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Improving the special physical training of gymnasts in sports aerobics at the initial training stage

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Competition is intensifying on the world platform, competitive activity is becoming more complex, requirements for the performing skills of athletes are being raised, special requirements are being placed on the level of special physical fitness of gymnasts, and it is becoming increasingly difficult to win. There are new problems that leading experts associate with the process of many years of sports training. Now in sports aerobics (aerobic gymnastics) there is the problem of developing special physical qualities of athletes, starting from the initial training stage. Also, the issues of selecting adequate means and methods have not been sufficiently resolved, their rational combination in the training process, taking into account the specificity of the competitive activity of this sport, modern refereeing and tasks of this stage.

Purpose: *theoretically develop and experimentally substantiate the methodology for improving the special physical training of gymnasts in sports aerobics at the initial training stage.*

Material & Methods: *a complex of scientific research methods (pedagogical research methods and methods of mathematical statistics) was used. 32 athletes (7–8 years old, girls) took part in the experimental part. Two groups were formed (control – 16 girls, and the main – 16 girls).*

Results: *through the use of an experimental technique, selection of funds and the optimal combination of loads, taking into account the age characteristics of young athletes, an increase in physical performance was obtained, the physical and functional preparedness of the gymnasts of the main group increased.*

Conclusions: *the developed methodology for improving the special physical training of gymnasts 7–8 years old, who are engaged in sports aerobics (aerobic gymnastics), ensures the growth of physical capabilities of athletes, solves the main tasks of the training stage, based on the specifics of motor activity, sensitive periods of development of physical qualities in this form sports, contributes to comprehensive physical development, integrated physical preparedness, the laying of a specific functional base for effective of learning technology.*

Keywords: *sports aerobics (aerobic gymnastics), special physical training, physical qualities, initial training stage.*

Introduction

Sports aerobics (aerobic gymnastics) is a spectacular, highly coordinated sport in which athletes perform a set of continuous movements of high intensity to the music at a fairly high pace [8; 9; 21].

Sports aerobics is developing and improving in accordance with the laws and trends of world sports [1; 3; 20]. However, in this sport, the issues of building a multi-year sports training remain insufficiently resolved.

Competition intensifies on the world platform, competitive activity is complicated, and it becomes more and more difficult to win. Athletes need to perform complex elements at a high technical level, quickly, easily, gracefully and artistically [5; 7]. The highest sports achievements in sports aerobics are the performance of a composition to music with the maximum manifestation of coordination abilities, flexibility, strength, vestibular stability, virtuoso body possession in all components of the competition program [2; 19]. These abilities are shown by the winning athletes. Due to the constant complication of competitive programs and increasing requirements for the performing skills of athletes, special requirements are imposed on the level of special physical preparedness of gymnasts [16]. New problems arise, leading experts associate with the process of many years of sports training, since at the moment the main contingent of athletes is provided by an influx from other sports (sports and rhythmic gymnastics, acrobatics, etc.).

Together with the coverage of issues related to building a training session with qualified athletes, the methodological issues of preparing a sports reserve in sports aerobics are not considered enough [19].

The problem of improving the process of special physical training is devoted to a large number of basic research in sports [7; 10; 11]. However, in sports aerobics, such studies are fragmented. Therefore, the development of methods for improving the special physical training of young gymnasts for use in the educational process in sports aerobics is relevant.

Purpose of the study: to theoretically develop and experimentally substantiate a methodology for improving the special physical training of gymnasts in sports aerobics at the initial training stage in annual macrocycles.

Objectives of the study. 1. To study the current state of the training process in sports aerobics. 2. To develop and ex-

perimentally substantiate a methodology for improving the special physical training of gymnasts in sports aerobics at the initial training stage.

Material and Methods of the research

32 athletes (7–8 years old) participated in the experiment. There were formed two groups of gymnasts (control – 16 girls, and the main – 16 girls) of a certain physical development and level of readiness. The study was conducted on the basis of the communal institution of the children's youth sports school No. 13 in Kharkiv.

Results of the research

A pedagogical experiment was conducted in elementary training groups throughout the year. Classes were held three times a week for a duration of 120 minutes. The control group was engaged in a curriculum for youth sports schools [12], and the main group introduced the author's method of special physical training, which in volume and intensity corresponded to work in the control group, but included more effective means and methods of special exercises and techniques, which allow you to purposefully increase the level of physical preparedness of young athletes.

The methodology is based on the specifics of the motor activity of this sport [8; 12], the sensitive periods of the development of physical qualities and contributes to comprehensive physical development, comprehensive physical preparedness, laying a specific functional base for effective training in movement technique and further improvement of athletes.

We have completed blocks of special tools for the development of such qualities as: general endurance, aerobic performance, flexibility, strength, speed, speed and strength qualities and coordination of young gymnasts. The content of the blocks was formed from exercises described in the scientific and methodological literature and used in the practice of sports training in gymnastic and dance sports. In the training process the following methods were used: interval training method, game method, combined method, repeated method, holistic method of training exercises and in parts [17; 18; 22].

