

Methodology for improving the body balance of athletes in acrobatic rock'n'roll at the stage of preliminary basic training

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An analysis of the content of the competitive programs of various categories of athletes in acrobatic rock'n'roll (sports couples and formation teams) allows us to determine that all motor activity occurs in complicated and sometimes extreme conditions with a constant change in body position in three planes: sagittal, frontal and horizontal. Given this, we can say that for a rational construction of the technique of motor actions, athletes are constantly faced with the need to restore and maintain the balance of the body, which has a close interaction with the general level of physical preparedness [1; 2; 4; 10; 12]. Based on the analysis of literary sources, we can state that at this stage in the development of acrobatic rock'n'roll there are too few scientific and methodological literature on the issues of purposeful and proportionate development of the ability of athletes to maintain body balance, as one of the determining factors for successful mastery of the technique of acrobatic rock'n'roll. This fact reduces the effectiveness of the training process of athletes.

Purpose: to consider ways to solve the problem of improving the balance of the body of athletes in acrobatic rock'n'roll at the stage of preliminary basic training.

Material & Methods: the study was conducted in Kharkov on the basis of the sports and dance club "Rapid". The experiment was attended by 28 athletes 10–12 years old. Athletes practice acrobatic rock'n'roll at the stage of preliminary basic training. We have chosen modern research methods: theoretical analysis and generalization of sources of scientific, methodological and specialized literature, pedagogical observations, pedagogical testing, methods of mathematical statistics.

Results: as a result of the implementation of the developed sets of exercises, including means of gymnastics, acrobatics and health preparedness, a significant increase was achieved in the indicators of maintaining body balance by athletes in acrobatic rock'n'roll at the stage of preliminary basic training.

Conclusions: the developed methodology for improving the body balance of athletes in acrobatic rock'n'roll at the stage of preliminary basic training has proved its effectiveness. There were significant changes in all the studied indicators of athletes $EG p < 0,05, p < 0,01$. The developed technique has a positive effect on the body systems that ensure the balance of the body. The effectiveness of a combination of acrobatic rock'n'roll exercises, gymnastics and health fitness has been experimentally proved in training acrobatic rock'n'roll athletes at the stage of preliminary basic training.

Keywords: acrobatic rock'n'roll, body balance, stage of preliminary basic training.

Introduction

Over the past decade, acrobatic rock'n'roll has expanded the boundaries of its popularity and turned into a spectacular dynamic sport. The structure of the technique of movement of acrobatic rock'n'roll is similar to the structure of the technique of movement in complex coordination sports, in which dance combinations and acrobatic elements combined with musical accompaniment in a single program [8; 13; 25].

Competitive programs of all categories have a large number of rotational movements and acrobatic elements, which are performed both without contact and in pair interaction, except for the category «children» [2; 22].

Despite the general increase in the complexity of competitive programs, a high level of motor fitness, there is a small number of those athletes who demonstrate motor actions that are adequate to the motor task [1; 10].

So, the peculiarity of performing acrobatic rock'n'roll movements, the constant complication of competitive programs and high competition on the world stage requires finding effective ways to economize the energy spent when performing complex technical coordination actions in competitive programs by improving the mechanisms for ensuring the

athlete's body balance.

Purpose of the study: to increase the capabilities of body systems that ensure the balance of the body of athletes from acrobatic rock'n'roll at the stage of preliminary basic training.

Objectives of the study:

1. To analyze modern approaches to the development of the balance of the body of athletes in complex coordination sports of an aesthetic orientation and, in particular, in acrobatic rock'n'roll.

2. To determine the indicators of monitoring the balance of the body of athletes from acrobatic rock'n'roll at the stage of preliminary basic training.

3. Experimentally verify the effectiveness of the methodology aimed at improving the balance of the body of athletes from acrobatic rock'n'roll at the stage of preliminary basic training.

Material and Methods of the research

To conduct this study, the following methods were used: theoretical analysis and generalization of sources of scientific, methodological and specialized literature, pedagogical

observations, pedagogical testing, methods of mathematical statistics. The study was conducted on the basis of the sports and dance club "Rapid", Kharkov. The experiment was attended by 28 athletes 10–12 years old. Athletes practice acrobatic rock'n'roll at the stage of preliminary basic training.

