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ANALYSIS OF IDENTIFIED VARIANTS OF SEX SOMATOTYPES IN A NUMBER OF WOMEN'S POWER SPORTS

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Annotation

In this research article, the author presents the results and analysis of his study devoted to the study of the features of formation, dynamics of development, and establishment, adaptive formation, occurring somatic changes in the bodies of young athletes and inversions of their original sexual somatotypes, in 75 adolescent athletes involved in a number (six) strength sports, which can be conditionally attributed to the original male, such as, in particular: weightlifting, powerlifting, sambo wrestling, boxing, shot put and hammer put.

Key words: female athletes, strength sports, sexual somatotypes, inversions, adaptation.

Introduction

Today, active sports activities by women of different age groups are a common and widespread phenomenon. If a female athlete performs a series of physical exercise complexes for a long time, often, intensively and in a sufficiently large volume, then intensive adaptive-adaptive changes occur in her body in all of her organs and systems **[1,5,6]**. Most of all, changes occur in the athlete's body, involving the skeletal system (skeleton and its components), the muscular-ligamentous system, adipose and connective tissue. Adaptive processes are interconnected with significant changes in the endocrine, reproductive and other systems of the athlete. At the beginning of sports activities, almost all young athletes have an initial, basic for women - gynecomorphic sexual somatotype **[2-4]**. In the process of life, in the presence of systematic physical activity, the body and the organism as a whole begin to use a set of adaptive biochemical mechanisms to ensure the normal functioning of the body of each specific athlete. A new, adaptive type of metabolism, hormonal release is determined, an individual heart rate (HR) and number of respiratory movements (RM), blood pressure (BP) are selected. In the body (soma, from Latin «Soma»), its own changes also occur. In myocytes and myofibrils, metabolism goes along a more gentle, economical path, with an adaptive transition in the process of the Krebs cycle, an increase in muscle mass, and its dominance over adipose tissue. When determining the component composition of the body and determining the percentage ratio in the body of muscle, fat and bone tissue, the dominant amount of muscle is determined **[1,2]**. And for women, a decrease in the percentage of adipose tissue automatically leads to a violation of the reproductive function, in the form of ovarian-menstrual cycle disorders - hypomenorrhea, oligomenorrhea, amenorrhea and, ultimately, secondary amenorrhea **[2,3,5]**. In this process, the endocrine system is directly involved, with a gradual but inevitable decrease in the level of estrogens and an increase in the level of androgens in female athletes **[2,3,5]**. As a result, adaptive masculinization of the body of female athletes progresses. For sports results and the performance of intense loads - this is good, but for the female body of female athletes and, in particular, their endocrine and reproductive systems - it is bad **[2,3,5]**. As a result of long-term and intense sports activity, the physiological sexual somatotype of female athletes shifts, at first, towards the transitional, non-physiological, mesomorphic sexual somatotype, and then towards the pathological (inverse), the opposite of the female - andromorphic sexual somatotype **[2,3,5]**. Thus, the following definition of somatotype can be given: "Somatotype is a type of body structure and its muscle, fat, bone and other components and constituents that is formed in an individual in the course of his life as a response, compensatory reaction (adaptation) to a variety of physical, mental and other types of influence, including intense, long-term in time, strength and volume" (author's definition - Bugaevsky K.A., 2021©). In this regard, the issues of studying and analyzing the media-biological (including adaptive) processes occurring in the bodies of female athletes of reproductive age, during their long-term and intensive sports activities, and especially in the so-called "originally male" sports, are very relevant and in demand. The study we conducted is part of a more extensive complex of scientific studies of adaptive processes in female athletes.

Aim of Study

The purpose of writing this research article and the study conducted by the author is to present and objectively analyze the results obtained for an even better understanding of a number of medical and biological changes occurring in the bodies of female athletes under the influence of intense and prolonged physical and psycho-emotional stress on the female body, often leading to serious, and sometimes irreversible, adaptation processes in their bodies and psyche, affecting the processes of formation and adaptation shifts in their sexual somatotypes, with inversions in the formation of their pathological forms.

