CME LIVE OPEN ACCESS

Journal of
Clinical Anesthesia and Research

Research Article

Studying the Values of The Finger Index in Women's Athletics in Women's Weightlifting

Konstantin Anatolyevich Bugaevsky*

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

Corresponding Author: Konstantin Anatolyevich Bugaevsky, Department of Medical and Biological Foundations of Sports and Physical Rehabilitation, The Petro Mohyla Black Sea State University, Nikolaev, Ukraine.

Received: 2024 Feb 03 **Accepted:** 2024 Feb 23 **Published:** 2024 Mar 03

Annotation

Based on the analysis and generalization of literary sources, as well as the results of a pedagogical experiment, the article provides data on the features of the 2D: 4D Digit Ratio finger index in young female athletes involved in weightlifting. A significant group of athletes who participated in the study noted the inverse changes in sex somatotypes towards mesomorphy and even andromorphy.

Keywords: Female Athletes, Adolescence, Weightlifting, Finger Index 2d:4d Digit Ratio, Morphofunctional Changes, Sexual Somatotypes, Masculinization.

1. Introduction

In modern women's sports, for researchers of its medical and biological problems, it is of significant interest to study adaptive processes in female athletes, in athletic sports, with their loads and specific requirements for female athletes of different age groups [1-12]. In this regard, the purpose of our study is to determine changes in the existing anatomical and morphofunctional indicators, the phenomena of masculinization and inversions of sexual somatotypes in female athletes involved in weightlifting. The relevance of the problem under study today is that physical education, health programs and sports are in great demand among young women who en masse attend sports sections and master new sports, previously classified as purely male sports. Therefore, questions concerning various aspects of the influence of physical and psycho-emotional stress on the female body, as well as its adaptive reactions, are always relevant when conducting medical and biological studies of female athletes [2, 3, 6, 8, 10]. This also applies to the study of adaptation processes in female athletes involved in weightlifting and powerlifting [2-4, 7]. Weightlifting, the intensity of power loads, the structural features of the training-competitive period, its compatibility with the cyclic changes of the female body, the processes of adaptation to these loads - this is not a complete list of issues that determine the problem when studying this problem [1-5].

1.2. Aim of Study

The purpose of this article is to determine the values of the finger index in a group of athletes who are engaged in professional women's weightlifting, as well as to analyze the obtained indicators to determine the phenomena of masculinization in them.

1.3. Research Hypothesis

In women of different ages, during the period of their reproductive activity, during weightlifting, with intense physical and psycho-emotional stress, over time, inversions of their sexual somatotypes occur, and masculinization phenomena are formed.

2. Material and Methods

To achieve the goal of the study, we used a set of scientific methods, including analysis of available scientific and scientific-methodological sources of information, determination of anatomical, anthropometric and morphofunctional values in female athletes, and interviewing. The experimental basis of the study was sports sections in which youth athletes involved in weightlifting trained.

To achieve the goal of the study, we used such anthropometric methods as determining shoulder width [SW] and pelvic width [PW], necessary to determine such a morphological index value as the sexual dimorphism index [SDI] according to J. Tanner. According to the obtained index values, somatotyping of the athletes was carried out based on the criteria corresponding to the classification of J. Tanner and W. Marshall. The values of the index of sexual dimorphism [SDI] are calculated according to their own formula: 3 x biacromial size, or SH minus the pelvic-crestal size [d. cristarum], or

SH. We took as a basis the index values proposed by these researchers for women, namely: gynecomorphic sexual somatotype - less than 73.1; [mesomorphic sexual somatotype – 73.1–82.1] and andromorphic sexual somatotype – more than 82.1. Mesomorphic and andromorphic sexual somatotypes refer to inversions, or pathological displacements that are not characteristic of the basic gynecomorphic sexual somatotype.

Activities were carried out aimed at determining the values of the sexual dimorphism index [SDI] in the studied groups of female athletes, with the determination of anthropometric indicators of shoulder width [SW] and pelvic width [PW], with the subsequent distribution of athletes into sexual somatotypes according to J. Tanner's classification. We also measured the index (II) and ring (IV) fingers of both hands for each athlete in the group, in strict accordance with the methodology proposed by J.T. Manning [1-12].

A variant of the norm for women of the reproductive period [including adolescence] was considered indicators from 0.99 to 1.1. Values less than normative were assessed as characterizing manifestations of increased levels of male sex steroids [1-3, 6, 9-12]. The experiment involved female youth athletes involved in weightlifting (n=67). The average age of the female athletes was 19.51±1.17 years, which corresponds to adolescence [1]. The experience in these sports ranged from 2 to 10 years. The level of sports qualifications of female athletes is from category III-I to candidate master of sports [CMS] and master of sports [MS]. The intensity and frequency of classes is 4-6 times a week, from 1.5 to 3 hours per lesson.

The method of literary analysis of available sources of information was used. The study was conducted in compliance with the basic bioethical provisions of the Council of Europe Convention on Human Rights and Biomedicine [dated April 4, 1997], the World Medical Association Declaration of Helsinki on Ethical Principles for Scientific Medical Research Involving Human Subjects (1964-2008), as well as the Order Ministry of Health of Ukraine No. 690 dated September 23, 2009. All participants who took part in the study, both athletes and non-athletes, gave their voluntary, written consent to it.

3. Results and Discussion

As a result of anthropometric measurements of shoulder width [SW] and pelvic width, we obtained the following values: SW was 38.38±0.73 cm, PW was 27.43±0.51 cm. According to the obtained data, SH and ST calculations of SDI values were made according to J. Tanner's classification, with the determination of sexual somatotypes in female athletes in the study group. As can be seen, from the obtained values of the performed anthropometry, the average values of the SW indicators in the group ($p \leq 0.05$) significantly exceed the obtained values of the PW, with values less than the anatomically acceptable value of 28-29 cm [1-5, 7, 8].

