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DEFINITION OF THE ANATOMICAL NORM OF HUMAN BUILDING

Summary. *In this paper, we outline the basic concepts of the anatomical norm, the existing differences in each organ, the body system and the areas of the human body and its dependence on the somatotype. It is also indicated that the anatomical norm is the basis for understanding and constructing a range of individual anatomical variability.*

Key words: *somatotype, anatomical norm, individual anatomical variability.*

Studying individual anatomical variability, it is necessary to correctly orientate in concepts and values of the anatomical norm. According to the teachings of acad. V.M. Shevkunenko and his followers, under the anatomical norm, should be understood as a genetically determined, rationally highly organized structure of the body, its organs, systems and tissues, which provides for normal human activity [1-14]. The anatomical norm is a constantly variable quantity, which is in tune with the constantly changing environmental conditions. In the applied meaning of the anatomical norm, the genetically determined dynamic band of morphological variability of the body, organs, systems and tissues, limited by the extreme forms of variability, within which the normal conditions of human life are provided (Fig. 1), should be considered.

It is known that the human body, its shape and structure of organs and tissues are in direct alignment with their functions and the surrounding biosocial environment. The appearance of new stimuli or factors affects the functioning of the body, individual organs and systems, and this leads to modification changes in morphological structures. Most researchers believe that there are no pure (isolated) functional disorders, but there are microanatomical changes in cellular, molecular, biochemical and other levels of human activity.

Functional-anatomical reliability of the human body is determined by the genetically determined excess and reserve of the biologically active substances of cells, organs and tissues, which makes a certain sense in understanding the anatomical norm.

This most important biological feature of human structure has undergone a complex evolutionary path and natural selection, until a certain individuality and unity of anatomical and functional structures, and their interrelations are developed. This explains the possibility of the human body for a long time to withstand many diseases and to compensate for pathological processes.

It should be noted that a substantial change in the shape, size, mass of organs and tissues of a person over a long period of time may not manifest itself as a violation of his health or any deviations from the anatomical norm. In the mass of any organ is placed compensatory and functional activity on the cellular and subcellular levels, ensuring the livelihoods of each person. Thus, 1/6-1/10 of the renal parenchyma (1/3 of one kidney) fully provides the urinary

tract function of the body, and 1/5 of the parenchyma of the liver copes with its functions and preserves life of the patient. In addition, 1/10 tissue of the adrenal gland and 0,2 % of the glandular tissue of the thyroid gland completely fulfill their hormonal functions. During the life of a person dies 10 % of brain neurons, only 4 % are functioning permanently, the rest constitute a reserve.

In this regard, the stability of the anatomical norm is carried out in the process of dynamic renewal of all tissues, systems and organs of the human body as a result of constant regeneration in accordance with the matrix DNA program.

Our anatomical-physiological ideas about the norm of human structure should be based on the accounting: influence of the form on the function; influence of functions on the form; constant dynamic balance between them; the presence of the strength of the organism or the existence of "reserve stocks"; fundamental stability of the form, which is genetically determined and programmed.

In the light of the above, anatomical norm should be understood as the genetically determined and rationally organized structure and form of the body, its organs, systems and tissues which ensure the normal functioning of human life. In other words, the term "anatomical norm" means the genetic set of morphological features of organs, systems, tissues and body shapes of a person limited by extreme forms of individual variability, within which the conditions for normal adaptation to the habitat, optimal human life and self-preservation of the biological species are provided [1].

Along with this, it is necessary to highlight the concept of anatomical type of physique. It is known that the type of human body entirely depends on the influence of hereditary and individual variability and consists of external contours and proportions, which represent the different mass of the skeleton, organs and connective tissue in each individual. The variability of external signs of a person should be classified on the basis of an evolutionary approach. Recognition of the types of physique should be based on various indices that characterize the structural features of the body.

The main attributes for the selection of types of physique are selected relative torso length, which is measured from the torso of the sternum to the upper edge of the symphysis [16]. Along with this, it is necessary to determine the relative circumference of the chest and the relative width of the

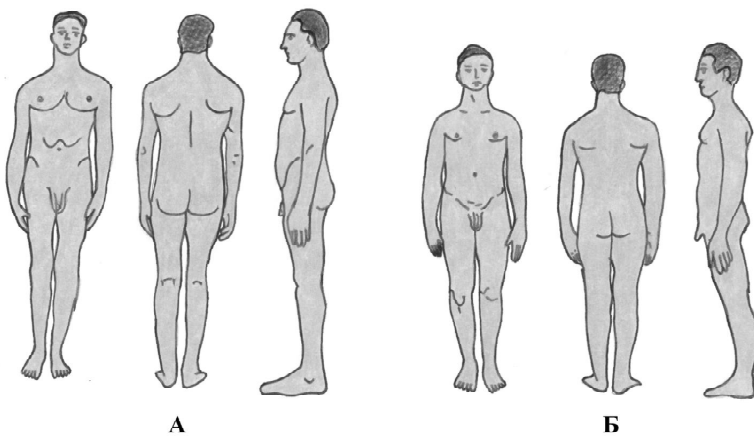


Fig. 1. Appearance of a human body in three projections: A - with dolichomorphic type of physique; Б - with brachymorphic.

