

PHYSIOLOGICAL BASICS OF PREPARING CHILDREN AND ADOLESCENTS FOR SPORTS. DYNAMICS OF THE DEVELOPMENT OF FUNCTIONAL CAPABILITIES AND PHYSICAL QUALITIES OF CHILDREN AND ADOLESCENTS IN ONTOGENESIS AND UNDER THE INFLUENCE OF SPORTS TRAINING

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Abstract

The integrity of the human personality is manifested, first of all, in the relationship and interaction of the mental and physical forces of the body. The harmony of the psychophysical forces of the body increases health reserves, creates conditions for creative self-expression in various areas of life. An active and healthy person retains youth for a long time, continues creative activity. No matter how perfect medicine is, it cannot get rid of all diseases. A person is the creator of his own health, for which he needs to fight. From an early age, it is necessary to lead an active lifestyle, be satisfied, engage in physical education and sports, observe the rules of personal hygiene-in a word, in rational ways, achieve real harmony of Health.

Keywords: Ontogenesis, individual development, heterochronic, physiology, hypokinesia, skeletal ossification.

Introduction

Human development from birth to death (ontogenesis) is a continuous integrated process (individual development).

Throughout life, the organism undergoes a number of natural (physiological) changes.

Personal development and age periodicity

Personal development. Ontogenesis is determined by the influence of hereditary factors and is determined by the genetic program that develops as a result of the interaction of parental genes. The genetic program of personal development is implemented in specific ecological conditions. At different stages of ontogenesis, the influence of genetic information and the environment is different. Thus, in the first years of life of newborns, the influence of the environment is much stronger than in subsequent years. The formation of organs and systems of a developing organism occurs heterochronously (not simultaneously): some of them develop earlier, while others develop later. Thus, morphologically, the brain and spinal cord grow most



rapidly in early childhood and reach their final size by the age of 10-12. The formation of the genitals is relatively slow until the age of 11-12, and much faster at the age of 12-14.

In the process of individual personality development, two interconnected processes constantly occur: assimilation (assimilation, creation) and dissimilation (destruction, decomposition). At different stages of development, the relationship between these processes changes. During the growth and formation of the organism, assimilation predominates. Protein synthesis increases, which is accompanied by relatively more energy expenditure than in adults.

At different stages of human development, the nature of neurohumoral regulation of functions changes. For example, in the early stages, the mechanisms of sympathetic regulation of the cardiovascular system prevail, which is manifested in significant heart rate at a relatively resting state; with age, the influence of the vagus nerve increases, which is especially manifested by a slowing of the heart rate.

Movement and physical exercises have a great influence on human development. Lack of movement, limitation of motor activity (called hypokinesia), negatively affects the formation of the body. The activity of various systems of the body is directly related to the activity of skeletal muscles, especially in childhood. Physical activity stimulates metabolism and energy, improves all the functions and systems of the body, and increases its performance.

Physical activity plays a significant role in preparing for work. By mastering new movements, a person learns to control muscle activity and complex movements necessary in work and sports activities.

Dynamic activity contributes to the assimilation of information coming from the external environment through sensory systems. This information is important not only for improving physical and mental indicators, but also for the development of the individual as a personality.

Age periodicity. Preschool and school age are divided into the following age periods:

- 1) infant - up to 1 year;
- 2) early childhood - from 1 to 3 years;
- 3) preschool or first childhood - from 4 to 6-7 years,
- 4) primary school or secondary childhood - from 6-7 to 12 years old (boys up to 12 years old, girls up to 11 years old);
- 5) secondary school or adolescent - from 12 to 15 years old (boys 12-15 years old, girls 11-15 years old);
- 6) secondary school - from 16 to 18 years old.

For a more accurate assessment of personal development, it is recommended to consider biological age along with calendar (passport) age. This is due to the fact that each organism is characterized only by its own specific developmental rate. Therefore, the time of individual age stages of biological development does not always coincide with the calendar age. Biological age is assessed by a number of indicators: physical development (height, weight, etc.), skeletal ossification time (bone age), the degree of sexual maturity, etc.

