Physical Development of Girls Engaged in Rhythmic Gymnastics

M. I. Ismatova[*]**, D. A. Hasanova, S. Y. Saidova, N. B. Rustamova**

Department of Anatomy, Bukhara State Medical Institute named after Abu Ali ibn Sino, Bukhara, Uzbekistan

Abstract   We took indicators of physical development of girls who do not go in for sports of the corresponding age. The study was conducted on 60 girls who did gymnastics and 60 girls who did not do sports. Rhythmic gymnastics girls were found to be lagging behind their non-sporting peers in body mass and height. The upper limbs and length of the lower limbs, by contrast, is longer in gymnastic girls. Such body composition of gymnasts depends on the frequency of exercise weight, taking into account the requirements of gymnastic exercises.

Keywords   Physical development, Anthropometric parameters, Girls, Rhythmic gymnastics

1. Introduction

For any sport, there is an anthropometric profile of a certain character, which can be differentiated even depending on the category of Event in each sports discipline [1].

Anthropometry-something that helps to assess the features and structure of the human body, is now actively used in medicine. The variability in the size of the human body has led to a great need for anthropometric studies. An important purpose of anthropometric methods is to identify the features of human development, and is also the cause of certain diseases at the initial stage. Assessment of the state of physical health is possible by performing individual calculations and comparing their results with the generally accepted standards of development of the human body [2].

Studies in the field of rhythmic gymnastics indicate the presence of certain morphological features that increase the chances of gymnasts to succeed. These features are specific to each sport, which determines the reference profile required for a successful talent identification process. Moreover, within the same type of gymnastics, there are differences depending on the role or category of competitions in which the athlete specializes [3].

Morphological typology of anthropometric measurements, body size and proportionality has been studied in such disciplines of rhythmic gymnastics as rhythmic gymnastics and rhythmic gymnastics [4,5,6].

Gymnastic exercises involve a combination of individual and group elements synchronized with music, which is the essence of this discipline. In pairs and groups, there are two main functions: groups that perform the roles of support and support, and peaks that explain flexibility, balance and their combination, or large acrobatic jumps in the air phase, movements that then catch them again or on the Ground [7].

Physical health is one of the criteria for indicators of the health of the child population. Assessment of the state of physical development is impossible without data on anthropometric indicators of various age groups of children [8,9].

Research in this area attracts the attention of representatives of various professions, including neurologists, traumatologists, pediatricians, gynecologists, physiotherapists, etc.In turn, the study of this problem can be helped by a detailed study of the processes of growth and development of children and youth, aimed at forming ways to improve physical health indicators [10,11,12].

Anthropometric indicators such as weight,size of upper and lower limbs, and hip circumference were suggested as important factors determining the evaluation of rhythmic gymnastics competitions [13]. Such parameters of physical fitness as flexibility and texture index were the determining factors contributing to the increase in performance [14].

The aim of the study was to study and compare the features of the anthropometric parameters of body parts of gymnasts engaged in rhythmic gymnastics, and as a control group, we took indicators of physical development of girls who do not go in for sports of the corresponding age.

2. Materials and Research Methods

The survey involved 80 girls of 7 and 8 years of age. Of these, 40 girls were engaged in the gymnastic centers "Nafis" and "Yoshlik", and the remaining 40 were girls of school №7, who are not involved in gymnastics. The study was carried

out on the basis of a bilateral with secondary school No. 7.

The anthropometric indicators of the observed contingent were assessed according to the following indicators: body length (cm), body weight (kg), chest circumference (cm), length of the lower and upper limbs (cm), pelvic dimensions (cm). The coefficient of texture was determined by the formula: **standing height / sitting height x 100%.**

Mathematical processing was performed directly from the General Excel 7.0 data matrix using the capabilities of the STTGRAPH 5.1 program, and the standard deviation and representativeness errors were determined.

3. The Results of the Study

Our studies have shown that the body length of 7-year-old gymnasts varied from 113.2 to 129.4, on average 120.0 + 1.0, and for girls not doing gymnastics this indicator ranged from 114.3 to 127.1, on average 123.5 + 0.79. In girls of 8 years of age, body length varied from 110.0 to 133.0, on average 121.3 + 1.43, in girls who were not gymnasts, sizes varied from 119.0 to 137, 2, on average 127.5 + 1.12.

