



# **AGE CHARACTERISTICS IN THE DEVELOPMENT OF PHYSICAL FITNESS OF SECONDARY SCHOOL STUDENTS**

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## **Abstract**

The article discusses the basic laws of growth and development in children, the importance of taking into account age characteristics in increasing physical fitness. Heterochrony, acceleration, physiological indicators of growth stages, and the effect of physical exercise are analyzed in a secondary school setting.

**Keywords:** Age physiology, physical development, heterochrony, acceleration, schoolchildren.

## **Introduction**

In order to properly educate a growing organism, it is necessary to know the basic features of the child's organism, such as growth and development. Growth and development are a characteristic of the human body, like all living organisms. The comprehensive growth and development of the organism begins from the moment of its emergence. These two processes are considered a complex process, are a single whole and interconnected.

Growth is an increase in quantity while maintaining its structure. It is understood as an increase in body weight, an increase in size due to the increase in cells and tissues in it. As a result of the increase in cells, an increase in the size of a living organism is understood, that is, an increase in height, an increase in weight. A child grows steadily until a certain age, but during the growth period, some parts of the body grow unevenly (the bones of the head, legs, and arms, the chest and



**WORLD BULLETIN  
PUBLISHING**

Online Publishing Hub

# World Bulletin of Physical Education and Sports Science (WBPESS)

ISSN (E) : 3072-1768

Volume 01, Issue 03, December 2025



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<https://worldbulletin.org/index.php/2>

abdominal cavity, and internal organs) and at different speeds at different ages. The growth process does not proceed equally in all organisms, it has age-related boundaries, and girls stop growing at the age of 18, and boys at the age of 20. In some cases, women can grow until the age of 21-22, and men until the age of 24-25. Along with growth, there is a process of increasing the functions they perform in cells. This is a developmental process. Development is a qualitative renewal, in which the complexity of the structure of the organism or the morphological improvement of tissues and organs is understood. Due to development, the functions and behavior of entire organisms improve. For example: physical development indicators include height, weight, head circumference, chest, etc.

These two processes occur on the basis of non-uniformity, continuity, heterochronic and acceleration processes. The growth and development of a child proceeds according to certain laws, which include heterochrony and acceleration.

Although growth and development in a normal state of the organism are closely interconnected and mutually influence each other, they do not occur simultaneously. They occur at different speeds, since an increase in the mass of tissue of an organ does not mean its simultaneous functional improvement. This phenomenon is called heterochrony, that is, uneven development. It ensures the survival of the baby, since vital systems develop faster than other organs.

## Methodology

The human body undergoes successive morphological, biochemical and physiological changes from birth to death. These changes are associated with hereditary factors that cause growth and development stages. However, the emergence of these hereditary factors, the formation of age characteristics, education, upbringing, nutrition of the child, hygienic conditions of life, his communication with adults, sports and labor activities, and in general the social life of a person have a great influence. Human life is a continuous process of development. The first steps of a child and the development of motor function throughout his life, the first words of a child and the development of speech



function throughout his life, the child's transformation into a teenager, the development of the central nervous system, the complexity of reflex activity. These are part of the continuous changes that occur in the body. Such changes can also be observed in the change in the proportions of the child's body. A newborn differs from an adult in the short legs and arms, the size of the body and head. The length of the head of a newborn is  $\frac{1}{4}$  of the total body length, at 2 years old it is  $\frac{1}{5}$ , at 6 years old it is  $\frac{1}{6}$ . The length of the arms of a newborn is equal to the length of the legs.

## Results

The brain grows faster than other organs. In a newborn, the weight of the brain is 25% of that of an adult, at 6 months it is 50%, at 2.5 years it is 75%, at 5 years it is 90%, at 10 years it is 95%.

With age, the growth of the head slows down, and the growth of the limbs accelerates. Until puberty, there is no noticeable difference in the proportions of the body of girls and boys, however, with the onset of puberty, sexual differences appear, that is, in boys, their limbs become longer, their body becomes shorter, and their chest becomes narrower.

The uneven growth and development of the length and mass of a child's height can be seen in the following examples.

A newborn child is 48-50 cm tall. Until the age of one, the child's height increases by two cm every month and reaches 75 cm by the end of one year. In the second year of life, it grows by only 10 cm. Up to 6-7 years, height growth slows down even more. At primary school age, the child's height increases by 7-10 cm. Due to puberty, girls begin to grow taller at the age of 12 and boys at the age of 15. Height growth usually stops at the age of 18-19 in girls and 20 in boys. During the entire growth period, the length of the legs increases 5 times, the length of the arms 4 times, the length of the torso 3 times, and the height of the head 2 times. During sexual maturity, the child's height increases by 6-8 cm.

