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METHODS OF TRAINING THE STRENGTH ABILITIES OF YOUNG ATHLETES

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Annotation: Nowadays, there is a tendency for the deterioration of the health of schoolchildren and a decrease in physical development indicators. In this article, the authors have developed strength training programs for teenagers aged 15-17 years. It is shown that this program contributes to the improvement of physical development and changes in the health status of young men.

Keywords: schoolchildren, physical training, strength exercises, development, training, abilities.

One of the main tasks solved in the process of physical education is to ensure the optimal development of physical qualities inherent in a person. Physical qualities are usually called innate (genetically inherited) morphofunctional qualities, thanks to which physical (materially expressed) human activity is possible, which receives its full manifestation in appropriate motor activity.

The main physical qualities include muscular strength, speed, endurance, flexibility and agility. Physical qualities form the basis of a person's "motor (physical) abilities".

In its most general form, "motor (physical) abilities" can be understood as individual characteristics that determine the level of a person's motor characteristics [1].

Motor abilities include strength, speed, speed-strength, motor coordination abilities, general and specific endurance.

It must be remembered that when it comes to the development of muscle strength or speed, this should be understood as the process of developing appropriate strength or speed abilities.

Each person's motor abilities are developed in their own way. The different development of abilities is based on a hierarchy of different innate (hereditary) anatomical and physical inclinations [2]:

- anatomical and morphological features of the brain and nervous system (properties of nervous processes-strength, mobility, balance, individual variants of the structure of the cortex, the degree of functional maturity of its individual areas, etc.);
- physiological (features of the cardiovascular and motor systems, maximum oxygen consumption, peripheral blood circulation, etc.);
- biological (features of biological oxidation, endocrine regulation, volume of substances, energy of muscle contraction, etc.);
- bodily (body and limb length, body weight, mass of muscle and adipose tissue, etc.);
- chromosomal (genetic).

The development of motor abilities is also influenced by psychodynamic inclinations (properties of psychodynamic processes, temperament, character, features of regulation and self-regulation of mental states, etc.).

A person's abilities are judged not only by his achievements in the process of learning or performing any kind of motor activity, but also by how quickly and easily he acquires these skills and abilities. Abilities manifest and develop in the process of performing activities, but this

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is always the result of joint actions of hereditary and environmental factors. The practical limits of the development of human abilities are determined by factors such as the duration of human life, methods of education and training, etc., but they are not inherent in the abilities themselves. It is enough to improve the methods of education and training so that the limits of the development of abilities immediately increase [3].

For the development of motor abilities, it is necessary to create certain conditions of activity, using appropriate physical exercises for speed, strength, etc. However, the effect of training these abilities depends, in addition, on the individual rate of reaction to external loads.

Strength is a person's ability to overcome external resistance or resist it through muscular efforts (strains) [4].

Strength abilities are a complex of various manifestations of a person in a certain motor activity, which are based on the concept of "strength" [4].

Strength abilities do not manifest themselves by themselves, but through some kind of motor activity. At the same time, the manifestation of power abilities is influenced by various factors, the contribution of which in each case varies depending on the specific motor actions and conditions of their implementation, the type of power abilities, age, gender and individual characteristics of a person. Among them are the following:

1) the actual muscle;
2) central nervous system;
3) personal and mental;
4) Biomechanical;
5) Biochemical;
6) physiological factors, as well as various environmental conditions in which motor activity is carried out [4].

The actual muscle factors include: contractile properties of muscles, which depend on the ratio of white (relatively rapidly contracting) and red (relatively slowly contracting) muscle fibers; activity of enzymes of muscle contraction; power of mechanisms of anaerobic energy supply of muscle work; physiological diameter and muscle mass; quality of intermuscular coordination.

The essence of central nervous factors consists in the intensity (frequency) of effector impulses sent to the muscles, in the coordination of their contractions and relaxation, and the trophic effect of the central nervous system on their functions.

A person's willingness to exert muscular efforts depends on personal and mental factors. They include motivational and volitional components, as well as emotional processes that contribute to the manifestation of maximum or intense and prolonged muscle tension [4].

Biomechanical (the location of the body and its parts in space, the strength of the links of the musculoskeletal system, the size of the displaced masses, etc.), biochemical (hormonal) and physiological (features of the functioning of peripheral and central circulation, respiration, etc.) factors have a certain influence on the manifestation of strength abilities. [5].

One of the most important methodological problems in the education of strength abilities is the choice of the amount of resistance. Its solution is possible only with an understanding of the features of movements performed with different muscle strains.

Let's look at some of these features.

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With unsaturated muscle effort, the frequency of effector impulses does not reach the highest values. The activity of the motor muscles is of a pronounced changeable nature: as they get tired, some turn off from work, and others begin to function instead. In this case, during the exercise, the mechanisms of alternating motor muscles will be improved in such a way that endurance can increase, but not maximum strength.

