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FEATURES OF PHYSICAL DEVELOPMENT, SPECIAL SWIMMING AND TECHNICAL PREPAREDNESS OF QUALIFIED WATER POLO PLAYERS WHO PERFORM THE FUNCTION OF CENTRAL DEFENDERS

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Purpose: to determine the features of physical development, special swimming and technical preparedness of qualified water polo players who perform the function of central defenders.

Material and methods: analysis and generalization of literary sources, anthropometric and physiological measurements, timing, assessment of special swimming, physical and technical preparedness by using tests, methods of mathematical statistics. The contingent of the surveyed consisted of athletes who have the playing role of central defenders. The level of their sports qualifications corresponded to the titles of master of sport of Ukraine and candidate for master of sports of Ukraine in water polo. The total number of surveyed people is 10 athletes.

Results: characterized the components of the structure of special preparedness of qualified water polo players who perform the function of central defenders, researched the degree of interconnection between indicators of the level of physical development, special swimming and technical preparedness of defense players, determined the profile parameters of the structure of special preparedness, which determine the effective actions of central defenders in men's water polo.

Conclusions: the structure of the special preparedness of qualified water polo players who perform the functions of central defenders has its own characteristics.

Athletes of this playing role are characterized by significant linear dimensions of the limbs and their segments, hand strength, powerful motor actions during the game, fast overcoming distances with the ball, and long-distance throws. The defense players have the closest correlation relationship between the indicators of technical and special swimming preparedness. Determination of the features of the structure of special preparedness on the basis of a complex analysis of parameters, which reflecting the level of physical development, technical and special swimming preparedness of players of different roles, allows to effectively differentiate the training process in modern water polo.

Keywords: water polo, central defenders, structure of special preparedness, components, interconnection, model characteristics.

Introduction

The search for ways to optimize competitive and training activities in sports today does not lose its relevance.

Modern world practice, scientific research convincingly shows that the highest achievements can have only gifted athletes, which characterize by rare morphological properties, high level of physical and mental abilities, perfect technical, tactical skills, etc [2; 8; 13; 14].

Given the fact that water polo is a sport that is complicated by actions in the aquatic environment, in order to effectively solve situational problems that arise during the game, water polo players should have a high development of physical qualities, the optimal level of swimming and technical preparedness [1; 3; 4; 5; 6; 11; 12].

A comprehensive study of these components determines the ways to optimize the process of competitive activity in water polo [7; 9; 10; 15].

Despite the significant amount of information which accumulated in this direction, there are a number of issues that need in-depth study.

One of them is to determine the features of the structure of special preparedness of players of different roles, to identify the degree of relationship between its main components.

Research in this area will provide information that can be used to improve the training process, as it is possible to correctly place the emphasis of training influences and, as a consequence, to achieve high results in modern water polo.

Purpose of the study – to determine the features of physical development, special swimming and technical preparedness of qualified water polo players who perform the function of central defenders.

Objectives of the study:

1. Describe the components of the structure of special preparedness of qualified water polo players who perform the function of central defenders.

2. Investigate the degree of relationship between indicators of the level of physical development, special swimming and technical preparedness of qualified water polo players who have the role of central defenders.

3. Determine the profile parameters of the structure of special preparedness, which determine the effective actions of defenders in men's water polo.

Material and Methods of research

The following methods were used to solve the tasks: analysis and generalization of literary sources, anthropometric and physiological measurements, timing, assessment of special swimming, physical and technical preparedness by using tests, methods of mathematical statistics.

The study was conducted in the period from 2018 to 2020. The surveyed contingent consisted of 10 athletes who had the level of sports qualifications: Master of Sport of Ukraine and Candidate for Master of Sports of Ukraine in water polo and had the playing role of central defenders.

Results of the research

Peculiarities of the structure of special preparedness of qualified water polo players, who have the role of central defenders, were determined on the basis of a study of the level of their physical, technical and special swimming preparedness.

Among the parameters of physical development we considered: body length and weight, linear dimensions of the upper and lower extremities and their segments, brush strength (right and left hand), test results for the number of pull-ups, barbell bench press and running on 1 km. The total number of studied parameters was 10 indicators.

On the basis of the received digital material the profile which reflecting a level of physical development of players of the given role was constructed (Fig. 1).

