Physiological features of the respiratory system athletes involved in rhythmic gymnastics

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ABSTRACT

The article considers a comparative assessment of the physical development and component composition of the body mass of female athletes involved in the types of gymnastics. Studies have shown specifically selected features that change under the influence of training loads, contribute to the formation of a harmonious figure and slender posture, and can be used in selective selection for practicing various types of gymnastics.

Keywords: physical development, gymnastics, aerobics, anthropometry, body components, total dimensions, partial body dimensions.

Relevance. At present, the problem of physical development and special physical fitness of children and adolescents has not been studied in depth. In this regard, it is important and necessary to purposefully intensively master rhythmic gymnastics by children and adolescents in all regions of Uzbekistan. At the same time, the center of gravity of research should be shifted towards the value orientations of health improvement and increasing the level of physical fitness of schoolchildren of different ages on the basis of the transformation of health-improving and training influences by borrowing acceptable means of sports training in accessible types of sports activities, which, of course, include gymnastics. On the basis of numerous literature data [1], it is shown that rhythmic gymnastics is one of the types of physical culture that affects the physical development and improvement of the respiratory system.

Purpose of the study. To increase the level of functional readiness of young athletes specializing in rhythmic gymnastics at the age of 6-8 years.

Research objectives. We studied 10 girls not involved in rhythmic gymnastics (control group) and 10 girls involved in rhythmic gymnastics. The age of the examined is 6-8 years.

Research results and discussion. External respiration is the first link in the oxygen transport system. It provides the body with oxygen from the surrounding air due to pulmonary ventilation and diffusion of oxygen through the pulmonary membrane into the blood [2,10].

External respiration is the first link in the oxygen transport system. It provides the body with oxygen from the surrounding air through pulmonary ventilation and diffusion of oxygen through the lung membrane into the blood.

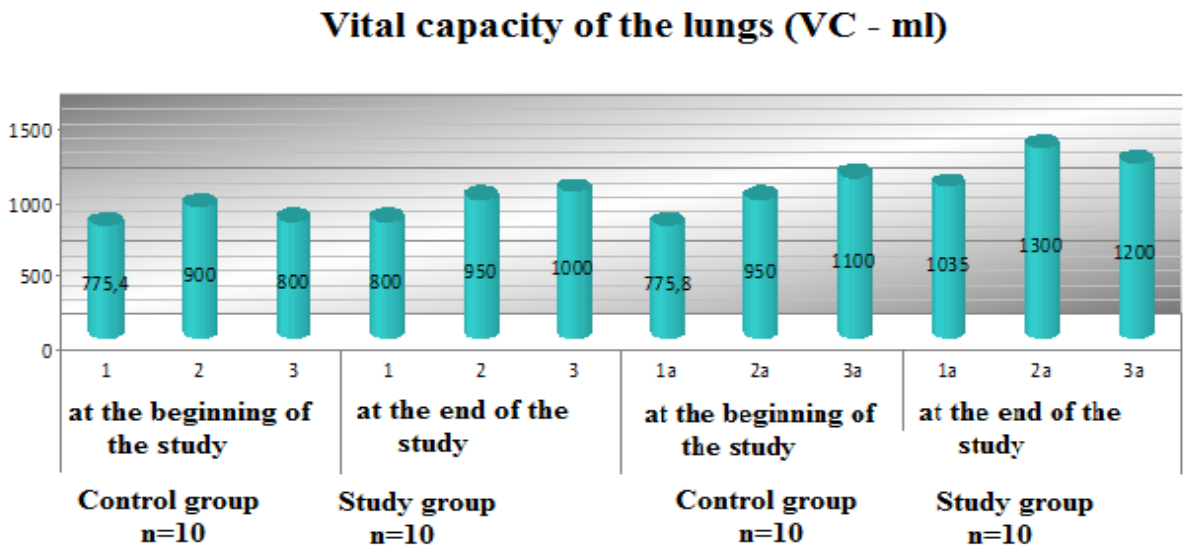

Fig-1. Indicators of the functions of external respiration (vital capacity of the lungs) of young athletes and adolescents in the control and study groups at the age of 6-8 years.

