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**Review Article**

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# To the Question of Research of the Functional State of the Cardiorespiratory System of Lyceum Students in the Conditions of Karakalpakstan

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**A B S T R A C T**

In the article the questions of research of the functional state of the cardio respiratory system of lyceums of students are examined in the conditions of Karakalpakstan. It is marked that external breathing, carrying out the interchange of gases between an environment and blood of pulmonary capillaries in the process of the age-related development suffers considerable changes in connection with a height and forming of bronchial vehicle at the lyceums of students, resident in Karakalpakstan.

## Introduction

Currently, the study of regulatory mechanisms and functional interactions between regulatory circuits is one of the most relevant areas of fundamental and applied environmental physiology. At the present stage of development of ecological physiology, it is important to note that in the analysis of the frequency structure of the rhythmogram, of particular interest is the temporal localization of changes in the spectral composition of the signal, which makes it possible to record the appearance, change in the contribution or disappearance of oscillatory components. In this regard, the problem of choosing from a number of proposed mathematical methods of spectral analysis those that would satisfy the tasks of physiological research, and would also be applicable for diagnostic purposes (Abramovskikh, 2007; Vorontsov, 1986), is of particular relevance. Evaluation of heart rate regulation will provide an opportunity to obtain prognostic information about the functional state and features of adaptive reactions of the whole organism (Gubareva and Ermolenko, 2005; Ketkin *et al.*, 1984; Maturazova, 2008).

One of the priority areas of modern ecophysiology is the study of the adaptive mechanisms of a growing organism to various types of physical activity (Abramovskikh, 2007; Vorontsov, 1986).

The cardiorespiratory system, as is known, is one of

the most important physiological systems that determines both the mental and physical performance of children and adolescents in ontogenesis and during adaptation to educational activities (Ketkin *et al.,* 1984). The required levels of minute respiratory volume can be provided only if there is an appropriate functional reserve and the maturation of the mechanisms of respiration regulation, which forms the economization of the functioning of the respiratory system.

As is known, the dynamic series of cardiointervals is a physiological signal reflecting the total neurohumoral regulatory effect on the heart. The use of spectral analysis makes it possible to isolate from the complex variability the components of its initial simpler oscillations, and to establish their frequencies and intensities (Klimova, 2005).

The complex application of spectral analysis methods in assessing heart rate variability makes it possible to comprehensively consider the functional state of the regulatory systems of the human body. During the formation of adaptive reactions, regulatory mechanisms can be switched on in a certain sequence, with a certain level of activity.

For example, in an orthostatic reaction, an increase in the level of sympathetic activity after a transition to a standing position can occur spontaneously and for a short time, and, in some cases, can be long-term and uniform. The formation of an adaptive response is a dynamic process, the development of which is characterized by the movement of the object under study on the phase plane (its individual phase trajectory) (Klimova, 2005).

So far, there are not enough studies on the dynamics of functional rearrangements in the body under the influence of certain physical loads and its influence on human ontogeny in the conditions of aridization and desertification of the territory of the Republic of Karakalpakstan, although this is of great scientific and practical importance in the field of ecophysiology. The state of health of the younger generation, which, due to the imperfection of the body's defenses, are the first among other groups of the population to react sensitively to adverse living conditions. Their body is a kind of marker of increased sensitivity to the state of the environment.
It is known that adolescence is on the border of two important periods in the development of the respiratory system. This age period is also characterized by smooth changes in morphofunctional parameters (Vorontsov, 1986; Gubareva and Ermolenko, 2005). At the same time, an increase in reserve and mophofunctional indicators is observed. Also, this age is considered the maximum efficiency of the organization of physiological functions in the body in adolescents.

The peculiarity of the physiological changes that occur in the respiratory system under static stresses, the rapidly onset of fatigue make them an important object for study, especially in the process of adapting students to educational processes. The study of the dynamics of indicators of external respiration and the cardiovascular system of students of lyceums for various types of loads during the academic year seems to be very relevant in terms of the adaptability of the body of students to various physical loads and, at the same time, to environmental living conditions. Somatic, morphofunctional and psychophysiological maturation of the body of adolescents requires the close attention of specialists in various fields, serious interdisciplinary research, and the development of optimal methodological and methodological approaches (Ketkin *et al.,* 1984; Klimova, 2005).

According to experts, different types of physical activity cause a sharp increase in oxygen consumption in the nervous and muscular systems of adolescents. In this regard, there is a need to ensure increased oxygen consumption by organs and tissues.

This function is provided by respiration - the exchange of gases between the external environment and the cells of the human body. Convection transport of respiratory gases combines two

processes - pulmonary ventilation and transport of gases by the circulatory system. The required levels of minute respiratory volume can be provided only if there is an appropriate functional reserve and the maturity of the mechanisms of respiration regulation, which ensures the economization of the functioning of the respiratory system (Abramovskikh, 2007; Klimova, 2005).

External respiration, which carries out gas exchange between the external environment and the blood of the pulmonary capillaries, undergoes significant changes in the process of age development due to the growth and formation of the bronchopulmonary apparatus (Gubareva, 2005; Klimova, 2005).

Despite numerous studies on the problems of studying the adaptive systems of modern children, however, a number of issues have not been discussed, or have not been considered comprehensively, in a narrow range of ontogeny.

In recent years, most of the works of modern researchers are devoted to the physical development of children and adolescents (Maturazova, 2008), and the results of complex functional studies are much less presented. Therefore, research in this direction requires the development of sufficiently deep research.

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