ADAPTATION OF YOUNG ATHLETES TO VARIOUS PHYSICAL ACTIVITIES

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Annotation: *The study was conducted at the Nukus State Pedagogical Institute named after Ajiniyaz. The article presents the results of research on the processes of adaptation of the body of young athletes to various physical loads. The urgency of this problem is undoubted, because physical culture and sports are becoming a norm of life and an integral attribute of personal success for many young people and adolescents in our country. It is found that regular physical activity helps to accelerate the growth processes of the body, changes the functional state of organs and systems in the form of breathing, increasing muscle strength and endurance, increasing vitality. There has also been an increase in the vital capacity of the lungs and an increase in the number of alveoli, an increase in oxygen utilization, and an improvement in airway permeability. The cardiovascular system responds to regular physical activity with a decrease in heart rate at rest as a result of a decrease in myocardial oxygen demand, which is a sign of more economical work of the heart. However, physical activity that does not suit individual characteristics or occurs in unfavorable environmental conditions can lead to various diseases and injuries.*

INTRODUCTION

It is known that physical activity directly affects the functional state of the human body. During exercise, the body needs to adapt to the new situation. The definition of adaptation to physical activity is that the body adapts not only to the volume of large loads, high or slow speeds, but also to changes in functions, biochemical processes and the humoral reactions they cause. In addition, the psychological and emotional aspects of the competition will change. A characteristic feature of flexible functional systems is their flexibility and resistance to achieving the same results in various conditions of the external and internal environment.

The functions of these systems are performed with maximum saving of human resources [10,13]. The relevance of studying the adaptation of the body of young athletes to different physical loads is undoubted, as physical education and sports are becoming a norm of life and an integral attribute of personal success for many young generations and adolescents of our country.

The purpose of this study is to study the processes of adaptation of the organism of young athletes to various physical loads and the external environment.

Under the influence of properly organized athletics, plastic processes in the body are enhanced, which leads to the rapid formation of bone tissue with the growth of young athletes. This process is more pronounced in childhood. In addition, moderate physical activity lasting 1.5-2.0 hours can lead to a 3-fold increase in the level of growth hormone in the blood. The higher the spontaneous level of self-tropin, the stronger the growth of a person [18].

1. Materials and methods

The normal movement of the body is based on a very delicate regulatory system of motion. On the one hand, both motor and autonomic systems, on the other hand, the vegetative component is associated with the activity of the cardiorespiratory systems, the basis of which is metabolism. Normal metabolism takes place under certain conditions, which is called homeostasis, and is the process of continuity of the internal environment and self-regulation. When an athlete's body enters conditions other than the environment in which it lives, such as the transition from flat conditions to high mountains, from a temperate climate to a high temperature and humidity zone, the body experiences significant difficulties, but homeostasis due to the plasticity of self-regulation mechanisms the organism adapts to new conditions to survive. When a person moves from one standard time zone to another with a standard time zone, the circadian rhythms in the body are disrupted. Also, after a while, biological rhythms adapt the body to new conditions. The body’s adaptation or adaptation to new environmental conditions to maintain homeostasis is called acclimatization. [11].

Depending on the state of the organism, the speed of changing conditions, the acclimatization period may be different. Human presence in high mountain climates: The main feature of high mountains is the sparse atmospheric air, more or less oxygen and its partial pressure, and so on. In addition, high mountains have low ambient temperatures, low humidity, strong solar radiation, and strong winds. When the partial pressure in the atmospheric air decreases, its pressure in the alveolar air decreases.

As a result of the transfer of oxygen into the blood and its binding to hemoglobin, it weakens, so the body develops a state of oxygen starvation, which is called hypoxia. To overcome this situation, compensatory reactions begin to develop on the basis of self-regulatory mechanisms.

First, ventilation of the lungs is increased due to the frequency and depth of respiration to compensate for the lack of oxygen in the blood.

Second, the mechanism of acclimatization is an increase in the oxygen capacity of the blood; with a decrease in oxygen in the blood, the blood is reflexively expelled from the depot, especially the spleen.

