

## ORIGINAL ARTICLE

# ESTABLISHMENT OF TYPES OF THE CONSTITUTIONS IN STUDENTS-ATHLETES AND IN STUDENTS-MEDICISTS WITH THEIR FURTHER ANALYSIS

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## ABSTRACT

**The aim:** Establishing anthropometric parameters and determining the patterns of formation of types of constitution in students-athletes and medical students while studying in higher education.

**Materials and methods:** We conducted a study of anthropometric parameters on 129 first and second year students of higher educational institutions in Chernivtsi (aged 16 to 21). The vast majority of students - 121 (93.8%), were from 17 to 19 years, 16 years - 5 (3.9%), 21 years - 2 (1.5%), 21 years - 1 student (0.8%). Of these, 83 (64.4%) were male and 46 (35.6%) were female. All respondents are divided into two groups: the main group - 89 (69%), control group - 40 (31%). Among the students of the main group there were 62 (69.7%) male and 27 (30.3%) female. The control group consists of 21 (52.5%) men and 19 (47.5%) women. Students of the main group, in addition to physical activity, which was included in the program of their specialty, additionally engaged in the following sports: football - 40 (44.9%) students, volleyball - 18 (20.3%), tennis - 10 (11.2%), fitness - 9 (10.1%), basketball - 7 (7.9%), freestyle wrestling - 5 (5.6%). All students underwent anthropometric research, according to the method of VV Bunak in the modification by PP Shaparenko. Anthropometric survey included the definition of total (length and body weight) and partial dimensions - longitudinal, transverse, circumferential. Determination of the somatotype was performed by MV Chornorutsky based on the Pinier index  $L - (P + T)$ ,  $L$  - body length,  $P$  - weight,  $T$  - chest circumference. In hypostenics (asthenics) this index is more than 10, in hypersthenics less than 10, in normostenics in the range from 10 to 30 and according to V.M. Shevkunenko, where  $Ind$ : length of the lower limb / height x 100. Based on the index, dolichomorphic type of structure of the lower limb corresponds to a value greater than 55, from 50 to 55 indicates a mesomorphic (middle) type of structure of the lower limb. If the figure is less than 50 - brachymorphic type of structure.

**Results:** The probable difference of types of the constitution of students of the main group for MV Chornorutsky on the based the Pinier index and VM Shevkunenko, using the Shevkunenko index. So, between the asthenic type and the hypersthenic type of constitution, because in the main group, according to the Pinier index of asthenics - 26 (29.2%), while according to the Shevkunenko index - 3 (3.4%). Hypertensives according to the Pinier index are - 9 (10.1%), on the difference according to the Shevkunenko index - 25 (28%). The result of a study of students in the control group based on the Pinier index by MV Chornorutsky, and according to VM using the Shevkunenko index, Shevkunenko also showed a significant difference for all types of constitution: according to the Pinier index of normostenics - 23 (57.5%), while according to the Shevkunenko index - 19 (47%), according to the Pinier index - 7 (17.5%) - hypertensive, according to the Shevkunenko index - 25 (28%), according to MV Chornorutsky, asthenics - 10 (25%) at the same time as according to Shevkunenko dolichomorphic type of constitution in students of the control group, was not observed during the study.

**Conclusions:** There is a significant discrepancy in terms of determining the types of constitution, according to MV Chornorutsky, based on the Pinier index and VM Shevkunenko, using the Shevkunenko index. Based on this, it is necessary to further study this issue because the criteria and methods of evaluation, indices, analysis of index results and in order to find common approaches to the methodology of establishing the types of constitution remain unrelated.

**KEY WORDS:** students, anthropometry, type of the constitution

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## INTRODUCTION

One of the means of studying the state of human health is anthropometric assessment of its physical development with the determination of dimensional and component indicators [1-4]. The study of age norms and variants of somatic features should be combined with the establishment of relative proportional indicators of body parts and somatological features of its structure.

