



Component composition of the body of armrestlers of various level of preparedness

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Abstract

Objective of the study was to identify the features of the somatotype of athletes - armwrestlers of various qualifications.

Methods and structure of the study. The experiment was carried out during the preparation of athletes for the All-Russian competitions in arm wrestling among students at the Belgorod State National Research University. The study involved 30 athletes of various qualifications involved in arm wrestling. Respondents were conditionally divided into two groups: qualified athletes with the category of Candidate Master of Sports (CMS) and above ($n=15$), and athletes of mass categories and without categories ($n=15$). Fat mass, percentage of fat mass relative to total weight, percentage of active cell mass and skeletal muscle mass relative to lean mass, as well as the somatotype of athletes were determined. To determine the somatotype, a 7-point Sheldon rating scale was used.

Results and conclusions. As a result of the study of the somatotypes of athletes involved in arm wrestling at the level of mass sports categories, the dominant type of mesomorphy was revealed. The most preferred body type for the effectiveness of the competitive activity of qualified armwrestlers of medium and heavy weight categories (80 kg and more) is endomesomorphic. Athletes with a wide range of relative values of body fat mass can demonstrate high sports achievements in arm wrestling.

Keywords: arm wrestling, bioimpedance analysis, body composition, somatotype, body fat mass.

Introduction. Body composition, or somatotype, is currently considered an integral criterion of physical development. Its assessment is carried out according to the ratio of the main components (muscle, fat and bone tissue).

A somatotype is a constitutional body type of a person, but it is not only the body itself, but also a program for its future physical development [1].

The size and shape of the body of each person is genetically programmed. This hereditary program is realized in the course of ontogeny, i.e., in the course of successive morphological, physiological, and biochemical transformations of the organism from its inception to the end of life [3].

The physique of a person changes throughout his life, while the somatotype is genetically determined and is his constant characteristic from birth to death. Age-related changes, various diseases,

increased physical activity change the size, shape of the body, but not the somatotype.

M. Dopsai and co-authors, studying elite athletes, came to the conclusion that body composition is one of the main predictors of the success of competitive activity. The authors confirmed that the bioimpedance method has a great informative significance and reliability [2].

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Methods and structure of the study. The experiment was carried out during the preparation of athletes for the All-Russian competitions in arm wrestling among students at the Belgorod State National Research University (Belgorod). It was attended by 30 athletes of various qualifications engaged in arm wrestling. Of these, one Honored Master of Sports of

*The results of the study of somatotype and body fat mass in highly qualified athletes*

Name	Body weight, kg	Fat mass, %	ENDO	MESO	ECTO	Somatotype	Rank
Timur M.	93	23,2	4,74	7	0,66	Endo-mesomorphic	Honored Master of Sports
David Sh.	113	14,3	3,87	9,53	0,10	Endo-mesomorphic	Master of Sports
Maxim P.	112	25,6	5,17	7,17	0,33	Endo-mesomorphic	Master of Sports
Michael B.	87	18,4	2,88	5,05	2,31	Endo-mesomorphic	Master of Sports
Michael V.	85	14,2	3,12	6,86	1,11	Endo-mesomorphic	Master of Sports
Michael K.	90	13,4	2,50	6,12	1,64	Endo-mesomorphic	Master of Sports
Nikita M.	92	17,4	5,34	10,27	0,10	Endo-mesomorphic	Master of Sports
Rustam A.	80	15,5	3,93	7,77	0,64	Endo-mesomorphic	Master of Sports

Russia, eight Masters of Sports, six candidates for the Master of Sports, 11 athletes of I-III categories, four without a category. Respondents were conditionally divided into two groups: qualified athletes with CCM category and above ($n=15$), and athletes of mass categories and without categories ($n=15$).

The study was performed using a bioimpedancemeter MEDASS ABC-02. The fat mass, the percentage of fat mass relative to the total weight, as well as the somatotype of the athletes were determined. To determine the somatotype, a seven-point Sheldon rating scale was used.

Results of the study and their discussion.

Visualization of the data obtained in the study of somatotypes of armwrestlers of mass sports categories and athletes without categories is presented in the form of a two-dimensional model of Sheldon's triangle in fig. one.

Athletes are in the upper part of the Sheldon's triangle, which indicates the dominant type of mesomorphy. Three respondents are outside the Sheldon's triangle, this is due to the fact that these athletes have an endomorphic indicator much higher than an ectomorphic indicator. Twelve athletes are within the triangle, as the obtained indicators are within the limits of the classification chosen for the study. The indicators of athletes are located in relative proximity, this fact indicates a slight variation in the data obtained.

