

SPEED AND POWER PREPARATION OF QUALIFIED WATER POLO PLAYERS

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Annotation. The scientific information of the improve of power and speed preparation of qualified water polo players were presented in the article. The application of power training exercises, similar in structure and composition with competitive acts of water polo players and also their purposeful use for developing power endurance, ultimate speed and explosive power, ensure their greatest development. It has been recognized determined that the use of speed training exercises in the middle of the training session is the most effective. In water polo training the practice of developing speed skills at the end of training session is the least effective. Combination of speed qualities training variants at different parts of training session throughout the year-round cycle of training adds the positive effect of speed qualification of water polo players in general.

Key words: water polo players, speed training, power training, water polo, physical qualities.

Introduction

One of actual problems of modern sports is realization of general therapeutic approaches and principles of sports training system in monitoring of training process. In water polo practice main attention of coaches and sportsmen is paid directly to improvement of technical and tactical sides of game.

Development of required physical features of water polo sportsmen is realized, mainly, in unsystematic way. However, with gaining of sportsmanship, when technical and tactical technique has already been sufficiently mastered, physical preparedness becomes especially important, because on its base high technique and efficient tactics are realized.

The problem of highly qualified water polo sportsmen's physical preparedness's development, speed and power capabilities in particular, has been comprehensively analyzed by specialists in special literature [5, 11]. At the same time many researches, concerning planning of training process, were conducted [9, 10], which, mainly, concerned planning of macro-, meso- and micro-cycles of trainings. The problem of sportsmen's physical features development in the process of certain training has not been studied sufficiently yet. Besides, there are differences in view of specialists, concerning purposefulness of certain physical qualities in different parts of training [3, 6, 8, 10].

In available scientific-methodological literature we have not found scientific researches of physical abilities' peculiarities of water polo sportsmen. At the same time the authors of many manuals and scientific papers on theory of sports give information

[1, 5, 9] which assure in necessity of development of speed capabilities, in particular, at the beginning of training process, that is explained by physiological peculiarities of human nervous system's functioning, and bio chemical indicators of muscular activity [2, 4, 8]. Traditionally, the coaches of highly qualified water polo teams observe these rules. Last time, there appeared some researches [6, 8, 10] about possibility and purposefulness of speed capabilities' development at the end of a training after long lasted aerobic work. In our opinion, other ways of speed capabilities' development in training process of qualified water polo sportsmen are not excluded, that requires special research.

Development of qualified water polo sportsmen's power abilities is carried out with standard, traditional means, which are borrowed from other kinds of sports and are, actually, general power exercises [12, 13]. They are, in particular, weight exercises, exercises with heavy balls, rubber cords, etc. With it, specificity of water polo sportsmen's strength activity in competition usually is not considered. It drives to searching of new means of players' power abilities' development, which would meet the specific feature of water polo game and increase power efficiency.

The work has been fulfilled as per plan of scientific & research works of water kinds of sports department of Lviv state university of physical culture and physical education department No.1 of National university "Law academy of Ukraine, named after Yaroslav Mudryi".

Purpose, tasks of the work, material and methods

The purpose of the work: development of program of purposed development of qualified water polo sportsmen's power and speed capabilities.

The tasks:

1. Determination of main theoretical-methodical principles of qualified water polo sportsmen's speed and power abilities' development as well as peculiarities of its realization in training process.
2. Determination of purposed development means efficiency of qualified water polo sportsmen's power abilities. Theoretical analysis
3. To develop the program of qualified water polo sportsmen's power abilities improvement.
4. To determine comparative efficiency of speed oriented trainings.
5. To check experimentally efficiency of author's program of improvement of water polo qualified sportsmen's power and speed capabilities.

The methods of the research: theoretical analysis and generalization of information from scientific-methodological literature and empiric materials, pedagogic observation, pedagogic experiment, separate methods of empiric data obtaining (power measurements in water and out of water, hand power, throw distance in water and out of water, jumping height in water and out of water, acceleration of ball's flight, measurement of time of separate sections swimming), methods of mathematical statistics.