Third, the mechanism of acclimatization is an increase in the oxygen capacity of the blood, with a decrease in oxygen in the blood, the heart rate reflexively increases,

and at the same time, an increase in blood flow rate and oxygen delivery to body tissues. Thus, adaptation to high mountain conditions depends on:

1. An increase in the number of red blood cells
2. Increase O2 delivery to tissues.

The increase in blood oxygen volume lasts for 1.5 - 2 months [2,6].

3. Results and discussions

The study of the adaptation of young athletes to physical activity is one of the central problems that form the methodological basis of sports theory and practice. Understanding the physiological mechanisms and laws of adaptation is the key to solving practical medical-biological and pedagogical problems of maintaining and strengthening health, increasing the ability to work in the process of physical education.

The ability of the environment (external and internal) to adapt to changes is the basis of life, the ability to do so is the most important feature of the human body. Biological adaptation is a dynamic oscillation process that is accompanied by the reconstruction of the functional system of homeostasis to a new level of regulation. [9].

The specificity of movement activities has a significant impact on the processes of adaptation to new climatic conditions. In particular, desynchrony has more of an effect on speed, speed-strength, and performance of complex coordination exercises, while its effect has less effect on endurance exercises. Athletes 'performance also varies from month to month, from season to season, i.e., depending on biorhythms with long periods. However, they have not been adequately studied, so there are currently no reliable, evidence-based conditions for their use in coaching practice. [12].

The essence of adaptation is closely related to the capabilities of the human body, i.e. the functional reserves that can be realized under changing (including extreme) conditions. By understanding the laws of the organization of the functional system, it will be possible to effectively influence its individual joints by various means and thus accelerate the adaptation to physical activity as a result of increasing general physical fitness.

The knowledge and understanding of the main mechanisms of changes in the body in the process of engaging in health-improving physical education, amateur and professional sports is important for highly qualified professionals in the field of physical education and sports, so the choice of profession , in terms of enrollment and kinesisenergonomics, solves the tasks of loading regime, level of physical fitness, state of health of the organism and rational planning of physical activity. Such knowledge is also necessary for those engaged in physical education and sports, as it allows them to self-control in the dynamic physical ascent. [9].

The long-term process of physical education and sports training can be successfully carried out taking into account the age and individual characteristics of human development, his level of training, the specifics of the chosen sport, the development of physical qualities and skills.

In order to achieve high results in sports, it is necessary to start training from childhood. The system of selection of promising young athletes plays an important role in the preparation of sports reserves. Practice shows that in the early stages of training it is not always correct to choose a contingent that is suitable for athletics. In this regard, the majority of athletes in sports schools drop out of school due to long-term lack of personal results. Misdirection of children and adolescents to sports leads to great losses, damages the child's psyche, does not improve the quality of the training process. [1].

The effectiveness of training depends on the direction and extent of physiological and biochemical changes that occur under the influence of physical activity. However, the effectiveness of changes in the body is determined by the main features of physical activity:

- intensity and duration of exercises performed;
- number of repetitions;
- duration and nature of rest intervals between exercises.

Proper distribution of the above parameters and physical loads allows to achieve positive changes in the functional state of the body from a physiological point of view, to achieve sufficient efficiency of training, to improve metabolism and, ultimately, to increase physical fitness.

The process of adaptation of the organism to the effects of physical loads has a phase character. It is common to distinguish two stages of adaptation: rapid and long-term (chronic). [5,9].

Meyerson F.E. According to the concept (1979), individual adaptation to multiple repetitive physical loads goes through several stages, while increasing the functional capacity of the organism. The first phase of “rapid adaptation” is characterized by an almost limited tension of the compensation mechanisms to fully mobilize the reserve capacity and ensure muscle movement. The second stage is the transition period to long-term adaptation, which is characterized by the development of muscle coordination of the body's motor and vegetative functions. It occurs after 8-15 months of training, depending on the individual characteristics of the organism. The initial stage of sports specialization is characterized by the flow of both the first and second stages of the process. During this period, the young athlete's body becomes very sensitive to the increase in oxygen deficiency. As a result of long-term adaptation to physical loads, the synthesis of specific proteins and nucleic acids in tissues is activated, which leads to an increase in the capacity of all structures of the musculoskeletal system, as well as an improvement in its energy supply. Morphofunctional changes in long-term adaptation are accompanied by the following processes:

- changing the relationship of regulatory mechanisms;
- mobilization and use of physiological resources of the body;

• formation of a special functional system of adaptation to a particular activity. [4,8].As a result of systematic training in athletics, flexible morphological and functional changes occur in the body during various activities, especially during competitions, depending on the specifics of a particular sport.