The body weight of 7-year-old female gymnasts ranged from 19.2 to 29.3, on average 23.6 + 0.62, and among those who did not train, it varied from 18.5 to 41.8, on average 24.9+ 1.46. 8 year old girls doing gymnastics had a mass in the range of 19.3 to 38.4, on average 22.7 + 1.18, girls who were not gymnasts in the range of 22.5 to 25.6, on average 24.4+ 0.19.

Breast circumference in a pause for girls of non-exercising gymnasts of 7 years is 1.03 times more than for gymnasts of this age. Breast circumference in a pause for girls of non-exercising gymnasts of 8 years is 1.06 times more than for gymnasts.

The chest circumference of 7-year-old girls, non-exercising gymnasts at the inspiratory height is 1.0 times greater than that of girls-gymnasts. At the height of inspiration, the chest circumference of 8-year-old girls who are not engaged in gymnastics is 1.08 times larger, in contrast to girls gymnasts.

Chest circumference with full exhalation in non-athletes girls 7 years old with an athlete is 1.04 times more. The chest circumference at full exhalation in girls who are not involved in sports for 8 years is 1.05 times greater than that of girls gymnasts. (see the table 1).

Changes in the parameters of the length of the upper extremities in girls engaged and not engaged in gymnastics are presented in table 2.

Changes in the parameters of the length of the upper and lower extremities in girls engaged and not engaged in gymnastics are presented in table 3.

The length of the upper limbs in girls doing gymnastics is almost the same as in girls who are not gymnasts of the same age. But the length of the lower limbs in girls doing gymnastics is greater than in girls who are not involved in sports.

When studying the size of the pelvis, it was found that in 7-year-old girls-gymnasts it ranged from 18.0 to 25.2, on average 20.5 + 0.4, and in those who did not train it varied in the range from 18.0 to 21.1, on average 19.9 + 0.19. 8 year old girls doing gymnastics had a pelvic width in the range of 18.1 to 27.2, on average 22.4 + 0.56, girls who were not gymnasts in the range of 18.0 to 28, 1, on average 22.1 + 0.62.

Table 1.   Anthropometric changes in the chest in girls engaged and not engaged in gymnastics of 7 and 8 years of age

№	Parameters	7 age		8 age	
		non-rhythmic gymnastics girls n=20	*rhythmic gymnastics girls n=20*	*non-rhythmic gymnastics girls n=20*	*rhythmic gymnastics girls n=20*
1	The chest circumference at the pause (cm)	60,0±0,74	58,5±0,62	61,2±0,99	57,5±0,49
2	Chest circumference at the height of inspiration (cm)	61,8±0,68	61,6±0,81	64,5±0,93	59,9±0,62
3	Chest circumference when fully exhaled	59,9±0,62	57,4±0,62	59,9±1,05	56,9±0,49

Table 2.   Comparative parameters of the upper extremities

Indicators	Non-Rhythmic Gymnastics Girls		Rhythmic Gymnastics Girls	
	7 years	**8 years**	**7 years**	**8 years**
Upper limb (cm)				
Upper limb length	56,8±0,68	59,2±0,87	57,6±0,68*	59,7±0,74*
Shoulder length	23,8±0,31	24,5±0,37	23,9±0,31*	24,8±0,31*
Shoulder width	27,9±0,25*	30,0±0,43	26,3±0,47	30,0±0,43
Shoulder girth	19,1±0,25	20,1±0,34	19,4±0,4*	20,1±0,25
Forearm length	18,5±0,19	19,3±0,34	18,9±0,37*	19,6±0,31*
Brush length	14,5±0,12	15,4±0,34	14,7±0,16*	15,4±0,19

*Note: * - significant differences p <0.05 were noted in relation to the previous group*

Table 3. Comparative parameters of the lower extremities

Indicators	Non-Rhythmic Gymnastics Girls		Rhythmic Gymnastics Girls	
	7 years	8 years	7 years	8 years
Lower limb (cm)				
Lower limb length	66,2±0,68	69,9±0,93	69,2±0,81*	72,6±0,37*
Thigh length	35,9±0,43	37,5±0,74	36,1±0,37*	39,0±0,56*
Thigh girth	31,9±0,43	34,8±1,05	35,4±1,3*	36,9±0,84*
Shin length	30,5±0,56	32,5±0,31	33,2±0,65*	33,7±0,56*
Calf circumference	24,8±0,43	26,3±0,37	27,5±0,74*	26,9±0,37*

*Note: * - significant differences $p < 0.05$ were noted in relation to the previous group*

Differences in the size of the pelvis in both groups are not significant, but with age there is a tendency to increase them.