Results of the research

Mastering the technique of dance movements is no exception to the general rules of teaching motor actions, both in sports in general and in acrobatic rock'n'roll, in particular. These principles are based on fundamental research that has been carried out by scientists in the field of sports earlier and supplemented by specialists in complex coordination sports of an aesthetic orientation [1; 3; 5; 9; 11; 14; 17; 18; 19; 21; 24].

High-quality performance of technical actions of acrobatic rock'n'roll makes high demands both on the general motor and functional preparedness of athletes, as well as on the high level of development of flexibility, coordination, speed and strength abilities, the integrated work of the body's sensory systems and the general coordination of motor actions.

This is due to the fact that according to the requirements of the WRRC (World Federation of Acrobatic Rock'n'roll), competitive exercises are performed with high dynamics and combine complex choreographic movements, which are saturated with a large number of revolutions, changes in the seats of partners and acrobatic elements, which are performed in contact partners and solo [7; 23].

Also, elements of the program should be represented by athletes at three levels: in full growth; on the floor; without contact with the floor, performing elements in the air [10].

Variation of changes in body positions in various planes constantly requires sensorimotor correction of movements to maintain the required body position [15].

Each deviation of the athlete's body from the optimal position corresponds to a certain effort to restore this position using balance actions. At the same time, the minimum amplitude of balancing will indicate the quality of the exercise in a squeal, and the maximum - vice versa. Improving the ability of the body of athletes to maintain body balance will significantly increase the efficiency of the process of training athletes [3; 6; 16].

So, to solve the tasks we conducted a pedagogical experiment.

The functional state of the vestibular analyzer of the studied athletes was monitored by recording the magnitude of the change in the duration of autonomic, sensory and motor reactions that occur in response to the load of the vestibular apparatus. To determine the indicators of static equilibrium while standing with closed eyes, we used the complicated "Rom-

berg test", to determine the indicators of static equilibrium while standing on one leg with open eyes, we used the "Swallow" test, to determine the indicators of dynamic equilibrium we used the "Walk in a straight line" test without visual control, as well as to determine the ability to restore body balance, a test was used according to the methodology of Arnoth and Gaines.

The results are presented in Table 1.

The average age of athletes from acrobatic rock'n'roll is 11.1 ± 0.9 years, but the youngest athlete is 10 years old, and an adult is 12 years old.

In the Romberg test, the average result of the static equilibrium of athletes on the right foot is 18.2 ± 10.3 s, on the left 16.4 ± 10.2 s. According to the scientific literature summarized by L.P. Sergienko [20], indicators of static equilibrium for children 10–12 years old are below normal. The obtained indicators may indicate the focus of funds in the training process.

In the Swallow test, we obtained the following results: on the right foot, the average value is 21.7 ± 12.7 s, on the left foot, 24.4 ± 15.1 s, the score is lower than normal. Analyzing the performance of athletes in this test, we can say that on the left foot the athletes showed a slightly better result than on the right.

According to the results of dynamic equilibrium, the athletes' results are as follows: the average deviation from the trajectory during this exercise is -24.8 ± 13.6 cm, the indicators are within the normal range, however, significant deviations of the indicators from each other and to the left are traced, which indicates problems orientated athletes.

This fact cannot but cause concern, since the high-quality performance of many dance figures, acrobatic elements and the composition as a whole depends on the development of spatial orientation. Also, when performing group exercises of the "formation" nomination, coordinated actions of all team members are required, which can control the dynamics of their movements around the site.

A significant number of elements in which athletes perform various rotations, tilts of the head and body, after which it is necessary to maintain a stable position of the body in poses requiring a high manifestation of balance. In the group, the average time to restore equilibrium after rotations is 34.2 ± 16.1 s. According to [20], indicators correspond to a low level.

After analyzing the results of the initial testing, according to the uniformity of signs, the athletes who took part in the experiment were divided into two groups: control (CG), the training process of which took place without changing the means, and experimental (EG), in the training process of which specially developed sets of exercises were introduced to develop the balance function of athletes. At the beginning of the experiment, the performance of athletes did not have significant differences at $p < 0.05$.

