

Basic provisions of the program of increase of efficiency of technique of rowing movements of sportswomen in synchronized swimming

Jury Litvinenko

National University of Physical Education and Sport of Ukraine, Kyiv, Ukraine

Purpose: the development and the check of efficiency of the program, which is directed to the improvement of technique of rowing movements in "horizontal" basic positions of the obligatory program of sportswomen of 11–12 years old, who specialize in synchronized swimming.

Material & Methods: theoretical analysis and synthesis of data of special literature, pedagogical experiment, anthropometry, methods of registration and analysis of movements, qualimetry and mathematical statistics.

Results: the program, which is directed to the improvement of technique of "standard" rowing movement in "horizontal" basic positions of the obligatory program of sportswomen of 11–12 years old, who specialize in synchronized swimming, is proved and approved experimentally.

Conclusions: the assessment of experts for the performance of "horizontal" basic positions at sportswomen of the experimental group grew statistically significantly as a result of the made forming experiment ($p < 0,05$). Positive changes were also noted on indicators of the biomechanical structure of technique in the experimental group. The nature of the noted change is connected with the approach of features of motive actions by the second way of "standard" rowing movement.

Keywords: synchronized swimming, sports technique, models, improvement, program.

Introduction

The modern level of the development of difficult-coordination sports requires the solution of the main problems of the development of the theory of management of the training process, the development of effective remedies and methods of all parties of training of sportsmen including technical [6].

The sports result in synchronized swimming is defined by judicial estimates upon the performance by sportswomen of the competitive program. Its major component is technical difficulty of the shown elements. In this regard questions of technical skill of the sportswomen, who specialize in synchronized swimming, are relevant that is confirmed by not indifferent relation of the research associates to this perspective and expressed in the corresponding scientific works [1–5, 7–9].

The experience of the advanced practice, and also these literatures [4; 9] indicate the need of the formation of system of knowledge in the sphere of training and improvement of basic elements of technique of the compulsory program in synchronized swimming as a reliable base for the further progressing and increase in complexity of the technical program of sportswomen.

At the time the detailed studying of questions of the improvement of basic elements of technique of the compulsory program in available information sources is presented fragmentary.

The stated above defined the direction of our researches, which are focused on the development of the program for sportswomen of initial grades in the improvement of tech-

nique of rowing movements.

Communication of the research with scientific programs, plans, subjects

The work is performed on the subject 2.32 "Technical training of the qualified sportswomen on the basis of rationalization of technique of performance of competitive exercises" (number of the state registration is No. 0116U002571).

The purpose of the research:

the development and the check of efficiency of the program, which is directed to the improvement of technique of rowing movements in "horizontal" basic positions of the compulsory program of sportswomen of 11–12 years old, who specialize in synchronized swimming.

Material and Methods of the research

16 sportswomen of 11–12 years old, who specialize in synchronized swimming, participated in the researches. *Research methods:* theoretical analysis and synthesis of data of special literature, pedagogical experiment, anthropometry, methods of registration and analysis of movements, qualimetry and mathematical statistics.

Results of the research and their discussion

The earlier developed by us [1; 3] average models of technique of the performance of the "standard" rowing movement of the highly skilled sportswomen, who specialize in synchronized swimming and also indicators of technique, which had

the close interrelation with model characteristics by results of the correlation analysis formed on the basis of the program for the improvement of technique of motive actions.

The offered program, which is directed to the improvement of technique of the "standard" rowing movement for sportswomen of 11–12 years old, who specialize in synchronized swimming, includes: purpose and tasks, didactic and specific principles, complexes of physical exercises, methods and forms of the organization of the engaged, control.

The developed flowchart of the improvement of technique of the "standard" rowing movement, which is applied in "horizontal" basic positions of the compulsory program of synchronized swimming, is given below (pic.).

The most important problems of technical training of sportswomen, on which it was specified repeatedly in the works of V. N. Platonov [6], we adapted under the specifics of synchronized swimming:

- achievement of stability and rational variability of the specialized motive actions, making the basis of technique of rowing movements in synchronized swimming;
- consecutive transformation of the mastered inclusion in various "horizontal" basic positions of the compulsory program in the effective implementation of figures of the compulsory program;
- improvement of structure of motive actions, their dynamics and kinematics taking into account specific features of sportswomen that assumed, in some cases, the individual selection of special exercises, the number of their repetitions,