4. Discussion and Conclusions

Our data are consistent with other studies showing that female gymnasts have a redistribution of the ratio of muscle components of body weight towards an increase in the first, and also an increase in the index calculated in relation to the width of the shoulders to the width of the pelvis, which is considered as a sign of an increase in the masculinity of the female body. And also in all age groups, we found that gymnasts have a lag in body length parameters compared to girls who do not go in for rhythmic gymnastics, which cannot be said about weight indicators. Gymnasts are lighter in weight than their non-athletic counterparts. The chest circumference at the height of inspiration among gymnasts involved in sports lags behind girls who do not do gymnastics due to their low weight.

Thus, the study of anthropometric data allows us to conclude that girls doing gymnastics are less well-fed and shorter than their peers who do not go in for sports, but they are more well-nourished and significantly taller than girls doing rhythmic gymnastics. Girls who do gymnastics are distinguished by their long legs than those who do not go in for sports. Pelvic parameters tend to increase with age. The texture of gymnasts depends on the frequency of training loads, taking into account the requirements of gymnastic exercises, in this regard, the most appropriate seems to be the optimization of the training process, as well as the development of specific approaches to the correction of hormonal disorders in the body of athletes.

REFERENCES

[1] Y. Taboada-Iglesias, M. V. Santana, A. Gutierrez- Sanchez. Anthropometric profile in different event categories of acrobatic gymnastics. // Journal of human kinetics. Volume 57/2017. P. 169-179.

[2] Ismatova M.I., Teshayev Sh.J., Khasanova D.A. Anthropometric changes in specificity in girls engaged in rhythmic gymnastics // The American journal of social science and education innovations.- vol. 02. Issue 10-2020. – P. 59-64.

[3] Ghobadi H., Rajabi H., Farzad B., Bayati M., Jeffreys I. Anthropometry of world-class elite handball players according to the playing position; reports from men's handball world championship 2013. // J Hum Kinet, 2013; 39: 213-220.

[4] Bester A., Coetzee B. The anthropometric floor-item achievement determinants of young gymnasts. // S Afr J Res Sport PhysEduc Recreation, 2010; 32(2): 13-30.

[5] Massidda M, Toselli S, Brasili P, Caló CM. Somatotype of elite Italian gymnasts. Coll Antropol. 2013; 37(3): 853–857.

[6] Poliszczuk T., Broda D., Poliszczuk D. Changes in somatic parameters and dinamic balance in female rhythmic gymnasts over a space of two years. // Pol J Sport tourism. 2012; 19: 240-245.

[7] Vernetta M, López-Bedoya J, Jiménez J. Using Records of intervention times of motor actions in acrobatic gymnastics. 2007; 12:110. www.efdeportes.com, Revista Digital.

[8] Teshaev Sh.Zh., Ismatova M.I. Comparative characteristics of the anthropometric parameters of girls of the I-II period of childhood involved in rhythmic gymnastics. // Problems of Biology and Medicine. 2019, no. 3 (111). S. 278-281.

[9] Ismatova M.I. Physical development of girls engaged in rhythmic gymnastics. // Scientific and practical journal. Young scientist bulletin. Volume 9. No. 4. 2020. P 154-156.

[10] Teshaev Sh.Zh., Ismatova M.I., Rustamova N.B. Comparative characteristics of anthropometric indicators of athletes involved in rhythmic gymnastics // New day in medicine- 2020, 2/1 (30/1). P. 98-100.

[11] Ismatova M. I. Gymnastics characteristics of Anthropometric parameters of girls 8-10 years of age. // International Journal of Pharmaceutical Research. Jan-Mar 2021. Vol 13. Issue 1. Pages: 2501-2505.

[12] Rutkauskaite R., Skarbalius A. Interaction of training and performance of 13-14 year old athletes in rhythmic gymnastics. UgdumasKunoKultura, 2011; 82: 29-36.

[13] Douda H.T., Toubekis A.G., Avloniti A.A., Tokmakidis S.P. Physiological and anthropometric determinants of rhythmic gymnastics performance. Int J Sports Physiol Perform, 2008; 3: 41-54.

[14] Srivastava A. Nutritional status of school-age children -

A scenario of urban slums in India / A. Srivastava, S.E. Mahmood, P.M. Srivastava, V.P. Shrotriya, 141 B. Kumar // Arch Public Health. – 2012. – Vol.70 (1). – P.8-10.