Table 1
Indicators of static balance of athletes in acrobatic rock'n'roll at the stage of preliminary basic training (n=28)

Statistical indicators	Test Age, years	Romberg Sample, s		Swallow, s		Walking without visual control, see: + right - left	Restoration of balance, s
		right	left	right	left		
\bar{X}	11,1	18,2	16,4	21,7	24,4	-24,8	34,2
σ	0,9	10,3	10,2	12,7	15,1	13,6	16,1
m	0,3	1,9	1,9	2,4	2,9	2,6	3,0

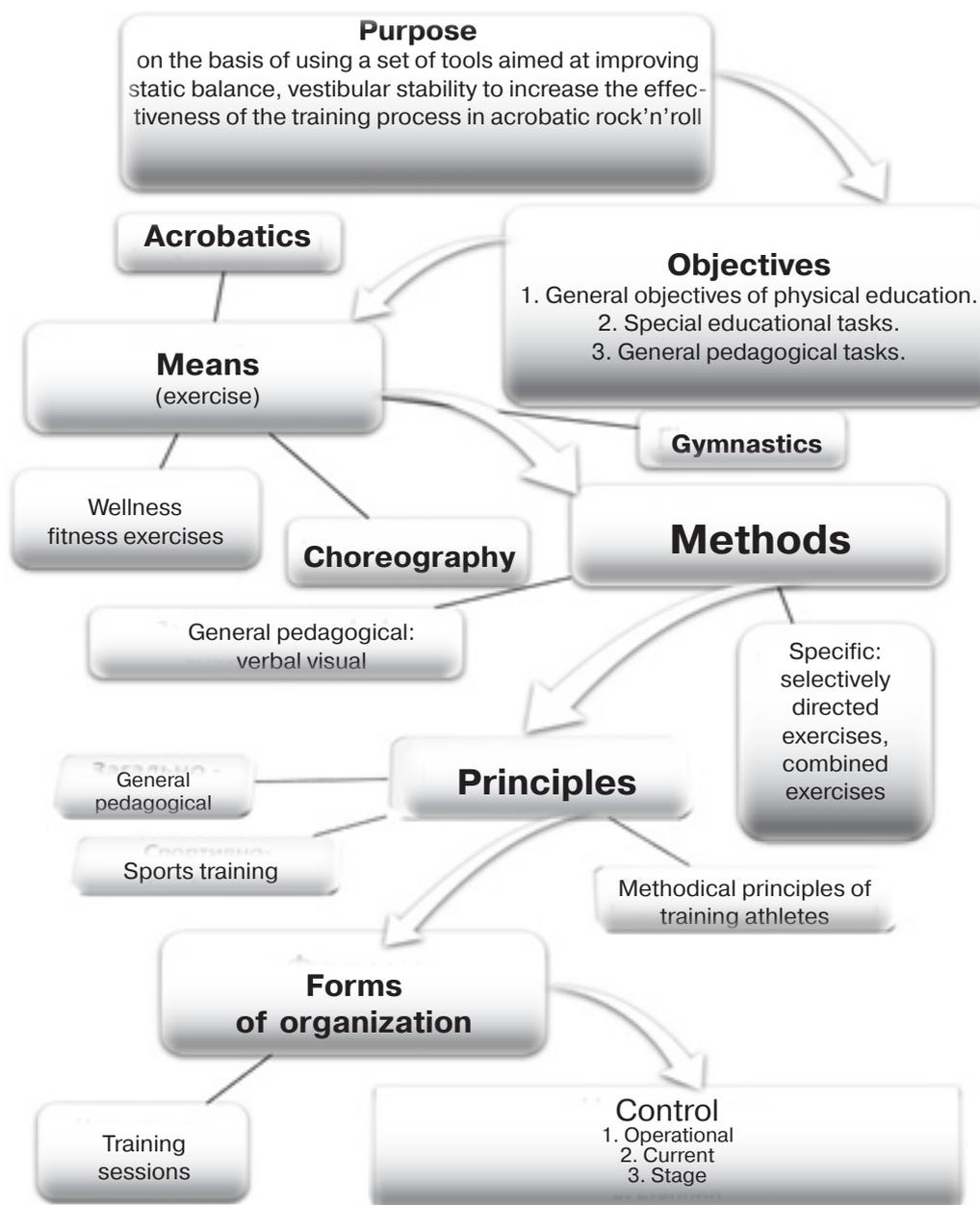


Fig. 1. Structure of the methodology for improving the body balance function

The construction of an experimental technique is based on three subdivisions of principles:

- general educational (consciousness and activity, accessibility and individualization, visibility and progression)
- the principles of sports training (specialization and individualization, the unity of all aspects of training, continuity and cyclicality, maximization and gradual increase in requirements, wave-like dynamics of loads)
- methodological foundations for training athletes with acrobatic rock'n'roll (“advancing”, contingency, proportionality, excess, modeling).

