

On the Issue of Studying the Functional Features of the Body of Student-Sportsmen in the Conditions of the Republic of Karakalpakstan

Sultansuinov A.S.
Karakalpak State University

Annotation. The article deals with the issues of studying the functional characteristics of the body of student-sportsmen in the conditions of the Republic of Karakalpakstan. It is noted that the system-forming factor of functional reserves indicates the results of activities that ensure the adaptation of the body of student-sportsmen to various physical loads. It was found that the level of cardiac synchronization characterizes the degree of vegetative balance.

Keywords: Karakalpakstan, the body of student-sportsmen, range of reliability, adaptation process, cardiorespiratory system, vegetative functions.

Introduction

Currently, a particularly important problem in the field of sports physiology is the study of the functional characteristics of the body of student – sportsmen engaged in professional sports. At the present stage of development of society, sport is a complex multifunctional and diverse process that occupies a priority place in the physical and spiritual culture of the student. Many scientists define the functional reserves of the body as the potential ability of the body to ensure its vital activity in unusual or extreme conditions [1, 4, 15]. As is known, the functional features of an organism are understood as "the adaptive and compensatory ability of an organ, system and organism as a whole formed in the process of evolution to increase the intensity of its activity many times over compared to the state of relative rest" [2, 3]. According to this statement, the result of active activity is considered as a system-forming factor of functional reserves, providing adaptation of the body to various physical activities [5, 8, 9].

The functional reserves of the organism enable fluctuations in the functional activity of its structural elements, their possibilities of interaction with each other to adapt to the effects of environmental factors on the body in order to ensure the optimal level of functioning of the organism for specific conditions and the effectiveness of its activities to achieve a specific result of adaptation [12, 8, 14,]. In the process of adaptation processes, there is some dynamics of the range of reserve capabilities of the organism and the ability to mobilize them [5, 6, 11]. The functional reserves of the body establish a range of reliability of its functional systems, in which, with increasing load, there is no violation of the functions of organs and systems of the body. The potential capabilities of functional reserves have already been introduced into the human genotype during the evolutionary process. These possibilities are revealed in certain conditions of vital activity and can change dynamically under the influence of purposeful active training, forming special individual functional features of the body [2, 6, 10, 14].

Material and methods

The study was conducted on the basis of Karakalpak State University. A total of 157 students (boys) were examined Karakalpak State University, students at the faculties of physical education and systematically engaged in sports for at least 5 years in the structure of the load (mobile sports) and having qualifications not lower than the second sports category. The study was conducted in 2018-2020. During the examination of student-sportsmen, physical exercises were taken into account, requiring a complex manifestation of physical qualities in the conditions of dynamics of motor activity, continuous changes in situations and forms of action. Acyclic work of variable power was used during training, aimed at developing agility, endurance, speed and strength [2, 13]. Training processes were carried out in all periods of the year. The sports load took place three times a week for two hours. The training consisted of three stages: preparatory, main and final. 20-25 minutes were allocated for the preparatory stage, the main stage takes about 1.10 – 1.20 hours, the rest of the time was

allocated for the final stage. To assess the functional state of the cardiovascular system, the heart rate was analyzed using a rhythmocardiograph using the method of cardiointervalography [2, 4]. The analysis of physiological processes in the circulatory system was carried out on a 3-channel electrocardiograph of the company "Biolight Guandun".

Discussion of the results

Adaptive capabilities are defined as a reserve of FR, consisting of information, energy and metabolic reserves, which are spent on maintaining the constancy of the internal environment of the organism and maintaining its balance with the external environment [1].

The possibilities of adaptation mechanisms are largely determined by the possibilities of mobilization of FR, which can provide an adequate request of the organism to the level of functioning of its organs and systems with optimal tension of regulatory mechanisms.

The body's reaction in response to environmental factors depends on the strength and time of exposure, as well as the body's adaptation capabilities, which are determined by the existence of FR [5, 6]. The state of an integral organism as an integral result of the activity of its organs and systems is largely determined by the optimality of regulatory mechanisms and control actions, their ability to ensure the balance of the organism with the environment and the necessary adaptation to the conditions of existence [7, 12].

The dynamic interaction of various functional systems, which is provided with the participation of different or sometimes common regulatory systems within the framework of the theory of functional systems, is complex and complex and depends on the activation resources determined by the FR [7, 12]. Respiratory-cardiac relationships are often considered as an example of such interaction. It is stated that in order to determine the functional state of an organism, it is sufficient to assess the reserve capabilities of its cardiorespiratory, central nervous and neurohumoral regulation, the functioning parameters of which reflect the indicators of homeostasis, as well as the FR of adaptation processes through the ratio of the level of regulation and the degree of tension of the regulation mechanisms [2, 3, 10].

