

Free wrestling: a series of morphological index values and anatomical and anthropometric indicators in young female athletes involved in freestyle wrestling

Annotation

In this research article, the author presents the results and their analysis, directly related to some anatomical and anthropometric indicators and some morpho-functional indices in a group of young female athletes, puberty and youth, engaged in free wrestling. The results obtained and their analysis may have applied practical significance in the preparation and medical supervision of other athletes of this age group.

Keywords: freestyle wrestling, female athletes of puberty and youth, anatomical and anthropological indicators, morpho-functional indices, adaptation

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Konstantin Anatolyevich Bugaevsky

Department of Medical and Biological Foundations of Sports and Physical Rehabilitation, The Petro Mohyla Black Sea State University, Ukraine

Correspondence: Konstantin Anatolyevich Bugaevsky, Department of Medical and Biological Foundations of Sports and Physical Rehabilitation, The Petro Mohyla Black Sea State University, Nilolaev, Ukraine, Tel 380996098926, Email apostol_luk@ukr.net

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Introduction

Questions concerning the medical and biological features of modern women's sports and their impact on the female body are of active research interest. Also, researchers are interested in the ongoing adaptation processes and the restructuring of the initial gender somatotype of female athletes under the influence of excessive, physical and psycho-emotional stress, both in the training and in the competitive process. In this regard, the ongoing adaptive changes that occur in absolutely any kind of modern sport are always relevant and in demand in the scientific community, incl. in girls and girls of prepubertal, pubertal and youthful age, in freestyle wrestling. In his research work, the author paid close attention to this issue, examining a number of important anatomical and anthropometric indicators and morpho-functional indices in young athletes involved in freestyle wrestling. The analysis of the results of the study, obtained by the author, may be of applied practical importance in the preparation of this category of young female athletes.

Aim of the work

The purpose of the article is to highlight and analyze the results of the study, with a detailed analysis of the data, all the identified changes in athletes in their age groups.

Material and methods

When conducting this study, the author actively used such research methods as literary-critical analysis of available, both domestic and foreign sources of information; anthropometry methods (measuring the width of the pelvis and shoulders, body weight and length); pelvimetry, with the calculation of the external dimensions of the bony pelvis of athletes; calculus, a number of some morpho-functional indices, such as:

- A. mathematical statistics method
- B. body mass index;

- C. Quetelet index;
- D. index of sexual dimorphism, according to the method of J. Tanner;
- E. Rohrer index;
- F. pelvis index;
- G. index of pelvic bones, according to the method of N.I. Kovtyuk;
- H. index of relative shoulder width;
- I. index of the relative width of the pelvis;

Organization and object of the study

The study was conducted in 2021-2022. It was attended by 16 athletes of pubertal and youthful age. The average age of female athletes was 16.74 ± 0.31 years ($p < 0.05$). Sports experience - from 3 to 5 years. All young athletes who took part in the study gave their voluntary consent to its conduct.

Results of the study and discussion

Body length was 163.63 ± 1.89 cm, body weight was 58.41 ± 2.51 kg ($p < 0.05$). Body mass index values - 21.62 ± 0.85 kg/cm², Quetelet I - 356.54 ± 14.18 g/cm², Rohrer index - 13.31 ± 0.58 kg/cm³ ($p < 0.05$). The values of the pelvic width (PW) were 26.41 ± 0.65 cm ($p < 0.05$), which was less than the permissible anatomical norm of 28-29 cm.¹⁻⁶ Shoulder width indicators (SWI) in the group were 31.53 ± 1.38 cm ($p < 0.05$). The ratio of PW to SWI in the group corresponds to the male structure of the body, the girls have an andromorphic type of figure - with broad shoulders and a narrow pelvis.⁶ The value of the sexual dimorphism index (SDI) in the whole group was 68.19 ± 3.89 ($p < 0.05$), which corresponds to the gynecomorphic type.⁵

At the same time, it was determined that there were 9 (56.25%) gynecomorph athletes, 5 (31.25%) mesomorphs, and 2 (12.5%) andromorphs. The relative shoulder width index (RSWI) was 19.22 ± 0.71 cm ($p < 0.05$), which corresponds to the mesomorphic type.