A diagram of the equilibrium development technique is depicted in Figure 1.

When selecting funds for the development of equilibrium, it was supposed to use the most diverse exercises possible to improve all analyzers that provide the equilibrium function. Each exercise that was introduced to improve balance, at the

same time solved other related tasks of preparation, that is, the development of motor qualities, the mastery of the technique of movements.

Exercises for the development of the equilibrium function alternated with others, aimed both at solving the problems of general physical training (to improve proper posture, to develop motor qualities, etc.), and to form the necessary motor skills.

The data of many studies have established that upright-ness is an inborn reflex and body installation. However, along with conditioned reflex prerequisites for the implementation of the body balance function, a person needs constant training (from birth) of organs and systems that ensure body stability [6].

Therefore, we provided for a gradual and systematic increase in the degree of influence of the special tools used on improving the systems of analyzers in the framework of one

lesson and from lesson to another lesson.

To gradually increase the load in an appropriate combination, the following were used: a) an increase in the pace of implementation; b) an increase in the number of repetitions and the number of exercises performed by athletes; c) increasing the complexity of exercises; d) performance of tasks with the exception of individual analyzer systems (for example, with eyes closed).

We have developed complexes of special exercises that are included in all parts of the training session. They were combined into separate blocks of acrobatics exercises, modern choreography and health fitness (exercises on fitball and the BOSU platform).

In the preparatory part, rotational movements were performed under ordinary conditions and with eyes closed, exercises for static stability were also added (choreography exercises – the content of various poses). In the main part of the lesson, to the usual arsenal of acrobatic rock'n'roll exercises, which improve the body balance function, we included acrobatics exercises, exercises on fitball and an unstable platform and various relay races exercises on dynamic balance. In the final part were added exercises for the development of static equilibrium.

At the end of the pedagogical experiment, to test the effectiveness of the complexes of exercises developed and introduced into the training process for developing the equilibrium function of the body of athletes, repeated testing was carried out and a comparative analysis of the initial and control indicators was made. The results of the CG and EG of athletes are presented in tables 2 and 3.

Analyzing the data of the control group of athletes, which are presented in Table 2, we can note a positive change in the average values of the balance indicators of the body of athletes.

We have found that for athletes 10–12 years old attending acrobatic rock'n'roll classes, the ability to static and dynamic balance and vestibular stability improves during training.

During the pedagogical experiment, at $p < 0.05$, the indicators of static equilibrium in the Romberg test (right and left leg) and dynamic equilibrium in the Walk without visual control test changed significantly. Without significant changes at $p > 0.05$, there remained an indicator of static equilibrium in the test Swallow (right and left leg) and vestibular stability in the test Restoring equilibrium.

Analyzing the change in the studied indicators of body balance of athletes in the experimental group, we can speak about the positive impact of exercises that were introduced and performed by athletes in the training process of acrobatic rock'n'roll.

During the study, all investigated parameters were

significantly changed at $p < 0.05$, $p < 0.01$.

The dynamic equilibrium index changed more significantly, the least changes in the static equilibrium index occurred.

We also analyzed the increase in body balance indicators of athletes of both groups, and Figure 2 shows their comparative analysis.

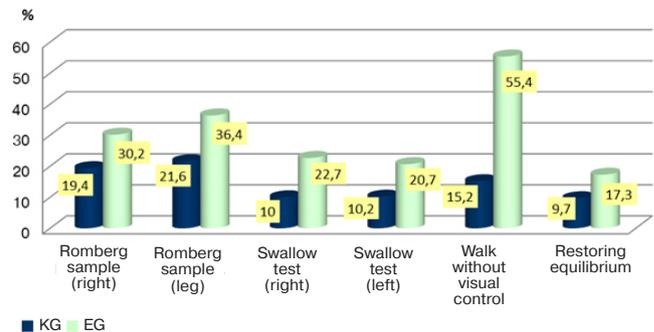


Fig. 2. Comparative analysis of the growth of the equilibrium indicators of the body of athletes in the control and experimental groups, in %

In the test, the Romberg test on the right of athletes in the EG increased by 10.8%, the left – by 14.8% more than the athletes of the CG. In the test, the Swallow on the right of the athletes of the EG increased by 12.7%, the left by 10.5% more than the athletes of the CG. In the test Walking without visual control, athletes in the EG increase by 40.4% more than athletes in the CG. In the test, Equilibrium recovery in athletes of the EG increased by 7.6% more than in athletes of the CG.

