

Features of the Values of a Number of Markers of Masculinization Processes in Female Athletes Engaged in Strength Sports

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Received date: November 23, 2024; Accepted date: January 24, 2025; Published date: February 03, 2025

Citation: Konstantin A. Bugaevsky, (2025), Features of the Values of a Number of Markers of Masculinization Processes in Female Athletes Engaged in Strength Sports, *Journal of Clinical Otorhinolaryngology*, 7(1); DOI:10.31579/2692-9562/138

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Abstract

The article presents the results of a study devoted to the study of the reliability and information content of the values of a number of markers for determining masculinization processes in female athletes of the 1st mature (reproductive) age who are professionally involved in strength sports, weightlifting.

Keywords: female athletes; strength sports; weightlifting; masculinization; index values; markers

Introduction

In today's women's sports of the highest achievements, the real fact is the cases of women of different age groups engaging in a number of sports that were previously considered to be primarily male. These include women's engagement in strength sports, for example, weightlifting. At the same time, the process of adaptation and masculinization of female athletes, the impact of intensive sports activities on their body, is not fully studied. The study of this problem requires the identification of clear criteria for determining the masculinization processes occurring in female athletes, and the identification, for the practice of studying these phenomena, of morphofunctional index values as markers of masculinization [1-7].

Aim of the article

The purpose of the article is to present an analysis of the results of the study, to identify markers of masculinization, their reliability and informativeness, for further study of medical and biological changes in athletes of the first mature (reproductive) age, who are professionally engaged in strength sports and weightlifting.

Hypothesis of the article

During the preparation for this study, its author developed a working hypothesis, the essence of which is that female athletes of any age group, during their intensive training, sports and competitive periods, undergo permanent, medical and biological, adaptive restructuring of their body and, in particular, somatic transformations, with the formation of changes in their original, gynecomorphic sexual somatotype, towards inverse ones - transitional, mesomorphic sexual somatotype and pathological, andromorphic sexual somatotype, as well as the formation of masculinization phenomena of varying degrees of their severity.

Methods and means of research

In conducting this study, the author used the following research methods: literary-critical analysis of available sources of information on the issue

under study, anthropometry and pelimetry methods, the method of morphofunctional index values, and the method of mathematical statistics. All athletes who took part in the study conducted by the author gave their voluntary, both oral and written consent. This study was conducted with the participation of athletes from a number of sports clubs in Nikolaev and the Nikolaev and Kherson regions of Ukraine (n=17), of 1 mature (reproductive) age, who are professionally involved in strength sports, including weightlifting. Their level of sports mastery is candidate for master of sports and master of sports. During the study, we determined such anthropometric indicators as body length, body weight of female athletes, their shoulder width (interacromial size), pelvis width (intercrestal size), for which, according to the classical method, anthropometry and pelviometry were carried out. Based on the results of the anthropometry, a number of morphofunctional index values were calculated, such as the sexual dimorphism index (SDI), andromorphy index (AI), masculinization index (MI), relative pelvic width index (RPWI), or morphine index for women, pelvic-humeral index (PHI) [1-7].

Abbreviations

- BMI - body mass index;
- SDI - sexual dimorphism index;
- AI - andromorphy index;
- MI - masculinization index;
- RPWI - relative pelvic width index, or morphology index for women;
- PHI - pelvic-humeral index;
- PBI - pelvic-brachial index;

- PW - pelvic width.

Results of the study and discussion

It was determined that the average age of the athletes in the group was 24.46 ± 1.06 years. The body length of the girls was 172.86 ± 0.59 cm, body weight - 74.87 ± 0.47 kg, BMI - 24.86 ± 0.12 kg/cm², which corresponds to the normal BMI values for girls in this age group [2, 4-7]. The dimensions of the shoulder width were 40.69 ± 0.53 cm, and d. cristarum (pelvic width) - 27.14 ± 0.53 cm, with the norm of this transverse size of the bony pelvis equal to 28-29 cm [1, 4-7]. The average value of d in the group. trochanterica (intertrochanteric size), in cm, was 30.28 ± 0.84 cm, with the standard value of this indicator being 31-32 cm [2, 4-7]. These data indicate that the girls in the group have broad shoulders and narrow pelvises [2, 4-7]. The value of the pelvic-humeral index (PHI), according to the methodology proposed by E.N. Khrisanfova, 2002, confirms this. This indicator is defined as a mathematical percentage value obtained by dividing the value of d. cristarum (pelvic width size) by the body length indicator, in cm [2, 4-7]. This allows us to judge the shape of the body of the athlete being studied [2, 4-7].

In the study group, the value of this morphofunctional index value was 62.71 ± 0.11 , which corresponds to a trapezoid body shape, according to the masculine type - broad shoulders and a narrow pelvis. When determining the masculinization index, which is a derivative of the result of dividing the biacromial diameter (shoulder width), in cm, by the value of d. trochanterica (intertrochanteric size), in cm, it was found that the average value of this morphofunctional index value in the group was 1.32, while in the population it can be from 1.15 to 1.23. Its results, indirectly, indicate the steroid balance (the ratio of estrogen and androgen saturation) of the athlete's body [2, 4-7]. The obtained value, in correlation with other obtained morphofunctional index values, indicates the ongoing processes of masculinization and hyperandrogenism in these athletes. When determining the values of the relative pelvic width index (RPWI), or morphia index, for women, its value was 15.95 ± 0.13 cm, which corresponds to the values of stenopyelitis, or narrow pelvis [2, 4-7]. The value of the relative pelvic width index (RPWI) was determined by us using the formula as a % ratio of the pelvic width (PW) - d. cristarum, cm, divided by the body length, cm. The average value of such a marker as the andromorphy index (AI) in the study group was 63.75, which corresponds to the indicators of the hypergynoid type, with reduced values of estrogen saturation and hyperandrogenism [2, 4-7]. When determining the values of the sexual dimorphism index (SDI), according to the method of J. Tanner and W. Marshall, and somatotyping carried out according to their formula, which has the following indicators: values less than 73.1 - gynecomorphic sexual somatotype; from 73.1 to 82.1 - transitional mesomorphic sexual somatotype (sex dysplasia); indicators from 82.1 and above - pathological, inverse, andromorphic sexual somatotype [2, 4-7]. We have established that the average value of the SDI in the group of female athletes studied was 95.99 ± 0.12 , which corresponds, after the somatotyping, to a pronounced, pathological for women, andromorphic sexual somatotype [1-3, 5, 7]. After analyzing the IPD values in the group, it was established that the gynecomorphic sexual somatotype is completely absent, and the mesomorphic (transitional) sexual somatotype is present only

in 2 (11.76%) female athletes professionally involved in strength sports and weightlifting.

Conclusions

1. All morphofunctional index values used by us in the course of the study, as markers for determining masculinization processes in female athletes, have shown their reliability and validity, and can be actively used in sports morphology.
2. This study, using a set of applied masculinization markers in female athletes, convincingly confirmed that long-term and intensive weightlifting exercises lead to adaptive somatic changes in the body of female athletes, towards a shift to mesomorphic and even the opposite for women, andromorphic sexual somatotypes.
3. The practical use of a number of indices, morphofunctional markers of masculinization in women's sports, used by the author of this study, is important both in the work of coaches and sports doctors, and provides objective, reliable information about inverse changes in somatic indicators and sexual somatotypes of the athletes studied.
4. The obtained results of the study fully confirmed the hypothesis put forward by the author of this study.

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DOI:10.31579/2692-9562/138

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