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**L.V. Stklyanina, V.I. Luzin****SOMATOTYPICAL DIAGNOSTIC OF THE TEENAGE POPULATION FROM THE DIFFERENT ETHNIC AND GEOGRAPHICAL REGIONS***State Establishment «Lugansk State Medical University»*

**Stklyanina L.V., Luzin V.I.** Somatotypical diagnostic of the teenage population from the different ethnic and geographical regions // Український морфологічний альманах. – 2014. – Том 12, № 3. – С. 79-81.

Three ethno-geographic groups (from the Donbass territories (D-), Hindustan (H-) and African (A-) continents) of the young males undergone the somatometric procedure. The distribution of the somatotypes in the revised racial groups was seen as following: in D- group the most were the brachymorphic (40.63%), H- and A- boys were mostly dolichomorphes (69.77% -49.38%). It was proved, that the body weight and height are strongly determined by the body constitution.

**Key words:** anthropometry, population, somatotype, teenagers, constitution

**Сткляніна Л.В., Лузін В.І.** Соматитипологічна діагностика характеристики підліткового населення різних етнічних та географічних груп // Український морфологічний альманах. – 2014. – Том 12, № 3. – С. 79-81.

Три групи хлопчиків різного етно-географічного походження ( мешканців Донбасу, Індустану та Африканського континенту) підлягало соматометричному обстеженню. З'ясовано, як розподіляються соматотипи у сучасній популяції юнаків: мешканці Донбасу були переважно брахіморфами (40,63%), підлітки з Індустану та африканці – доліхоморфами (69,77% - 49,38%). Доведено, що зрісто-вагові параметри тіла чітко детерміновані конституціональним типом.

**Ключові слова:** антропометрія, популяція, соматотип, підлітки конституція.

**Сткляніна Л.В., Лузін В.І.** Соматитипологическая диагностика подросткового населения различных этнических и географических групп // Український морфологічний альманах. – 2014. – Том 12, № 3. – С. 79-81.

Три группы юношей разного этно-географического происхождения ( население Донбасса, Индустана и Африканского континента) подверглось соматометрическому обследованию. Выяснено, каким образом распределяются следующим образом: среди россиян преобладали брахиморфы (40,63%), жители Индустана и Африки – преимущественно долихоморфы (69,77% -49,38%). Доказано, что массовые параметры тела четко детерминированы конституциональным типом.

**Ключевые слова:** антропометрия, популяция, соматотип, подростки, конституция.

**Background.** Evolution is going one. Lot's of years anthropologists registries the metamorphoses of body proportions in Homo Sapiens at the different stages of the centuries throughout the whole world. For now the revision of the anthropometric status become extremely actual because the somatic conditions in the modern humanity, especially in teenage populations, undergone the significant changes that have become obvious by the naked eye, but changes are still not described as the figural data. During the XXI in most of the European countries the rate of the body growth and process of the pubertate maturation in human populations has become stabile, but the progressive increase of the total and fat body weigh was seen [1]. The obesity in modern European society was stated as the "secular obesity trend" [2]. Opposite tendency, that was seen in Russia, is the relative sliming of the teenagers accompany with the elongation of the skeleton and gentle physic, what was stated as the "asthenization". At the same time in Asian continent (such as in India, Malasya etc) the malnutrition, retardation of the growth and hypogonadism was established during the last decade [3, 4]. In African continent modern population last time was

separated into the high-conditional, physically well-developed persons and their hypotrophic counterparts [5]. So, it is the matter of the great evolutionary interest to revise the current anthropological state in the different racial populations. This has been the **aim** of this study. The current review is the part of the Human Anatomy Department's scientific research "Dynamic estimation of the physical condition of the different ethnoterritorial populations from the anthropometric point of view", State Institution "Lugansk State Medical University", state registration number №0113U007092.

**Materials and methods.** For the typing of the somatotypes the healthy young boys (17-22 y.o.) were recruited. Following their family history and passport data, participants were subdivided into the three groups: from the different regions of the Donbass (D-, n=256), Hindustan continent- from the India, Sri-Lanka, Bangladesh, Pakistan, (H-, n=241), and Africa - teenagers from the South, East and Central Africa (A-, n=165). Persons with the chronic diseases of the locomotor system or the congenital abnormalities were expelled from this study.

