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Peculiarities of the Functioning of the Circulation System in Rower Athletes Hot Climate

Xujabekov M.A., Kuziev M.S.
Samarkand State University

Annotation. This in the article of students knowledge activity increase, independence role increase and creative thinking ability in raising STEAM technologies study in the process of application features and benefits given is this technology modern at school of application important aspects set given

Key words: STEAM, Education efficient teaching method

Introduction

At present, the question of adaptation of the body to intense physical activity in athletes under various temperature regimes is one of the urgent tasks in the field of environmental physiology. Adaptation is a mechanism for the development of an athlete's body, to prepare him for stressful, unforeseen circumstances that may occur in the process of participating in competitions or other training processes. Changes in morpho functional parameters, as well as changes in hemodynamic parameters, lead to irreversible metabolic processes in the circulatory system [2, 4]. To identify signs of adaptation or maladjustment, as well as assess the state of the cardiovascular system, when using an increased load on the body, an integrated approach is needed. Physical activity has an effect on almost most of the body systems, but the main organ is the heart, which experiences excessive stress and mainly affects the achievement of a good result - this is the specificity of adaptation [1, 10].

The state of physical development plays one of the leading roles in ensuring high performance in athletes. Particularly noteworthy is the relationship between the indicators of physical development and the functional characteristics of the whole organism under the influence of the physical stress of athletes [4].

During the maximum compensation of all functional systems of the body in the conditions of competitive activity, additional energy costs are required, which leads to a decrease in the reserve capabilities of the body of athletes [2, 3]. As a result, this becomes the cause of the pathology of the cardiovascular system with inadequate selection of physical activity at the stage of preparation for competitions and during the competitive period [3, 12].

However, despite the importance of this problem, the literature still does not cover the issues of adaptation of the organism of rowers to physical activity under high temperature conditions. In this regard, there is a need to study the adaptive capacity of the body of athletes to physical activity in the conditions of Samarkand. The data obtained make it possible to make adjustments in solving the issues of managing the educational and training process, depending on the development of means to increase sports performance.

Material and methods.

In order to study the adaptive capacity of the cardiorespiratory system in rowing athletes to physical activity under conditions of exposure to high ambient temperature, medical examinations and physiological observations were regularly carried out for a number of months. The research work was carried out in several stages, at each of which an assessment of the physical performance and thermal state of athletes was carried out. The studies were carried out in the period from 2016-2022. At the first (preparatory) stage at the sports base of the Chirchik State Institute of Physical Culture and Sports (Chirchik) and on the basis of Samarkand State University (Samarkand) (Fig. 1). We conducted a survey of 37 athletes (boys) involved in rowing.

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Fig.1. Map-scheme of research

At the second stage, the possibility of using a typical methodology for individual determination of the resistance (endurance) of athletes to maximum physical exertion under two regimens of moderate (18-200C) and high (35-390C) degrees of hyperthermia was evaluated in order to assess the degree of their aggravating effect on the athlete's physical performance. involved in rowing.

The study of the functional characteristics of the examined was carried out using a traditional set of methods. Height was measured in a standing position using a medical stadiometer with an accuracy of 0.5 cm. Body weight was measured with a special medical balance scale with an accuracy of 50 g. In a standing position, the chest circumference was measured with maximum inspiration, full expiration and calm breathing (the measurements were carried out with a plastic tape with an accuracy of 1 mm).

Statistical processing and analysis of the obtained results was carried out using Excel and Statistica programs.

Results and discussion.

A comparative analysis of the physical development of athletes involved in rowing showed that the growth of the body of student-athletes involved in canoeing at the age of 19-20 years is lower than that of boys aged 17-18 years (Fig. 1). Athletes-rowers engaged in kayaking have a body height of 178±2.47 to 180±2.56 cm, respectively, in two age groups.