This type of SW/PW ratio indicates a masculine body type in female athletes [1-5, 7, 8]. The distribution of female athletes by gender somatotype is as follows: among weightlifters (n=67), girls with a gynecomorphic gender somatotype were not identified. The number of athletes with a mesomorphic sexual somatotype in this group is 61 (91.04%), with an andromorphic somatotype - 6 (8.96%) weightlifters. In this group of young weightlifters, the following SDI value was obtained: 80.47±1.03 ($p<0.05$), which corresponds to the values of the mesomorphic sexual somatic type, at the level of its upper threshold values [1-5, 7, 8].

After taking measurements of the II and IV fingers of weightlifters, mathematically processing the results obtained and analyzing them, the following results were obtained: values at which the length of the index finger would exceed the length of the ring finger (2D>4D) were not determined for any of the female athletes At the same time, in 7 (10.15%) female athletes, "male" proportions of the relationship between the lengths of the 2nd and 4th fingers were determined, according to the androgynous type - less than the normative values of 0.99-1.1, which corresponds to The number of representatives of the andromorphic sexual somatotype in the study group of female athletes was 6 (8.96%), with symptoms of hyperandrogenism.

For the rest of the group of female weightlifters - 61 athletes, the values of the digital index were determined, corresponding to the values of the mesomorphic transitional sexual somatotype, which was within 2D≥4D, which reflects a shift in morphological somatic indicators from basic gynecomorphy to inverse andromorphy and, indirectly, indicates an increase in them the level of androgenic steroid hormones [1-3, 6, 9-12]. These proportions, as well as the shift in gender somatotypes, can be regarded as the result of intense, sometimes inadequate training physical activity, and as a consequence of intense adaptive processes in young weightlifters, which increase with their sports experience.

4. Conclusions

The indicators we have identified of anatomical and morphofunctional changes in the bony pelvis and the degree of their narrowing, against the background of inversions of the values of sexual dimorphism in all three groups, towards mesomorphic and andromorphic sexual somatotypes in female athletes involved in athletic sports, gives reason to think about significant adaptive changes in the bodies of young female athletes due to intense physical activity.

Numerous combined disorders of a number of reproductive indicators identified as a result of the study give grounds to assert that they are directly related to intense physical and psycho-emotional stress.

The hypothesis of the study is that women of different ages, during the period of their reproductive activity, during weightlifting, with intense physical and psycho-emotional stress, over time, inversions of their sexual somatotypes occur, and the phenomena of masculinization are formed.

References

1. Bugaevsky K. A. Features of the index of sexual dimorphism and a number of reproductive indicators in athletes engaged in athleticism. Actual problems of the theory and methodology of armwrestling, bodybuilding, weightlifting, powerlifting and weightlifting. Issue. 4: Sat. sci. articles / ed. V. P. Simenya. Cheboksary: Chuvash. state. ped. Univ., 2017. – P. 100-106.
2. Bugaevsky K.A. Studying the peculiarities of the values of the 2D: 4D finger index in athletes involved in pankration in different age groups "Secondary professional and higher education in the field of physical culture and sports: current status and development prospects": All-Russian Scientific and Practical Conference. – Chelyabinsk, March 29, 2018. – P. 150-154.
3. Bugaevsky K.A. Definition of the finger index 2D: 4D as one of the markers of sexual dimorphism in women's boxing // Collection of scientific articles of the All-Russian with international participation in-person scientific-practical conference "Olympism: Origins, Traditions and the Present" Voronezh, November 29, 2018) / Editorial: G.V. Bugaev [et al.]. Voronezh: Publishing and Printing Center "Scientific Book", 2018. – P. 180-186.
4. Zamchiy T. P., Spataeva M. Kh. Functional state and reproductive health of women of heavyweights // Scientific and sports herald of the Urals and Siberia. 2016. Volume 1. 2:36-39.
5. Zamchiy T. P., Koryagina Yu. V. Sexual dimorphism in morphological characteristics of sportsmen of power sports // Modern problems of science and education. 2011. 3. – URL: https://science-education.ru/ru/article/view?id=4676 (Date of circulation: 02.02.2024).
6. Kniga, E., & Trotskaya, K. (2015). Sexual dimorphism of the ratio of the second and fourth fingers. Sat. materials scientific.
7. Bugaevsky, K. A. WOMEN'S WEIGHTLIFTING: A STUDY OF THE FINGER INDEX.
8. Mandrikov, V. B., Samusev, R. P., & Zubareva, E. V. (2015). On the Inversion of Indicators of Sexual Dimorphism Among Representatives of Masculine Sports. Vestnik VolgGMU, 76-78.
9. Oleinik E.A., Lebedeva A.D. The finger index and psychological characteristics of women in shooting sports // Modern trends and current issues in the development of shooting sports: Sat. materials of the III All-Russian with international participation scientific and practical conference dedicated to the 40th anniversary of FSBEI HE "VGIFK", June 5, 2019 / [Ed. HE. Savinkova, M.M. Kublanova]. Voronezh: Elist Publishing House, 2019. – P. 38-42.
10. Oleinik E.A. Finger proportions in female athletes involved in martial arts as a marker of morphological masculinization // Uchenye Zapiski universiteta imeni P.F. Lesgaft. 2009 8 (54). P:96-98.
11. Manning, J. T. (2002). Digit ratio: A pointer to fertility, behavior, and health. Rutgers University Press.
12. Voracek, M., Tran, U. S., & Dressler, S. G. (2010). Digit ratio (2D: 4D) and sensation seeking: New data and meta-analysis. Personality and Individual Differences, 48(1), 72-77.