Somatometric measurements were performed due to the classical rules of the anthropometric

methodology by the V. Bunak. The process of the somatometry included the measurements of the body stand height, weight, biacromial distance or the shoulder width). Somatotype was established due to the shoulder width's index (SWI), proposed by the famous anthropologist P. Bashkyrov [6]. Index was calculated as the equation:  $SWI = \text{biacromial distance (cm)} / \text{stand height (cm)} \times 100\%$ . Gradation of the SWI as follows:

- dolychomorphes (D): SWI less than the 21.5;
- mesomorphes (M): SWI from 21.5 to 23.00;
- brachymorphes (B): SWI over than 24.5.

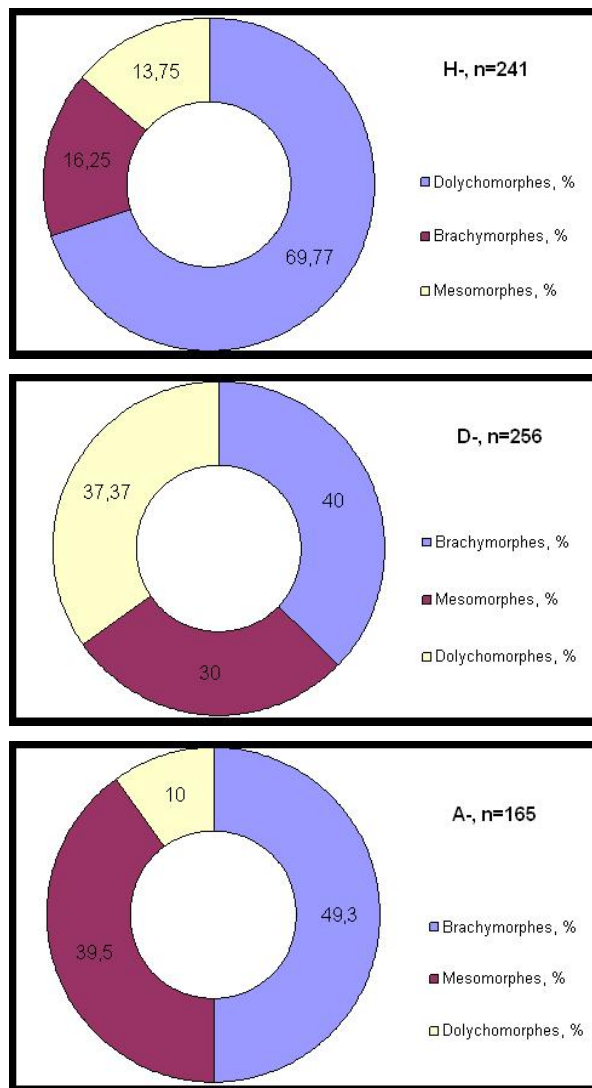
In the study there were applied other indexes, such as the body-mass index BMI (or Ketley-2), Tanner's index. The BMI is calculated as the equation:  $BMI = \text{body weight (kg)} / \text{height (m)}^2$ . Index describes the correspondence of the body mass to the height, and due to the WHO expert consultation, the appropriate BMI is 19-25 for the normotrophy, BMI less than the 18.00 means caloric deficiency, 26-31 – overweight, more than 31 – obesity [7]. The Tanner's index (J.Tanner, 1968) was used to reveal the tendency towards the andromorphic or hynecoid body proportions for the complete constitutional diagnostic. The Tanner's index calculated as the:  $3 \times \text{biacromial diameter} - \text{distantia spinarum}$ . For the males means of this index less than 83.7 stated as the hynecoid constitution, 83.7 -93.1 – mesomorphic constitution, more than 93.1 – andromorphic constitution. Obtained data were processed by the «Statistica 7.0» program software for the Windows XP Professional 2007.

