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Research Article

Anatomic and Anthropological Features and Peculiarities of Morphofunctional Indicators of Bone Pelvis in Sexual Somatotypes of Female Athletic Sports

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Abstract

The article presents data on the morphofunctional features of the bone basins in young athletes involved in athletic sports. Also, this article presents the anatomical and anthropological features of the bony pelvis in young female athletes actively involved in a number of athletic sports. Pelvimetry was carried out, with the determination of the external dimensions of the bony pelvis of the athletes, and anthropometry, with the determination of the latitudinal dimensions of the body of the athletes - the width of the shoulders and pelvis. The value of such a morphofunctional index value as the sexual dimorphism index was also determined. Based on its values, somatotyping of the female athletes who took part in the study was carried out.

Keywords: Female Athletes; Juvenile Age; Athletic Sports; Bone Pelvis; Pelviometry; Morphofunctional Changes; Sex Somatotypes

Abbreviation

SDI: Sexual Dimorphism Index; SH: Shoulder Width; PS: Pelvic Width; SFP: Simple Flat Pelvis; UNP: Uniformly Narrowed Pelvis

Introduction

Any research work concerning the medical and biological features of women's sports in ontogenesis, and especially in the traditionally male athletic and strength sports, is always relevant and in demand [1-5].

Aim of the work

The purpose of the study is to determine the existing morphofunctional indicators in female athletes of different gender somatotypes involved in such athletic sports as kettlebell lifting, weightlifting and powerlifting.

Material and Methods

Our experiment involved female youth athletes involved in weightlifting (n = 18), kettlebell lifting (n = 13), powerlifting (n = 17), a total of 48 athletes. The average age of the athletes was 19.43 ± 0.46 years, which corresponds to adolescence [1]. Measurements of the values of the index of sexual dimorphism (SDI) were carried out, with the determination of anthropometric indicators of shoulder width (SH) and pelvic width (PS), with the subsequent distribution of athletes into sexual somatotypes according to the classification of J. Tanner, pelviometry using the classical method [1-5]. The method of literary critical analysis on the issue under study and the method of mathematical statistics were also used. All young athletes who took part in the study gave their voluntary, written consent to participate in it.

Pelvimetry was carried out, with the determination of the external dimensions of the bony pelvis of the athletes, and anthropometry, with the determination of the latitudinal dimensions of the body of the athletes - the width of the shoulders and pelvis. The value of such a morphofunctional index value as the sexual dimorphism index was also determined. Based on its values, somatotyping of the female athletes who took part in the study was carried out.

Results of the study and discussion

According to the anthropometric measurements of the width of the shoulders and the width of the pelvis, we obtained the following

values: among athletes in kettlebell lifting (n = 13), the width of the shoulder was 36.64 ± 0.77 cm, and the width of the pelvis was 27.67 ± 0.34 cm. In female weightlifters, the shoulder width was 36.47 ± 0.44 cm, the pelvic width was 27.14 ± 0.77 cm.

In the group of female athletes involved in powerlifting, the shoulder width was 35.78 ± 0.63, and the pelvic width was 26.85 ± 0.82 cm. Based on the obtained data on the shoulder width and pelvic width, IPD values were calculated according to J. Tanner's classification, with the determination of sexual somatotypes [1,3] in female athletes of the 3 study groups. As can be seen, from the obtained values of the anthropometry performed, the average values of shoulder width in all three study groups ($p \leq 0.05$) significantly exceed the obtained values of pelvic width, with values in all groups less than the anatomically acceptable value of 28-29 cm [1,4]. This type of shoulder width/pelvic width ratio indicates a masculine body type in female athletes of all three groups [1].

The distribution of female athletes by sexual somatotype and SDI is as follows: among athletes in kettlebell lifting (n = 13), the gynecomorphic sexual somatotype was not determined, mesomorphic was determined in 9 (69.23%), andromorphic - in 4 (30.77%) athletes. Among the weightlifters (n = 18), girls with a gynecomorphic sexual somatotype were also not identified. The number of athletes with a mesomorphic sexual somatotype in this group is 12 (66.67%), with an andromorphic somatotype - 6 (33.33%). In powerlifting, a gynecomorphic sexual somatotype was identified in 1 (5.88%) female athlete, a mesomorphic sexual somatotype in 13 (76.47%) female athletes, and an andromorphic sexual somatotype in 3 (17.65%) female athletes. In all three groups, athletes classified as mesomorphic - 34 (70.83%) and andromorphic sexual somatotypes - 13 (27.08%) athletes predominate.

According to pelviometry data, the following values of the bone pelvis and their changes were obtained: normal pelvic dimensions were determined in only one (2.08%) athlete out of 48 studied; anatomically narrow pelvis, with a decrease in 1 or more dimensions [1,4] in 47 (97.92%) of all studied athletes from three groups. A simple flat pelvis (SFP) was determined in 2 (15.39%) athletes from the group of girls involved in kettlebell lifting, in 3 (16.67%) weightlifters and in 2 (11.77%) athletes involved in powerlifting.

A uniformly narrowed pelvis (UNP) [1,4] was determined in 1 (7.69%) female athlete in kettlebell lifting, 2 (11.11%) female weightlifters, and 3 (17.65%) female athletes in powerlifting. Data on the identified degrees of narrowing of the bony pelvis are as follows: in the group of athletes involved in kettlebell lifting (n = 13), the first degree of narrowing of the pelvis was determined in 4 (30.77%) athletes, the second degree of narrowing - in 2 (15.39%) girls. In the group of weightlifters, I degree of pelvic narrowing was determined in 3 (16.67%), II degree of narrowing - in 1 (5.56%) female athletes.

In the powerlifting group, the first degree of pelvic narrowing was determined in 4 (25.53%) female athletes, and the second degree of pelvic narrowing was determined in 2 (11.77%) female athletes. In addition, the "unisex" pelvis, or mixed pelvis shape [1,4], was determined in 7 (53.85%) female athletes in kettlebell lifting, in 11 (61.11%) weightlifters, and in 10 (58.82%) of female athletes in powerlifting. The largest number of anatomical and morphological changes in the structure of the pelvis and degrees I-II of its narrowing were identified in athletes from all three groups, with a certain mesomorphic somatotype, and also, to a lesser extent, in athletes from the group with an andromorphic sexual somatotype. In the groups of female athletes engaged in kettlebell lifting and powerlifting, the same number was determined - 6 athletes each with degrees I-II of pelvic narrowing, but at the same time, their number dominates among athletes in kettlebell lifting - 46.15% and 35.19% in powerlifting.

Conclusions

- In all three groups of female athletes, the mesomorphic sexual somatotype predominates - in 34 (70.83%) and the andromorphic sexual somatotype - in 13 (27.08%) athletes.
- A simple flat pelvis was identified in 2 (15.39%) athletes from the kettlebell lifting group, 3 (16.67%) weightlifters and 2 (11.77%) athletes in powerlifting.
- A generally uniformly narrowed pelvis was identified in 1 (7.69%) female athletes in kettlebell lifting, 2 (11.11%) female weightlifters, and 3 (17.65%) female athletes in powerlifting.
- In athletes of all three study groups, degrees I-II of pelvic narrowing were identified in girls with mesomorphic and andromorphic sexual somatotypes.
- Among the athletes involved in kettlebell lifting and powerlifting, 6 athletes (46.15% and 35.19%) were identified with I-II degrees of pelvic narrowing.
- A "mixed" pelvic shape (unisex pelvis) was determined in 7 (53.85%) athletes in kettlebell lifting, 11 (61.11%) weightlifters, and 10 (58.82%) athletes involved in powerlifting.

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