

# Comparative Characteristics of Anthropometric Indicators of Swimmers

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**Abstract:** In such a sport as swimming, morphological features have a great influence on the giftedness and prospects of athletes, as well as record achievements, thereby causing different adaptation to various conditions of activity, which together affects the selection of the most talented athletes. Anthropometric data directly affect success in competitive activity, because physical qualities are directly proportional to physical performance. In this regard, the sports selection of promising athletes is a set of measures to identify talented athletes with a high level of abilities that meet the requirements of the specifics of this sport.

**Key words:** choice of sport, sports cycling, athletics, swimming, junior and cadet athletes, assessment of physical development, anthropometric research.

**Relevance.** In the modern world, sports activities will enable healthy children to develop the adaptive abilities of their body in extreme circumstances under high physical and psycho-emotional stress. And that factor, which can be corrected in a timely manner, which limited the ability to work, endurance of an athlete and remained unnoticed, may in the future be the key mechanism for ending the career of a young athlete much earlier than the noted genetic period. Today's professional sport will give a real opportunity to a healthy young athlete to develop the adaptive capacity of the body in circumstances of extreme conditions of activity, mainly under significant physical and psycho-emotional stress [3, 5, 9, 12, 14, and 15]. Precise identification of those factors that limit the physical activity of a junior and cadet athlete and timely elimination of certain factors, as well as adequate use of corrective means for these factors, will help achieve significant results in sports activities and, in turn, help maintain the health of junior and cadet athletes. Obtaining comprehensive data on the anthropometric characteristics of cadet and junior athletes is necessary to assess the quality of general health. Determining the level of physical development based on the results of anthropometry should serve as the basis for a systematic approach in the preventive direction of the work of medical institutions, with a focus on a particular individual, taking into account his physical development and the characteristics of the metabolic processes of the body, as well as, in general, for the population during adolescence. According to a number of authors, at the initial stages of sports training, it is not always possible to select the contingent that corresponds to a particular sport. At the same time, in modern sports, the method of early specialization is widespread, which does not always take into account the anatomical and physiological characteristics, the level of preparedness and physical development of the child [1,2,4,6, 7, 8, 10,11,13].

**Purpose of the study.** Analysis of the success of junior and cadet athletes, increasing the efficiency of the selection system based on the assessment of physical development by the method of anthropometric studies.

**Materials and research methods.** To study the physical development of the examined groups in our work, various anthropometric indicators were used, methods for measuring length, body weight, chest circumference, girth measurements of body parts, followed by the calculation of the Quetelet, Erisman, Livy and Manouvria indices. The data obtained were compared both with regional indicators and with international standards recommended by the World Health Organization (WHO). All measurements were carried out on naked athletes in the first half of the day with verified instruments in natural light. Standing height or body length was measured with a vertical stadiometer. In this case, the subject was placed in such a way that the body was free, without touching the vertical bar. A movable perpendicular bar is placed freely on top of the head. The data obtained are indicated in centimeters (cm). Individual indicators for each adolescent studied were compared with standard values for the age and sex group. Body weight was determined using floor electronics in kilograms (kg).

**Results of research and discussion.** To facilitate the statistical and mathematical processing of the data obtained and the calculation of the results, each of the subjects was divided into groups by age (cadets and juniors). As a result of the anthropometric measurements and the calculation of indices, the level of physical and anthropometric (table 1 - 6) indicators in the studied groups aged 12-17 years was revealed. Measurements of anthropometric indicators were carried out once in 2019.

**Table 1.** The results of anthropometric indicators of athletes, swimmers cadets and juniors M $\pm$ m

Index	cadets (12-14 years old), n=70	juniors (15-17 years old), n=37
Height, cm	153 $\pm$ 3,1	165 $\pm$ 1,7
Weight, kg	46 $\pm$ 3,3	65 $\pm$ 3,8
Body mass index	19,7 $\pm$ 2,9	23,6 $\pm$ 2,3

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Table 2. The results of anthropometric indicators on the indices of athletes, swimmers, cadets and juniors,  $M \pm m$

Index	cadets (12-14 years old), n=70	juniors (15-17 years old), n=37
Ketle index	19,7±2,9	23,6±2,3
Erisman index	2,0±0,6	2,7±1,4
Manuvria index	87±1,3	90±1,8

According to the studies of the anthropometric indicators of cadets and juniors of both sexes of swimmers (Tables 1, 2), one can judge the harmony of development by a number of indicators, so according to the calculations of the Ketle indices in both groups, the study of BMI corresponds to the standard indicators, according to the Erisman index, juniors of both sexes observed normal values of indicators of chest development in comparison with cadets. According to the Manuvria index, juniors have mesoskele, while in the group of cadets this indicator characterizes microskelia.

Table 3. The results of anthropometric indicators of male athletes swimmers,  $M \pm m$

Index	cadets (12-14 years old), n=59	juniors (15-17 years old), n=25
Height, cm	154±2,3	167±1,1
Weight, kg	48±2,2	65±3,8
Body mass index	20,2±3,1	23,3±2,9

As can be seen from Tables 3 and 5, the indicators of anthropometric measurements according to the Ketle index in cadets in both groups correspond to the standard values of BMI according to WHO. According to the Erisman index, cadet and junior athletes have normal indicators of chest development. When determining the length of the legs according to the Manuvria index in cadets-swimmers, this indicator corresponds to microskelia, while in juniors macroskelia is observed.

Table 4. The results of anthropometric indicators of female athletes swimmers,  $M \pm m$

Index	cadets (12-14 years old), n=11	juniors (15-17 years old), n=12
Height, cm	152±3,8	163±2,4
Weight, kg	44±4,5	64±2,5
Body mass index	19,3±2,8	21,3±3,1

The data obtained as a result of calculating the Ketle index for cadet swimmers does not correspond to the standard BMI values (Table 4, 6) and is defined as a body weight deficit, while for junior swimmers this indicator corresponds to normal values. According to the Erisman index in swimmers of adolescence, this indicator indicates a narrow chest, in juniors, normal indicators of chest development are observed. The Manuvria index in both groups indicates microskelium.

Table 5. The results of anthropometric indicators on the indices of male swimmers,  $M \pm m$

Index	cadets (12-14 years old), n=59	juniors (15-17 years old), n=25
Ketle index	20,2±3,1	23,3±2,9
Erisman index	2,2±2,4	3,2±1,7
Manuvria index	88±2,5	91±1,4

Table 6. The results of anthropometric indicators on the indices of female swimmers,  $M \pm m$

Index	cadets (12-14 years old), n=11	juniors (15-17 years old), n=12
Ketle index	19,3±2,8	21,3±3,1
Erisman index	1,8±1,4	2,2±2,1
Manuvria index	87±3,5	89±2,3

**Conclusion.** Thus, according to the obtained data of anthropometric measurements and calculations of the Ketle, Erisman and Manuvriy indices, we assessed the physical development of the studied groups. In the groups of male cadet and junior swimmers, the Ketle and Erisman indices correspond to normal values, while in cadet swimmers these indicators determine the body weight deficit and narrow chest. According to the Manuvria index, the length of the legs in both groups of males is noted as medium, and in swimmers - short.

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