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Dynamic Studies of Body Weight Components

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Summary
Dynamic studies of body mass components have been carried out by many scientists in various fields. In sports medicine, the determination of the compositional composition of the body of athletes is a method of monitoring the physical performance of athletes; it allows you to effectively manage their training process. The interrelation of body composition with indicators of physical performance of a person, with its adaptation to environmental conditions, as well as with professional and sports activities has been proved.

Keywords: sports medicine, determination of the human body composition, the relationship of body composition, athletes.

Relevance. One of the medical and biological problems is the problem of sports choice, the development of which determines the level of sports achievements and sports science in general [22]. It is important for athletes to study body composition. In sports medicine, the study of body composition is a method of monitoring physical activity indicators, which allows you to monitor the health of athletes, effectively manage the training process, and also control dietary interventions [1]. The study of the age composition of the body revealed the peculiarities of changes in the labile component of the body weight of young athletes at different ages. The dynamics of changes in the components of body weight is mainly reflected in the age of hormonal formation and the processes of growth and development under the influence of sports. [23]

However, when forming the above goals in sports, it is necessary to take into account age and qualification differences, the peculiarities of sports, model characteristics, the relationship with physical qualities and functional indicators [1, 3, 4, and 27].

Dynamic studies of body mass components have been carried out by many scientists in various fields. It is known that the composition of the body changes under the influence of the different composition of proteins, fats and carbohydrates in the diet [5]. An increase in the level of fat mass is observed with an increase in the proportion of the carbohydrate-fat combination in the diet; however, when the amount of fat and carbohydrate-containing foods is limited, adverse changes in the body composition

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are noted [25]. The use of various pharmacological drugs also affects body composition: the use of anabolic drugs increases muscle mass, improves performance and endurance [27]. The study of the age composition of the body of young and cadet athletes revealed the variable properties of the labile components of body weight at different ages.

The dynamics of changes in body mass components mainly reflects the processes of growth and development under the influence of age-related hormonal levels and sports. In the prepubertal period, there is a gradual and insignificant increase in muscle mass and fat layer. During puberty, boys experience a significant increase in muscle mass, as well as a decrease in adipose tissue and an increase in girls. The postpubertal period largely reflects physical maturation with muscle growth and a decrease in adipose tissue components [21]. Direct correlations with indicators of body composition and levels of physical activity have been established [27]. Intense physical activity leads to a decrease in fat content and an increase in active body weight [7,26]. Significant improvements in body composition, especially leanness, have been found when exercising for nine hours or more per week, which is important for healthy growth and fitness for athletes [8].

The values of body mass components confirmed that they are associated with the manifestation of various physical indicators and the development of functional systems of the body: strength, speed and flexibility are associated with certain aspects of training and, as an integral indicator, with specific physical activity and direct or indirect sports results. It has been shown that the development of muscle mass connects the energy supply of muscle activity by different systems: aerobic and anaerobic performance [3]. Several studies have shown the crucial role of muscle mass in shaping the response of the cardiovascular system to physical activity.

The specificity of body mass component values is also determined by the sports and skills chosen by the athletes. High ranking athletes have higher levels of muscle tissue and lower levels of fat mass than less qualified athletes.

Currently, the requirements for athletes are increasing, they must meet morphologically complex criteria, deviate their physical data from general morphological norms and rely on more specialized methods in exercises to ensure optimal implementation of the biomechanical stereotype of sports. One of the current challenges for athletes is maintaining optimal body weight, which forces athletes, especially in heavy weight sports, to use extreme methods to reduce or keep body weight low. Maintaining a low body weight or short-term rapid weight loss can lead to serious health problems. All this becomes a common problem for many sports [9, 10].

Each sport forms a unique morphological model of athletes, the observance of which is a key advantage for success and longevity in sports. If there is an imbalance in the morphological model with high motivation of the athlete, this condition requires additional compensatory actions, which, in turn, reduces the chances of high results and longevity in sports, also poses a health risk and

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requires strict control over the adaptation of the athlete's body to exercise. does [21].

An important step in maintaining the health and performance of athletes was the change in the rules and possibilities for determining the body composition of athletes, which today are more accurate and reliable [1]. In sports medicine, it is important to control the water balance in the body of athletes, because even mild dehydration can lead to serious negative consequences in the body. Studies have shown that in order to prevent weight loss in athletes before the start of the competition, it is necessary to check the total water intake by the body, the volume of intracellular fluid when correcting body weight [8, 12].