A factor that further complicates the precise description of actual age is a process called acceleration. This process is characterized by the following main features: accelerated physical development, early puberty, and an increase in body size. Thus, in recent years, adolescents



and young men grew by 10-13 cm compared to 1923-1925, body weight increased by 9-11 kg, the first menstruation (one of the indicators of sexual development) among schoolgirls was observed in 1927-1930 at an average of 14 years and 2 months, and now this process is recorded at 12 years and 11 months.

Along with fast-developing children, there are also slow-developing children and those lagging behind in physical and sexual development. Therefore, the same calendar age often unites a biologically different contingent of children.

In the process of improving physical culture and sports, it is necessary to take into account not only the calendar, but also the biological age and individual developmental characteristics of the participants.

Age-related features of physiological functions and systems

The growth and formation of the organism, the effectiveness of its interaction with the external environment largely depends on the development of the nervous system and mainly on the leading part of the cerebral cortex. At certain stages of development, children are distinguished by the peculiarities of higher nervous activity.

In elementary school age, the ability to form conditioned reflex connections increases. Thus, in children aged 10-12, positive conditioned reflexes to simple and complex stimuli are sharply expressed and are characterized by significant stability. At the same time, reflex reactions in children often have a diffuse character. This is the result of the clear radiation of the excitation process. Because the strength of internal inhibition is still insufficient, it is more difficult to develop differentiation than in adults. At 10-12 years of age, the frequency of the alpha rhythm of the brain's bioelectrical activity is established, which is characteristic of adults, i.e., 10-12 vibrations per second. At the same time, the electroencephalogram of children is characterized by significant variability, there are significant differences in the frequency distribution of electrical activity in different areas of the brain.

In elementary school age, speech function actively develops, the ability to use abstract concepts from thinking and actions is rapidly formed, the relationship between the first and second signal systems, internal speech, and the ability to think about actions are improved. Oral information becomes more accurate and complete. Temporary connections between words are strengthened as a stimulating and instrumental function. Thanks to this, a person's ability to express their actions more diversely and deeply orally increases.

Improvement of physical education and sports contributes to a more subtle interaction of signaling systems and expands the influence of speech and thinking on the motor function. Adolescence coincides with puberty and physical development. The onset of this process occurs in girls at the age of 11-12, and in boys at the age of 13-14. There are three phases associated with the process of puberty:

Stage 1 - prepubertal, characterized in part by changes characteristic of the previous period;

2nd stage - real puberty, expressed in the intensification of sexual development and the appearance of its symptoms;

Stage 3 - the period after puberty, associated with the end of puberty and its continuation until middle school age.



Adolescence is characterized by a number of specific features. These partial motor movements of the adolescent are often characterised by a large number of additional movements, unnecessary muscle contractions, and excessive rigidity. Children of this age may experience temporary difficulties in the formation of conditioned reflexes and differences. Adolescents are characterized by a sharply increasing emotionality of behavior, sometimes accompanied by mental instability - a rapid transition from oppression to joy and vice versa. Such changes are temporary and are the result of neurohormonal changes characteristic of this age period.

Adolescence, as a period of puberty, is characterized by the activation of the hormonal function of the sex glands. Against the background of the interaction of the gonads with the pituitary and thyroid glands, neuroendocrine and neuro-humoral relationships in the body, characteristic of the previous childhood period, change.

The transition to adolescence is associated with the further improvement of higher nervous activity. The level of analytical-synthetic activity of the cerebral cortex increases, the generalizing function strengthens, the role of oral signals increases, and the latent period of the oral stimulus decreases. The formation of the electrical activity of the cerebral cortex is completed, and by the age of 17-18 its activity is quite mature.

Conclusion

- Under the influence of physical exercises, the structure and function of all organs and systems of a person improve, their effectiveness increases, and their health is strengthened.
- Motor activity is a leading factor in strengthening human health, as it is aimed at stimulating the body's protective forces and increasing its health potential.
- Full physical activity is an integral part of a healthy lifestyle that affects almost all aspects of human life.

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