These data will determine the standards of physical development, taking into account the periods of puberty and

aging. In addition, these standards need to be periodically updated due to the acceleration processes taking place in society [5-7].

Also, somatotyping is an extremely relevant scientific field in sports today, as evidenced by a sufficient amount of both domestic and foreign data on the relationship of individual somatological and anthropometric parameters, both normal and to assess the risk of various pathological conditions [6-9].

In recent years, scientists have accumulated a significant amount of material that suggests that the constitution of the

athlete's body is formed largely at the genetic level, because it is a set of individual morphological, physiological and mental properties of the body due to heredity [10-14].

Therefore, the success of the athlete depends mainly on these factors, it is important to study the constitution of the body and somatotype, based on the results of which it is possible to predict high results of future athletes [15-19].

## THE AIM

Establishing anthropometric parameters and determining the patterns of formation of types of constitution in students-athletes and medical students while studying in higher education.

## MATERIALS AND METHODS

We conducted a study of anthropometric parameters on 129 first and second year students of higher educational institutions in Chernivtsi (aged 16 to 21). The vast majority of students - 121 (93.8%), were from 17 to 19 years, 16 years - 5 (3.9%), 21 years - 2 (1.5%), 21 years - 1 student (0.8 %). Of these, 83 (64.4%) were male and 46 (35.6%) were female.

All respondents are divided into two groups: the main group - 89 (69%), are first-year students of the Faculty of Physical Culture and Human Health of Chernivtsi National University named after Yuriy Fedkovych, control group - 40 (31%) - college students and students Faculty of Dentistry, Bukovynian State Medical University, Chernivtsi.

Among the students of the main group there were 62 (69.7%) male and 27 (30.3%) female. The control group consists of 21 (52.5%) men and 19 (47.5%) women. Students of the main group, in addition to physical activity, which was included in the program of their specialty, additionally engaged in the following sports: football - 40 (44.9%) students, volleyball - 18 (20.3%), tennis - 10 (11.2 %), fitness - 9 (10.1%), basketball - 7 (7.9%), freestyle wrestling - 5 (5.6%).

The subjects of the control group were loaded with hours of physical education, according to the curriculum of their specialty and did not additionally play sports.

All students underwent anthropometric research, according to the method of VV Bunak in the modification by PP Shaparenko [1, 3, 9], in accordance with the requirements of anthropometric research, which ensures the accuracy of measurements and allows to compare results. Anthropometric survey included the definition of total (length and body weight) and partial dimensions - longitudinal, transverse, circumferential.

All anthropometric measurements were performed in the morning, on an empty stomach, on the right and left parts of the body [1, 9].

Determination of the somatotype was performed by MV Chornorutsky based on the Pinier index  $L - (P + T)$ ,  $L$  - body length,  $P$  - weight,  $T$  - chest circumference. In hypostenics (asthenics) this index is more than 10, in hypersthenics less than 10, in normosthenics in the range

from 10 to 30 and according to V.M. Shevkunenko, where  $Ind: \text{length of the lower limb} / \text{height} \times 100$ . Based on the index, dolichomorphic type of structure of the lower limb corresponds to a value greater than 55, from 50 to 55 indicates a mesomorphic (middle) type of structure of the lower limb. If the figure is less than 50 - brachymorphic type of structure [2].

All obtained results were statistically processed.

## RESULTS

Having determined the somatotypes among 129 first and second year students of higher educational institutions in Chernivtsi, according to MV Chornorutsky, on the basis of the Pinier index, the following data were obtained that the normosthenic type of constitution was in 77 (59.6%) students, asthenic (hypostenic) in 36 (28%), and hypersthenic type in 16 (12.4%) students.

So, according to the results obtained, the largest number of students are normosthenics, and the smallest are hypersthenic, among all students.

During the analysis in both groups separately, we obtained the following results:

the main group, where normosthenics are - 54 (60.7%), asthenics - 26 (29.2%), hypertensives - 9 (10.1%);

control group, in which 23 (57.5%) are normosthenics, 10 (25%) are asthenics and 7 (17.5%) are hypersthenics.

