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Review Article

Analysis of Finger Index Values in a Group of Female Athletes Engaged in Pankration Wrestling

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Abstract

The article presents the results of a study devoted to the study of the values of the index 2D:4D in athletes of adolescent and I reproductive age, engaged in pankration. The sportsmen studied the variants of the manifestations of the values of the finger index. 4 (33.33%) girls have finger proportions corresponding to manifestations of femininity. In the group of athletes of the I age of reproductive age, only 1 (9.09%) female athlete were found feminine values of finger proportions, and in the remaining 10 (90.91%) female athletes. The data obtained as a result of the research gives the right to assert that the finger proportions 2D:4D can serve as markers reflecting the masculinization and are the criteria for predisposition to sports activity, and one of the methods for selecting young men and girls in different sports.

Keywords: female athletes: adolescents: I reproductive age: masculinization: finger index 2 D:4 D: pankration

Introduction

For several decades, interest in the study of various aspects of women's sports, including masculinization in women in various types of martial arts, has not been reduced. The occupation of young women with such a sport as Pankramion is no exception. Here, as in other types of martial arts, the young athletes of athletes reflect intensive physical and psycho-emotional stress, leading to the adaptation of their body to increased requirements, reflected in the restructuring of all systems and organs of girls, with a tendency to masculinization [1, 2, 3]. First of all, these changes relate to the reproductive and endocrine systems, which consist in dualism of hyperandrogenia/ hypoestrogenia.

As a result of long-term adaptive processes, the athletes form the phenomena of masculinization, with an accompanying decrease in the amount of adipose tissue and an increase in muscle mass, impaired ovarial-menstrual cycle (OMC), and the formation of mesomorphic and andromorphic sexual somatotypes. Modern principles of selection of ауьфду athletes to initially male sports, which can be safely attributed to Pankramion, also suggest, also, the use of such an important diagnostic method as determining the finger index 2D:4D by J.T. Manning i.e. The ratio of the length of the index (second) finger and ring (fourth) [1-14].

The length of the index finger is affected by the “female” sex hormone estrogen, and the “male” hormone testosterone. One of the factors affecting this proportion can be considered the intrauterine development of the female fruit in conditions of increased androgen content, which is typical for women who are engaged in sports before and during pregnancy [1-14]. The importance of using this method in modern sports medicine, anatomy and other disciplines has been repeatedly emphasized by leading researchers of this problem [4].

So, for example, R.V. Oleinik, in his study, comes to a very important conclusion that “the ratio of the length of the second and fourth fingers of the representatives of different sports has a certain differentiation and ... the viability of the fingers of the fingers according to the male type, as a rule, is characteristic of the athletes of high-speed-power and power sports ”and“ the ratio of the length of the second finger to the fourth “2D: 4D” has a pronounced sexual dimorphism due to the negative influence of prenatal testosterone and positive - prenatal estrogen ”[2]. This opinion coincides with the conclusions of authors such as Yaroshevich S.P. and Vrubblevskaya O.D., 2016 “The finger proportion of manning 2D:4D is a manifestation of sexual dimorphism” [4]. This conclusion adheres to Mandrikov V.B. with co-authors, who in their study indicate not that “among athletes involved in masculine sports more often than among non-passage girls there are women with morphological signs of inversion of sexual dimorphism” [5]. These authors also argue that “athletes involved in masculine sports, the morphological signs of inversion of sexual dimorphism in the tanner indexes and the finger proportions “2D:4D”, which can be used as morphological criteria for the selection of girls for masculine sports” [5].

Manning J.T. with co -authors, in their studies, reliably established that for women the ratio of 2 D:4 D is 0.99–1.1 [6; 7, p. 446–450; 8, p. 446–450]. The values determined below this standard indicate an increase in testosterone levels in women under study, including athletes. These values indirectly indicate the ongoing processes of masculinization in the body of athletes and corresponds to the male criteria of the finger index according to the criteria J.T. Manning [1-14]. If the indicators exceed the indicated values, this indicates a decrease in testosterone level and, accordingly, an increase in estrogen levels. As a result of numerous studies, it was found that the value

of the finger index "2D:4D" in less than 0.99 in women indirectly indicate an increased level of testosterone in the body and the possible effect of masculinization, manifested in various morphological and psychological characteristics [1-14].

Method and materials of the study

This study was conducted on the basis of the sports club (SK) Pankration, coach Dmitry Tsibulenko, in the city of New Kakhovka, Kherson region, Ukraine. It was attended by 2 groups of athletes (n = 23), engaged in Pankration. The first group included athletes of adolescence (n = 12) and I of reproductive age (n = 11).