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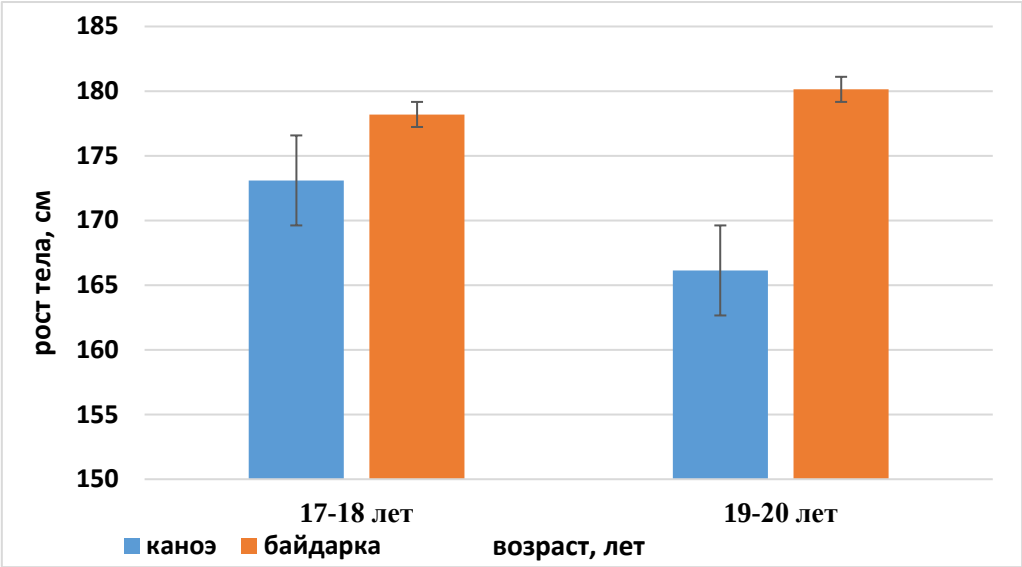
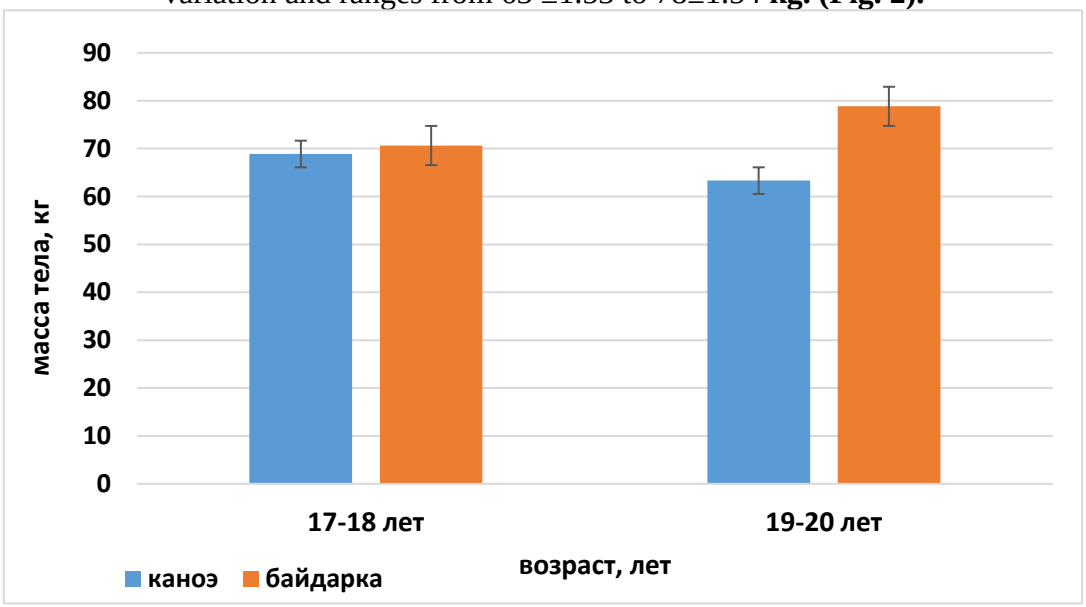


Fig.2. Body height indicators in rowers (n=37)

A comparative characteristic of the body weight indicators of all the examined showed that in the age group of 17-18 years, body weight is 69 ± 3.15 - 70 ± 1.88 kg, and in the age group of 19-20 years there is a wider variation and ranges from 63 ±1.53 to 78±1.54 **kg. (Fig. 2).**



Rice. 3. Indicators of body weight of athletes-rowers (n= 37)

A comparative analysis of chest volume indicators (THV) in rowing athletes showed that all examined young people have an age-related increase in chest volume (Fig. 3).

