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Borys Kokarev
kokarevas@gmail.com

Study of Changes in Level of Physical Capacity and Physical Preparedness of Female Athletes of High Qualification in Sports Aerobics in an Annual Cycle of Preparation

Zaporizhzhya national University (Zaporizhzhya)

Abstract:

Topicality of the work. It is studied the current state of the problem of increasing the efficiency of training process of female athletes of high qualification in sports aerobics at the stage of implementation of the individual maximum capacity; peculiarities of changing the level of physical performance, aerobic capacity and physical fitness of highly skilled female athletes in sports aerobics in a year cycle of preparation. It was found out that development of new programs of building of the training process of highly qualified athletes that would meet the requirements of sport of high achievements is topical nowadays. *Results of the work.* It was found out that at the beginning of the preparatory period of a year cycle of preparation it was observed average values of indicators of physical performance and aerobic capacity, as well as average, below average or above average performance of special physical readiness of the surveyed. The absence of significant changes in these indicators at the end of the preparatory period was shown. It was testified that at the end of the competition period there was a significant, compared with the end of the preparatory period, the decline in physical performance to 13,87 – 14,06 %. Similar changes were observed with indicators of aerobic capacity of an organism. We have analyzed the performance of special physical fitness of female athletes at the end of the preparatory and competitive periods. The end of the preparatory period was marked by increasing the rates from 2,46 to 5,19 %, and at the end of the competitive period – significant decline. At the end of the competition period the results dropped by between 1,87 to 9,58 %. It is proved that the use of the current program of construction of the training process did not contribute to increase of the level of physical performance, aerobic capacity and physical fitness to the completion of the preparatory period, as well as the optimal level of these indicators during the competition period. *Conclusions.* It was established experimentally that the use in the training process of highly skilled female athletes of the current program does not contribute to considerable improvement of their level of physical capacity and aerobic capacity and physical fitness.

Key words:

sports aerobics, working capacity, preparedness, qualification, period of preparation.

Stating the problem. Improvement of long-term sports training system in different kinds of sports activities still remains one of the most topical problems of the sports theory and methodology [5; 7; 8].

Various aspects of a problem which examines the training process construction and separate component's perfection of sportsmen's general preparedness of different age and specializations were investigated by a great number of authors [1; 2; 9]. It allowed us to obtain information about high efficiency of sportsmen preparation in accordance with the modern requirements of sports of high achievements.

Special attention, according to many experts, has to be devoted to maximal implementation of individual possibilities, which envisages the achievement of the highest sporting scores by sportsmen in the selected type of sport. This is due to the decline of sporting achievements of native sportsmen and sportswomen in the international arena for the last 5–10 years in many kinds of sports [3; 4].

Thus, the study of efficiency of the training programs construction of highly qualified sportswomen, who specialize in sports aerobics, for optimization of level their physical capacity and physical preparedness determine topicality and practical meaning of the study.

Work is an integral part of the scientific programs of the Faculty of Physical Education and the Department of Olympic and Professional Sport of Zaporizhzhya National University and is executed within the framework of the theme of «Study of adaptive possibilities of sportsmen's organisms on different stages of educational-training process» (the number of national registration 0110U000683) of the Erected plan of Science and Research Work by Department of Education and Science of Ukraine in 2010–2015 years.

The aim, methods and organization of the research. The main aim of the current study was to evaluate the efficiency of the existing building program of the training process of highly-skilled sports aerobics athletes in the annual cycle of preparation in order to fully increase and implement maximum individual potential.

Tasks of the research were solved with the help of the following methods: analysis and generalization of scientifically-methodical literature; generalization of sports-pedagogical experience; pedagogical supervision; pedagogical experiment; pedagogical testing of physical capacity, aerobic possibilities and special physical preparedness, methods of mathematical statistics.

The experimental study was conducted with two stages. The first stage examined the current state of the problem of improvement of the efficiency of highly qualified athletes within the training process, who specialize in sports aerobics, up to the stage of realization of individual potential.

Pedagogical experiment was held in the second stage. It studied the dynamics of physical features of operability, aerobic capacity and physical fitness of qualified athletes as part of the annual training cycle.

Research was conducted on the base of sports club of Zaporizhzhya National University from 2013 to 2014. The research involved 20 sportswomen of high qualification, aged from 18 to 24 years, specializing in sports aerobics and the ones, who have the title of master of sports of Ukraine. All athletes were part of the mixed team of Zaporizhzhya National University.

Research results. Pedagogical experiment was conducted in accordance with the current program of training process of construction of highly-qualified sportsmen and calendar events. The training process in the annual cycle had a classical two-phase scheme. It included preparatory, competitive and transition periods that contained inverted, basic, control and preparation, pre-competition and competitive meso-cycle, but only if they had all types of micro-cycles.

It is proven that at the beginning of the experiment which was linked to the beginning of the annual cycle preparatory period, it was observed that athletes showed the average physical performance operability, aerobic capacity and average, below average and above-average performances of their special physical preparedness (Table 1).

Second testing of athletes which was held at the end of the preparatory period did not allow to record significant ($p > 0,05$) changes in these indicators, although improvement in quality evaluation tests for speed-strength and coordination abilities should be noted.

