

Integral technologies of psycho-physical training of athletes in sports aerobics

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Purpose: substantiate the use of integral technologies for the psycho-physical training of athletes in sports aerobics.

Material & Methods: 46 qualified aerobics participated in the study, 22 athletes made up a control group, 24 were experimental, and 19 aerobists, 9 athletes made up an experimental group, 10 were a control group. Methods: theoretical analysis of literature data; method for evaluating the results of competitive activities; pedagogical experiment; methods of mathematical statistics with the use of computer programs "EXEL" and "SPSS".

Results: psychophysical training should be one of the main parts of the variable component of the general training program for aerobic athletes. It is based on the implementation of special sets of exercises in conjunction with mental imagery of the nature of the movements. The positive effect of the use of integral technologies of psychophysical training on the competitive performance of athletes.

Conclusion: construction of the training process with the use of integral technologies of psychophysical training had a positive effect on the effectiveness of the competitive activity of athletes.

Keywords: sports, aerobics, equipment, team, psychophysical training, integral, technology.

Introduction

Sports aerobics is a complex and emotional sport that includes the following categories of competitive performances: individual men's, individual women's, mixed pairs, threes and groups (5 athletes), and dance gymnastics (Aerodance) and gymnastic platform (Aerostep) [4; 5; 7; 8]. Psychophysical training of athletes is of great complexity, since sports aerobics is not only a sport based on the performance of certain motor programs, but also art, requiring emotional transfer of various plot lines of programs. In modern scientific research, the problem of developing the ability of athletes to transmit different images through movements remains practically unlighted. In sports aerobics, from the ability not only to correctly convey the general structure of movements, but also to uncover the plot of the performance, success in competitions depends to a large extent.

At present, there are a large number of studies that show the effectiveness of the application of psychophysical methods of training athletes [6; 7; 12; 13; 14]. A special place is occupied by technologies of psychophysical training connected with the transmission of various images through movements. One of such technologies is special sets of exercises, performed under verses, reflecting various images [10; 11].

It is logical to assume that the use of psychophysical technologies will be effective for the training of athletes in sports aerobics, since sports aerobics requires the display of artistry, the ability to move emotions, create various images and plots.

Relationship of research with scientific programs, plans, themes. The research was carried out according to the Consolidated Plan of Research Work in the Field of Physical Culture and Sport for 2011–2015 on topic 2.4 "Theoretical and Methodological Principles of Individualization in Physical Education and Sport" (State Registration No. 0112U002001); research work, which is funded by the state budget of the Ministry of Education and Science of Ukraine for 2013–2014. "Theoretical-methodical bases of application of informa-

tion, pedagogical and medical-biological technologies for formation of a healthy way of life" (State registration number 0113U002003); research work, which is funded by the state budget of the Ministry of Education and Science of Ukraine for 2015–2016. "Theoretical-methodical bases application of means of information, pedagogical, medical and biological orientation for impellent and spiritual development and formation of a healthy way of life" (State registration number 0115U004036); research work, which is funded by the state budget of the Ministry of Education and Science of Ukraine for 2017–2018. "Teoretikal-methodical bases of application of information, medico-biological and pedagogical technologies for realization of individual physical, intellectual and spiritual potential and formation of a healthy way of life" (State registration number 0117U000650).

The purpose of the research: substantiate the use of integral technologies for the psycho-physical training of athletes in sports aerobics.

Material and Methods of the research

The following research methods were used: theoretical analysis of literary data; method for evaluating the results of competitive activities; pedagogical experiment; methods of mathematical statistics with the use of computer programs "EXEL" and "SPSS". The data obtained were analyzed using non-parametric Kolmogorov-Smirnov tests for independent samples and Wilcoxon for dependent samples.

46 qualified aerobics participated in the study, 22 athletes made up a control group, 24 were experimental, and 19 aerobists, 9 athletes made up an experimental group, 10 were a control group.

Results of the research and their discussion

To improve mutual understanding of athletes in teams, as well as for psychophysical training, training programs for athletes were developed, taking into account their individual characteristics of the structure of integrated preparedness, including

indicators of functional and psychophysiological capabilities.

Developed training programs included basic and variable components. The basic component of the programs was a standardized structure for selecting the means and methods of training aerobic athletes, the same for all formed groups of athletes. The variational component of the training programs contained special tools and methods that differ in character and scope for the representatives of each group. One of the main parts of the variable component was psychophysical training. It was based on the implementation of special sets of exercises in conjunction with imaginative representations. We have applied special complexes of psychophysical exercises that affect not only the physical aspect, but also the conscious, the psychological in a holistic integrated form.

When constructing training session programs, we were guided by the fact that in order to ensure an integral impact on the consciousness of athletes and on motor development combined with the development of the ability to transfer various plot lines of programs, it is necessary to create conditions for a relatively comfortable state of the musculoskeletal system, a high level of energy consumption, development of physical qualities, functional capabilities and creating an atmosphere of unity of body and mind, self-knowledge, non-standard and unordinary [7; 12; 13].

Our method of psychophysical preparation of the integral effect on the consciousness of athletes and on motor development combined with the development of the ability to transmit various plot lines of programs is also based on the principles of movements described in the works of Zh. L. Kozina and co-authors [10; 11]. These principles are combined with the need to develop imaginative thinking in psychophysical training in sports aerobics.