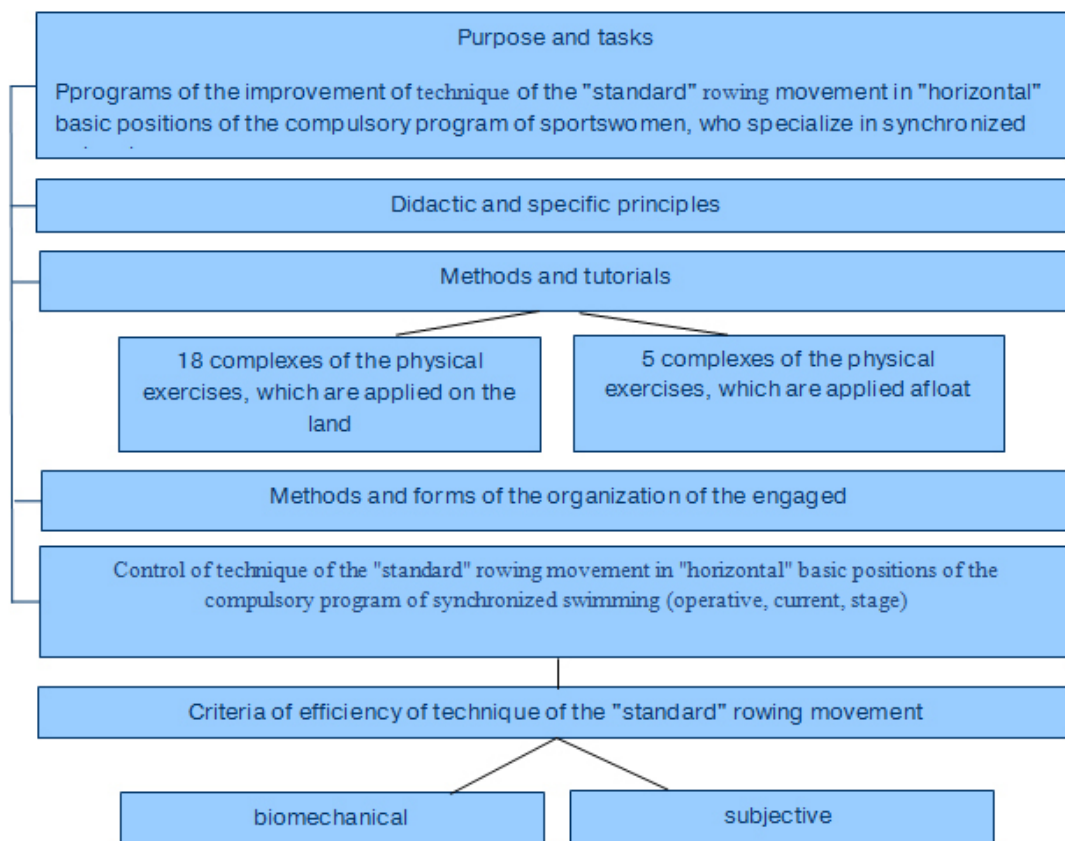
individual tasks;

- improvement of technical skill of sportswomen, proceeding from the requirements of performance of the "standard" rowing movement, and also "horizontal" basic positions of synchronized swimming.

In the program It was offered to use the bringing and imitating exercises in the hall and afloat, the exercises, which are aimed at the development of muscular strength and flexibility in the joints (involved in the implementation of this motive action) and also the exercises, which are directed to the improvement of rhythm structure of the separate indicators (entered the developed by us models) of kinematic structure of technique of performance of rowing movements.

Intermediate skills were applied to the facilitate development of sports technique by systematic, stage-by-stage performance of the simple motive actions, providing performance of the main movement. Imitating exercises were used at the improvement of technical skill as they allow to create the idea of technique of the "standard" rowing movement, provide the optimum control of coordination structure of movements just before competitions and promote the control of optimum coordination structure of the "standard" rowing movement.

We considered the fact that when performing the "standard" rowing movement, the conditions are provided, which facilitate the development of motive actions that renders positive effect at the initial stages. For example, as the facilitating conditions such positions of the compulsory program as standard position "On back", "Group" were applied both in the hall, and on water. "Horizontal" basic positions of the compulsory program on water were carried out by sportswomen with the use



Pic. The block diagram of the implementation of the experimental program for the improvement of technique of the "standard" rowing movement of sportswomen of 11–12 years old, who specialize in synchronized swimming

of additional stock, and also the material means providing the facilitating influence (“noodles”, swimming boards, creation of support for sportswoman about pool side, swimming track, etc.). Conditions, which make the complicating impact when performing these physical exercises, were applied (both in the hall and on water) at later stages of the process of the improvement of technique of rowing movements of the sportswomen, who specialize in synchronized swimming.

The complicated conditions of the performance of these motive actions in the hall were provided with the application of rubber tube and the making heavier dumbbells (weighing up to 0,5–1 kg) when performing the exercises, which are directed to the improvement of technique of rowing movements. Imitating exercises in “horizontal” basic positions of the compulsory program were mainly used at the same time.