Table 1

Indicators of physical operability, aerobic performance and special physical preparedness of highly qualified athletes (n = 20) at different stages of the annual cycle of preparation ($\bar{X} \pm S$)

Indicators	Start of the preparatory period	End of the preparatory period	End of the competition period
BPWC ₁₇₀ , kgm•min ⁻¹ •kg ⁻¹	20,76±1,11 average	21,36±1,00 average	17,88±1,09* below average
BMSK, ml•min ⁻¹ •kg ⁻¹	55,73±2,76 average	55,71±1,94 average	51,32±1,81 average
Amplitude leg swings, amount	144,20±1,30 above average	147,75±1,50 above average	141,48±1,17** above average
List of flexibility tests, points	8,13±0,14 average	8,38±0,14 average	7,79±0,11** average
Angle emphasis, s.	21,40±1,85 below average	22,45±1,56 below average	19,35±1,47 below average
Straight legs lift, amount	9,90±0,47 average	10,35±0,39 average	9,43±0,38 below average
Arm's push-ups, amount	19,25±0,58 average	20,25±0,56 average	18,02±0,41** below average
Long jump, cm	196,10±2,36 average	201,05±2,31 average	192,34±1,98** Below average
Squatting on one leg, amount	46,80±1,30 above average	48,15±1,32 above average	44,12±1,27* average

Notes: * – $p < 0,05$; ** – $p < 0,01$ compared with the index's value in the middle of stated experiment. Levels on «below average», «average», «above average» – M. V. Malikov (2006).

Analysis of physical operability and aerobic capacity of the athletes testified reduced levels of physical operability and aerobic capacity by the end of the competition period. There was a significant change ($p < 0,05$) compared to the middle of the experiment (completion of the preparatory period) and following

decline in physical operability: $aPWC_{170}$ to 14,06 % and 1,87 % for $rPWC_{170}$ (Fig. 1). Moreover, in the second phase, the indicator's quality level went down from «average» to «below average». Similar changes were observed with another couple of the body's aerobic capacity indicators of athletes with the only one difference – transition values tested in different quality levels were not observed.

According to the results on the beginning of the preparatory period, the absolute and relative levels of importance MOCs, based on the results of testing at the end of the preparatory period, changed to 8,73 % (difference between the middle and the end of the experiment) and from 7,79 % to 7,84 % (difference between the middle and the end of the experiment 7,84 %). None of the indices showed significant changes ($p > 0.05$) during the test.

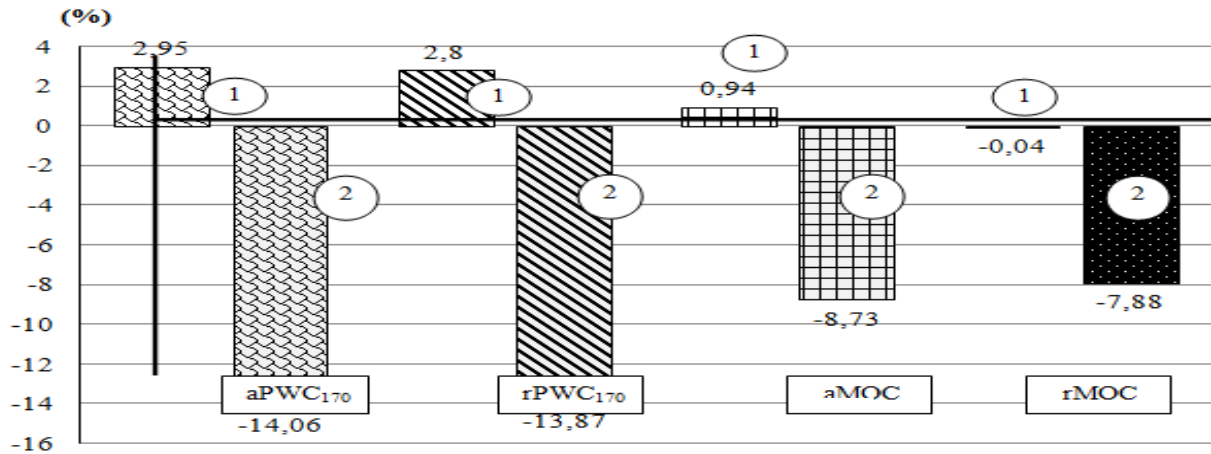


Fig. 1. Changes in physical operability and aerobic capacity of highly-skilled athletes' qualifications in sports aerobics during the end of preparatory training cycle and the whole competition cycle (in % from baseline).

Notes: (1) –end of preparatory period; (2) –end of competition period;

Evaluation of athletes' special physical training has shown that (Fig. 2) at the end of the preparatory training period has showed some growth from 2,46 % to 5,19 % ($p > 0,05$).

The end of competitive season was characterized with significant ($p < 0,05$; $p < 0,01$) decrease of results in most of special physical fitness tests compared to the beginning and end of the experiment (completion of the annual preparatory period). All tests of general and special physical fitness competition period showed a relative decline in value results from 1,87 % to 9,58 %.