Hypothesis of the Study

The author of the conducted scientific study, in the process of forming the goal of the conducted study, a working hypothesis arose that in young women

of reproductive age, different age groups, engaged in a number of strength sports, which can be (conditionally) attributed to originally male sports, with long and intense (in terms of the strength and duration of their impact on the female body), physical and psycho-emotional loads arising in the process, both the training and competitive period, over time, various kinds of adaptive-adaptive processes can be formed and dynamically occur, leading, over time, to the formation in their bodies of various kinds and degrees of expression, inversions of their soma / body - at the level of formation, non-physiological for women, transitional and pathological somatotypes, and at the level of behavioral and psychological, also adaptive, changes associated with their behavior, perception of their own body and the changes occurring in it and physiological / pathophysiological processes, with their long-term and, often, professional training in these strength sports.

Material and Methods

This study was conducted on the basis of a number of sports sections and clubs from different regions of Ukraine, specializing in training female athletes in different areas, with the voluntary involvement of a coaching staff and 111 athletes. The frequency of training is from 5 to 6-7 times a week, for 2-2.5 hours. The level of athletic skill of the athletes is from a candidate for master of sports (CMS) to a master of sports (MS). representing 6 sports, which can be conditionally attributed to traditionally male. Representation by sports is as follows: weightlifting (n = 21); powerlifting (n = 19); sambo wrestling (n = 22); boxing (n = 18); shot put (n = 16); hammer throw (n = 15). The average age of young athletes was 23.47 ± 1.23 years. The experience of practicing these sports was from 5 to 12 years.

Results and Discussion

At the beginning of the study, we conducted the following anthropometric measurements, which were carried out using the classical method: shoulder width measurement, cm; pelvic width measurement, or interspinous size (d. spinarum), cm; body length, cm; body weight, kg. ‘Based on the results of the anthropometric indicators obtained, by mathematical recalculations, with strict consideration of the author's versions of the formulas, the necessary morphofunctional index values were calculated’. The anthropometric values obtained in each of the groups of athletes are presented in Table 1, at $p<0.05$

Table 1. Anthropometric Indicators in the Study Groups (n=111)

Name of the Indicator	Shoulder Width, cm	Pelvis Width, cm	Body Length, cm	Body Weight, kg
Weightlifting (n=21)	40,08±1,06	27,06±0,54	178,34±1,01	71,14±1,06
Powerlifting (n=19)	39,12±1,31	27,19±1,03	177,48±0,93	71,32±1,11
Sambo wrestling (n=22)	38,55±1,87	27,11±0,84	175,76±1,16	68,74±1,27
Boxing (n=18)	39,19±1,23	27,53±0,53	175,89±1,14	67,58±1,23
Shot put (n=16)	40,13±1,06	26,98±1,26	178,56±1,24	68,89±1,13
Hammer throw (n=15)	40, 65±1,08	28,02±0,77	1**77,**12±0,63	71,67±0,93

An analysis of the obtained anthropometric values showed that, according to the average group values, the female athletes in all six examined groups have broad shoulders and reduced pelvic width (d. cristarum), which is normally 28-29 cm **[1]**. This means that the female athletes in the examined groups have a male body type, which is one of the signs of the masculinization process occurring in their bodies. The ratio of body length and weight indicates the formation and proportionality of its component composition. The most powerful anthropometric indicators, compared to female athletes in other groups, are found in young athletes involved in weightlifting, powerlifting and hammer throwing. These are fairly strong athletes with a masculine body type. Based on the results of the anthropometric study data – body weight and length, shoulder and pelvic width, we calculated 2 morphofunctional index values – body mass index (BMI) and sexual dimorphism index (SDI), according to the author’s method proposed by J. Tanner (1996) **[2,4]**, with subsequent individual and average values for each studied group of female athletes. ‘The results of calculating the indicators of a number of morphofunctional index values obtained in the studied groups of female athletes are presented in Table 2, at $p<0.05$’

Table 2 Indicators of Morphofunctional Index Values in the Study Groups (n=111)