The main methodological rule for using the methodology developed by us was the regular use of special breathing exercises in the training process in different parts of the training session (in the warm-up, in the main part and after the training session).

The content of the methodology consisted of three functional blocks. The first block was used before starting the workout during the warm-up, it contained exercises with alternating calming and invigorating breathing. The second block of breathing exercises was performed in the main part of the training session, between the main physical activities. This block is mainly composed of breathing exercises aimed at increasing the vital capacity of the lungs, developing the strength and endurance of the respiratory muscles and the ability to maintain maximum ventilation. The third block was applied after training. The breathing exercises of this block are soothing in nature and are aimed at accelerating recovery processes. The time spent on a complex of breathing exercises was 20% of the total training session time. At the same time, the complex of breathing exercises was designed so that their complexity and dosage progressively increase.

Before and after the experimental training sessions, young gymnasts of both groups were examined according to a single method. The methodology for examining the participants in the experiment provided for determining the level of special physical preparedness and basic physical qualities that determine the effectiveness of the special sports activities of gymnasts in sports aerobics.

When assessing the special physical preparedness of athletes, we focused on generally accepted tests [7; 13], and for tests [1; 5; 16], the choice of which was carried out on the basis of the analysis of the dominant motor mode of the competitive exercise and the specifics of aerobic gymnastics, as well as the age characteristics of the athletes, the requirements of the competition rules, data from previously conducted studies in complex coordination sports (sports and rhythmic gymnastics, acrobatics, figure skating, etc.). Given this, test tasks were proposed to evaluate special physical preparedness. In addition, as an indicator of the level of development of the body of athletes, physical development was determined: 1) age (years); 2) height (cm); 3) weight (kg); 4) heart rate (beats·min^{-1}); 5) VC (ml). The results were processed using mathematical statistics methods [14].

At the end of the pedagogical experiment, the results of repeated testing of the level of development of special physical preparedness of young athletes by comparing the results of the study before and after the experiment checked the effectiveness of the author's methodology.

As a result of the application of the experimental technique, more substantial gains of the studied parameters were obtained.

The results of special physical preparedness of young athletes registered in the process of control examinations before and after the experiment are presented in the table.

In general, the research results confirmed the effectiveness of using the developed author's methodology for improving the special physical training of young gymnasts specializing in sports aerobics.

Indicators of physical preparedness increased in both groups. However, the improvement in motor tests in athletes of the main group after the experiment was much greater.

During the experiment, the gymnasts of the MG increased the vital capacity of the lungs by 5,37% ($p<0,01$), this indicator is closely interrelated and largely determines the overall physical performance (according to HSTI), which increased by 5,39% ($p<0,01$) and can serve as a confirmation of the increased endurance of young athletes. The index of the cardiovascular system (HR) at rest decreased by 2,96% ($p<0,05$), which indicates an increase in the efficiency and efficiency of the circulatory system.

It should be noted that in the main group there was an increase in the indices of coordination abilities by 3,57%, 6,42% ($p<0,01$), 6,71% ($p<0,05$), and 12,18%, ($p<0,01$). The strength abilities also show an increase in results by 30,67% ($p<0,01$), 12,65% ($p<0.01$), 5,86% ($p<0,01$). Performance

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Comparative analysis of indicators of special physical preparedness of gymnasts at the stage of initial training during