Morphofunctional changes in the body are characterized by the efficiency of the functioning of all central and peripheral mechanisms that ensure the performance of the athlete. Systemic activation of neurochemical and enzymatic processes leads to an expansion of the range of functional properties of neural structures at all levels of the central nervous system - excitability, mobility, stability, etc. [17,16].

These features are reflected to some extent in the electroencephalogram (increasing the expressiveness of the alpha rhythm as a resting rhythm, increasing the frequency of rhythm acquisition and reducing the latent period of reactions, etc.). A decrease in the level of non-specific activation of the brain at rest is reflected in the indicators of electrocutaneous conductivity. An increase in the mobility of cortical processes is manifested by an increase in the critical frequency of the combination of light flickers. [17].

Thus, we consider in detail the specific physiological adaptation as a result of regular exercise or physical activity. Some principles apply to all types of physical activity. Each is considered according to its specific occupational type. Here we consider the basic principles of training loads.

Individual principle. The ability to adapt to training loads is not the same in every athlete. Heredity plays a big role in determining how quickly and to what extent an organism adapts to a training program. With the exception of monozygotic twins, the human body does not have exactly the same genetic characteristics.

Therefore, the adaptation of the human body to the same exercise loads will be different. Fluctuations in cell development, metabolism, nerve and endocrine regulation intensity also cause significant individual differences.

It is these differences that explain why some people experience significant improvements after a particular workout program, while others experience minimal or no improvement after the same program. Therefore, any training program should take into account the specific needs and abilities of individual disciplines. This is the principle of individuality. [5.15].

The principle of originality. Adaptations to training are very specific to the type of physical activity, as well as the amount and intensity of physical activity performed. To improve muscle strength, for example, a core thrower should not focus on long-distance running or slow, low-intensity strength exercises. Similarly, it does not make sense for a long-distance runner to perform mostly sprint-type interval exercises. Therefore, athletes who exercise to develop strength and power, such as weightlifters, typically have greater strength and are distinguished by the same level of aerobic endurance as non-exercisers. According to the principle of specificity, the training

program should provide a load of physiological systems that are crucial for achieving a particular workout and achieving optimal results in this sport. [5,15,19].

The principle of termination of training loads. Most athletes agree that regular exercise increases the muscles 'ability to produce more energy and reduce fatigue. Similarly, endurance training improves an athlete's ability to do more work over a longer period of time. However, if the athlete stops training, the level of preparation will decrease significantly. All achievements gained as a result of training will be lost. The curriculum should include a plan to maintain the results achieved. [7,15].

The principle of progressive overload. Two important concepts - overload and progressive training - are the basis of all types of training. According to the principle of progressive overload, all training programs should include these two components. For example, muscles need to be overloaded to increase muscle strength. This means that downloads should exceed normal. Progressive strength exercise means that as muscle strength increases, more resistance is needed to further stimulate muscle strength. [7,15].

Take, for example, an athlete who can lift 68 kg (150 pounds) 10 times before reaching fatigue. After 1-2 weeks of strength training, it can increase the number of repetitions to 14-15 (same mass). Then, with an increase of 2.3 kg (5 lbs) of mass, it will be able to repeat 8-10 times. By continuing to exercise, he will increase the number of repetitions, and in the next 1-2 weeks he will be ready to add another 2.3 kg (5 pounds) to the shell mass. Thus, a progressive increase in the rising mass is achieved. Similarly, by doing anaerobic and aerobic exercise, it is possible to gradually increase the amount of training (intensity and duration). [3,7,15].