One of the important factors in sports is the calculation of fat mass, which serves as a metabolically active organ, the level of which plays an important role in maintaining overall health [6]. Knowing the number and distribution of bones and muscles can be just as important in determining an athlete's ability. During the competition, it is undesirable to reduce fat mass to 5-6%, and muscle and bone tissue to 46%, which often indicates a strong fatigue of athletes [25]. Active physical activity is accompanied by the loss of trace elements, primarily sodium and potassium, with sweat, which negatively affects the functional state of the cardiovascular system and the properties of the neuromuscular regulator.

Over the past century, many methods have been proposed for determining the composition of the human body, and today modern approaches make it possible to study this indicator at all levels of the biological system - elementary, molecular, cellular, tissue and organ as a whole [25, 27]. However, they all have their drawbacks, and at present there is no "gold standard" or generally accepted criteria for determining body composition [14]. All the technical means used are divided into the following categories: simple method, laboratory tests and reference methods.

Simple methods include anthropometry, bioimpedance, and body mass index. Laboratory research methods include densitometry, hydrometry, ultrasound, three-dimensional scanning, two-energy symmetry of X-ray absorption, as well as standard methods of multicomponent models, computed tomography, and magnetic resonance imaging [1].

Anthropometric, caliperometric methods for determining physique in sports and medical practice have shown their effectiveness. It is one of the cheapest, simplest and most portable methods for determining body composition. However, anthropometric measurements require highly qualified examiners and strict adherence to the test protocol [1,23,24,25]. Among the simplest methods for studying body composition, a certain place is occupied by body mass indices. Unfortunately, the use of Purchased Weight Indices does not provide reliable information on body composition at the individual level. This method is a less informative method for determining fat mass in people whose activities are associated with physical labor or regular exercise, as well as exercises associated with an increase in muscle mass [19, 20].

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Bioelectric methods are also used to assess body water content, one such method is called bioimpedance measurement, which is widely used in surgical and desired conditions, as well as in clinical and outpatient practice. Bioimpedance analysis is based on significant differences in the electrical conductivity of adipose tissue and lean body mass. This method is distinguished by optimal accuracy, portability, relatively low cost of equipment and verification, simplicity of the research method, and the possibility of automatic data processing [15]. The disadvantages of this method are the lack of uniform standards for equipment and measurement methods, which makes it difficult to compare and analyze the results. The advantage of individual models of this method is that it is possible to simultaneously evaluate clinically important parameters, such as active cell mass and basal metabolism, as well as to study not only integral, but also local parameters of body composition [15, 16, and 26].

An example of a body composition test method based on body density is plethysmography, in which body density is measured in a sealed chamber filled with normal air. An alternative method for determining body density is hydrostatic densitometry. For this, body weight is measured in water and under normal conditions. This method, which requires the body to be completely submerged in water to measure body weight, reduces its applicability in children, as well as the elderly and the sick. In general, hydrostatic densitometry and air plethysmography are technical difficulties and must be performed in a hospital setting. It is also difficult to obtain accurate and complete information with these methods due to individual differences. Another way to determine body composition using body models is to estimate the total amount of water in the body.

The standard method for measuring body water is isotope mixing using tritium and deuterium. Unlike hydrostatic densitometry and air plethysmography, this method is very easy to use and can be used in any conditions, but the analysis is sent to the laboratory and tested there for several days. In addition, another disadvantage of this method is associated with the impact of low levels of radiation (in the case of tritium) on the body and the high cost of testing (when using N2 18O). Another limitation of this study is the assumption that the main source of deviation from the slightly clear figure is the relative amount of water in body weight. Therefore, the use of this method is not recommended for people with suspected hydration problems.

Ultrasound is one of the most accurate methods of detecting fat, muscle and other tissue in body composition studies today. Portable ultrasonic devices allow measurements in any conditions [1, 18].

Another of the most common methods for diagnosing body composition is the dual-energy X-ray absorbiometry method. Initially, this method was successfully used in medical practice for the diagnosis of osteopenia and osteoporosis. Currently, in addition to assessing mineral density and bone mineral mass, dual energy X-ray absorbiometry is used to measure body fat and fat-free mass. The method of dual energy X-ray absorbiometry allows examining both the peripheral and axial

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parts of the skeleton. The installed program automatically corrects the measurement results taking into account the density of soft tissues. This method is minimally invasive, relatively inexpensive and does not require active patient participation. Analysis of neutron activation of the results of the dual-energy X-ray absorbiometry method, comparison with hydrostatic densitometry methods showed the possibility of a fairly accurate assessment of fat and fat-free body mass. Based on this, the method of dual-energy X-ray absorbiometry is used as information to check the prediction formulas based on body mass indices, as well as calipometry and bioimpedance measurements [25, 26].

