

# Improvement of special physical training of athletes 9–10 years old engaged in rhythmic gymnastics

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**Purpose:** to substantiate the effectiveness of using the author's methodology for improving the special physical training of athletes 9–10 years old engaged in artistic gymnastics.

**Material & Methods:** in the study, during the year, took part 16 athletes 9–10 years old, engaged in rhythmic gymnastics. To identify the effectiveness of the author's methodology, analysis and generalization of literary sources, pedagogical observation, testing, pedagogical experiment, methods of mathematical statistics.

**Results:** based on the results of the experiment, the improvement of practically all the studied indicators was revealed, namely, the results of the implementation of equilibrium varieties (15–39%) and jumps (20–42%) were significantly improved.

**Conclusions:** the obtained results showed the effectiveness of the developed author's methodology aimed at improving the special physical training of athletes during the preliminary basic training.

**Keywords:** rhythmic gymnastics, gymnasts 9–10 years, testing, special physical training

## Introduction

It is well known that the effectiveness of the training process in rhythmic gymnastics is directly dependent on the funds used in the classes with athletes [1; 2]. In modern conditions for the development of rhythmic gymnastics, there is a need to develop effective methods aimed at improving the special physical training of young athletes, especially at the stage of basic training – the most important stage in the formation of future gymnasts. Artistic gymnastics as a sport by the nature of motor activity refers to complex co-ordinates, and requires athletes to display a wide range of motor skills, skills and qualities [3–5]. Exercises of rhythmic gymnastics are complex combinations of movements of individual parts of the body with the manipulation of various objects that are performed under musical accompaniment and require high-level athletes to demonstrate specific special motor qualities [3; 5–7]. In connection with the constant complication of competitive programs and increasing requirements for the performing skills of gymnasts [7], special requirements are imposed on the level of special physical training of athletes. The results of the analysis of the special literature have shown that at the present time the problems connected with the method of improving the special physical training of athletes at the stage of specialized basic training [2–4; 8]. It should be noted that the leading experts in the field of rhythmic gymnastics also emphasize the importance of finding effective techniques for the improvement of special physical training as a prerequisite for the successful competitive activity of young gymnasts [2; 3; 8].

**Purpose of the study:** to substantiate the effectiveness of using the author's methodology for improving the special physical training of athletes 9–10 years old engaged in artistic gymnastics.

## Material and Methods of the research

In the course of the research, the following methods were

used: theoretical analysis and generalization of literary sources; pedagogical observations; testing; methods of mathematical statistics; pedagogical experiment. To assess the effectiveness of the author's methodology for improving the special physical training of young gymnasts, a pedagogical experiment was conducted, in which 16 athletes aged 9–10 years. Based on the results of the initial and repeated testing, a comparative assessment was made of the level of development of special physical fitness of young gymnasts. The quality of the tests was assessed on a 10-point scale in accordance with the curriculum for rhythmic gymnastics [9]. According to the curriculum, 75% of the training time is given to exercises of special physical and technical training [9]. In the framework of the developed methodology, the above exercises were conditionally divided into special groups: "basic" technical actions – 40% and SPP exercises – 35%. In turn, the SPP exercises were divided as follows: "narrow special focus" exercises – 20% and "combination" exercises – 15%. The developed complexes of exercises "of a narrow special orientation" were divided into several subgroups: exercises that develop imaginative thinking and its motor expression; rhythmoplasty exercises; differentiating exercises; group exercises and dance choreographic exercises. "Combined" exercises were developed in the following subgroups: narrow orientation; wide or complex impact; model combinations that meet the adversary requirements and are used as fractional ones, that is, are part of a competitive composition. Specificity of the developed complexes of "narrow special orientation" and "combination" exercises was determined by a significant number of motor tasks and the corresponding versatile influence on the gymnasts. At the end of the sequential experiment, according to the data of repeated testing of the level of development of special physical fitness of young athletes, the effectiveness of the author's method was tested by comparing the results of the study before and after the experiment.

## Results of the research and their discussion

To test the effectiveness of the developed author's method-

ology, repeated testing of young gymnasts was carried out and a comparative analysis of changes in the level of special physical preparedness of athletes during the study period (Table 1).