**Results.** The distribution of the constitutional types in the observed racial groups was as following: in the D-ethnic group the brachymorphes dominates (40.36%), and fifty/fifty – for the meso- (30.00%) and dolychomorphes (27.73%). Among the H-boys the dolychomorphes were in majority (69.77%), less amount – for the brachymorphes (16.25%), and minimum – for the mesomorphic somatotype (13.75%). In the A- racial group boys were mostly dolychomorphes (49.38%), moderate amount – for the brachymorphes (39.50%), and least – with the brachymorphic somatotype (39.50%) (pic. 1.).

Due to the distribution of the Tanner's index, most of the D- were andromorphic (71.20%), less amount were mesomorphic (16.00%), and least were hynecomorphic (12.80%). Boys from the H-group were in 60.00% hynecomorphic, 25.42% - andromorphic, and only 13.75% - mesomorphic. A- boys were, in contrary, in 51.23% andromorphic, than – hynecomorphes (40.47%), and the least were andromorphic (6.79%).

Than the general constitutional types were revised in the each **constitutional** group. In the group of boys with the dolychomorphes constitution the greatest average body weight was seen in A- ( $71.96 \pm 1.37$  kg), least - ( $63.93 \pm 0.91$  kg) – in

H-ethnic group. In the group with the mesomorphic constitution the D- boys have the greatest body weight ( $69.68 \pm 1.00$  kg), least - again in H-group ( $63.94 \pm 1.71$  kg). In the group with the brachymorphic constitution the boys from the D-ethnic group were having the lightest body weight ( $67.67 \pm 0.69$  kg.), when the H- brachymorphes were the heaviest not only in this constitutional group, but all over the observed racial groups at all ( $76.13 \pm 1.75$  kg in average).



**Picture 1.** Distribution of the somatotypes in the different racial groups.

Revision of the means of the body height shows that the highest among the dolychomorphes were boys from the D-group ( $178.89 \pm 0.73$  cm), than - the A- ( $176.04 \pm 0.82$  cm), and the H-teenagers were the shortest ( $172.27 \pm 0.54$  cm). Interesting to note, that the same tendency exists in the group of the persons with the mesomorphic constitution: D- boys are tallest ( $178.11 \pm 0.63$  cm), H- – shortest ( $169.69 \pm 0.93$  cm), but in the groups of the brachymorphes the A- boys were dominant in height ( $173.86 \pm 0.68$

cm), when the D- and H- persons have approximately the same average height means ( $172.13 \pm 0.83$  cm and  $172.50 \pm 0.97$  cm, correspondently).

Due to the distribution of the BMI' means among the observed participants, in the case of the dolychomorphic constitution (the racial origin doesn't matters) were normotrophic, that means the harmony between the height and body weight in modern teenage populations of the different races. The H-'s and A-'s BMIs were the lowest in the normotrophic category, so their BMI' means were marginal to the signs caloric deficiency ( $19.11 \pm 0.25$  и  $19.04 \pm 3.02$ ), but the teenagers from the D-ethnic group, in contrary, were have the BMI, that is close towards the hyperthrophia, but does not exceed the normal levels ( $24.44 \pm 2.02$ ). In the mesomorphic group the caloric deficit was revealed in boys from the H-ethnic group (BMI  $18.45 \pm 6.14$ ), and D- and A-teensagers were the normotrophic. Interesting data were revealed for the persons with the brachymorphic constitution (D- and H- teenagers): despite the brachymorphic proportions, when the body has the bulky look, the observed persons have the average lowest BMI' means in population ( $16.94 \pm 1.12$  and  $15.10 \pm 3.42$ ), that looks as the contradiction, but reveals, that even if the transverse parameters of the body are prevalent, it does not identical to the overweight. In contrast to the mentioned above features, the African brachymorphes, due to their BMI, have the first-level obesity (BMI  $31.31 \pm 2.38$ ).

**Conclusion:** In the modern teenage populations with the different racial origin the dolychomorphic constitution means the normotrophy; the mesomorphic constitution is the rare case, and brachymorphic constitution could be combined with the deficient of the body weight. The hynecoid Tanner's stage is the feature for the male teenagers from the Hindustan, when the Africans and boys from the Donbass region in their majority are mostly andromorphic.

**Perspectives of the future researches:** Revealed data in future have to be summarized in the regional-, age- and gender-oriented standards of the physical condition of the modern teenage population.

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Рецензент: проф. Ю.М. Вовк