Restriction or expansion of spatial borders of the performance of techniques and actions was reproduced us due to fixing of corners when performing the “standard” rowing movement (in particular, the tapes providing fixing of corners in joints were applied). These rowing movements were applied when performing figures of the compulsory program.

The ways, complicating the performance of motive actions (the exercises performed both in the hall and on water) in conditions were also applied in the course of improvement of technology of the fungal movements of the sportswomen specializing in synchronized swimming: the increased emotional pressure (as a rule, before or in the course of competitive activity), the derivation or the distributed attention, the complicated activity of separate analyzers (first of all, due to the performance of the set motive actions without visual control), etc.

The offered exercises, which are directed to the improvement of technique of the “standard” rowing movement, depending on their complexity and orientation on the correction of separate “technical” elements, were included in the structure of complexes of physical exercises, which were integrated into the process of training of sportswomen. Operating control by correctness and stability of the performance by sportswomen of elements of technique, which are improved, was carried out by the coach by means of the method of visual observation.

The current control with the application of method of video filming was carried out at the end of each mesocycle. The analysis of video records and discussion of the technical mistakes, which were made by sportswomen, were carried out individually with each sportswoman. Such analysis of the data gave the operational information about the progress of improvement of technique of rowing movements.

The stage control was carried out at the end of the preparatory period of the annual cycle of preparation. Methods of video filming and the video computer analysis were used.

The developed by us model biomechanical indicators of technique of the “standard” rowing movement, when performing “horizontal” basic positions of the compulsory program, and also subjective criteria were used as the criteria of efficiency by the process of improvement of technique of rowing movements of the sportswomen, who specialize in synchronized swimming [1; 3].

The implementation of the program, which is directed to the improvement of technique of motive actions, was carried out in the preparatory period of the annual cycle of the training process of sportswomen of the experimental group (n=8) of 11–12 years old, who specialize in synchronized swimming. The control group of sportswomen (n=8) was engaged according to the standard program of preparation.

In view of the recommendations, which are submitted in special literature [6] and also current trends of the development of synchronized swimming, by drawing up the annual cycle of preparation, and also complexes of physical exercises, the need was considered, at this stage of long-term sports improvement, to provide conditions for mastering sportswomen comprehensive and various motive actions, creations of extensive base of the motive abilities promoting the successful development of the engaged more difficult technical elements at the subsequent stages of long-term preparation.

Nine trainings were planned within the week, according to recommendations of the training program about synchronized swimming for CYSS, SCYSOR, SHSS and SECSS. The offered complexes of physical exercises were applied three times a week in the main part of classes, and the mastered complexes were applied daily in special warm-up, both on the land, and on water.

The considerable or average loading was, as a rule, planned in classes. The mastered complexes of physical exercises were applied at the same time in special warm-up of each training classes.

The assessment of experts for the performance of “horizontal” basic positions at sportswomen of the experimental group increased statistically significantly ($p < 0,05$) as a result of the made forming experiment. The dynamics of change of these indicators (on the example of “horizontal” basic position “Ballet leg”) before carrying out the forming experiment is characterized by the increase in estimates for: reduction of swims of body of a sportswoman (in longitudinal, cross, diagonal, circular directions) – from $\bar{X}=5,1$ ($S=0,2$) till $\bar{X}=6,1$ ($S=0,1$) point; deduction of level of height of body over water surface – from $\bar{X}=5,06$ ($S=0,02$) till $\bar{X}=6,25$ ($S=0,2$) point; reduction of fluctuations of legs (vertical and horizontal) – from $\bar{X}=5,03$ ($S=0,1$) till $\bar{X}=6,18$ ($S=0,2$) point; decrease in intensity of waves on water surface – from $\bar{X}=5,08$ ($S=0,04$) till $\bar{X}=6,09$ ($S=0,04$) point; improvement of «geometry» of body – from $\bar{X}=5,21$ ($S=0,4$) till $\bar{X}=6,3$ ($S=0,1$) point. The general assessment for performance of this «horizontal» basic position increased statistically authentically from $\bar{X}=5,09$ ($S=0,12$) up to $\bar{X}=6,19$ ($S=0,1$) point ($p < 0,05$).

The noted positive dynamics on these indicators sportswomen of the control group before carrying out experiment wasn't statistically reliable ($p > 0,05$).

Positive changes in the experimental group were also noted on indicators of the biomechanical structure of technique which nature of change is connected with the approach of features of motive actions by the second way of the «standard» rowing movement that was reflected on statistically significant ($p < 0,05$): reduction of length trajectory of CM of a hand in the horizontal plane on $\bar{X}=0,07$ m ($S=0,02$); reduction of duration of rowing cycle by $\bar{X}=0,08$ s ($S=0,01$); reduction of the corner formed by transverse axis of hand and horizontal on $\bar{X}=71^\circ$

($S=4$); increase in resultant speed of CM of a hand throughout the whole rowing cycle on $\bar{X}=0,58 \text{ m}\cdot\text{s}^{-1}$ ($S=0,02$), etc.