Note: Control group: 1 - at rest before physical education lesson; 2 - in the middle of a physical education lesson; 3 - after a physical education lesson.

Study group: 1a - at rest before training; 2a - in the middle of training; 3a - after training.

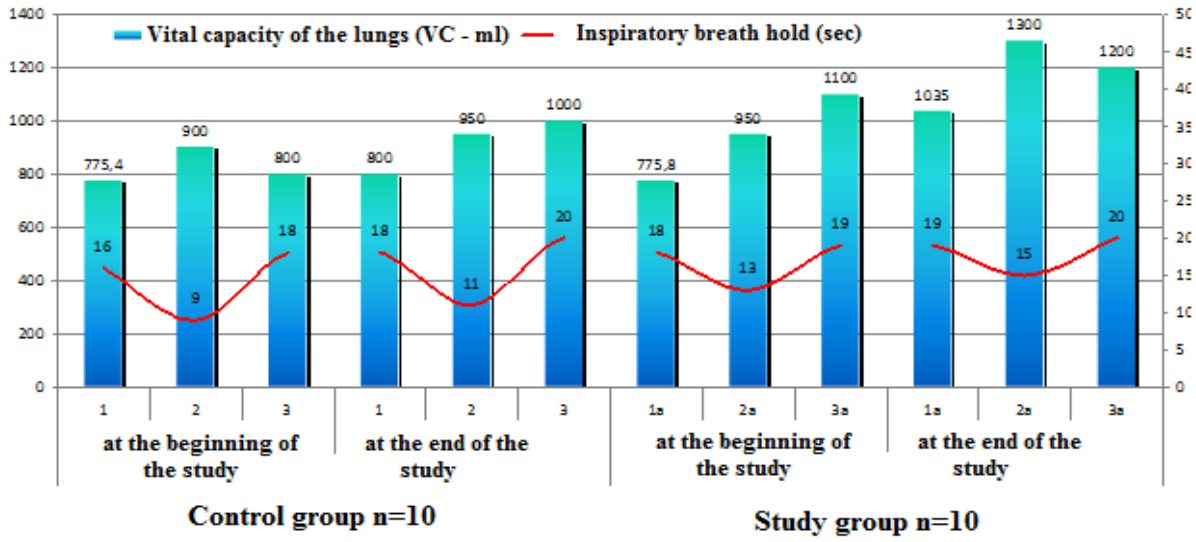

Fig. 2. Indicators of external respiration functions (vital capacity of the lungs - ml and breath holding on inspiration - sec.) of young athletes and adolescents in the control and study groups at the age of 6-8 years.

Note: Control group: 1 - at rest before physical education lesson; 2 - in the middle of a physical education lesson; 3 - after a physical education lesson.Study group: 1a - at rest before training; 2a - in the middle of training; 3a - after training.

The figure shows that in the study group they have VC at the beginning at rest 775.8 ml and at the end of the study 1035 ml, VC increases by - 33.4%. Whereas during training these values corresponded to the following indicators - 950 ml, 1300 ml, VC changed by - 36.8%. While after training at the beginning of the study, VC was 1100 ml, at the end of the study, after training, VC was 1200 ml, VC increased by -10%.

Similar data obtained in the control group for all indicators, VC is slightly less than in the study group.

In the control group, breath holding (AP) did not have a significant effect. As can be seen from Table 3, in the study group, HR increased by -6% (at rest 18 sec, at the end of the study 19 sec).

The results of the study showed that ZD as an indicator of oxygen resources at the tissue level gives insignificant changes.