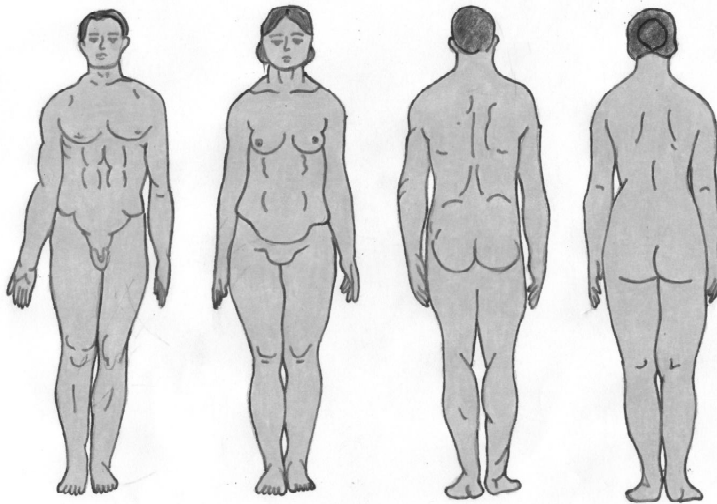


Fig. 2. Appearance of male and female mesomorphic type of physique with average anthropometric and morphometric characteristics.

shoulders, which allows to identify the extreme types of human body [15]. According to these founders, the doctrine of individual anatomical variability, you can give the first description of anatomical types of physique.

Brachymorphic (eurysomen) type is characterized by the following main features: circular form of head, middle or lower than average height, relatively long torso, large circle of chest, broad shoulders, short lower limbs, enlarged pelvic angle, walking by legs, deployed back.

Dolichomorphic (leptosomen) type has the opposite characteristics: long form of head, high or above average height, a relatively short torso, chest circumference small, medium or narrow shoulders, long lower limbs, reduced angle of the pelvis, gait by feet, deployed in advance.

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In the middle of the variational series of variability of proportions of the physique there are representatives of the mesomorphic (medium) type of physique, for which the average anthropometric features of the above extreme types are characteristic (Fig. 2). All variants of the physique, whose features are within the limits of $M \pm \sigma$, are mesomorphic, but have larger or smaller values to one of the extreme types. More precisely, brachymorphic type are people with a relative length of the body, the relative circumference of the chest and the relative length of the width of the shoulders with a greater $M + \sigma$. To dolichomorphic belong people with the above listed parameters less than $M - \sigma$. To this classification are close typological gradations Viola-Pende, Chernorutsky and Krechmer.

In this regard, the brachymorphic type corresponds to hypersthenic - partially picnic, and dolichomorphic type - asthenic - leptosomen. The type of physique is usually judged by somatometric data, that is, the measurement is made between the bone points and characterizes the development of the human skeleton. In addition, it has been observed that with a brachymorphic type there is an earlier occurrence of ossification and the formation of shortening of tubular bones, and with dolichomorphic type, on the contrary, a longer process of ossification and there is an increased growth of tubular bones, which leads to their lengthening.

Conclusions and perspectives of further development

1. The anatomical norm characterizes the existing differences of each organ, system of the organism and areas of the human body, providing the basis for understanding and constructing a range of individual anatomical variability.

2. Anatomical norm is genetically determined and depends on three types of somatotypes: ectodermal, mesodermal and endodermal origin. Accordingly, ecto-, meso- and endomorphs are formed.

3. Out of the extreme forms of the anatomical norm outside the extreme forms are congenital and acquired abnormalities and developmental defects, atavisms and predisposition to various pathological changes and diseases.

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ВИЗНАЧЕННЯ АНАТОМІЧНОЇ НОРМИ БУДОВИ ЛЮДИНИ

Резюме. У даній роботі викладені основні поняття про анатомічну норму, існуючі відмінності кожного органу, системи організму та ділянки тіла людини, її залежність від соматотипу. Також вказується на те, що анатомічна норма є основою для розуміння і побудови діапазону індивідуальної анатомічної мінливості.

Ключові слова: анатомічна норма, індивідуальна анатомічна мінливість.

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ОПРЕДЕЛЕНИЕ АНАТОМИЧЕСКОЙ НОРМЫ СТРОЕНИЯ ЧЕЛОВЕКА

Резюме. В данной работе изложены основные понятия об анатомической норме, существующих различиях каждого органа, системы организма и участков тела человека и ее зависимость от соматотипа. Также указывается на то, что анатомическая норма является основой для понимания и построения диапазона индивидуальной анатомической изменчивости.

Ключевые слова: анатомическая норма, индивидуальная анатомическая изменчивость.

Reviewer - doctor of medical sciences, prof. Pivtorak V.I.

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