Determining the total amount of protein in the body is carried out by determining the amount of nitrogen using neutron activation analysis, which is only available in a few laboratories around the world. When using this four-component model, the body protein / body weight ratio should be constant, but either when observing short-term changes in body fat under the influence of physical activity, or when changing the diet, changes in cell and protein mass in the body can lead to deviations. , Different models have special specifications. For example, a two-component body composition model is not suitable for tracking changes in individual body composition due to significant changes in body weight and density, but excludes initial diagnosis and evaluation of the effectiveness of treatment for overt obesity or obesity. This model can be used to describe group averages. The three-component model can be used to characterize a healthy population of adults and adolescents, which may slightly improve the accuracy of body fat measurements, whereas in patients with fluid imbalance or mineral changes in body volume, the three-component models lead to significant percentage errors in the measurement of body fat[25].

Traditional, two-, three-, four-piece and five-level multi-piece models are used. However, component models for assessing body composition (body density, body water, mineral body mass, total body protein, cell mass) are time consuming to measure parameters, as well as to use expensive and specialized technologies.

One of the reference methods for determining body composition at the tissue level is magnetic resonance imaging and computed tomography. X-ray computed tomography allows you to separately monitor the amount of subcutaneous and internal fat, as well as the mass of skeletal muscles and internal organs. Magnetic resonance imaging can be used as a reference method for determining skeletal muscle mass, similar to computed tomography. The advantage of the methods is their high accuracy. Disadvantages are the high cost of the test, the use of a source of radioactive radiation, the lack of regulatory criteria, and the need to apply the method under stationary conditions [1].

Conclusions. Thus, in many respects, the choice of a method for determining the composition of the body depends on the purpose of the study and the availability of technology. Undoubtedly, when

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conducting population studies and on an outpatient basis of sports medicine, preference is given to relatively simple, portable and inexpensive methods - anthropometry, calipometry and bioimpedance analysis. The requirement for high accuracy of this method is of great importance in scientific and clinical research. Of course, the introduction of new technologies and research methods can improve the reliability and efficiency of body composition assessment. However, as already noted, the value of new methods, as well as the standardization of methods for their practical application, also requires the development of normative normative indicators.

Bibliography:

1. Berthelot G, Len S, Hellard P. et al. Exponential growth combined with exponential decline explains lifetime performance evolution in individual and human species. Age. 2012. – 34. - P. 1001–1009.
2. Vimaleswaran, Karani S., et al. "Candidate genes for obesity-susceptibility show enriched association within a large genome-wide association study for BMI." Human molecular genetics (2012): dds283.
3. Vanden, Heuvel JP. "Nutrigenomics and nutrigenetics of ω3 polyunsaturated fatty acids." Progress in molecular biology and translational science108 (2011): 75-112.
4. Fenech, Michael, et al. "Nutrigenetics and nutrigenomics: viewpoints on the current status and applications in nutrition research and practice." Journal of nutrigenetics and nutrigenomics 4.2 (2011): 69-89.
5. Weggemans, R. M., et al. "Genetic polymorphisms and lipid response to dietary changes in humans." European journal of clinical investigation 31.11 (2001): 950-957.
6. Djordjevic, Natasa, et al. "Induction of CYP1A2 by heavy coffee consumption is associated with the CYP1A2−163C> A polymorphism." European journal of clinical pharmacology66.7 (2010): 697-703.
7. Rasulovna R. M. Method for Assessing Body Composition and Neurophysiological Characteristics of Junior Athletes and Cadets, Taking into Account the Polymorphism of Genes Responsible for Metabolizim //Central Asian Journal of Medical and Natural Science. – 2021. – С. 131-136.
8. Rakhmatova M.R., Jalolova V.Z., Methods of research of body composition in athletes// Электронный научный журнал «Биология и интегративная медицина» №4 – июль-август (44) 2020– С.16-29
9. Rasulovna R. M. Sports Genetics is the Key to High Achievements of Athletes //INTERNATIONAL JOURNAL OF HEALTH SYSTEMS AND MEDICAL SCIENCES. –

PUBLISHED UNDER AN EXCLUSIVE LICENSE BY OPEN ACCESS JOURNALS

Volume: 2 Issue: 11 | Nov – 2023 **ISSN: 2720-6866**
http://journals.academiczone.net/index.php/rjtds

2023. – Т. 2. – №. 1. – С. 23-30.

