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Influence of Sports on the Adaptive Capabilities of Schoolchildren's Cardiorespiratory System in the Conditions of the Aralie

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Annotation

The article is devoted to the study of the issues of somatometric indicators that form the basis for assessing the physical development of children, since it is in any age period that it reveals the dialectic of the relationship between the body and the environment, characterizes the metabolic processes in the body and its functional state.

Keywords: Aral Sea region, somatometry, cardiorespiratory system, children

The age-related development of the functional capabilities of the child's body is clearly reflected in the reaction of adaptation to physical activity (Fomin 2003; Baranova, 2006). The process of adaptation to muscular activity in young athletes is characterized by a number of features associated with high rates of age-related morphological and functional rearrangements of the cardiovascular system (Isaev et al., 2004). At the same time, the study of heart rate variability indicators makes it possible to identify reactions caused by different levels of regulation of physiological functions (Mikhailov, 2005). The improvement of neurovegetative mechanisms of regulation of the circulatory system was manifested by an increase in the significance of the segmental level of autonomic regulation of the chrono- and inotropic function of the heart, a decrease in the activity of the suprasegmental level of regulation of the tone of large vessels.

Recognizing the importance of physical culture and sports for maintaining the health and harmonious development of children and adolescents, a Decree of the President of the Republic of Uzbekistan was issued on measures to stimulate the work of coaches employed at children's sports facilities, especially in rural areas.

In accordance with the decision of the Board of Trustees of the Children's Sports Development Fund of the Republic of Uzbekistan dated March 11, 2010 and in order to create the necessary conditions for the active involvement of children and adolescents in sports, especially in rural areas, the wide involvement of highly qualified, professionally trained coaching staff to work with children and studying youth at children's sports facilities, strengthening the material incentives for their work, a number of instructions were issued by the relevant authorities.

Recently, there has been a tendency to increase the number of children involved in regular sports, as a result of which young athletes develop neurohumoral mechanisms of urgent and long-term adaptation characteristic of each type of sports activity, which ensure a quick switching of functions to achieve the maximum useful result. At the same time, in children's sports it is necessary to observe the principle of adequacy: the load must be dosed taking into account the age-related functional capabilities of the organism (Agadzhanyan et al., 2004; Trokhimchuk, 2007).

The cardiorespiratory system plays a decisive role at all hierarchical levels of adaptation. Due to the high lability of the physiological mechanisms of its regulation, it is one of the first to be included in the compensatory-adaptive activity aimed at adequate provision of tissues with oxygen. In the numerous literature concerning the study of the impact of sports on the state of the cardiovascular system of children and adolescents, insufficient attention was paid to the study of the autonomic regulation of the activity of the heart of young athletes, the studies are fragmented and incomplete.

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The use of somatometric indicators forms the basis for assessing the physical development of children, since it is in any age period that it reveals the dialectic of the relationship between the body and the environment, characterizes the metabolic processes in the body and its functional state, and, first of all, is an integral indicator of the state of the cardiovascular system (A.V. Shakhanova, 1998; E. I. Prakhin, V. L. Gritsinskaya, 2004).

It is known that sports are accompanied by significant metabolic changes, which make it possible to diagnose signs of fatigue, overwork, tension of regulatory systems at an early stage and make adjustments to the training process (Baevsky et al., 1997). The composition of mixed saliva can be used as an indicator of the state of the sympatho-adrenal system and the mineralocorticoid activity of the adrenal glands (Baevsky, 1979).

The analysis of scientific studies shows that in relation to young athletes specializing in acyclic and cyclic sports, complex studies taking into account the state of the cardiorespiratory system, somatic status and electrolyte composition of saliva have not been conducted. At the same time, carrying out such a study in the longitudinal mode would make it possible to assess the adaptive capabilities and patterns of functioning of the organism at different periods of ontogeny.

Considering the CVS as an indicator of the state of the whole organism and taking into account the need to study in order to predict its possible reactions (primarily the processes of energy supply), we will focus on some studies using variational pulsometry in terms of its use to predict adaptive capabilities of the cardiorespiratory system.

Systematic physical exercises also cause economization of the heart at rest, which is expressed in a decrease in the heart rate of children compared to their peers who did not go in for sports. The testing load leads to an increase in heart rate, but the difference reaches significant values only by the end of the second macrocycle ($P < 0.05$), and an increase in sympathetic influences while maintaining the predominance of vagal tone in the autonomic balance. Yu.S. Vanyushin (2001) notes that the conditioning of adaptive processes by the influence of the sympathetic nervous system occurs in young athletes whose left ventricle is not yet enlarged. This provides an increase in contractility regardless of the initial stretch.

In the course of the conducted studies, it was revealed that the adaptation of the external respiration system to training loads during hand-to-hand combat is accompanied by an increase in both volumetric and volume-velocity parameters at the level of large bronchi, medium and small bronchi and an increase in the performance of the respiratory system. A positive effect of systematic training loads on the level of physical development and physical qualities (strength, general and power endurance) of cadets-lawyers involved in various sports has been established.

We have also previously shown that a generalized assessment of the response of the cardiovascular system to the ongoing functional test is provided by an analysis of the cumulative changes in blood pressure and heart rate, which characterizes a certain type of vegetative support of activity (VAS) of the cardiovascular system according to the classification of A.M. Wayne (2000) in the individuals we examined. In the main group, the type of VOD was regarded as normal in all athletes of the 3rd subgroup; in the 1st subgroup, excessive VOD was detected in 15% of persons and insufficient - in 5%, which reflects the stress of adaptation of cadets-athletes to loads in the hand-to-hand combat section at the first stage of training. In the control group, on the contrary, there was an increase in the number of persons with deviations from the normal type of VOD. It was revealed that the adaptation of the external respiration system to physical loads with the experience of hand-to-hand combat for more than 3 years leads to a significant increase in both volumetric and volume-velocity parameters at the level of large, medium and small bronchi and an increase in the performance of the respiratory system (MVL values).

Thus, it is physiologically justified to use training in various sports in addition to the program for physical education of students of the faculties of physical education in the universities of the republic to increase their level of physical development, the functional state of the respiratory and cardiovascular systems, and improve professional skills.

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