During this study, the ratio of the second and fourth fingers of the brush was determined (2D:4D proportion index), an analysis of the affordable domestic and foreign scientific literature on the issue studied, the method of mathematical statistics. Direct measurements of the length of the 2nd and 4th fingers of both hands were made from the inner edge of the basal crest at the base of the finger to the tip of the finger from each participant according to the method developed by J.T. Manning with co -authors [4]. Each finger was measured twice using a caliper (with an accuracy of 0.01 mm) [4]. In the group of athletes of adolescence (n=12), after processing and analyzing the obtained research materials, we obtained the following results: the average age of athletes was 20.04 ± 0.75 years. Pancration classes - from 3.5 to 5.8 years. The level of sports qualifications - from I category to a candidate for master of sports (CMS) and master of sports (MS). The intensity of training sessions is 4-5 times a week, 2.5-3 hours each. Competitive experience-from 1.5 to 3 years. The average age of athletes of reproductive age was 22, 43±0.76 years. Sports qualification level - CMS and MS. The intensity of training sessions-5-6 times a week, 3.5-4 hours. Competitive experience-from 4.5 to 6 years.

The finger proportion, or the finger index is calculated by dividing the length of the second finger into the length of the fourth finger [3, 7] in women, the proportion is "turned upside down" and is from 0.99 to 1.1 (female type of brush). The finger proportion of the length of the second (2D) and the fourth (4D) fingers, called the "Manninga ratio", was determined by the author's methodology and are presented in the figure.

All female athletes who took part in the study conducted by the author of this article, the study, gave them to participate in it, their voluntary, both oral and written consent.

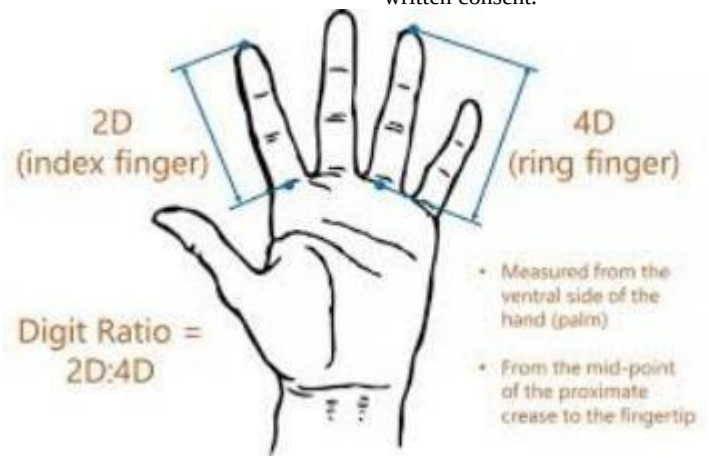

Figure: Finger proportion 2D:4D fingers (2D:4D ratio for finger length [IMAGE] | EurekAlert! Science News Releases)

Results of the study and discussion as a result of the study, to determine the values of the finger index in the studied groups, the following results were obtained, which are presented in table.

Name of the indicator	**2D < 4D**	**2D = 4D**	**2D > 4D**
Female Athletes of adolescence (n=12), engaged in pankration.	1 (8,33%)	7 (58,33%)	4 (33,33%)
Female Athletes of reproductive age (n=11), engaged in pankration	6 (54,55%)	4 (36,36%)	1 (9,09%)

When considering the results, it was possible to establish the following: among athletes of adolescence (n = 12), despite the short period of classes of this sport, signs of masculinization are already formed, an indirect confirmation of which is a significant increase in the number of athletes, with not characteristic of women and/or/or/or conventionally permissible manifestations of the finger in 8 (66.67%) young female athletes. In a group of young athletes (n=11) of reproductive age, the number of athletes with typically male manifestations of medium (transitional) values of the finger index, detected in 10 female athletes and together with 90.91%, dominates. Only one athlete of this age group determined the values of a finger index characteristic of women.

Aim of the article: the purpose of writing this research article is to present and analyze the materials of the study, in women athletes of different age groups involved in pankration

Research hypothesis

In preparation for this study, its author, a working hypothesis had, the essence of which was as follows: in different age groups, depending on sports experience and long-term intensive physical and psycho-emotional stress, both in the training and competitive period, Permanent, the phenomena of masculinization occur, with changes in the endocrine system, towards hypoestrogenemia and the formation of altered sexual somatotype, towards its inversions and a gradual departure from the original, physiological gynecomorphic sexual somatotype

Conclusions

1. In the group of young female athletes involved in the pankration, 4 (33.33%) girls have finger proportions corresponding to the manifestations of femininity, the rest of the female athletes have the values of the finger index, indicating the process of muculinization of female athletes.

2. Only in 1 (9.09%) female athletes of reproductive age, feminine values of the finger proportment were revealed, and in the remaining 10 (90.91%) female athletes its values indicate the active process of masculinization.

3. With a sufficient degree of confidence, it can be asserted that the 2D:4D finger proportions can serve as markers reflecting meculinization and are the criteria for predisposition to sports activities, and one of the methods of selection of boys and girls with different sports.

4. The analysis of the results of the study obtained confirms the hypothesis put forward by him.

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