10. Rasulovna R. M. The Role of ADRB2, ADBR3 Genes Polymorphism in the Development of Age-Dependent Adaptability, Movement Speed, Speed-Strength Qualities in Junior and Cadet Athletes //Scholastic: Journal of Natural and Medical Education. – 2023. – Т. 2. – №. 1. – С. 147-152.
11. Рахматова М. Р. Жалолова В. З. Methods of research of body composition in athlete's //биология и интегративная медицина. – 2020. – №. 4. – с. 16-28.
12. Гладков В. Н. Некоторые особенности заболеваний, травм, перенапряжений и их профилактика в спорте высших достижений / В. Н. Гладков. – М. Сов. спорт, 2007. – 386 с.
13. Граевская Н. Д. Спортивная медицина: курс лекций и практические занятия / Н. Д. Граевская, Т. И. Довлатова. – М. Сов. спорт, 2005. – 299 с.
14. Гурьянов М. С. Состояние здоровья и пути совершенствования медицинского обеспечения детско-юношеских спортивных школ : автореф. дис. канд. мед. наук / М. С. Гурьянов. – Казань, 2002. – 22 с.
15. Деревоедов В. В. Профессиональные заболевания в спорте высших достижений / В. В. Деревоедов. – М. ЛФК и массаж, спортивная медицина. – 2008. – №8 (56). – С. 3–6.
16. Клейн К. В. Проблемы возрастных норм допуска к занятиям спортом детей и подростков / К. В. Клейн, И. В. Николаева, А. В. Люлюшин // Материалы I Всероссийского конгресса «Медицина для спорта». – М. 2011. – С. 196–198.
17. Комолятова В. Н. Электрокардиографические особенности у юных элитных спортсменов / В. Н. Комо-лятова, Л. М. Макаров, В. О. Колосов, И. И. Киселева, Н. Н. Федина// Педиатрия. – 2013. – Т. 92, № 3. –С. 136–140.
18. Курникова М. В. Состояние морфофункционального статуса высококвалифицированных спортсменов подросткового возраста : автореф. дис. канд. мед. наук / М. В. Курникова. – М., 2009. – 22 с.
19. Мавлянов З.И., Жалолова В.З., Рахматова М.Р., Юлдашева Н.М. Характеристика компонентного состава гена FABP2 у юных спортсменов занимающихся различными видами спорта // Тиббиётда янги кун. – 2019. - № 4. – С. 35-42
20. Мавлянов З.И. Особенности соматотипа спортсмена и его взаимосвязь со спортивными генами. Дисс. Раб. на соиск. Учен. Степ. PhD. – 2018. – С. 18
21. Мавлянов З.И., Жалолова В.З., Рахматова М.Р., Анализ антропометрических показатели физического развития у юниоров и кадетов в спортивной медицине // Тиббиётда янги кун

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Volume: 2 Issue: 11 | Nov – 2023 **ISSN: 2720-6866**
http://journals.academiczone.net/index.php/rjtds

– 2020. - № 2(30/2). – С. 38-42

22. Мирошникова Ю. В. Медико-биологическое в обеспечение детско-юношеском спорте в Российской Федерации (концепция) / Ю. В. Мирошниченко, А. С. Самойлов, С. О. Ключникова, И. Т. Выходец // Педиатрия. – 2013. – Т. 92, № 1. – С. 143–149.
23. Михалюк Е. Л. Современные взгляды на диагностику метаболической кардиомиопатии вследствии хронического физического перенапряжения организма спортсменов / Е. Л. Михалюк, В. В. Сывовол // Спортивная медицина. – 2014. – № 1. – С. 3–12.
24. Ніколаєв С. Ю. Оздоровча спрямованість засобів атлетичної гімнастики для юнаків старшого шкільного віку / С. Ю. Ніколаєв // Молодіжний науковий вісник. – 2013. – № 9. – С. 85–88.
25. Платонов В. Н. Система подготовки спортсменов в олимпийском спорте. Общая теория и практические приложения// В. Н. Платонов. – Киев : Олимп. лит., 2004. – 808 с.
26. Расуловна, Р. М. (2022) “Нейрофизиологический Статус Спортсменов Юниоров И Кадетов Занимающихся Легкой Атлетикой И Велоспортом”, *Miasto Przyszłości*, 25, pp. 217–220.
27. Рахматова М.Р., Жалолова В.З. Юниор ва кадет спортсменларда тананинг компазицион таркибини ўрганиш.// Тиббиётда янги кун. - № 2 (30/2). - В. 67-
28. Рахматова М. Р., Собирова Г. Н. Спортчиларда Генлар Полиморфизминиг Ёшга Боғлиқ Мослашувчанлик, Ҳаракат Тезлиги, Тезлик-Куч Сифатлари Ривожланишидаги Аҳамияти //Miasto Przyszłości. – 2023. – Т. 36. – С. 266-271.

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