Body weight changes depending on age as follows. The average weight of newborn girls is 3 kg, and that of boys is 3.4 kg., The child's weight increases by 600 g in the first month after birth, and by 800 g in the second month. The



weight of a one-year-old child triples its birth weight and reaches 9-10 kg. At 2 years old, the child's weight increases by 2.5 - 3.5 kg. At 4, 5, and 6 years old, the child's weight increases by 1.5 - 2 kg every year. Starting from the age of 7, his weight increases rapidly. Up to 10 years, boys and girls have the same body weight. With the onset of puberty, girls gain 5-8 kg per year from 4-5 kg to 14-15 years. Boys gain 7-8 kg from 13-14 years. Starting from the age of 15, their weight exceeds that of girls.

Uneven mental development can be observed in students of all grades. In some cases, this unevenness is due to the child's mental retardation, in other cases, it is due to the relatively rapid growth of the individual. In the first case, this feature is more common in children of primary school age, in the second case, it also depends on the teacher's teaching skills. In the second case, the student, having surpassed his classmates, becomes independent and self-willed, and does not obey the teacher. Such students, trying to equalize with the teacher and disrespecting their classmates, lag behind in life experience. Therefore, it is necessary to have a relative attitude towards the relative superiority of children. It is impossible to carry out educational work without taking into account the individual growth and development of children. The mental maturity of children relative to their age depends on their personal abilities and environmental conditions. Their mental and psychological development also depends on the environment surrounding children and educational work. It should be remembered that the fact that children live in relatively the same conditions for several years affects the pace of their personal growth. At the same time, there are also extremely talented children among children of primary school age. These are called prodigies (in German, magical children). We know that many famous people had great abilities from a young age. In particular, we can cite as examples our great scholars Abu Raykhan Beruni, Alisher Navoi and Abu Ali ibn Sina. Abu Ali ibn Sina was known as a famous physician-doctor from the age of 16-17. The Italian writer Torquato Tasso was declared the world's first child prodigy. At the age of 13, he became a student at the University of Ballon. Victor Hugo received a scholarship from the French Academy. We can also cite the great composer Mozart as an example. He wrote music at the age of 4. We



can cite many such examples in history. Currently, great attention is paid to such children in our country. Special lyceums and gymnasiums have been established for them.

As mentioned above, living conditions, school work, physical exercises, and illness are of great importance in the physical and mental growth and development of children.

In addition, weather conditions, climate, and solar radiation also have a great influence on their growth and development. Children grow especially quickly in the summer (July-August). If a child regularly engages in physical exercises and sports from an early age, he will grow up healthy and his organs will develop properly. (e.g. the improvement of the child's respiratory organs has a positive effect on the development of the cardiovascular system.

Acceleration is a Latin word meaning acceleration. In the late 19th and early 20th centuries, it was discovered that children's height growth was accelerated in many countries. Information about this was published in the press in 1876. By 1935, the German scientist R. Koch called the acceleration in growth and development that is taking place acceleration.

Acceleration is the rapid spiritual and physical growth of the younger generation. Since acceleration is clearly visible within 100 years, that is, a century, acceleration is in the broad sense a "circular trend" that is, a century-long trend. It has been said that over the past 100 years, the height of newborns has increased by 5-6 cm, the height of children of primary and secondary school age by 10-15 cm, and their weight by 8-10 kg. In addition, acceleration includes an increase in the body size of adults, an increase in human life expectancy, a later end of menstruation, and other changes in mental functions and human development.

## Discussion

The issue of acceleration has interested many scientists around the world. They have created their own hypotheses indicating several factors that lead to acceleration. In particular, some scientists say that the strong influence of ultraviolet rays causes the rapid growth of children, while others say that the effect of magnetic waves on the endocrine glands. Still others attribute this to



cosmic rays. They cite the increased need for proteins, fats, carbohydrates, mineral salts and vitamins, the progress of science and technology, the emergence of new forms and methods in the educational process, sports and physical labor, and genetic factors as examples. We can call these factors biological and social factors. Thus, growth and development are a complex process, in which hidden quantitative changes lead to overt qualitative changes and manifestations. For example, as a child begins to reach puberty, he begins to pay attention to the environment, existence, and changes in it with interest, and especially in children of preschool and school age, an increase in vocabulary can be observed.

## Conclusion

In developing the physical fitness of students, it is important to take into account age characteristics and the gradual course of the growth process. It is necessary to select exercises appropriate for each age period, and to take into account the differences between biological age and passport age. Then physical education will serve to raise a healthy, physically and mentally mature generation.

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