Based on the results, a comparison of the both study groups, it was determined that the normosthenic type of constitution predominates, fewer students with asthenic type and the smallest number in both groups - hypersthenic.

When determining the type of lower extremity constitution of the studied students of both groups, using the Shevkunenko index, the following data were obtained that the main group is dominated by mesomorphic type of lower extremity constitution - 61 (68.5%), brachymorphic type - 25 (28.0%), respectively dolichomorphic type was observed in 3 (3.4%) students.

In the study of students in the control group (40 students), according to the Shevkunenko index, brachymorphic type of constitution prevails - 21 (52.5%), mesomorphic in 19 (47.0%) students, dolichomorphic type of constitution, was not observed during the study.

Based on the results, a comparison of both study groups by V.M. Shevkunenko, using the Shevkunenko index, it was determined that in the main group the mesomorphic type prevails over the brachimorphic type, and in the control group, on the contrary, more students with the brachimorphic type of constitution than with the mesomorphic one. At the same time, as in the main group with dolichomorphic type of constitution the number of subjects was small, in the control group this type of constitution was not observed at all.

So, between the asthenic type and the hypersthenic type of constitution, because in the main group (89 students), according to the Pinier index of asthenics - 26 (29.2%), while according to the Shevkunenko index - 3 (3.4 %) students. Hypertensives according to the Pinier index are - 9

(10.1%), on the difference according to the Shevkunenko index - 25 (28%).

So, summarizing the data we can conclude that there are significant differences in determining the types of constitution, according to MV Chornorutsky, based on the Pinier index and VM Shevkunenko, using the Shevkunenko index.

## DISCUSSION

The our opinion, the difference between the somatotypes of student-athletes and medical students is that athletes in the relevant sports have physical activity on the muscles of the lower extremities, and as a result increase not only comprehensive anthropometric parameters, but also longitudinal, which are used when determining the Shevkunenko index.

So, taking into account the results of the study of students of the main group, the difference between the types of constitution according to M.V. Chornorutsky, based on the Pinier index and V.M. Shevkunenko, using the Shevkunenko index [11].

Analyzing the research data of the students of the control group on the basis of the Piné index according to M.V. Chornorutsky, and according to V.M. Shevkunenko, using the Shevkunenko index, we can also note a significant difference for all types of constitution: according to the Pinier index of normosthenics - 23 (57.5%), while according to the Shevkunenko index - 19 (47%), according to the Pinier index - 7 (17.5%) - hypertensive, according to the Shevkunenko index - 25 (28%) students, according to MV According to Chornorutsky, asthenics - 10 (25%), while according to the Shevkunenko index dolichomorphic type of constitution in students of the control group, was not observed during the study.

Considering the differences between the methods of determining the types of constitution according to M.V. Chornorutsky, based on the Pinier index and V.M. Shevkunenko, using the Shevkunenko index, it is not possible to use these techniques for the relevant sports for further sports selection.

Based on this, it becomes possible that further study of this issue is necessary because the criteria and methods of evaluation, indices, analysis of index results and in order to find common approaches to the methodology for establishing types of constitution remain unclear.

## CONCLUSIONS

1. Significant differences in the types of constitution according to MV Chornorutsky, based on the Pinier index and VM Shevkunenko, using the Shevkunenko index. namely, between the asthenic type and the hypersthenic type of constitution, because in the main group, according to the Pinier index of asthenics - 26 (29.2%), while according to the Shevkunenko index - 3 (3.4%), hypertensives according to the Pinier index, they make up 9 (10.1%), and according to the Shevkunenko index, they make up 25 (28%).

2. Further study of the criteria and methods of determining the patterns of formation of types of constitution, because the criteria and methods of evaluation, indices and analysis of the results of index indicators are not clarified.

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**Conflict of interest:**

*The Authors declare no conflict of interest.*

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