According to the results of the pedagogical experiment, it was revealed that in the "Bridge stand test with capture ankle joints, the standings of the legs apart", the athletes showed an average result of  $5,6 \pm 0,4$  s and  $7,6 \pm 0,4$  s. The difference between these indicators is statistically significant, since  $t_p = 3,7 > t_{gr} = 2,97$ . This means that after the experiment the results of this test objectively improved and their increase was 36%. When performing the next exercise "Holding the foot forward, standing sideways to the support" gymnasts showed the average score on the right –  $5,6 \pm 0,3$  s, on the left –  $5,5 \pm 0,4$  s before the experiment and  $7,8 \pm 0,4$  s and  $6,9 \pm 0,4$  s after. A comparison of these results by the Student's test shows that the difference between the mean group values is statistically significant ( $p < 0,01$  on the right leg and  $p < 0,05$  on the left one). The obtained indicators, with the help of which the test exercise "Holding the foot to one side, standing sideways to the support" was evaluated, there was a statistically significant ( $p < 0,05$ ) improvement in the results for the right leg and an unreliable ( $p > 0,05$ ) on the left leg. After using the developed technique, the increase in the result on the right leg was 26%, on the left – 17%. The results of the study also indicate that, while performing the "Holding the leg back, standing sideways to supports" exercises after the experiment, the gymnasts showed a statistically unreliable ( $p > 0,05$ ) improvement in the results on the right and left legs. The increase in the result at the end of the experiment was 23% on the right foot and on the left 22%. When performing the next test task "Raise the leg forward, translate to the side and back" the female athletes showed the average group result of  $5,8 \pm 0,5$  s on the right; and  $6,8 \pm 0,5$  s on the left to the experiment and  $6,8 \pm 0,5$  s (right leg) and  $6,3 \pm 0,5$  s (left leg) after it was performed. The results of the study indicate an unreliable ( $p > 0,05$ ) improvement in the result of the right and left legs. The increase in the result of testing the translation

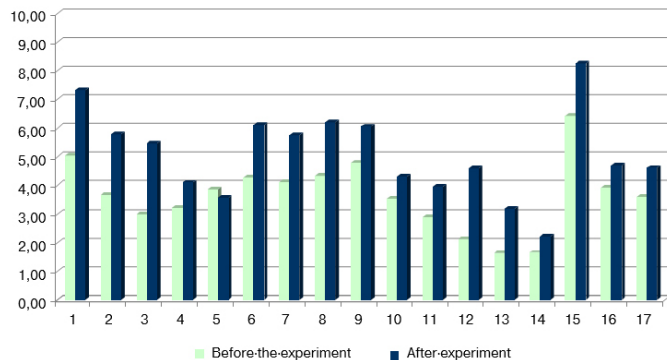
of the right leg in comparison with the initial one was 17%, in contrast to the left translation result, where the average result of the exercise decreased by 7% (Table 1). In the process of comparative analysis of the results of the "High balance" test, a reliable improvement in the results  $t_p = 2,2 > t_{gr} = 2,14$  only on the right foot. Improving the result on the left is statistically not significant, since  $t_p = 1,1 < t_{gr} = 2,14$  (Table 1). The results of the introduction of the developed methodology for improving the special physical training in rhythmic gymnastics also indicate that the highest improvement in the result (42% increases) was observed in the test "Jump by the jog with two hands on the belt". Thus, at the beginning of the experiment, the gymnasts showed an average result of 25,9 cm, at the end of 36,9 cm. The difference between these indices is statistically significant, since  $t_p = 13,3 > t_{gr} = 2,97$ . In the next test "10 jumps with the dilution of the legs back and forth by jerking the two" the gymnasts showed the average result on the right leg  $4,7 \pm 0,3$  times at the beginning of the experiment and  $5,8 \pm 0,6$  times at the end. Because the  $t_p = 2,2 > t_{gr} = 2,14$ , then we can conclude that the difference between these indicators is statistically reliable. This indicates that the introduction of the proposed methodology contributed to improving the result of the test "10 jumps with the dilution of the legs back and forth by jerking the two" on the right foot, where the increase was 23%. And although the improvement of the result of this exercise on the left leg is 20% with the average group results of  $4,5 \pm 0,6$  times to the experiment and  $5,4 \pm 0,5$  times after their comparison by the Student's test showed that the difference between them is statistically unreliable ( $t_p = 1,2 < t_{gr} = 2,14$ ). The average results of the test "Bending back lying on the stomach for 15 s" suffered significant changes during the study period. If at the beginning of the experiment the maximum number of times the correct performance of this test was 7,4 times, then at the end of the experiment this result increased to an average of 9,1 times. So, the increase in the results of young athletes of the In the course of the study, the results shown by the athletes during the test "Bending body back in the rack on one, the second bend forward, sideways to the support", allow us to affirm the effectiveness of the proposed

**Table 1**  
**Dynamics of indicators of special physical training of young gymnasts during the period of pedagogical experiment (n=16)**

