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Research Article

Women's Judo: Sex Somatotypes and Their Variants in Female Students of The Physical Education University

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Abstract

This research article presents the results and analysis of the conducted study, which aims to study and analyze the variants of the identified sexual somatotypes in female students of the 1st to 5th years of the University of Physical Education, professionally engaged in such a type of martial arts as judo. The ongoing dynamics in the change of sexual somatotypes, from physiological to pathological, is a direct consequence of active adaptive processes occurring in the bodies of young female athletes of different age groups, in response to long-term accumulation of physical activity.

Key words: female students; university of physical education; judo; sexual somatotypes

Aim of the article

The purpose of this article is to present and analyze the results of a study devoted to the study of the variability of sexual somatotypes in female students of different years of university involved in judo.

Introduction

Professional training in any kind of modern sport, with its intensive physical and psychological loads on the body of sportswomen of different age groups, during the training and competition period, has a direct impact on the changes occurring in their body. These adaptive processes directly affect all organs and systems of the body of sportswomen. In order to achieve success and victories in any kind of sport, you need to be stronger, faster, more resilient than your competitors, be able to quickly rebuild and adapt to difficult conditions and increased requirements of each of the sports disciplines. The musculoskeletal, cardiovascular and respiratory systems, endocrine and reproductive systems, like all the others, must work in an increased, but economically rational mode, which ultimately leads to victory [1-4].

Many researchers of recent years have reliably noted that the winners are primarily "masculine sportswomen", in whose bodies adaptive processes lead to a somatic (bodily) restructuring of the sportswoman to the energy supply and functioning mode of the "male type". In other words, sportswomen undergo a process of masculinization and androgenization, with active hormonal restructuring, one of the key moments of which is a change in the hormonal supply of the sportswomen's body - hyperandrogenism (an increase in male sex steroids and, accordingly, compensatory hypoestrogenism, with a decrease in the production of their own estrogens and their effect on the sportswoman's body [1-4]. Such a type of martial arts as judo, which attracts an increasing number of sportswomen of different age groups, is no exception.

There is the following regularity, confirmed by both domestic and foreign researchers of this problem - the more time, volume and level of sports qualification of the athlete, the greater the probability of the shift of her sexual somatotype from the physiological gynecomorphic, to the intermediate (transitional) - mesomorphic and, in fact, to the pathological for women, inverse - andromorphic sexual somatotype [1-4]. This entire long path of adaptation to constantly increasing physical activity is accompanied by forced adaptive changes in all organs and systems of the athlete's body. At the same time, hyperandrogenism and masculinization of the body become inevitable phenomena, and the reproductive system of female athletes falls into an adaptive "sleep" mode of a forced "waiting" state, until the situation changes. In an athlete, due to hyperandrogenism, strength, speed, endurance, physical performance increase, which brings its fruits in the form of an increase in athletic achievements and victories in competitions. Most athletes and their coaches are quite satisfied, especially during the peak of active sports activity and demand for the athlete. But what next, when sports are left in the past and no longer relevant?! Unfortunately, there are practically no global studies talking about the long-term consequences of such adaptive restructuring in the body of female athletes.

There are many research works revealing the negative aspects of the "triad" of female athletes, there are a number of works on late pathology of the cardiovascular (ischemic heart disease) and skeletal systems (osteoporosis), pathological course of menopause and other problems associated with the reproductive and endocrine systems in older and elderly female athletes. [1-4]. In this regard, a thorough study of the dynamics of changes in sexual somatotypes in female athletes of different age groups, in different sports, is very relevant and in demand.

Research hypothesis

In the initial period of preparation for this study, and even before writing my research article based on its results, the following working hypothesis was put forward: in young female athletes involved in such a martial art as judo, as the duration and intensity of the training and competition process increases, as well as the intensity and increase of physical and psycho-emotional loads, changes in their sexual somatotypes are permanently formed, inversely turning into a mesomorphic and, in some cases, into a pathological for women, andromorphic sexual somatotype, as a result of their adaptive masculinization.