Movements with different muscle strains differ in the nature of the concentration of effort in space and time.

When lifting the near-limit or maximum weight, the speed of movement quickly reaches about the limit value and then remains almost constant. Acceleration fluctuates slightly around zero; at the same time, the mechanical force is approximately equal to the weight of the projectile being lifted.

When lifting less weight, two options are possible. In the first case, the applied efforts are maximum. Acceleration first increases, then drops to zero, and in the second part of the movement becomes negative. The force first exceeds the weight of the weight being lifted, and then becomes less than it. The second part of the movement is largely performed due to the kinetic energy of the projectile being lifted. In this case, the nature of the concentration of efforts will be sharply different from the picture that is observed when lifting the maximum weight. The exercise only reinforces this distinction. In addition, the total duration of the movement here is much shorter. The time during which the muscle is in a tense state can become so short that the exercise will have almost no training effect on the development of strength.

In the second case, the spatial and temporal characteristics of movement (speed, acceleration) may be the same as when lifting the limit load. However, such an artificial slowing down of movement leads to the fact that antagonistic muscle groups will be involved in the work. With the repetition of movements in this form, the activity of antagonists can gain a foothold. This, of course, will make it difficult to display the maximum values of force.

External resistance is a physiological stimulus of a certain strength. Lifting the maximum weight is accompanied by a powerful flow of centripetal impulses; with small external resistances, the strength of the stimulus is relatively small. In accordance with the general physiological "law of force", the intensity of the response is proportional to a certain limit to the strength of the stimulus: stimuli of great strength cause a more active reaction (however, too powerful irritation leads to pessimal phenomena). Arousal, as it is known from physiology, is a phase process. Every arousal is followed by inhibition, which is expressed the more strongly, the stronger the previous arousal was. Very often, a biological object after arousal, having passed the inhibition phase, comes into a state of readiness for increased arousal (exaltation phase). The more intense the previous excitation process, the more pronounced the process of subsequent inhibition, the stronger the phase after inhibitory exaltation. Studies have shown that these general physiological patterns manifest themselves in the process of muscle strength education [6, 11, 13, 15].

The physiological features of movements performed with different stresses explain why attempts to increase muscle strength without resorting to maximum force stresses are not effective enough.

The results of the following experiment conducted with a large group of students are indicative [7, 14]. The subjects practiced with weights that they can lift in one approach about 25

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times. However, they raised them only 15-18 times. Although the total number of lifts in one session was high, even long-term training did not lead to a significant increase in strength.

If a person does not systematically show significant muscular efforts, then there is no increase in strength, and with very small amounts of stress, the level of strength development may even decrease. In the untrained, it begins to decrease if the amount of effort exerted becomes less than 20% of the maximum force. The process of falling muscle strength and muscle atrophy proceeds the faster the lower the amount of stress. In people who are used to significant muscle strains, a drop in strength can begin even when using relatively large weights, however, those that are less familiar.

It is equally important to choose the optimal pace of exercise. You can perform strength exercises in one approach with different frequencies. It is shown that the application of the maximum tempo (do not mix with the maximum speed!) it gives a relatively small effect; preferably some medium pace: at the same time, the increase in strength is greater. The main reason for the lower efficiency of work at the maximum rate is, apparently, the irradiation of excitation in the central nervous system, which occurs under the influence of a powerful flow of afferent impulses. This makes it difficult to form the necessary coordination of nerve impulses for the manifestation of strength. [8, 12].

If the frequency of movements is low, then its specific values are insignificant. Thus, lifting the load at a rate of 2 and 15 lifts per minute led to almost the same increase in strength [9]. Here you should focus on the natural pace at which it is most convenient to perform the movement. This natural frequency of movement is higher in the distal segments of the extremities than in the proximal ones. For example, the optimal frequency of finger movements is 2-3 times higher than in the shoulder joint.

Conclusions. Determining the rational ratio of means and methods of developing strength abilities and the effective sequence of their distribution in each complex can significantly accelerate the physical development of young men aged 15-17 years. The conducted control and pedagogical tests showed that in order to ensure the comprehensive development of high school boys, taking into account their age characteristics, the most effective are sets of exercises with weights in strength training classes. The method of using exercises with weights in strength training classes for high school students allows to increase the level of physical development of young men aged 15-17 years, which is confirmed by the results of the experimental group: an increase in pull-up - 18.2%; in lifting the trunk - 9.6%; in running 1000 m - 9.8%; in running 60 m - 5.8%; in in the long jump - 12.4%; in the high jump - 13.7; in the throwing of a stuffed ball - 11.4%.

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