No.	Name of test		Before exp.	After exp.	$t_p$	p	Increase in results, %
			$\bar{X} \pm m$	$\bar{X} \pm m$			
1.	"Bridge stand" with capture ankle joints beginning position stand the legs apart. Hold (s)		$5,6 \pm 0,4$	$7,6 \pm 0,4$	3,7	<0,01	36
2.	Holding the leg forward, standing sideways to the support (s)	right	$5,6 \pm 0,3$	$7,8 \pm 0,4$	4,0	<0,01	39
		left	$5,5 \pm 0,4$	$6,9 \pm 0,4$	2,5	<0,05	25
3.	Holding the leg to one side, standing sideways to the support	right	$6,2 \pm 0,4$	$7,8 \pm 0,5$	2,5	<0,05	26
		left	$5,8 \pm 0,3$	$6,8 \pm 0,5$	1,7	>0,05	17
4.	Holding the leg back, standing sideways to supports (s)	right	$5,6 \pm 0,5$	$6,9 \pm 0,4$	2,05	>0,05	23
		left	$5,8 \pm 0,5$	$7,1 \pm 0,5$	2,02	>0,05	22
5.	Raise the leg forward, translate to the side and back. Hold for 2 s	right	$5,8 \pm 0,5$	$6,8 \pm 0,5$	1,4	>0,05	17
		left	$6,8 \pm 0,5$	$6,3 \pm 0,5$	2,09	>0,05	-7
6.	High balance in right (left). Hold for 10 s	right	$6,0 \pm 0,6$	$7,5 \pm 0,4$	2,2	<0,05	25
		left	$5,3 \pm 0,5$	$6,1 \pm 0,5$	1,1	>0,05	15
7.	Jump by the jog with two hands on the belt (cm)		$25,9 \pm 0,6$	$36,9 \pm 0,5$	13,3	<0,01	42
8.	10 jumps with the dilution of the legs back and forth by jerking the two (times)	right	$4,7 \pm 0,3$	$5,8 \pm 0,6$	2,2	<0,05	23
		left	$4,5 \pm 0,6$	$5,4 \pm 0,5$	1,2	>0,05	20
9.	Bending back lying on stomach for 15 seconds (times)		$7,4 \pm 0,6$	$9,1 \pm 0,5$	2,06	>0,05	23
10.	Bending body back in the rack on one, the second bend forward, sideways to the support – 10 s (times)	right	$5,9 \pm 0,6$	$7,4 \pm 0,4$	2,07	>0,05	25
		left	$5,3 \pm 0,5$	$6,1 \pm 0,4$	1,4	>0,05	15

methodology. Improvement of the results on the right leg was 25%, on the left 15%. In accordance with the Student's test, the difference between the mean group results of this test is statistically unreliable both on the right and left legs

Thus, positive changes in the level of development of special



**Figure 1. Assessment of test questions of gymnasts of the experimental group before and after the introduction of the author's technique (in points):**

"Bridge stand" with capture ankle joints beginning position stand the legs apart. Hold (3 s); Holding the foot forward, standing sideways to the support (5 s); Holding the leg to one side: right (No. 4); left (No. 5) (hold 5 s); Holding the leg back: right (No. 6); left (No. 7) (hold 5 s); Raise the leg forward, translate to the side and back: right (No. 8); left (No. 9) (hold 2 s); High balance: right (No. 10); left (No. 11) (hold 10 s); Jump by the jog with two hands on the belt (No. 12) (cm); Jumps with the dilution of the legs back and forth: right (No. 13); лівою (No. 14) (10 times); Bending back lying on stomach for 15 (No. 15) (кількість пасів); Bending body back in the rack on one, the second bend forward: right (No. 16); left (No. 17) (10 s, times)

physical preparedness of gymnasts of the study group were due to the multi-dimensional influence of the introduced author's technique, which is confirmed by the results of repeated testing (Figure 1).

## Conclusions

1. The analysis of scientific and methodical literature showed that the modern state of development of rhythmic gymnastics requires the development of effective techniques aimed at improving the special physical training of young athletes, especially at the stage of basic training – the most important stage in the formation of the future gymnast.

2. To improve the level of special physical preparedness of young gymnasts, the author's method was developed, the essence of which was to distribute exercises of rhythmic gymnastics to special groups: "Basic", "narrow special orientation" and "combination" and their percentage ratio in the training process (40%; 20%, 15%, respectively).

3. The results of the whole complex of conducted studies have proved the effectiveness of the developed author's methodology aimed at improving the special physical training of young athletes engaged in rhythmic gymnastics.

**Prospects for further research** consist in the introduction of the developed author's methodology for improving the special physical fitness of athletes in the training process of the Youth Sports School, Specialized Youth Sports School, clubs and specialized educational institutions for further improvement.

**Conflict of interests.** The authors declare that no conflict of interest.

**Financing sources.** This article didn't get the financial support from the state, public or commercial organization.

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Received: 06.03.2018.

Published: 30.04.2018.

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