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CHARACTERISTICS OF SOMATIC DEVELOPMENT OF ATHLETES AND NON-ATHLETIC GIRLS RESIDING IN THE ARAL REGION

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Annotation. This article provides information on the features of somatic development and body constitutions of female athletes and non-athletes aged 18-21 living in the Aral Sea region.

Keywords: physical development, sports, adaptive capabilities, morphofunctional indicator, extreme zone, somatometric indicator.

Introduction. In our republic, in recent years, special attention has been paid to the development of comprehensive measures to study the influence of the level of motor activity on the physical development and vegetative indicators of athlete students and the implementation of the achieved positive results into practice. In this regard, certain results are being achieved in the Aral Sea region of our country regarding the adaptation of student-athletes' bodies to the influence of unfavorable environmental factors and the improvement of physical development indicators. In recent years, scientific research has been conducted worldwide to assess the adaptive capabilities of individual development, the level of functional motor activity, and the morphofunctional indicators of the body of a person regularly engaged in sports under sharply changing natural and climatic conditions. In this regard, great attention is paid to determining the functional indicators of the body depending on various climatic conditions and functional states, scientifically substantiating the positive effects of physical exercises on the characteristics of adaptation to unfavorable climatic conditions, adapting to the influence of unfavorable environmental factors in extreme regions, and developing measures to improve physical development indicators.

Purpose of the research. It consists of determining the somatometric indicators of female athletes and non-athletes living in extreme environmental conditions of the Aral Sea region.

The object of the study was athletes and non-athletes aged 18 to 21 years living in the Aral Sea region.

Research methods. The study utilized somatometry and statistical analysis methods.

Main part. The research was conducted in the Aral Sea region. The study was conducted during 2025-2026. The study included 143 healthy non-athletes and athletes aged 18 to 21 years. They were examined in two groups. 65 female athletes were selected for the first group, and 78 non-athletes for the second group.

The group of female athletes regularly participated in team sports such as handball and basketball. Team sports hold a leading position in terms of popularity among our people. Training and competitive activity in team sports require the performance of large-scale speed-strength loads and the high-level development of general speed and endurance. Loads applied in the sports training regimen should only lead to changes corresponding to the stage of increasing the body's non-specific endurance [1].

The distribution of the examined individuals by age groups is presented in Table 1.

Table 1

Distribution of examined individuals by age group (n=143)

Age	Sportswomen	Non-sports girls

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18	16	18
19	17	22
20	16	20
21	16	18
Total	**n=65**	**n=78**
	n=143	

The study of the functional characteristics of the subjects was conducted using a set of traditional methods. By the somatometric calculation method, the total body dimensions—height, body mass, and chest circumference—were determined.

Height measurement was performed in a standing position using a medical height gauge with an accuracy of up to 0.5 cm. Body weight was measured on special medical lever scales with an accuracy of up to 50 g. In a standing position, chest circumference was measured by resting breathing (measurements were performed with a plastic tape with an accuracy of up to 1 mm).

Somatotyping was performed using an anthropometric method based on the calculation of the Pine index in accordance with the classification of M.V. Chernorutsky. (Chernorutsky et al., 1979). This method involves identifying three physical body structures of the organism: asthenic (index 20 or higher), normostenic (index from 10 to 20), and hyperstenic (index below 10).

The moderate course of metabolic processes in living organisms determines the characteristics of physical development. At different ages, the rate of changes in lifestyle significantly differs in the growth of the organism and body parts. It has been proven that somatometric indicators depend on genetic capabilities (more than 80%), living conditions, and the biological status of the individual (20%) [2,3].

The presented data on the body structure of athletes will help in the correct choice of sport, as well as in the selection of specific exercises to eliminate deficiencies in body proportions and individualize sports training. In the process of studying the typological characteristics of the physical development and functional state of female athletes, it was established that the frequency of various body constitution types differs significantly among all female athletes, as well as among female students who do not engage in sports (Tables 2-3).

Table 2.

Physical constitution indicators of female athletes (n=65)

№	Age	Quantity	Type of body type (%)		
			Asthenic	normostenic	hypersthenic
1	18	16	43,5	48,2	8,3
2	19	17	42,2	52,0	5,8
3	20	16	48,0	46,5	5,5
4	21	16	47,0	48,4	4,6
	Total	**65**	**45,15**	**42,8**	**6,05**

Analysis of the data presented in the table showed that 45.15% of female athletes have an asthenic body structure, 42.8% of female athletes have a normostenic body structure, and

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6.05% of female athletes have a hyperstenic body structure. It should be noted that the body parameters of 20–21-year-old female athletes with an asthenic physique were relatively similar, amounting to 48.0% and 47.0%, respectively. The maximum normostenic body strength indicator was 52.0% in 19-year-old female students and an average of 46.5% in 20-year-old female students. Among hypersthenics, the highest indicator was observed in 18-year-old female student-athletes (8.3%). Other age groups ranged from 4.6% to 5.8% ($p<0.01$).

Table 3.

Body constitution indicators of girls not involved in sports (n=78)

№	Age	Quantity	Type of body type (%)		
			Asthenic	normostenic	hypersthenic
1	18	18	55,6	38,0	6,4
2	19	22	54,8	36,5	8,7
3	20	20	53,5	42,0	4,5
4	21	18	45,0	44,2	10,8
	Total	**78**	**52,2**	**40,2**	**7,6**

As seen from the analysis of body composition results in girls who do not engage in sports, female students aged 18–19–20 had an asthenic body type (55.6%, 54.8%, and 53.5%, respectively), while female students aged 20–21 had a normostenic body type (42.0%, and 44.2%, respectively). It can be noted that 21-year-old girls who do not engage in sports have similar indicators of asthenic body structure (45.0% respectively). The maximum indicator of normostenic body structure was found in 21-year-old female students (44.2%), while 20-year-old students had a relatively low indicator of 42.0%. The highest indicator among hyperstenics was found among older girls in the field of humanities education at age 21 (10.8%), while in other age groups it ranged from 4.5% to 8.7%.

Regarding age dynamics, it was established that the growth rate of female athletes is generally higher than the growth rate of those who do not engage in sports, and it was established that those who do not engage in sports consistently lag significantly behind the growth rate.

Thus, summarizing the above data, we note that the transition from one functional state to another during the implementation of the organism's adaptive reactions allows for the conclusion that this occurs as a result of changes in the level of functional activity of life support systems.

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