys with accelerated development were distributed over two blocks.

The analysis of indicators representing the level of development of strength abilities of adolescents aged 13-14 years shows that the distribution of characteristics analyzed with age increases, the specificity of their distribution, the specialization of the structure of their motor

development. The study proved the need to take into account and use many standards of strength training. Only such an approach will ensure the individualization of the educational process in secondary schools.

Notes formation of some structures and functions is reflected in the alternating slowing and acceleration of development. The analysis of research materials on the methodology of AA Gujalovsky underlies the qualitative descriptions of the periods of individual development of adolescents.

Adolescents aged 13–14 years in all typological groups show mainly small and moderate sensitivity to changes in power characteristics, only in some age groups a much higher sensitivity to the development of these qualities is observed (see Table 3.4). The most favorable age periods for the development of strength abilities in adolescents with different constitutional features are as follows: asthenoid-type body structure - 13 years, thoracic - 14 years, digestive - 13, muscular - 14 years.

We also identified features of the formation of strength abilities in adolescents 13–14 years of age with different body types: mainly, even at one year of age, the characteristic feature of the manifestation of sensory periods is inconsistent; the intensity of change of indicators was found to be in a certain wavy pattern; in adolescents with asthenoid and thoracic-type body structures, an increase in the intensity of the development of strength abilities is observed with age, while in the muscular and digestive types, the increase in the intensity of these characteristics is relatively reduced.

A mass examination of adolescents shows that the strength direction of the learning process in physical education should take into account the age-specific dynamics of development of strength abilities.

Table 3: A map of the power skills development cycles of 13-14 year old school students. (muscle type body structure)

T / r	exercise	Transition period, age.	
		13	14
1.	Panja kuchi	crisis	low sensitivity
2.	The power of the body	subcritical	Crisis
3.	Long jump from standing position		high sensitivity
4.	Pulling on a horizontal bar	Low sensitivity	Crisis
5.	Bending arms while lying down - writing	subcritical	moderate sensitivity
6.	Throw the stuffing ball	subcritical	Crisis
7.	Lifting and lowering the body in 1 minute	crisis	high sensitivity
8.	Throwing a small ball	Low sensitivity	Subcritical
9.	Jump high from the ground	high sensitivity	Crisis
10.	Keeping the body in a horizontal position	subcritical	moderate sensitivity
11.	Hanging on a horizontal bar	moderate sensitivity	moderate sensitivity
12.	Lifting the legs by hanging on a horizontal bar	subcritical	high sensitivity
13.	Holding a corner hanging on a horizontal bar	moderate sensitivity	Crisis

Thus, it is necessary to introduce new forms of pedagogical control in the system of physical education. The obtained experimental materials provide a basis for recognizing the need for the introduction of a new method of stratified assessment of physical fitness of adolescents in the learning process. The data obtained in the research can be the basis for the application of new approaches in the design of the learning process, and can become one of the promising areas in the development of program-regulatory requirements for physical fitness.