No. i/o	Indicators	Main group (n=16)				Control group (n=16)			
		OD ($\bar{X} \pm \sigma$)*	FD ($\bar{X} \pm \sigma$)	%	t; p	OD ($\bar{X} \pm \sigma$)	FD ($\bar{X} \pm \sigma$)	%	t; p
	Physical development								
1.	Age (years)	7,26±0,5	7,44±0,2	0,14	0,2>0,05	7,42±2,2	7,68±2,1	0,13	0,2>0,05
2.	Height (cm)*	122,4±0,6	122,8±0,5	0,07	0,1>0,05	121,7±1,9	122,1±1,7	0,06	0,1>0,05
3.	Body weight (kg)*	23,4±2,0	22,23±1,9	0,29	0,4>0,05	22,5±2,5	22,41±2,2	0,27	0,2>0,05
4.	Heart rate (beats· min^{-1})*	81,04±2,4	78,56±2,3	2,96	2,8<0,05	81,0±2,5	80,46±2,3	0,61	1,2>0,05
5.	VC (ml)*	1775±2,1	1873±2,0	5,37	3,6<0,01	1794±2,5	1831±2,1	2,33	2,7<0,05
	Coordination abilities								
6.	Shuttle 3x10 (s)*	11,66±2,5	11,28±2,2	3,57	1,2>0,05	11,62±2,1	11,45±1,9	1,75	0,8>0,05
7.	Flamingo (s)	87,43±1,5	93,46±1,4	6,42	4,7<0,01	87,25±1,7	90,24±1,6	2,22	2,6<0,05
8.	2 forward somersaults, jump with 360° rotation (points)	8,25±1,9	8,95±1,7	6,71	2,3<0,05	8,0±2,0	8,2±1,8	2,40	1,1>0,05
9.	Aerobic track connection (points)	8,65±2,2	9,85±2,1	12,18	3,2<0,01	8,30±2,1	8,90±1,9	6,74	2,5<0,05
	Strength abilities								
10.	Flexion and extension of the arms in an emphasis lying down (number of times)*	12,25±1,9	17,67±1,8	30,67	3,3<0,01	12,63±1,9	13,88±1,9	9,0	2,2<0,05
11.	Raising the torso in a sedan from a prone position (number of times)	22,91±1,7	26,23±1,5	12,65	4,8<0,01	22,05±1,9	24,23±1,7	8,99	2,4<0,05
12.	Hold the position of "high chair" against the wall (s)	77,21±1,5	82,02±1,3	5,86	4,4<0,01	75,56±1,5	78,13±1,5	3,28	2,5<0,05
	Speed abilities								
13.	Running on the spot 5 s (quantity)	18,27±1,5	19,06±1,3	4,14	2,4<0,05	17,76±1,5	17,96±1,2	1,12	1,1>0,05
14.	Raising and lowering straight arms from the position of the main stand, arms below 10s (number of times)	12,15±1,9	14,83±1,8	18,07	3,7<0,01	12,23±2,0	13,28±1,9	7,90	2,2<0,05
15.	10 bends forward from the position of the main stand, arms up (s)	11,93±1,8	14,65±1,7	18,56	2,9<0,01	12,07±2,0	13,15±1,9	8,21	2,1<0,05
	Speed-strength abilities								
16.	Jumping up from a deep squat in 20 s (number of times)	26,18±1,9	29,26±1,7	10,52	2,6<0,05	26,21±1,5	27,42±1,4	4,41	1,9>0,05
17.	Alternate swing legs 90° forward for 20 s (number of times)	22,75±1,8	25,05±1,5	9,18	2,4<0,05	23,15±1,5	24,35±1,5	4,90	1,9>0,05
	Flexibility								
18.	Bridge (points)	8,98±0,7	9,0±0,5	1,0	0,4>0,05	9,05±0,5	9,13±0,5	0,88	0,9>0,05
	Twine to the right (points)	9,76±0,9	9,96±0,8	0,2	0,8>0,05	9,82±0,7	9,86±0,6	0,2	0,9>0,05
19.	Twine to the left (points)	9,64±0,4	9,86±0,3	0,2	0,8>0,05	9,83±0,5	9,85±0,3	0,2	0,8>0,05
	Twine transverse (points)	10,00±0,2	10,00±0,2	0	0>0,05	10±0,2	10±0,2	0	0>0,05
	Functionality								
20.	HSTI (c. u.)*	79,32±1,5	82,43±1,2	5,39	3,2<0,01	78,55±1,7	80,39±1,5	1,08	1,2>0,05

***Remark.** OD – output data (before the start of the experiment); FD – final data (after the experiment); HR – heart rate; HSTI – Harvard step test index.*

abilities increased by 4,14% (p<0,05), 18,07%, (p<0,01), and 18,56%, (p<0,01). In terms of speed and strength abilities, the increase is: 10,52% (p<0,05), 9,18% (p<0,05). Flexibility indicators increased, but unreliably from 0,2% to 1,0%. This result can be explained by the fact that already in the initial testing the gymnasts showed very high results.

Thus, the use of the methodology developed by us creates a functional basis for the growth of special technical preparedness at the stages of in-depth sports specialization, sports improvement and sports longevity in long-term training of gymnasts.

Conclusions / Discussion

The proposed methodology provided a high level of aerobic capabilities and increased the energy supply efficiency when using various exercises with a wide range of actions, as well as additional means, in particular breathing exercises, which have a positive complex effect on the functions of the central nervous system, acting as a factor that optimizes the psycho-functional and sensorimotor capabilities of the body.

The fact of an increase in the overall physical performance of gymnasts as a result of the use of special exercises coincides with the research results of A. Dobryak and A. Deineko, I. Krasova in rhythmic gymnastics [4; 5].

The work supplemented special requirements and clarified the training process of young gymnasts in sports aerobics.

Among the motor abilities that provide the necessary level of mastering of technical actions, an important role is played by those in which the coordination of movements is of paramount importance, and the results of our experiment were confirmed by the authors' studies [3; 6; 15] that technical mastery in sports aerobics as well as in many gymnastic and dance sports is more determined by coordination abilities.

Theoretically developed and experimentally substantiated, the technique of special physical training of gymnasts in sports aerobics at the initial training stage improves physical qualities, comprehensively affects the body of athletes, providing

a more significant increase in the functional capabilities of the cardiovascular and respiratory systems, and, as a result, increased aerobic and anaerobic performance and physical performance compared to the program that is currently used in sports other schools of the country.

In the future, further research is expected to develop the theoretical and methodological foundations for building the training process in sports aerobics at various stages of preparation.

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