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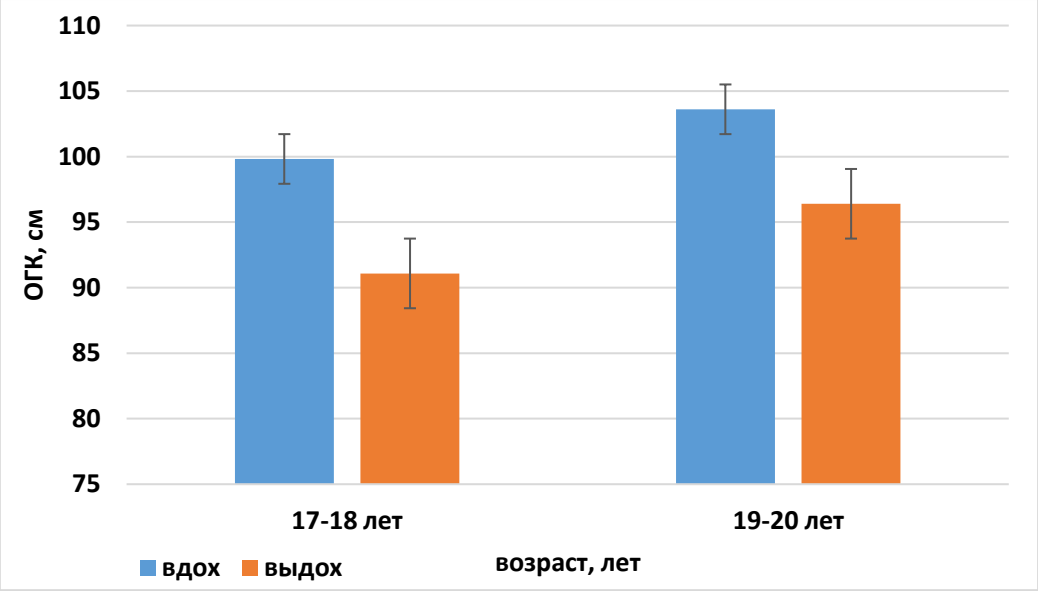

Fig.3. Indicators of the circumference of the chest in athletes -rowers, cm (n=37)

Considering the differences in the indices of the circumference of the chest (THC) among the surveyed rowers, it was found that at the age of 17-18 years, the indicators of the TC when inhaling were 99.82±1.89 cm, and when exhaling they were 91±2.56 cm. In the age group of 19-20 years, the difference in OGK values ranged from 1.8 to 5.4 cm (during inhalation and exhalation, respectively). The analysis showed that the values obtained for the volume of the chest in all examined young people are in good agreement with many literature data [1, 9, 11]. The adaptation of athletes to the effects of physical activity occurs due to the intense work of the cardiovascular system, which is limiting in athletes training for endurance. However, despite the importance of this problem, the literature does not cover the processes of adaptation of the body of young rowers to physical activity. Essential for assessing the characteristics of the functional state of the circulatory system and the adaptive capabilities of the body of athletes is the level of blood pressure, which is the reaction of a complex set of regulatory hemodynamic influences: the state of the heart, blood vessels, tissues, various links of regulation - central, vegetative, humoral [5, 7].

Arterial pressure as an integral indicator of the functional state of the cardiovascular system in athletes plays an important role in diagnosing the state of fitness [6]. According to the scientific literature [6, 14] and our observations, BP in qualified athletes at rest is within the normal range or there is a tendency to decrease. In rowers, BP, on average, was: systolic 112.5±9.5 (minimum 67.5±5.3 and pulse - 45±3.1 mm Hg).

The increase in blood pressure in athletes training in the specific conditions of Samarkand is no more than 1% against 12-15% in the literature [8, 16, 17]. The maximum arterial pressure at the level of 100 mm Hg. revealed in 9.7%, the minimum - 60 mm Hg. in 23.5% of athletes. Systolic blood pressure above 120 mm Hg. was observed in 6.7% of athletes, including those above 129 mm Hg. in 1.3% of the studied athletes. As can be seen from Table 1, the level of the studied indicators, depending on the ambient temperature, showed that the pulse rate at rest at a temperature of 18-200C and 35-390C was 67.4±5.1 and 72±6.4 beats/min, respectively. . Arterial pressure, respectively, 118.5±7.0 and 123.0±8.0 mm Hg, and pulse pressure 49.5±3.9 and 52.0±1.8 mm Hg (Table 1).