Organization of the researches. The researches were conducted at two stages. Water polo sportsmen of team "Dynamo", Lviv, who were divided into control group (CG-13 persons) and experimental one (EG- 13 persons) by occasional sampling, took part in the experiment. At the first stage of experiment, which took 4 weeks, we researched the changes of power preparation indicators in CG and EG. Experiment had cross character, i.e. the selected grouped were control and experimental in turn (2 weeks for every period). Control group was trained by traditional and experimental – by developed by us methodology.

The second stage of experiment stipulated studying of water polo sportsmen's speed preparation. This stage consisted of three micro-cycles.

In the first micro-cycle the sportsmen of experimental group took sprinter loads at the beginning of training in the second – in middle part of training and in the third – at the end of training. Every micro-cycle took 6 days and they were delimited by restoration micro-cycles.

Results of the researches

At the beginning of experiment there was no confident difference ($p > 0,05$) observed by indicators of power preparedness of control and experimental groups' sportsmen.

After 1st stage of experiment we found substantial increment ($p < 0,05$) of EG sportsmen power indicators in comparison with CG. So, maximal power increment out of water was 2,13 % in CG and – 8,83 % in EG; indicators of ball throw distance out of water: in CG– 1,7 %, and in EG– 7,45 %; indicators of right hand strength dynamics in CG– 1,6 %, and in EG – 7,4 %; indicators of height jumps in spot in CG– 1,58 %, and in EG– 4,18 %; indicators of ball's acceleration in CG– 1,5 %, and in EG– 8,7 %.

For determination of power preparedness and endurance level of water polo sportsmen the tests for determination of maximal start driving force in water and maximal driving force in water are considered. By these indicators in analogous way ($p < 0,05$) we observed significant increment of EG sportsmen (correspondingly CG – 1,73 %, EG– 5,8 %; CG – 1,78 %, EG – 4,1 %).

It is known that efficiency of a player is determined by the quantity of goals. One of the goal quality indicators is its strength. That is why in the process of pedagogical experiment we used special test for determination of ball's throw distance in water. Increment of results is confidently ($p < 0,05$) higher in EG (4,83 %), than in control group (1,5 %).

High jump from water is a specific test for determination of lower limbs' power capabilities development. Comparing of such indicators of control and experimental groups' water polo sportsmen witnessed that they confidently ($p < 0,05$) improved at EG. Increment rate of experimental group was 5,8 %, and control group - 2,6 % .

Pedagogical experiment data witnessed that only by indicators of left hand dynamometry there was no confident difference ($p > 0,05$) found at CG and EG. Though it should be noted that more expressed increment of these results was at EG (4,1 %) comparing with CG (1,4 %).

The second stage of developed power training efficiency methodology's

determination of qualified water polo sportsmen in the frames of pedagogical research envisaged cross experiment. Testing was conducted by analogous indicators. The results of control indicators' increment at CG and EG, after the 2nd stage of power preparedness research, turned out to be analogous and given in table 1.

Table 1

Indicators of results' increment at the 2nd stage of research

Power preparedness indicators	Control group	Experimental group
	Increment rate (%)	Increment rate (%)
Maximal driving force out of water (kg)	2,2	9,3
Ball's throw distance out of water (m)	1,6	4,2
Right hand dynamometry (kg)	1,4	7,3
Left hand dynamometry (kg)	1,4	4,2
Height jump on the spot (cm)	1,36	5,9
Maximal drive force of start in water (kg)	0,9	6,7
Ball's acceleration out of water (m.p.s ²)	1,46	4,68
Maximal driving force in water; 45 sec. of swimming (kg)	1,57	6,42
Ball's throw distance in water (m)	1,83	6,31
Jumping out of water (m)	2,12	5,85

By the results of experiment concerning speed preparedness of qualified water polo sportsmen we did not find any confident difference ($p>0,05$) by speed indicators of CG and EG sportsmen after first cycle of trainings, because the researched groups were trained by traditional methods.

