

# Phenomena of the Process of Masculinization and its Peculiarities in Sports Women Participated in Greco-Roman and Free-Style and Wrestling in Gender Somatotypes

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**\*Corresponding author:** Bugaevsky KA, Department of Medical and Biological Foundations of Sports and Physical Rehabilitation, The Petro Mohyla Black Sea State University, Ukraine

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**Bugaevsky KA\***

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

## Annotation

The paper presents the results of a study devoted to determining the degree of masculinization manifestations in sexual somatotypes in female athletes of adolescence and I mature (reproductive) age, engaged in freestyle and Greco-Roman (classical) wrestling. The study involved 14 female youth athletes and 13 female athletes of the 1<sup>st</sup> mature age, engaged in freestyle wrestling, as well as 15 female athletes of youth and 11-1<sup>st</sup> mature age, engaged in Greco-Roman (classical) wrestling. Total: 29 youth athletes and 24 senior athletes. It was found that in both groups of young athletes, the width of the shoulders exceeds the width of the pelvis. The girls are broad-shouldered, with narrow pelvises, which corresponds to the masculine body type of female athletes. In the group of female athletes of the first reproductive age, it was reliably determined that the average values of shoulder width in female athletes of both groups exceed the values of pelvic width, which also indicates the masculine body type of female athletes. Analysis of the obtained indicators of morpho functional index values showed the following: The average values of the index of sexual dimorphism in the group of young athletes involved in Greco-Roman wrestling are approaching the maximum limit values of the mesomorphic sexual somatotype, even though in this age group there are no athletes with physiological gyneco morphic, and with a pathological-andromorphic sexual somatotype. In the group of female athletes involved in freestyle wrestling, there were also no female athletes identified with a gyneco morphic sexual somatotype. At the same time, this group is dominated by athletes with a pathological, andromorphic sexual somatotype-9(64.29%) and with a transitional, mesomorphic sexual somatotype-5(35.71%). The average values of the masculinization index in female athletes of both groups correspond to indicators indicating the initial processes of a decrease in estrogen levels and the formation of hyperandrogenism phenomena (indicators less than 1.15).

As a result of the study, it was determined that in the group of young female athletes involved in classical wrestling, athletes with a mesomorphic sexual somatotype dominate, and in the group of young female athletes involved in freestyle wrestling, athletes with an andromorphic somatotype and masculinization phenomena dominate, with manifestations present in both studied groups hypoestrogenism. It has also been established that in groups of female athletes of the first mature age involved in classical and Greco-Roman wrestling, masculine female athletes dominate, both with mesomorphic and, mainly, with inverse andromorphic sexual somatotypes.

**Keywords:** Sportswomen; Single combats; Freestyle wrestling; Classical wrestling; Sexual somatotypes; Masculinization

**Abbreviations:** WP: Width of the Pelvis; WS: Width of the Shoulders; SDI: Sexual Dimorphism Index, according to J. Tanner; BMI: Body Mass Index; MI: The Masculinization Index; AI: Andromorphic Index; CMS: Candidate for Master of Sports; MS: Master of Sports

## Introduction

Women's sport and its medical and biological features in recent years have been the object of close study by specialists from various areas of medicine, psychology and biological sciences. A high level of workload, increased competition, the desire for victory and self-affirmation in life through sports success and achievements-this is not a complete list of

the motivation of female athletes of different age groups. Mass character of sports activities, incl., and the desire of women to be on a par with men, to “conquer” men’s sports and achieve success in them, is characteristic of female athletes, both in our country and abroad [1-3]. At the same time, often, both the athletes themselves and their coaching team do not consider and sometimes, they clearly ignore the changes that occur in the body of an athlete, as adaptive (adaptive) processes in response to the intense demands, both in frequency and in their volume, physical and psychological loads in the training and competitive process of these athletes [4-6]. Depending on the age of the athlete and the time of the start of sports, as well as the specifics of this sport, somatic restructuring of many organs and systems of the female body is formed. As a result, there are negative changes in metabolism, hormonal changes, displacement of sexual somatotypes, disturbances in the functioning of the reproductive system, and other processes [4-6].

