

Female Wrestling: The Finger Index «2d:4d» Of Female Athletes

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Abstract

Aim of study

The aim of this article is to present and analyze the research conducted to identify the changes in the values of finger index 2D:4D, in a group of female athletes, intensively and professionally engaged in such types of martial arts as pankration and judo wrestling and pankration.

Hypothesis of the study

The hypothesis of this study is that female athletes with mesomorphic and andromorphic sex somatotypes, and values of finger index 2D:4D, male type, will have better sports results when practicing their sports - judo wrestling and pankration, which is due to the medical and biological restructuring of their body, under the influence of intense physical and psycho-emotional loads.

Keywords: athletes; masculinization; finger index «2D:4D»; pankration; judo female wrestling

Introduction

In recent years, women's sports and its medical and biological features have been the object of close study by specialists from various fields 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 motivations for female athletes of different age groups. Mass participation in sports, incl. and the desire of women to be on an equal footing 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, 6]. At the same time, often both the athletes themselves and their coaching team do not take into account, and sometimes, clearly ignore, the changes that occur in the athlete’s body as adaptive processes in response to intense demands, both in frequency and in their volume, physical and psychological stress in the training and competitive process of these athletes [2; 4; 6]. Depending on the age of the athlete and the time she started playing sports, as well as the specifics of this sport, somatic changes in many organs and systems of the female body are formed. As a result, negative changes in metabolism, hormonal changes, shifts in sexual somatotypes, disturbances in the functioning of the reproductive system and other processes occur [2, 4, 6].

For several decades now, interest in studying various aspects of women's sports, including issues of masculinization among women in various types of martial arts, has not decreased. In the developing sport of pankration,

as in other types of martial arts, female athletes are subject to intense physical and psycho-emotional stress, leading to adaptation of their body with a tendency towards morphological and psychological masculinization [1, 2, 3]. These changes concern the endocrine system and affect the reproductive function of female athletes, forming the phenomenon of masculinization, with a concomitant decrease in the amount of adipose tissue and an increase in muscle mass, disturbances of the ovarian-menstrual cycle, and the formation of mesomorphic and andromorphic sexual somatotypes.

Modern principles of selecting female athletes in initially male sports, which can safely include pankration and judo, also imply the use of such an important diagnostic method as determining the finger index “2D:4D” according to J.T. Manning i.e. the ratio of the length of the index (second) finger and ring (fourth) finger [4]. It has been determined that the growth of the index finger is influenced by the “female” sex hormone estrogen, and the growth of the ring finger by the “male” hormone testosterone.

One of the factors influencing this proportion can be considered the intrauterine development of a female fetus under conditions of increased androgen content, which is typical for women involved in sports before and during pregnancy [4, 5]. For women, the 2D:4D ratio is 0.99–1.1 [4]. Values determined below this standard indicate an increase in testosterone levels in the women studied, incl. female athletes. The use of this method in modern sports medicine and morphology provides an additional

opportunity in the sports selection and training process to identify female athletes with congenital signs of masculinization [1, 2, 3, 5].

Material and methods

This study was conducted at NSU. P.F. Lesgafta, St. Petersburg" and on the basis of the sports club "Pankration", in Novaya Kakhovka. It was attended by 23 athletes involved in pankration and 16 in judo wrestling. Sports qualification: from 1st category to Master of Sports; age: 18-20 years. The control group consisted of 18 girls who did not go in for sports. The finger index was calculated as the ratio of the lengths of the second and fourth fingers of the hand according to J.T. Manning [4]. Direct measurements of the length of the 2nd and 4th fingers on both hands were

taken from the inner edge of the basal ridge at the base of the finger to the tip of the finger without pressure in each participant. Each finger was measured twice using an electronic caliper (with an accuracy of 0.01 mm). It was considered that if the finger index "2D:4D" was less than 0.99, it was a male type of hand, and values from 0.99 to 1.1 were a female type.

Results and discussion

As a result of the study of the finger index in female athletes, the following results were obtained, which are presented in the **table1**.

Types of women's wrestling	Xcp ± Sx	δ	CV %
Pankration (n=23)	0,981±0,007*	0,05	4,9
Women's judo (n=16)	0,975±0,006*	0,29	3,8
Control group (n=18)	0,995±0,004	0,036	3,5

*- the differences are significant, compared with the control, at $p < 0.05$

Table 1: Values of the digital index in the studied groups

Also, as a result of the study, we determined the index of sexual dimorphism, according to the method of J. Tanner's, and the number of different somatotypes both in the two studied groups of female athletes and in the control group. Tanner's, and the number of different somatotypes, both in the two studied groups of female athletes and in the control group. The obtained data are reflected in

Types of sport/uniform combat	Gynecomorphic sexual somatotype	Mesomorphic sexual somatotype	Andromorphic sexual somatotype
Pankration (n=23)	7 (30,43%) female sportsmens	9 (39,13%) female sportsmens	7 (30,43%) female sportsmens
Judo (n=16)	5 (31,25%) female sportsmens	7 (43,75%) female sportsmens	4 (25,00%) female sportsmens
Control group (n=18)	16 (88,89%)	2 (11, 11%)	not identified

Table 2:

In the studied groups of female athletes (n=39), 12 (30,77%) with gynecomorphic sexual somatotype were identified in total, and 11 (28,21%) athletes with transitional, non-physiological mesomorphic sexual somatotype and 11 (28,21%) with pathological for women andromorphic sexual somatotype. In all studied groups of female athletes, non-physiologic for women sex somatotypes were determined in 27 (69,23%) female athletes.

Female athletes involved in martial arts, like girls in the control group, have both male and female types of hands. Equal lengths of the second and fourth fingers were also observed. At the same time, the average index values among female athletes were lower than in the control group. The largest representation of female athletes with male-type finger proportions was found in the group of girls involved in judo wrestling (76%). The dominance of the female type of hand and the same length of the studied fingers were more often found in non-athletes. Among pankration representatives, index values less than 0.99 were found in 65% of cases. The predominance of women in sports, with various signs of acquired and congenital masculinization, is noted by many researchers [3, 5].

The multi-stage process of sports selection promotes the concentration of females with individual characteristics approaching male parameters in sports that require masculine traits, which gives these female athletes a number of advantages in these sports.

Conclusions:

1. Thus, in terms of finger index indicators in various types of martial arts, female athletes with genetically determined masculinization predominate.

2. The finger index, which is quite simple to use, can be used in the practice of sports activities as one of the informative criteria for the masculinization of the female body.

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