Visualization of the data obtained in the study of somatotypes of arm wrestlers of a high level of preparedness is presented in the form of a two-dimensional model of Sheldon's triangle in fig. 2.

Athletes are at the top of the Sheldon's triangle, indicating a dominant mesomorphic score. Seven subjects are outside the triangle, which indicates

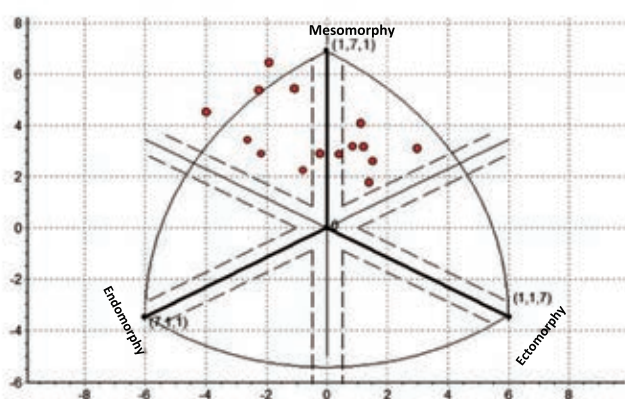


Figure 1. Graphical distribution of armwrestlers of mass discharges in Sheldon's triangle

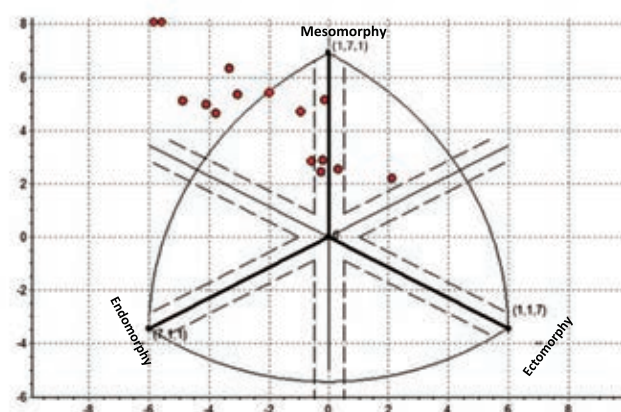


Figure 2. Graphical distribution of qualified athletes - arm wrestlers in the Sheldon triangle



a strong excess of the norm in terms of endo and mesomorphy.

Let us dwell in more detail on the results of measuring the somatotype of qualified armwrestlers (masters of sports of Russia and above, $n=8$). It was found that all examined highly qualified athletes had an endo-mesomorphic somatotype. At the same time, all respondents belonged to medium and heavy weight categories - 80 kg and above. A wide range of indicators of the proportion of body fat mass was revealed. The percentage indicators of the fat mass of armwrestlers vary according to the specifics of the weight categories in which the athletes perform (see table).

Conclusions. As a result of the study of the somatypes of athletes involved in arm wrestling at the level of mass sports categories, the dominant type of mesomorphy was revealed. The most preferred body type for the effectiveness of the competitive activity of qualified armwrestlers of medium and heavy weight categories (80 kg and more) is endo-mesomorphic. Athletes with a wide range of relative values of body fat mass can demonstrate high sports achievements in arm wrestling.

References

1. Batotsyrenova T.E., Blokhin M.M., Gavrilova K.A. et al. Analiz sostava tela studentov instituta fizicheskoy kultury i sporta po dannym bioimpedansometrii [Analysis of the body composition of students of the Institute of Physical Culture and Sports according to bioimpedancemetry data]. Proceedings national research-practical conference, Vladimir, December 4, 2020. Vladimir: Vladimir State University publ., 2020. pp.18-25.
2. Dopsai M., Markovich M., Kasum G. et al. Diskriminaciya razlichnyh pokazatelej struktury tela sportsmenov vysokogo urovnya v sportivnyh edinoborstvah, izmerennaya metodom mnogochastotnogo bioimpedansa [Discrimination of various indicators of the body structure of high-level athletes in martial arts, measured by the method of multi-frequency bioimpedance]. Mezhdunarodnyj zhurnal morfologii. 2017. pp.199-207.
3. Nikolaev D.V., Shchelykalina S.P. Lekcii po bioimpedansnomu sostavu tela cheloveka [Lectures on the bioimpedance composition of the human body]. Moscow: RIO TSNIIOIZ of the Ministry of Health of the Russian Federation publ., 2016. 152 p.