

GENERAL FUNCTIONAL STATE OF THE CARDIORESPIRATION SYSTEM IN STUDENTS

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Annotation. *Under the influence of physical activity, specific changes occur in the cardiorespiratory system, and the level of these changes depends on the type, strength, intensity of physical exercises, as well as the characteristics of the body. For example, a young body's reaction to exercise is different from that of an adult. It is in students that the reaction of the body to physical exercises is distinguished by its uniqueness.*

Key words: *cardiorespiratory system, physical exercise, intensive, systolic volume.*

It is known that the heart of athletes adapts to long-term physical exertion mainly due to an increase in systolic volume, partly due to an increase in the number of heart contractions. This adaptation is efficient and requires little effort to achieve high results. In people who do not exercise, this adaptation is mainly due to an increase in heart contractions. However, in some sports that require great stress in a short period of time, such as sprinters, the heart rate can exceed 250 beats per minute.

Physical activity accelerates the heart rate depending on the speed and severity of the work performed. In this case, the heart rate can increase to 160-190, and sometimes up to 200-220 times. Depending on the heart rate, the work capacity performed in sports practice is determined. The stronger it is, the faster the heartbeat.

The systolic volume is the largest when a relatively light physical load is performed. A heavy load does not increase this indicator, and sometimes it can decrease it. Physical exercise shortens the heart cycle and the duration of its cycles. The magnitude of this contraction depends on the magnitude of the physical load performed. We provide information about this in the table below.

1 – table.

Changes in the heart cycle and its constituent periods during physical work

Heart cycle and the duration of its cycles (seconds)	During peace	In physical exercise		
		Light exercise	Moderate exercise	Heavy exercise
Heart cycle	0,906	0,411	0,394	0,380
Ventricular systole	0,356	0,236	0,232	0,219
Ventricular diastole	0,550	0,175	0,162	0,161

The more intense the physical exercise, the more the minute volume will increase. Under the influence of physical exercises, this indicator can reach from 10-15 l to 40 l.

This increase in cardiac output helps to supply tissues and cells with an adequate amount of O₂ during hard work. It should also be said that the blood flows to the muscles participating in the work, and at the same time it may decrease in other organs and muscles. Normally, 20% blood flows to the muscles of the body at rest, 45% during light work, and 88% during heavy work. The distribution of blood between muscles and organs during exercise is expressed in the table below.

2 – table.

Distribution of minute volume of blood in various organs and muscles during rest and during physical work (ml/min).

Minute volume of blood	Peace status	When doing physical exercise		
		Light	Average	Heavy
General	5800	9500	17500	25000
Body muscles	1200	4500	12500	22000
Heart	250	350	750	1000
Kidneys	1100	900	600	300
Skin	700	1500	1900	600
Abdominal organs	1400	1100	600	30

As can be seen from the table, the heavier the physical exercise, the more blood supply to the heart, and less blood to the skin, kidneys, and abdominal organs. This is because, as mentioned, during physical activity, blood is drawn more directly to the working organs.

Systolic and minute volumes of blood are the main indicators of heart performance. In particular, it is very important to record them when assessing the body's ability to work. Therefore, determining these indicators during physical work, rest periods and post-work recovery periods is of great importance in the practice of sports and physiology.

Physical exercise leads to an increase in systolic pressure (up to 150-22 mmHg) depending on its amount, speed and level of training of the athlete. Diastolic and mean pressure do not change much, but sometimes (for example, after marathon runs) due to the expansion of blood vessels in the working muscles, it may even decrease.

Blood pressure changes in different parts of the human body as a result of exercise. The blood pressure in the organs directly participating in the work does not increase as much as in other organs, because the blood vessels in the working muscles expand slightly during exercise.

Doing sports in detail leads to an increase in the size of the heart. At this time, the chambers of the heart expand, and the walls thicken. Its volume can reach 1200cm³ in well-trained athletes. Such an increase in the size of the heart is called physiological hypertrophy, and at this time the blood supply to the heart muscles is much improved. The heart is supplied with special blood vessels, which are called coronary or crown vessels. Usually, when a person is at rest, 250-350 ml of blood flows through the coronary vessels of the heart in 1 minute. With the beginning of physical activity, this indicator increases, and when heavy work is done, it reaches its maximum level and can reach up to 1000 ml.

It is well known that people who engage in moderate exercise experience increased physical performance and endurance. The study of the cardiovascular system is important in determining the level of training.