In 9 (56.25%) female athletes, a dolichomorphic type was determined, in 4 (25.00%) - mesomorphic, in 3 (18.75%) - brachymorphic body type.⁵ The average indicator of the relative pelvic width index (RPWI) was 16.15 ± 0.38 cm ($p < 0.05$), which was metriopyelia (average pelvic dimensions).⁶ In 9 female athletes (56.25%), the RPWI corresponded to the indicators of stenopyelia (narrow pelvis), in 5 (18.75%) it corresponded to the values of metriopyelia (middle pelvis), and in 2 (12.50%) a wide pelvis was determined.⁵ Pelvimetry data in the group: d. spinarum - 23.19 ± 0.58 cm, d. cristarum - 26.41 ± 0.65 cm, d. trochanterica - 31.16 ± 0.66 cm, p. externa - 19.00 ± 0.58 cm, p. vera - 10.41 ± 0.42 cm ($p < 0.05$).

The results of pelvimetry indicate that the obtained indicators were less than the norms of the external dimensions of the pelvis: d. spinarum - 25-26 cm; d. cristarum - 28-29 cm; c. externa - 20-21 cm.^{1,5,6} The exception is indicators d. trochanterica), corresponding to normal values (30-32 cm).^{1,5,6} To assess the development and determine the degree of formation of the pelvic bones, the pelvic bone index (PBI) was used.³ Among all athletes, PBI was 42.63 ± 1.81 cm, which corresponds to the average value for this age group.³

Also, such a morphological indicator as the pelvic index (PI) was used.¹ In the group, its value was 99.69 ± 2.07 ($p < 0.05$), which corresponds to the presence of a narrow pelvis.^{1,5,6} At the same time, in 9 (56.25%) the indicator indicates a narrow pelvis, in 3 (18.75%) it is close to the norm, and in 4 (25.00%) athletes, it is below the norm with a tendency to form a narrow pelvis. The revealed changes in the shape of the pelvis and its functionality were as follows: a simple flat pelvis was recorded in 1 (6.25%), a transversely narrowed pelvis - in 7 (43.75%) athletes, a wide pelvis - in 2 (12.50%), anatomically narrow pelvis and "erased" forms of the pelvis - in 13 (81.25%), normal pelvic dimensions - in 1 (6.25%) athletes. Narrowing of the pelvis of the 1st degree - in 5 (31.25%) and 2nd degree - in 3 (18.78%) female athletes.

Conclusion

1. In 9 (56.25%) athletes of prepubertal and pubertal age, the gynecomorphic type of sexual constitution was still preserved, in the older groups the number of mesomorphs was growing - 5 (31.25%) and andromorphs - 2 (12.5%). 2

2. Formation in 13 (81.25%) young athletes of an anatomically narrow pelvis, combined with narrowing of the pelvis of I-II degree, in 8 (50.00%) girls is an obstetric risk factor and may in the future be a problem in childbirth.

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None.

Conflicts of interest

There is no conflicts of interest.

References

1. Bugaevsky KA. Features of the pelvis, a number of anthropometric values and morphological parameters in female volleyball players. Collection of materials of the international scientific and practical conference. Medical science and practice at the current historical stage. Kyiv. 2016. p. 20–25.
2. Dyusenova AA, Oleinik EA. Somatotypological and endocrinological features of athletes involved in wrestling and boxing. Scientific notes of the University named after P.F. Lesgaft. 2013;2:116–120.
3. Kovtyuk NI. Dynamics of the formation of pelvic expansion in girls of the school age of the Chernivtsi region. *Clinical anatomy and operative surgery*. 2004;3:48–49.
4. Nadeina SYa, Klots VM, Zvyagintsev, LA, et al. Determination of morphofunctional features in athletes with different somatotypes according to the classification of J. Tanner. *Izvestia of AltGU*. 2011;3:26–29.
5. Strelkovich TN, NI Medvedeva, EA Khapilina. Anthropometric characteristics of the pelvis of women depending on the somatotype. *In the world of scientific discoveries*. 2012;2(2):60–73.
6. Syrova OV, TM Zagorovskaya, AV Andreeva. The relationship of anthropometric parameters with the size of the pelvis in girls 17-19 years old. Syrova. *Morphology*. 2008;133(3):45–47.