Method and materials of the study

The study involved female students of the University of Physical Education and Sports, 1st-5th years, professionally involved in judo: 1st year - 19 athletes; 2nd year - 17 athletes; 3rd year - 18 athletes; 4th year - 16 athletes; 5th year - 17 athletes. A total of 87 young athletes, of adolescence (18.74±1.03 years) and the first reproductive (mature) age - 22.26±1.34 years. Sports experience - from 3.5 to 10 years. The level of sports qualification - from II-I category to candidate for master of sports and master of sports. The frequency of training - from 4-5 to 5-7 times a week, for 1.5-2.5 - 3 hours. All athletes who took part in the study expressed their voluntary participation. In conducting this study, the anthropometric method was used to determine the biacromial size (shoulder width) and the intercrestal size of the bony pelvis (d. cristarum), or the width of the pelvis in female athletes, in cm. The obtained dimensions were used to determine the value of the sexual dimorphism index (SDI), calculated according to the method of J. Tanner (1996), with subsequent determination of the values of sexual somatotypes in each of the groups of female athletes we studied [1-4]. Also, the method of critical analysis of available sources of information on the issue under study, the method of mathematical statistics, was used.

All female athletes who took part in the study gave their voluntary consent to participate in it, both verbal and written.

Results of the study and discussion

After conducting the anthropometric measurements of the shoulder and pelvic width, in cm, required for the study, the results were obtained, reflected in Table 1, at $p>0.05$:

Name of the indicator	Shoulder width, cm	Pelvis width, cm
1st year students (n=19)	34,12±1,41	27,14±0,53
2st year students (n=17)	35,39±1,23	27,38±0,55
3st year students (n=18)	36,69±1,36	27,78±0,68
4st year students	38,44±1,43	28,29±0,36
5st year students (n=17)	39,28±1,47	27,79±0,88

Table 1: Anthropometric indicators in the studied groups of judo female students

The analysis of the obtained anthropometric results showed that with age (from junior to senior years), as they grow older and mature, the transverse dimensions of the width of the shoulders and pelvis increase. But, at the same time, in all groups of female athletes, the shoulder width indicators exceed the pelvis width indicators, which corresponds to a masculine, not feminine, body type in female athletes. Also, the average pelvis width values do not quite correspond to the normative for this age group, at 28-29 cm. Only in female students, starting from the 3rd to the 5th year, inclusive, this indicator approaches the average normative values, which indicates (indirectly) the phenomena of androgen and estrogen imbalance, such as hyperandrogenism/hypoestrogenism. Sportswomen, especially senior students, with large volumes of physical activity, long sports experience and a higher level of sports qualifications, have a clearly masculine (trapezoid) body type - with broad shoulders and narrow pelvis [1-4]. After carrying out the necessary mathematical recalculations in order to determine the indicators of the sexual dimorphism index (SDI), according to the method of J. Tanner (1996), its values were obtained, presented in Table 2:

Name of the indicator	Gynecomorphic sexual somatotype	Mesomorphic sexual somatotype	Andromorphic sexual somatotype
1st year students (n=19)	11 (57,89%)	8 (42,11%)	No
2 st year students (n=17)	7 (41,18%)	10 (58,82%)	No
3 st year students (n=18)	4 (22,22%)	12 (66,67%)	2 (11,11%)
4st year students (n=16)	No	12 (75,00%)	4 (25,00%)
5st year students (n=17)	No	11 (64,71%)	6 (35,29%)

Table 2: Values of the SDI in the studied groups of female judo students

The analysis of the obtained results convincingly showed that in female students from the first to the fifth year, as they mature, increase their sports experience, grow their sports qualifications and undergo many years of intensive physical activity, changes occur in the adaptive formation of their sexual somatotypes. Thus, if in first-year students, with the least sports experience, level of sports qualifications and still insignificant physical activity, the physiological sexual somatotype dominates over the number of mesomorphic athletes, with a complete absence of representatives with andromorphy, then gradually, the picture begins to change. In second- and third-year students, although an insignificant number of gynecomorphic athletes remains, their number decreases sharply. The number of mesomorphic athletes increases, and in the third year, athletes with a pathological, andromorphic sexual somatotype already appear. Among 4th and 5th year students, as their sports qualifications grow, their sports experience and long-term, multi-year cumulative volume of physical activity increases, the number of mesomorph and andromorph sportswomen grows. Naturally, their level of strength, endurance, speed, physical performance, adaptive response of the body, as well as sports achievements, is significantly higher.

Conclusions

1. As age, level of sports qualification, sports experience and physical activity increase, young female athletes actively change their sexual somatotypes.
2. The ongoing dynamics in the change of sexual somatotypes, from physiological to pathological, is a direct consequence of active adaptive processes occurring in the bodies of young female athletes of different age groups, in response to long-term accumulation of physical activity.
3. The hypothesis of the study, put forward by its author, was confirmed in full.

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