Quite other picture was observed in other micro-cycle of the research. Analysis of tests' results showed significant differences in average indicators and their increments in favor of experimental group. With it statistic checking of these differences showed their confidence with $p<0,05$. If at initial testing no confident changes were found ($p>0,05$), between sportsmen of CG and EG, at the end of second micro-cycle such changes become confident by all indicators. So, 10 meter swimming indicators, with start in water, were showed as the most maximal by water polo sportsmen of experimental group– 5,98 %, while the sportsmen of control group showed only 1,85 % increment. In specialists' opinion for speed training of attacking players, indicator of swimming the goal line 5x3 m is rather informative; in our experiment this indicator demonstrated rather an increment of 5,1 % (experimental group) though for CG group increment was 0,73 %.

Large gap in indicators increment in experimental and control groups was observed at swimming 20 and 50 meters by crawl with start from water. CG and EG indicators were correspondingly 1,6 % and 4,9 % (20 m), and– 1 % and 4,6 % (50 meters).

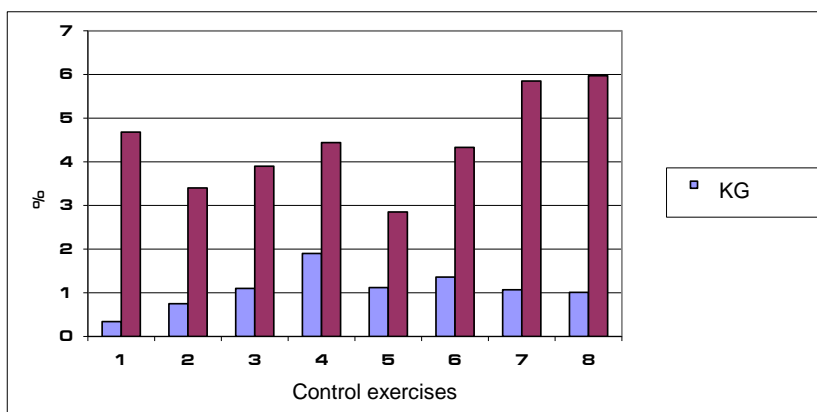
Practically equal increment of EG sportsmen were registered in the following indicators of speed training: swimming 50 meters by crawl style, start from pedestal– 4,09 % swimming 25 meters by crawl with start from water– 3,9 %. CG indicators were 0,96 % and 2,03 %.

By crawl swimming 25 meters with start from water, mean increment of EG sportsmen's results was 3,4 %, CG results were – 0,99 %. This indicator completely reflects ability of water polo sportsmen for quick counter attacking actions. Exactly this is a decisive reason of victory in modern water polo, because competition activity has brightly expressed speed character. Indicator of crawl 15 meters swimming with start from water has the least increment from all indicators of EG sportsmen– 3,1 %. For CG sportsmen this indicator is 1,19 %.

After the third micro-cycle, when speed abilities were developed at the end of training, by all studied indicators water polo sportsmen of EG manifested confident reduction of results in comparison both with CG and with their own results of previous micro-cycles of training ($p<0,05$). So, indicators of crawl 10 meters swimming with start from water worsened by 6,12 %; indicators of crawl 15 meters swimming – by 5,21 %; indicators of crawl swimming goal line 5x3m – by 5,2 %; indicators of crawl 50 meters swimming (start from pedestal) – by 4,97 %; the same (start from water) - by 3,95 %; показатели проплавания 20 м кролем, старт з води – на 3,62 %; indicators of crawl 25 meters swimming, start from water – by 3,59 %; indicators of crawl 25 meters swimming, start from pedestal – by 1,81 %. At the same time CG sportsmen showed increase of results within the limits from 0,94 % to 2,55 %.