An analysis of the results showed that an increase in VC and HR causes more significant ventilation of the lungs and satisfaction of the oxygen supply. Therefore, young gymnasts, in the study group in physical terms, according to cardio-respiratory indicators, are from teenagers who do not go in for sports.

Table 1 shows that the respiratory rate at the beginning of the study at rest in the control group was 23 cycles per minute, at the end of the study at rest was 23 cycles per minute. In the study group, at the beginning of the study at rest, the respiratory rate was 24 cycles per minute, at the end of the study it was 25 cycles per minute. After a physical education lesson at the beginning of the study, the respiratory rate increased to 24 cycles per minute, at the end of the study, the respiratory rate increased to 25 cycles per minute. In the study group, after training at the beginning of the study, the respiratory rate was 25 cycles per minute, and at the end of the study after training, the respiratory rate decreases to 26 cycles per minute. Breathing with a change in the pace of movements quickens faster. This indicates a higher mobility of the mechanisms that regulate the respiratory rate, as well as an increase in oxygen demand [3,9].

Thus, an increase in VC leads to a decrease in respiratory rate both at rest and during exercise. With systematic gymnastics, it stimulates the development of the respiratory system [4,8]. The analysis of the results showed that the vital capacity (VC) and the breath holding time on inspiration in the study group are higher compared to the control group. In the study group, VC at rest increased by 33.4%, and in the control group at rest, VC increased by 25%.

Table 1
Indicators of the functions of external respiration of young athletes and adolescents of the control and study groups at the age of 6-8 years

№	Indicators	Control group n=10						Study group n=10					
		at the beginning of the study			at the end of the study			at the beginning of the study			at the end of the study		
		at rest before gym class	in the middle of gym class	after gym class	at rest before gym class	in the middle of gym class	after gym class	at rest before training	in the middle of a workout	after training	at rest before training	in the middle of a workout	after training
		M			M			M			M		
1	Vital capacity of the lungs (VC - ml)	775,4	900	800	800	950	1000	775,8	950	1100	1035	1300	1200
2	Respiration rate (cycles per minute)	23	35	24	23	33	25	24	33	25	25	30	26
3	Inspiratory breath hold (sec)	16	9	18	18	11	20	18	13	19	19	15	20

Increasing VC and holding the breath causes more significant ventilation of the lungs and satisfaction of the oxygen supply. Therefore, young gymnasts in the study group differ from teenagers in the control group by a better ratio of lung volumes and an increase in the supply of oxygen in the alveoli of the lungs. An increase in VC leads to a decrease in respiratory rate both at rest and during exercise [5,6]. With systematic gymnastics, the respiratory system improves [6,7,11].

Dynamometry in the study group is significantly higher than in the control group. The study of dynamometry of the right hand in the study group changed by 8.3%, the indicators of the left hand changed by 33.3%. A set of exercises for the development of the cardio-respiratory system for endurance showed the effectiveness of young athletes involved in comparison with the control group. Growth and weight indicators at the end of the studies in the control and study groups did not change.

Consequently, the young gymnasts of the study group in terms of physiological development (height, weight, dynamometry) exceed adolescents from the control group. Summarizing the obtained material, it should be noted that systematic physical activity, physical culture and sports have a positive effect on the human body, incl. on the respiratory organs.

On the basis of the studied data, a number of conclusions can be drawn.

Conclusions: 1. In young athletes in the study group, the vital capacity of the lungs and the breath holding time on inspiration are higher than in adolescents in the control group.

2. Respiratory rate both at rest and during exercise is lower in the study group than in the control group.

3. In young athletes in the study group, the minute volume of breathing is higher than in adolescents in the control group.

4. As a result of regular use of breathing exercises, ventilation of poorly ventilated areas of the lungs increases, blood circulation improves, and conditions for gas exchange are optimized. The vital capacity of the lungs increases very significantly, the mobility of the chest in the study group increases.

5. At the end of the study, the young gymnasts of the study group in all indicators of physical development exceed their peers from the control group.

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