Conclusions

The developed experimental program for the improvement of technique of the «standard» rowing movement in «horizontal» basic positions included 23 complexes of physical exercises, which orientation is focused as on the increase in the efficiency of technique of the «standard» rowing movement, and on the expansion of arsenal of motive abilities of sportswomen of 11–12 years old, who specialize in synchronized swimming and which main components are: purpose and tasks, didactic and specific principles, means and methods of training, methods and forms of the organization of the engaged, control, taking into account the received biomechanical and sub-

jective criteria of the efficiency as a result of the researches.

The approbation of the program in the educational training process of the annual cycle of the training of sportswomen of 11–12 years old which is directed to the improvement of technique of the “standard” rowing movement in “horizontal” basic positions showed the efficiency that affected as the increase in estimates for the performance of “horizontal” basic positions, and the change of number of model biomechanical indicators of technique of rowing movements.

Prospects of further researches are connected with the development of programs of the improvement of technique of “vertical” basic positions of the sportswomen, who specialized in synchronized swimming at the stage of the specialized basic preparation.

Conflict of interests. *The author declares that there is no conflict of interests.*

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

References

1. Hordeieva, M. V. (2015), *Tekhnika rukhovoykh dii sportsmenok, yaki spetsializuiutsia u synkhronnomu plavanni na etapi poperednoi bazovoi pidhotovky: avtoref. dys. kand. nauk z fiz. vykh. i sportu* [Technology motor action athletes who specialize in synchronized swimming at the stage of previous base preparation: PhD], NUFVSU, Kyiv, 19 p. (in Ukr.)
2. Zvyagintseva, T. M. (1991), “Improving kinematics and biodynamic characteristics of the basic strokes in synchronized swimming”, *Problemy biomekhaniki sporta*, pp. 114–115. (in Russ.)
3. Litvinenko, Yu. V. & Gordieieva, M. V. (2015), “Comparative analysis technology grebkovykh movements of athletes of different qualification, specializing in synchronized swimming”, *Visnik Chernigivskogo natsionalnogo pedagogichnogo universitetu*, Vol 129, pp. 110–113. (in Ukr.)
4. Maksimova, M. N. (2012), *Teoriya i metodika sinkhronnogo plavaniya* [Theory and Methods of synchronized swimming], Sovetskiy sport, Moscow, 304 p. (in Russ.)
5. Pigida, K. S. (1998), *Obuchenie tekhnike grebkovykh dvizheniy na etape nachalnoy podgotovki v sinkhronnom plavanii : dis. kand. ped. nauk* [Education Technology grebkovykh movements on a stage of initial preparation in synchronous swimming: PhD diss.], RGAFK, Moscow, 166 p. (in Russ.)
6. Platonov, V. N. (2015), *Sistema podgotovki sportsmenov v olimpiyskom sporte. Obshchaya teoriya i ee prakticheskie prilozheniya: v 2 kn.* [The system of training athletes in Olympic sports. The general theory and its practical applications: a textbook in 2 books], Olimp. lit., Kyiv, Book 1, 680 p. (in Russ.)
7. Rudkovska, T. I. (2014), *Kontrol pidgotovlenosti kvalifikovanih sportsmenok, yaki spetsializuyutsia u sinkhronnomu plavanni : avtoref. kand. nauk z fiz. vikh. i sportu* [Control preparedness skilled athletes who specialize in synchronized swimming: PhD thesis], NUFVSU, Kyiv, 24 p. (in Ukr.)
8. Rybyakova, T. V. (1990), *Tekhnika ispolneniya elementov vysokoy stepeni slozhnosti v sinkhronnom plavanii i puti ee sovershenstvovaniya : avtoref. kand. ped. nauk* [Media of elements of high degree of complexity in synchronous swimming and ways of its perfection: PhD thesis], GDOIIFK im. P. F. Lesgafta, Sankt-Peterburg, 23 p. (in Russ.)
9. Dawn Pawson Bean & Stephen Corey. (2005), *Synchronized Swimming: An American History*, U.S.A., McFarland & Company, 320 p.

Received: 23.06.2016.

Published: 31.08.2016.

Jury Litvinenko: *PhD (Physical Education and Sport); Associate Professor, National University of Physical Education and Sport of Ukraine: Fizkul'tury str. 1, Kyiv, 03680, Ukraine.*

ORCID.ORG/0000-0003-1137-9952

E-mail: ylitvinenko@mail.ru