Listed results lead into a conclusion that the use of current training-process building program does not contribute to increase of the level of physical, technical, artistic, choreographic and compositional training during the pre-competing phase.

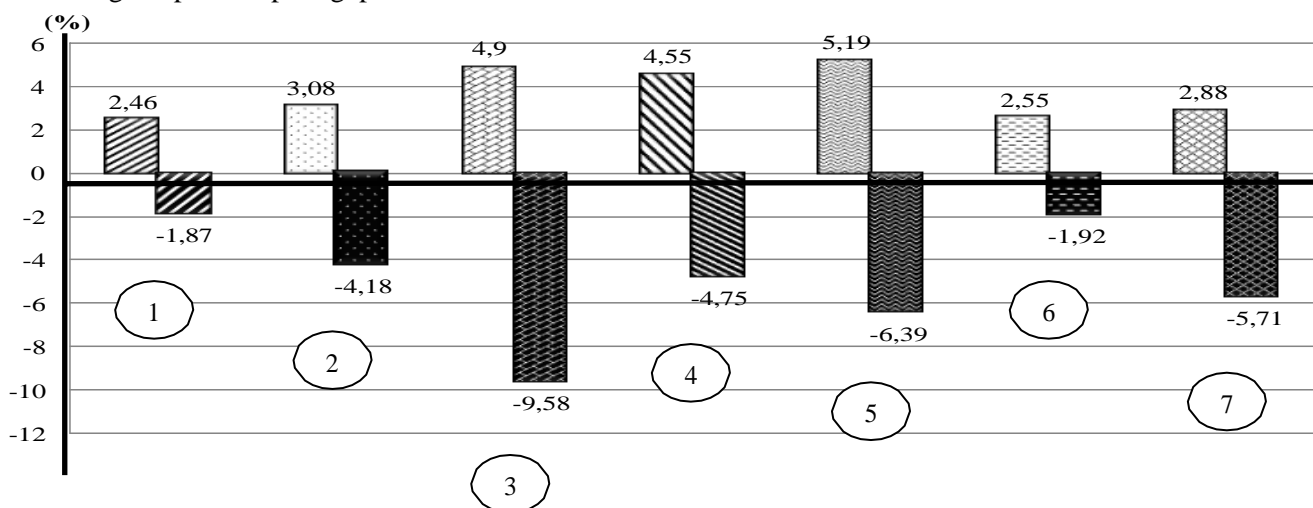


Fig. 2. Changes in physical fitness of highly-qualified sports aerobics athletes' qualifications during the annual training cycle (in % from the baseline).

Notes: 1 – «Amplitude leg kicks»; 2 – «Listofflexibility tests»; 3 – «The angle's emphasis»; 4 – «Lifting straight legs from climbing wall to touch toes for 30 seconds»; 5 – «Two arm push-ups»; 6 – «Long jump»; 7 – «Squatting on the right/left foot, left/right ahead or known as «gun».

As well as the optimal level of these indicators do not help to win during the competitive period in the preparation of highly skilled athletes in sports aerobics. As a result there were relatively low places in competitions at various levels (4–7 places).

Conclusions and recommendations for further research. After analyzing the results the following can be stated:

1. Analysis of scientific and methodical literature suggests that the problem of improving the training process of sports-aerobic athletes requires further investigation on stage to realize individual potential. One of the promising ways to improve the various components of the overall preparedness of qualified sport-aerobic athletes is to develop new programs build training process in the annual cycle of training.

2. The results of the experiment revealed that the use of the training process of highly-skilled sports aerobics athletes does not promote substantial optimization of their physical capacity and aerobic capacity and physical fitness while using the current building program. The following should be pointed:

- Only average physical capacity, maximal oxygen consumption and average and below average physical fitness values were typical for athletes at the beginning of the experiment;

- At the end of the preparatory period of sportsmen were no significant ($p > 0,05$) changes in indicators of general fitness. It was confirmed that small size relative values increased in overall physical operability (at $2,89 \pm 1,35$ % compared to baseline), aerobic performance (at $0,17 \pm 1,22$ %), high-speed and power-speed (at $2,46 \pm 1,53 - 5,19 \pm 1,39$ %), static strength endurance (at $4,91 \pm 1,31$ %), speed-strength endurance (at $2,88 \pm 1,43$ %), the level of flexibility (to $3,08 \pm 1,41$ %), explosive strength (at $4,04 \pm 1,29$ %);

- Athletes observed a significant deterioration after the competition period, compared with the results of testing at the end of the preparatory period. Most indicators of overall fitness showed, namely to $16,29 \pm 1,48$ % of physical performance, to $7,88 \pm 1,37$ % aerobic performance to $4,24 \pm 1,27$ % – $13,87 \pm 1,37$ % specific indicators of physical fitness.

The prospect of further research is to develop and implement the construction of the training process of sports-aerobics athletes in order to increase their maximal individual potential.

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Information about the Authors:

Kokarev Borys; <http://orcid.org/0000-0002-2335-6611>; kokarevas@gmail.com; Zaporizhia National University, 66 Zhukovskiy Street, Zaporizhia, 69600, Ukraine.

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