The results obtained in the pedagogical experiment do not contradict the already known scientific facts of L.P. Matveev (2008), V.I. Lyakha (2006), V.N. Platonov (2015), which claim that the most favorable period for the development of equilibrium ability in children is the age of 7 to 12 years, and by 13–14 years, the indicators of body stability reach the values characteristic of an adult. Meanwhile, focused training can provide earlier improvement in the capabilities of the systems responsible for the equilibrium function [14; 16; 19].

Conclusions / Discussion

1. In the process of analyzing the scientific and methodological literature on the development of the body balance of athletes attending classes in complex coordination sports of an aesthetic orientation, we found sources that contributed to solving this issue. These sources touch upon the development of the balance of athletes in rhythmic

Table 2
A comparative analysis of the change in the estimates of the equilibrium indicators of athletes of the CG in acrobatic rock'n'roll during a pedagogical experiment (n=14)

Test		BE $\bar{X} \pm m$	AE $\bar{X} \pm m$	Increase, %	t	P
Romberg Sample, s	right foot	18,2±1,9	22,6±2	19,4	2,2	<0,05
	left foot	16,3±1,9	20,8±2,2	21,6	2,2	<0,05
Swallow, s	right foot	21,7±2,4	24,1±2,2	10	1,1	>0,05
	left foot	24,4±2,9	27,2±2,4	10,2	1,2	>0,05
Walking without visual control, see: + to the right; - to the left		-34,7±2,7	-29,4±2,9	15,2	2,2	<0,05
Restoration of balance, s		34,3±3	38±3,1	9,7	1,5	>0,05

Table 3

A comparative analysis of the change in the estimates of the equilibrium indicators of athletes of the EG in acrobatic rock'n'roll during a pedagogical experiment (n=14)

	Test	BE $\bar{X} \pm m$	AE $\bar{X} \pm m$	Increase, %	t	P
Romberg Sample, s	right foot	18,2±1,9	26,1±1,8	30,2	4,0	<0,01
	left foot	16,4±1,9	25,8±1,9	36,4	4,8	<0,01
Swallow, s	right foot	21,7±2,4	28,1±2,2	22,7	3,0	<0,05
	left foot	24,4±2,9	30,8±2,5	20,7	2,7	<0,05
Walking without visual control, see: + to the right; - to the left			-15,2±1,7	55,4	9,3	<0,01
Restoration of balance, s			41,4±3,1	17,3	3,0	<0,05

and artistic gymnastics, acrobatics and figure skating. Unfortunately, in the literature accessible to us from acrobatic rock'n'roll, a limited amount of information has been found that would reveal the development of balance in athletes from acrobatic rock'n'roll.

2. An analysis of the source data showed that when assessing static equilibrium, the results of athletes are below normal (Romberg test: rights 18.2±10.3 s, left 16.4±10.2 s; test "Swallow": rights 21.7±12.7 s, left 24.4±15.1 s. The results of the athletes' dynamic equilibrium are as follows: the average deviation from the trajectory when performing this exercise is -24.8±13.6 cm. Significant deviations from the midline give reason to state a low level of development of abilities orientation in space and dynamic balance of athletes.

In the group, the average time to restore equilibrium after rotations is 34.2±16.1 s. According to the authors, the indicators are low.

3. During the pedagogical experiment, at $p < 0.05$, the

static equilibrium of the athletes of the CG in the test of the Romberg test (right and left leg) and the dynamic balance in the Walk without visual control test changed significantly. Without significant changes at $p > 0.05$, there remained an indicator of static equilibrium in the test Swallow (right and left leg) and vestibular stability in the test Restoring equilibrium.

In EG athletes, a significant change in all the studied parameters is observed at $p < 0.05$, $p < 0.01$. The indicator of dynamic equilibrium has changed more significantly, the changes in the indicator of static equilibrium have occurred less. Therefore, we can argue that the tools for developing equilibrium that we developed and introduced into the educational process of EG athletes at the stage of preliminary basic training turned out to be more effective.

In the future prospect of further research, it is supposed to determine the relationships between the equilibrium indicators and the anthropometric parameters of athletes from acrobatic rock'n'roll at the stage of preliminary basic training.

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