Our review of the literature indicates the need for further study of the cardiorespiratory system indicators in sportsmen living in the northern and southern regions of the Republic of Karakalpakstan. In the course of the conducted studies, the following results were obtained. The maximum value of heart rate indicators (HR) is observed in student -sportsmen aged 20 years (65.14 ± 0.39 beats/min), and the minimum value at the age of 19 years (64.26 ± 0.76 beats/min). In sportsmen who do not engage in sports, the maximum indicator was detected at the age of 18 and 21 years (71.53 and 71.93 beats/min), and the minimum level was also noted at the age of 19 -20 years (70.39 and 70.94 beats/min, respectively). As for the comparative assessment of this indicator with students who are not involved in sports, there is a uniform change in this indicator among young men who are not involved in sports. On average, for all age groups, heart rate indicators for student-sportsmen is 64.75 beats/min, and heart rate indicators for students who are not engaged in sport is on average 71.15 beats/min. It seems to us that in this case, low heart rate values in sportsmen compared to those of students who do not engage in sports prevents the "wear" of the myocardium and has an important health value.

Arterial pressure (BP) in sportsmen is an important integral indicator of the functional state of the cardiovascular system and is a relatively constant value. The study of blood pressure readings is important both for the diagnosis of fitness status and for the diagnosis of pre-pathological and pathological conditions of the sportsmen's body [1, 2, 4].

The value of blood pressure is determined by a sufficient number of factors, among which the most significant is the ratio of the minute volume of blood flow and the resistance to blood flow exerted at the level of arterioles (peripheral resistance). As is known, the normal range of oscillation for the maximum pressure in sportsmen is 100-129 mm Hg, for the minimum 60-79 mm Hg [4, 15]. Considering the average values of arterial diastolic pressure (ADP) in conditions of physical exertion, it can be noted that here also the minimum values correspond to the age periods of 18 years, the maximum values correspond to the age of 21 years, both for student-sportsmen and students not involved in sports. So, for student-sportsmen, the minimum value of the ADP indicator under load conditions at the age of 18 is 75.14 mm Hg, and the maximum value is 76.97 mm Hg for the age of 21. For students who are not involved in sports, the maximum level of ADP under load conditions is 75.5 mm Hg at the age of 21, and the minimum level corresponds to 73.3 mm Hg for the age of 18. The analysis of changes in blood pressure in response to physical activity showed the minimum indicator

for students who do not play sports at the age of 18 – 86.57 mm Hg, the maximum indicator at the age of 21 – 91.2 mm Hg. In student-sportsmen, the minimum indicator at the age of 18 showed 86.6 mm Hg, the maximum indicator at the age of 21 – 89.7 mm Hg. Systematic exercise allows you to maintain a high level of health and performance [6].

The basis of physical exercises is motor activity, which is accompanied by a large flow of information in the central nervous system associated with proprioceptive afferentation from the muscles [2, 14]. At the same time, the functional activity of all parts of the central nervous system increases, the content of RNA in neurons increases, the activity of the hypothalamic-pituitary system is activated, the endocrine system is involved and optimal regulation of the cardiovascular, respiratory and other systems of the body is achieved [2, 6]. All processes occurring in the body should be considered, first of all, from the standpoint of guaranteed maintenance of thermodynamic disequilibrium between the amount of free energy [6, 14] entering the body from the environment and the amount of energy released during catabolic transformations of its structures.

Conclusion

It has been established that the level of respiratory-cardiac synchronization characterizes the degree of vegetative balance, and respiratory-cardiac relationships are extremely labile and integrally reflect systemic vegetative rearrangements occurring in the human body under various external influences. This makes it possible to use their analysis to assess the functional state of the body.

Thus, according to research data, the students we examined who were engaged in various sports, regardless of age and degree of fitness, had higher blood pressure than normal. The detected DM above 100 mm Hg in students who do not play sports in the older age groups (20-21 years) can be considered a risk factor for hypertensive conditions, probably due to the ecological and climatic conditions of the area of residence in the Republic of Karakalpakstan. The respiratory-cardiac coefficient reflects the redistribution in the activity of various levels of regulation of vegetative functions and allows us to evaluate the integral characteristics of the vegetative reactivity of the body during stress tests, which, apparently, may indirectly indicate the state of the functional reserves of the body.

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