The principles of motion of systems [10; 11], which were applied in the proposed procedure:

1. Movements are performed by the whole body along the basic planes of human movements. These are the most rational and energetically economical from the point of view of biomechanics and physiology of motion [1; 2; 3]. In each movement, all parts of the body participate successively to the fingertips according to the principle of a dynamic wave with circular motions.
2. In gymnastics wave-like movements of the spine predominate, which improve blood circulation, affect the body as a system like wavy movements of smooth muscles.
3. Gymnastics is constructed as a dance in which one movement flows smoothly from the other, developing the skill of economy and plasticity is extremely necessary for harmonious natural movements.
4. To each exercise (according to the method of Zh. L. Kozina and co-authors [10; 11]) there corresponds a line of poems about nature that sets the image of a similar movement in animals, plants or natural phenomena. Each exercise is also accompanied by mental representations of various images (natural landscapes, color combinations, etc.) according to the individual characteristics of the person.

To determine the impact of the application of psychophysical

training on competitive effectiveness, statistical analysis of the ranking indicators in all-Ukrainian and regional competitions was conducted. The following competitions were analyzed: the championship of Ukraine, the Cup of Ukraine, and the championship of the Kharkov region and the Cup of the Kharkov region. The places in the ranking of the competitions of each athlete in 2015 were registered and their places in the rating in 2016.

Before the experiment, out of 25 analyzed performances by athletes in the experimental group, 13 fourth, 3 fifth places and 9 sixth were registered. In the control group, before the experiment was conducted, 3 fourth places and 11 fifth places were placed at 7 sixth places, 4 seventh places.

Before the experiment on the results of the competition in 2015, the control and experimental groups were not statistically different ($p > 0,05$).

After the experiment, out of 25 analyzed performances by athletes in the experimental group, 6 sixth places, 3 fifth places and 16 fourths were registered. In the control group, after the experiment, 10 seventh places, 9 sixth places, and 6 fifth places were registered.

After the experiment, statistically significant differences in the competitive rating of athletes of the experimental and control groups ($p < 0,05$).

In the experimental group, after the experiment, 3 cases of athletes' transition from fifth to fourth in the ranking of competitions were registered, 2 cases of transition from fourth to third places, 5 cases of transition from sixth to fourth places and 9 cases of fifth places that remained unchanged.

The results of the comparative analysis of the places in the rating of the main aerobics competitions of the experimental group before and after the experiment showed a significant improvement in the competitive performance ($p < 0,001$), which indicates the effectiveness of the developed methodology for qualified aerobists.

The results of a comparative analysis of the places in the rating of the main aerobic competitions of the control group before and after the experiment did not show any significant changes in the competitive performance ($p > 0,05$), which indicates the difficulty of increasing the place in the competitive rating in sports aerobics.

In the control group, after the experiment, four cases of transfer of athletes from the sixth to the fifth place in the ranking of competitions were recorded, 5 cases of transition from fifth to fourth places, 5 cases of transition from fourth to third places, 6 cases of sixth places that remained unchanged, and 5 cases of the seventh places that have remained unchanged.

Effectiveness of the application of the developed methodology was assessed based on the results of the All-Ukrainian level competitions. The results of competitive efficiency are presented in Tables 1 and 2.

As can be seen from the presented data, as a result of the developed technique, the athletes of the experimental group significantly increased their competitive effectiveness ($p < 0,001$), while the competitive performance of the control

Table 1
Determination results of competitive efficiency changes in experimental (n=33) and control (n=32) groups as a result of the experiment (conv. units).

Group	Before experiment		After experiment		Significance of differences, p
	\bar{X}	S	\bar{X}	S	
Experimental	7,8	0,4	8,4	0,3	<0,001
Control	7,9	0,5	8,03	0,4	>0,05

group remained practically unchanged ($p>0,05$). The control and experimental groups did not differ between themselves before the experiment ($p>0,05$), and after the experiment the groups of the steel differ significantly ($p<0,001$) (Table 2).

Table 2
Determination differences results of competitive effectiveness between the experimental (n=33) and control (n=32) groups before and after the experiment

Testing period	Experimental		Control		Significance of differences p
	\bar{X}	S	\bar{X}	S	
Before the experiment	7,8	0,4	7,9	0,5	>0,05
After the experiment	8,4	0,3	8,03	0,4	<0,05

The received results testify to efficiency of application of integral technologies of psychophysical preparation and a complete set of commands in sports aerobics.

In the practical work of sports aerobics trainers, one should apply the principles of mathematical modeling for optimal team completion and integrated technologies for psychophysical training and team completion.

Conclusions

1. Psychophysical training should be one of the main parts of the variable component of the general training program for aerobic athletes. It is based on the implementation of special sets of exercises in conjunction with mental imagery of the nature of movements.

2. Positive effect of the use of integral technologies of psychophysical training in sports aerobics on the competitive performance of athletes is shown. Before the experiment on the results of the competition in 2015, the control and experimental groups were not statistically different ($p>0,05$). After the experiment, statistically significant differences in the competitive rating of athletes of the experimental and control groups ($p<0,05$).

Prospects for further research. It is supposed to conduct an in-depth scientific substantiation of the impact of psychophysical training on the effectiveness of training athletes.

Conflict of interests. The author declares 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: 09.11.2017.

Published: 30.12.2017.

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