### Aim of Study

Considering the above, the purpose of our work is to study the processes of masculinization occurring in athletes of different age groups, in the sex somatotypes identified in them.

### Material and Methods

When conducting this study, we used such methods as: anthropometry, with the determination of the length and weight of the body of athletes, the determination of their interacromial diameter (shoulder width) and intercrest size (pelvis width), as well as trochanter size (distance between the greater trochanters of the femoral bones); the method of indices, with the determination of the Body Mass Index (BMI) of female athletes, the Sexual Dimorphism Index (SDI), according to the formula of J. Tanner, the Masculinization Index (MI); Andromorphic Index (AI); the method of literary analysis, using available domestic and foreign materials related to the problem under study; method of mathematical statistics of the obtained research results. 14 female athletes of youthful age and 13 female athletes of the 1<sup>st</sup> adult age involved in freestyle wrestling, as well as 15 female athletes of the youthful age and 11-1<sup>st</sup> of mature age involved in Greco-Roman (classical) wrestling took part in the study. In total: 29 female athletes of

youthful age and 24 female athletes of the I mature age. The sports experience of female athletes of youthful age is from 3 to 5 years, and in the group of female athletes of the I mature age-from 3-6 to 10 years. The average age of young sportswomen was 15.34±1.03 years, and the middle-aged sportswomen -23.72±1.24 years. The level of sports qualification-from I, II category for young athletes, to Candidate for Master of Sports (CMS) and Master of Sports (MS)-for senior female athletes. The frequency of classes is from 4-5 to 5-6 times a week for 1.5-2 and 2-3 hours per lesson. All athletes who took part in the study gave their written, voluntary consent to it.

### Result and Discussion

After carrying out the necessary anthropometric measurements-body length and weight, width of the shoulders and pelvis, intertrochanteric diameter in each age group, the indicators presented in Table 1 were determined. 1, at  $p < 0.05$ . As can be seen from the results of anthropometry, the indicators in both groups of athletes are close in value to each other. Attention is drawn to the fact that in both groups of young athletes the width of the shoulders exceeds the width of the pelvis. The girls are broad-shouldered, with narrow pelvises, which corresponds to the masculine body type of the athletes. At the same time, the width of the pelvis corresponds to their age parameters, as well as the trochanteric (intertrochanteric) size. Both indicators are approaching the values that female athletes should have in 1.5-2 years: intercrest diameter (pelvis width)-28-29cm, and intertrochanteric size (d. trochanterica)-31-32cm [1-3,6]. The average values of weight and height indicators in both groups also correspond to age norms in the population [1-3,6]. Also, in the group of female athletes of the I mature (reproductive) age, after carrying out the necessary anthropometric measurements performed according to classical methods, the indicators were obtained, which are presented in Table 2, at  $p < 0.05$ . The analysis of the obtained anthropometric indicators in the group of female athletes of the 1<sup>st</sup> mature (reproductive) age also showed that the female athletes are close in terms of the obtained values of their average anthropometric indicators. The obtained dimensions of the pelvis are quite consistent with the values of the bone pelvis of women in the population (29-29cm for the intercrest diameter and 31-32cm for the intertrochanteric diameter) [1-3,6].

**Table 1:** Anthropometric indicators of female athletes of youthful age.

Name of Indicator	Freestyle Wrestling (n=14)	Greco-Roman Wrestling (n=15)
Body length, cm	168,32±1,34	167,56±1,17
Body weight, kg	62,36±1,04	61,12±1,13
Interacromial diameter shoulders, cm	34,64±0,73	34,89±0,79
Intercrest diameter of the pelvis, cm	27,04±0,83	27,13±0,47
Intertrochanteric size of the pelvis, cm	28,45±1,03	29,28±1,06

**Table 2:** Anthropometric indicators of female athletes of the first mature age.

Name of Indicator	Freestyle Wrestling (n=13)	Greco-Roman Wrestling (n=11)
Body length, cm	173,41±0,72	171,65±0,66
Body weight, kg	69,12±0,83	68,93±0,79
Interacromial diameter shoulders, cm	37,79±0,81	37,83±0,89
Intercrest diameter of the pelvis, cm	27,71±0,36	28,23±0,47
Intertrochanteric size of the pelvis, cm	29,68±0,47	30,73±0,53