Name of the Indicator	Results Obtained	
	Body Mass Index (BMI) - kg/cm²	Sexual Dimorphism Index (SDI) - Conventional Units
Weightlifting (n=21)	22,42±0,14	95,82±0,73
Powerlifting (n=19)	22,78±0,23	93,07±0,44
Sambo wrestling (n=22)	22,37±0,31	93,31±0,32
Boxing (n=18)	21,98±0,19	93,2±0,14
Shot put (n=16)	21,68±0,22	95,43±0,38

Hammer throw (n=15)	22,98±0,28	96,4±0,56

The analysis of the obtained results of morphofunctional index values in the female athletes of the studied groups, who have been professionally involved in traditionally male sports for a long time, is very revealing and informative. Although the body mass index (BMI) values in all the studied groups of female athletes correspond to the norm **[2-5]**, the average group values of the sexual dimorphism index (SDI), according to the obtained values, objectively and reliably indicate that in all groups of female athletes, there are no representatives of the physiological, gynecomorphic sexual somatotype. Representatives of the transitional, mesomorphic sexual somatotype are isolated in the groups where the athletes are involved in boxing and sambo wrestling. The dominant, absolutely in all groups, is the pathological for women, inverse sexual somatotype **[2-5]**. Thus, we have established that female athletes who have been professionally involved in a number of sports, conventionally classified as “primordially male,” for a long time have undergone adaptive formation of variants of sexual somatotypes that are not characteristic of the female body.

Conclusions

1. It has been established that female athletes of reproductive age, who have been involved in strength, traditionally male sports for a long time, experience intensive adaptive somatic processes that lead to their masculinization.
2. Statistically, all the obtained indicators, a number of morphofunctional index values, indicate the phenomena of adaptive masculinization and hyperandrogenism, the opposite of the initial, basic feminine state of female athletes of reproductive age.
3. It has been reliably established that in all the studied groups of athletes, there are no representatives of the physiological, feminine, gynecomorphic sexual somatotype.
4. It has been determined that the dominant sexual somatotype, in all groups of athletes, is the inverse, andromorphic sexual somatotype, identified in 97.54% of all the studied athletes.
5. It was established that the remaining 2.46% of female athletes have a transitional, mesomorphic sexual somatotype.
6. The analysis of the obtained results of the conducted research fully confirms the research hypothesis put forward by the author, which is a direct confirmation of the importance and necessity of conducting such studies concerning various aspects of medical and biological changes in female athletes involved, both professionally and at an amateur level, in various types of modern sports.

References

1. Bugaevsky K.A. Bugaevskaya N.A. (2020). Women's athletic sports and martial arts: changes in sex somatotypes // Actual problems of physical culture, sports and tourism: materials of the XIV International scientific and practical conference: in 2 volumes / Ufa state aviation tech. univ. Ufa: RIC UGATU, XIV International scientific and practical conference "Actual problems of physical culture, sports and tourism". 25-27, 276-281.
2. Bugaevsky K.A. (2016) Anthropometric and morphological features of the pelvis in somatotypes according to the classification of J. Tanner in female students of a special medical group // Scientific and practical journal "Science and Education" of the Pivdenno-Ukrainian National Pedagogical University named after K.D. Ushinsky. 6, 56-65.
3. Nenenko N.D, Abramova O.A, Chernitsyna N.V, Kuchin R.V. (2014) Study of gender-dependent characteristics of female athletes, representatives of feminine, masculine and neutral sports / Modern problems of science and education. 6: 15-25.
4. Mandrikov VB, Samusev RP, Zubareva EV, Rudaskova ES, Adelshina GA (2015) On the issue of inversion of sexual dimorphism indicators in representatives of masculine sports / Bulletin of VolGMU. 4(56):76-78.
5. Oleynik EA, KA Bugaevsky (2020) Features of sex somatotypes and a number of anthropometric indicators in athletes in women's pair acrobatics / Man. Sport. Medicine. 20(2):22-28.
6. Platonov VN, Bulatova MM, Kosminina ES (2012) Medical and biological grounds for limiting the development of the female part of the Olympic Games program / Sports Medicine. 1:3-9.