Measurement of muscle strength in a person is done by his arbitrary actions, his desire to minimize the required muscles. Therefore, when we talk about human muscle strength, we are talking about maximum voluntary strength (in sports pedagogy, this concept is equivalent to the concept of "absolute muscle strength"). It depends on two groups of factors: muscle (peripheral) and coordination (central nerve). [7,14].

The muscle (peripheral) factors that determine maximum voluntary strength include:

- mechanical conditions of traction of muscles - the arm of the handle of the muscle force and the angle of application of this force to the bone handles;

- the length of the muscle, because muscle tension depends on its length;

- the diameter (thickness) of the activated muscles, because when other things being equal, the greater the apparent muscle strength, the greater the total diameter of the voluntary muscles;

- muscle composition, i.e. the ratio of fast and slow muscle fibers in contracting muscle.

Coordinating (central-nervous) factors include a set of central-nervous coordination mechanisms for the management of the muscular apparatus -

intramuscular coordination mechanisms and intermuscular coordination mechanisms. [7,14].

Intramuscular coordination mechanisms determine the number and frequency of impulses of motor neurons of a particular muscle and the time relationship of their impulses. Using these mechanisms, the central nervous system regulates the maximum voluntary force of a particular muscle, i.e., how close the voluntary contraction force of a given muscle is to its muscle strength. The maximum voluntary strength of any muscle group, even a single joint, depends on the contractile strength of many muscles. Perfection of intermuscular coordination is manifested in the adequate selection of "necessary" synergistic muscles, limiting the "unnecessary" activity of antagonistic muscles of these and other joints, and increasing the activity of antagonistic muscles of neighboring joints and others that provide fixation. Thus, managing the muscles in the central nervous system and determining their maximum voluntary strength is a much more difficult task. From this, it was found that the maximum voluntary strength of muscles under normal conditions is less than their muscle strength. The difference between the muscle strength of the muscles and their maximum voluntary strength is called strength deficiency. [7,14].

Power deficiency in the human body is defined as follows. In a special dynamometric unit, the maximum voluntary strength of the selected muscle group is measured, followed by the strength of its muscles. To measure muscle strength, a nerve that innervates a specific muscle group is stimulated by electrical impulses. The power of electrical stimulation is selected in such a way that it stimulates all motor nerve fibers (axons of motor neurons). In this case, a stimulation frequency sufficient (usually 50–100 pulses / s) is applied to cause the occurrence of complete tetanus of the muscle fibers. Thus, all the muscle fibers of a particular muscle group contract and develop the maximum possible tension (Muscle Strength) for them.

The smaller the power deficit of this muscle group, the more perfect the central control of the muscular apparatus. The magnitude of the power shortage depends on three factors:

1. psychological, emotional state (attitude) of the subject;
2. the required number of muscle groups activated at the same time;
3. the degree of perfection of their voluntary management.

Ivan Petrovich Pavlov said in his Nobel Prize-winning speech on November 12, 1904: "In fact, we are only interested in one thing in life - our spiritual composition. However, its mechanism is wrapped in a deep darkness for us. All human sources: art, religion, literature, philosophy and history have come together to illuminate this darkness. But at the disposal of man is another powerful source - natural science, with its strictly objective methods. It's a science that we all know is evolving every day. " The call of a great physiologist can become a program for the further development of human research activity.

4. Conclusions

Understanding the physiological mechanisms and laws of adaptation is the key to solving practical medical-biological and pedagogical problems of maintaining and strengthening health in the process of physical education, increasing work efficiency. The laws of adaptation are based on the coordinated reactions of individual systems and organs, which ensure the optimal functioning of the whole organism as a whole. It is during intense physical activity that the body's reserve capacity to maintain circulatory and respiratory functions is maintained, resulting in inhibition of the digestive and excretory systems in athletes. Adaptation to physical activity manifests itself in the form of changes in the functional state of the human body. Basically, these manifestations are positive, but the magnitude of the load on the body, its incompatibility with its functional systems, on the contrary, they can adversely affect the functional state, leading to various diseases and injuries.

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