In order to solve the above-mentioned problem, a lot of practical works, researches and observations, verification works are being carried out abroad, in the Russian Federation and, moreover, at the scale of our Republic. For example, according to the scientists who studied the indicators of cardiovascular activity of football lyceum-boarding students in Fergana region and at the same time students of secondary school No. 3 in Fergana city, the school arterial blood pressure, cardiac reserve and cardiac endurance level of students, i.e., 10-13-year-old boys, are unique in a number of aspects.

The results obtained from many studies and observations show that the number of heartbeats of sports school students is lower than that of high school boarding school students, which means that the systolic volume of the heart is increased in them, and

the body's need for blood is mainly due to the systolic volume. indicates that it is satisfied due to the increase.

According to the obtained results, the average systolic pressure of football lyceum-boarding students was lower than the average systolic pressure of school students by 50-10 mm, and diastolic pressure by 3-5 mm. According to them, lower arterial blood pressure in football boarding-lyceum students may be due to increased elasticity of arterial vessels as a result of systematic physical training.

In these experiments, cardiac reserve was determined by appropriate methods. To determine the heart reserve, the maximum contraction of the heart was taken as 200 beats per minute, from which the age of the subject and the heart rate at rest in 1 minute were subtracted. For example, if a healthy 12-year-old child's heart beats 84 times per minute, the heart reserve (200-12) is 84-104. The cardiac reserve of the examined 10-12-year-old schoolchildren was equal to 101-106 per minute. The heart reserve of lyceum boarding school students was 105-110, that is, during physical work, the heart reserve was more in boarding school students.

Observations show that because the students of the football boarding high school were constantly engaged in physical exercises and sports, it turned out that the functional state of the heart, that is, the endurance, was much higher than the students who did little sports. .

In general, the body engaged in sports is fundamentally different from the body that is not engaged in sports. This can be clearly seen in the example of changes in the size of the heart. Students who play basketball have a much higher heart volume than those who do not play sports.

Based on the above, it can be said that as a result of physical exercise and sports, students' health improves, as well as their working ability and the functional state of the cardiovascular system.

Physical education of students is a very complex and long-lasting process, which consists of all-round physical development of the child, training of the body, formation of desire and interest in physical education. Solving these important tasks is carried out only by strictly taking into account the anatomical and physiological characteristics of the child's organism, taking into account the main laws of its growth and development.

When engaging in physical education, the age of students should be taken into account first of all. Then exercise will have a positive effect. The main reason for this is that a number of morphological, physiological, biochemical changes occur during the growth and development of the student's organism.

Medical-biological observations of growth characteristics, development and growth processes of the human organism allow to divide vital activity into separate

phases. Based on this, the periodization of youth in science has been developed. These periods differ in terms of quantity and quality. Quantitative changes occur gradually, then in a very short period of time the organism moves to a new qualitative state of its development, that is, it enters a new phase.

It is necessary to take into account the various aspects of the body's function and morphological changes, the content of the life cycle, and their differences from each other during physical training. Currently, in science, a person's life from birth to adulthood is studied in stages.

Studying the possibilities of adaptation of the student's body to muscle activity is considered one of the current problems. The study of this problem provides an opportunity to assess the nature of physiological changes in the body of students under the influence of muscle activity, to identify conditions that may negatively affect their health, and to rationally organize the processes of physical education. The relevance of this problem is that, even if it is rare, in the practice of physical education of students, the methods of applying physical loads intended for the training of older athletes are used.

However, the ability to adapt to physical loads changes in children and students in each period of growth and development. In addition, each growing organism, that is, a student, is a separate individual, and his physical development and capabilities are unique. Considering this, it should be taken into account that students' adaptation to muscle activity depends on the specific characteristics of physiological systems and their functions. It is known that the qualitative development of physiological systems in students is perfected in different periods of ontogenesis. A clear example of this is the activity of the muscular, cardiovascular and respiratory systems. Muscular activity has a great positive effect on the development and improvement of these systems and helps students adapt not only to physical loads, but also to other social environments.

Summary. Based on the above, it can be noted that ensuring that students are constantly engaged in physical education and sports is important for protecting their health, increasing mental and physical work capacity, and preventing situations such as fatigue, laziness, weakness, etc. moreover, it is important in mastering subjects well. In this regard, it is important to explain and promote sports and its importance among students.

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