Mass-height proportions in both groups of athletes also correspond to population criteria [7]. But, at the same time, the average values of the width of the shoulders in athletes of both groups exceed the values of the dimensions of the width of the pelvis, which also indicates the masculine type of figure of the athletes [1-3,6]. Also, morpho functional index values were determined in each of the age groups. The obtained indicators, in athletes of youthful age, are presented in Table 3, at  $p < 0.05$ . Analysis of the obtained indicators of morpho functional index values showed the following: BMI values in young athletes of both groups are within the normal range. The average values of SDI in the group of young female athletes involved in Greco-Roman wrestling are approaching the maximum limit values of the mesomorphic gender somatotype, even though in this age group there are no female athletes with a physiological gynomorphic and with a pathological andromorphic sexual somatotype [1-3,6]. In

the group of female athletes involved in freestyle wrestling, there were also no athletes with a gynomorphic sexual somatotype. At the same time, this group is dominated by female athletes with a pathological andromorphic sexual somatotype -9(64.29%) and with a transitional, mesomorphic sexual somatotype -5(35.71%) [8]. The average values of the Masculinization Index (MI), in athletes of both groups, correspond to the indicators indicating the initial processes of reducing the estrogen background and the formation of hyperandrogenism (indicators less than 1.15) [1-3,6]. The average values of the Andromorph Index (AI) in both groups correspond to the hypernode type (less than 67.5) [1-3,6]. Similar mathematical calculations, necessary to obtain indicators of morpho functional index values, were also carried out in the group of female athletes of the 1<sup>st</sup> mature age. The results obtained are presented in Table 4, at  $p < 0.05$ .

**Table 3:** Index values for female athletes of youthful age.

Name of Indicator	Freestyle Wrestling (n=14)	Greco-Roman Wrestling (n=15)
Body mass index, kg/cm <sup>2</sup>	22,48±0,12	22,07±0,23
Sexual dimorphism index	88,24±0,33	79,44±0,14
Masculinization Index	1,17±0,11	1,2±0,37
Andromorphy index	55,43±0,09	48,88±0,41

**Table 4:** Index values for female athletes of the first mature age.

Name of Indicator	Freestyle Wrestling (n=13)	Greco-Roman Wrestling (n=11)
Body mass index, kg/cm <sup>2</sup>	23,12±0,21	23,55±0,11
Sexual dimorphism index	88,21±0,13	87,46±0,14
Masculinization Index	1,28±0,22	1,24±0,34
Andromorphy index	55,50±0,13	50,64±0,18

The average group values of the Body Mass Index (BMI) in athletes of this age group correspond to the standard values [1-3,6]. The average indicators of the index of sexual dimorphism in both groups of female athletes of this age group correspond to the values of the andromorphic sexual somatotype (more than 82.1) [1-3,6]. At the same time, in both groups there are no athletes with a physiological sexual somatotype (upper, maximum values (up to 82.1), and the number of athletes with a mesomorphic somatotype in the freestyle wrestling group is 4 (30.77%), and in the classical wrestling group -3 (27.27%). Indicators of the index of masculinization, in athletes of both groups, indicate a stable phenomenon of hypoestrogenism (indicators less than 1.15) [1-3,6]. The average values of the Andromorph Index (AI), in both studied groups, indicate the presence of the heparinoid type in athletes (an indicator of less than 67.5) [1-3,6].

## Conclusion

A. In the group of young female athletes involved in classical wrestling, female athletes with a mesomorphic sexual somatotype dominate, and in the group of young female athletes involved in freestyle wrestling, female athletes with andromorphic somatotype and masculinization phenomena dominate, in the presence of manifestations of hypoestrogenism in both studied groups.

B. It has been established that in the groups of female athletes of the first mature age, engaged in classical and Greco-Roman wrestling, masculine female athletes dominate, both with mesomorphic and mainly, with inverse andromorphic sexual somatotypes.

C. We believe that the shift of the sexual somatotype, the phenomena of masculinization and hypoestrogenism are formed adaptively because of many years of intense physical activity.

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