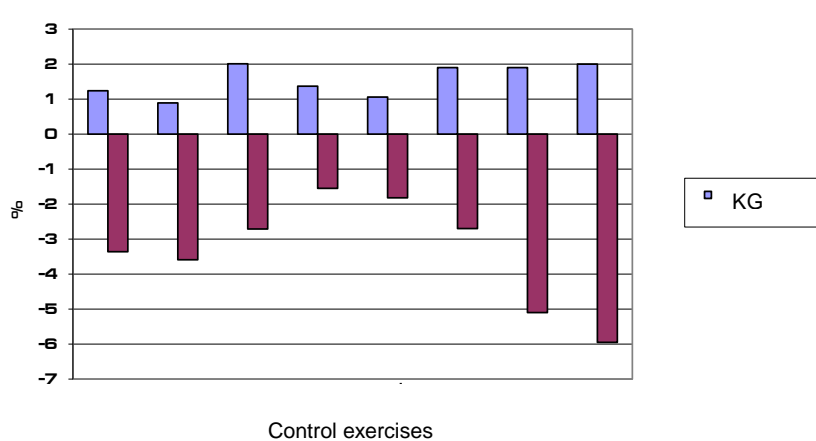
The results of fulfilled testing in three micro-cycles before the 2nd tour of competition were the same. After the first micro-cycle moderate increase of researched indicators was registered (with traditional training). After the second micro-cycle the same rate of increment was observed at EG, and after the third micro-cycle – worsening of results (see fig. 1, 2).

Thus, carrying out of cross experiment confirmed our assumptions, which were put forward after 1st stage of pedagogical experiment. Application of speed abilities' development program of qualified water polo sportsmen in the middle of training is accompanied by positive changes, that were reflected in significant confident increment of results by all, without exclusions, indicators.



KG - control group.

Fig.1. Indicators of increment rate of water polo sportsmen's speed preparedness after second micro-cycle of second tour.



KG - Control group

Fig.2. Indicators of increment rate of water polo sportsmen's speed preparedness after third micro-cycle of second tour:

- 1 – crawl swimming of 5x3m goal line;
- 2 – 50 m crawl swimming, start from pedestal;
- 3 - 50 m crawl swimming, start from water;
- 4 -25 m crawl swimming, start from pedestal;
- 5 -25 m crawl swimming, start from water;
- 6 - 20 m crawl swimming, start from water;
- 7 – 15 m crawl swimming, start from water;
- 8- 10 m crawl swimming, start from water;

Conclusions

1. Analysis of scientific-methodological literature and documents, which regulate training process of qualified water polo sportsmen showed that the problem of specially purposed power training of water polo sportsmen with application of exercises, which by their structure and content are similar to competition actions, has not been completely solved. Theoretical- methodological principles of structuring of speed abilities' development of qualified water polo sportsmen in training are practically absent.

2. Preparation of qualified water polo sportsmen is, mainly, based on application of old training programs. When correcting these programs, coaches use power and speed exercises of general character, which do not reflect specificity of water polo sportsmen's competition activity and, thus, do not give the expected result.

3. Methods of qualified water polo teams require correction, which shall be oriented on discrete excluding of exercises, directed to development of strength only out of water and replacing them by exercises, close to competition activity and specificity of water polo sportsmen's movements, first of all in water and on special SIMs.

4. Experimental program of qualified water polo players' power training, which envisaged purposed development of power abilities (maximal speed, exploded force, power endurance) by means of special exercises' application, which would meet peculiarities of competition activity, showed its efficiency both in preliminary and in main experiment. Application of power exercises, which are close by structure and content to competition actions of qualified water polo sportsmen, facilitated significant increment of power abilities of EG sportsmen. Increment value of EG power indicators were from 4,1 % to 9,3 %, and CG from 0,9 % to 2,6 % ($p < 0,05$).

5. Experimental program of speed training of qualified water polo players', which stipulated checking of speed exercises' application in training structuring purposefulness (at the beginning, in the middle and at the end of main part of training) also showed its efficiency both in preliminary and in main experiment.

The most efficient for development of speed abilities of qualified water polo players is application of speed exercises in the second one third of main training.

Application of speed swimming exercises in the first one third of main training is comparatively less efficient and facilitates confident ($p < 0,05$) increment of speed indicators within 0,87 % – 4,1 %.

Application of speed exercises in the third one third of main training is inefficient and shows confident ($p < 0,05$) worsening of speed indicators.

The prospects of further researches. It is envisaged to determine the peculiarities of other physical capabilities' development of qualified water polo sportsmen, considering their purposed development during one training.

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