Table 1

Dynamics of heart rate and blood pressure in athletes at rest under different temperature regimes

Heart rate and blood pressure indicators	**Temperature**	
	18-20^0 C	**35-39^0 C**
At rest		
Pulse rate (in 1 min)	67,4±5,1	72,0±6,4
BP maximum, mm Hg	118,5±7,0	123,0±8,0
BP minimum, mm Hg	69,0±5,2	71,0±6,2

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BP pulse, mm Hg	49,5±3,9	52,0±1,8
After loading		
Pulse rate (in 1 min)	160,0±10,0	150,0±8,0
BP maximum, mm Hg	175,0±11,2	142,0±9,3
BP minimum, mm Hg	77,0±5,5	61,0±1,2
BP pulse, mm Hg	98,0±1,3	81,0±6,3

After performing physical activity at different temperature conditions, the indicators of heart rate and blood pressure changed in different directions. For example, an increase in heart rate and an increase in blood pressure after exercise at a temperature of 35-390C were significantly less compared to the data obtained at a temperature of 18-200C. It should be noted that the level of the minimum arterial pressure was 10 mm Hg. less than at rest at a temperature of 35-390 C. Pulse pressure after exercise increased significantly, reaching 81.0±6.3 (at rest - 52.0±1.8 mm Hg) under high ambient temperature. Significant changes after exercise at high temperatures were also detected in terms of hemodynamic parameters (Tables 2, 3).

Table-**2**

Analysis of hemodynamic parameters in rowers under different temperature regimes

Hemodynamic parameters	**Temperature regime**	
	18-20^0 C	**35-39^0 C**
At rest		
CO (мл)	65,5±5,2	72,6±6,1
МОК (л/мин)	4,1±0,3	5,2±0,25
CDD (мм рт.ст.)	86,0±7,1	90,0±6,4
After exercise		
CO (мл)	92,0±5,0	93,1±4,2
МОК (л/мин)	14,7±1,4	14,0±1,3
CDD (мм рт.ст.)	109,7±9,0	88,0±6,5

Таблица 3

Анализ показателей сердечного индекса у спортсменов-гребцов при различных температурных режимах

Methods of determination	**Temperature regime**	
	18-20^0 C	**35-39^0 C**
At rest		
СИ	2,28 л/мин/ кв.м	2,88 л/мин/кв.м
After exercise		
СИ	2,28 л/мин/ кв.м	2,88 л/мин/кв.м

Based on the results of the analysis, it was found that at rest at a temperature of 18-200 C and 35-390 C, the DDS indicators were 86, ± 7.1 and 90.0 ± 6.4 mm Hg, respectively. After exercise, these indicators were 109.7±9.0 and 88.0±6.5 mm Hg, respectively. At rest, the total peripheral vascular resistance at a temperature of 18-200 C was 1628±15.1 dyn.sec/cm5. After performing physical activity at the same temperature, this indicator decreases to 595±15.9 dyn.sec/cm5.

Similar changes in peripheral vascular resistance (PVR) were found in rowers under high temperature conditions. However, in the latter case, the decrease in PSS was more significant compared to the data obtained at a temperature of 18-200C. At a high temperature (35-390C), the performance of physical activity caused an even greater decrease in PSS than it was after performing physical work at a temperature of 18-

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200C, which indicates the intensity of the function of the cardiovascular system in connection with the performance of the same physical activity. in conditions of high ambient temperature in Samarkand.

Conclusion.

The analysis of our own research and literature data indicates that at present there are disagreements about the dynamics of blood pressure increase in rowing athletes. Apparently, this is due to the fact that the border of the “normal” blood pressure in athletes, in addition to fitness, also depends on environmental factors (high temperature, solar insolation, etc.).

The functioning of the body when performing physical activity in conditions of high air temperature occurs with significant stresses compared with the performance of the same physical activity at normal ambient temperatures. In a hot climate, training processes are accompanied by sharper changes in heart rate and a slowdown in their recovery processes. Under such conditions, the state of the regulatory mechanisms of blood circulation gradually adapts to various physical loads and temperature regimes of the external environment.

Intensive training under conditions of physical activity and high ambient temperature leads to orthostatic instability of the cardiovascular system, slowdown in recovery processes, rapid increase in body temperature, increased sweating, and the onset of dehydration of the body, which further increases the load on the cardiovascular system, thereby improving adaptive capabilities of a particular organism

The data obtained indicate the need to take into account environmental factors when solving issues of managing training processes in a hot climate.

Thus, physiological, anatomical and many other aspects of preparedness can be attributed to the individual characteristics of athletes-rowers. Taking into account the physiological state of canoe and kayak rowers is one of the main conditions for the education of a high-class athlete. In this regard, reliable and reliable methods of monitoring certain physiological indicators, which will largely determine the competitive result, come to the fore.

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