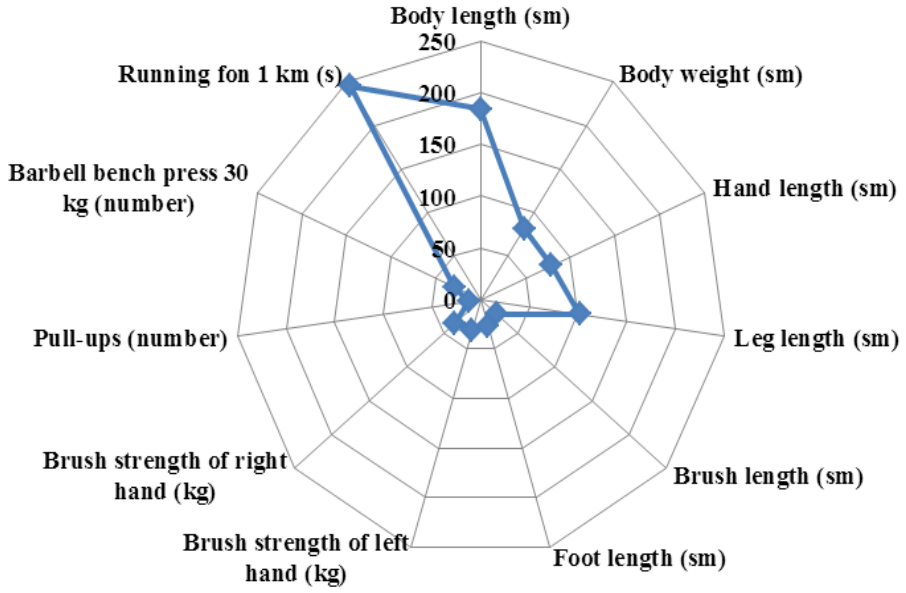

Fig. 1 The level of physical development of qualified water polo players who perform the function of central defenders

As can be seen from figure 1, the central defenders characterize by significant values of the linear dimensions of the lower extremities and their segments (leg and foot length are 101,6±5,5 cm and 26,56±0,98 cm, respectively), brush strength (right 34,63±1,4 kg and left arm 31,19±1,56 kg), mean values of height and body weight (184,1±5,69 cm and 81,6±8,04 kg), length of upper extremities and their segments (values of arm and hand length are 79,1±2,64 cm and 21,31±1,57 cm, respectively). Players of this role show quite high results in tests, which indicate the level of development of strength abilities and special endurance.

The greatest differences occur in such indicators as: length and weight of the body, the length of the lower extremities, the number of pull-ups and barbell bench press, the results of running on 1 km (Fig. 2).

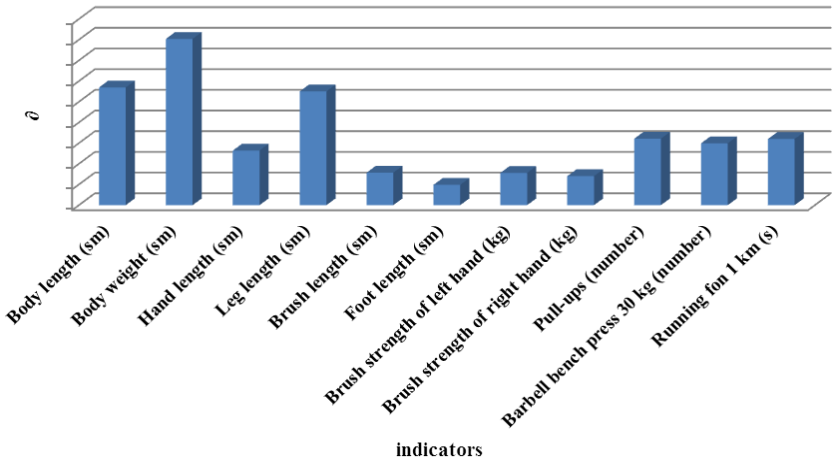

Fig. 2 Values of standard deviation of physical development indicators of central defenders

The technical preparedness of qualified water polo players, who perform the functions of central defenders, was assessed by the following test indicators: «50 m ball handling», «main throw from the place», «4x25 m ball handling», «throw range».

The obtained results indicate that the studied athletes quite quickly overcome the distance of 50 meters with the ball (32,64±0,97 s), show good results in the throwing distance (29,8±1,87 m). At the same time, the accuracy of the goal during the main throw from the place of water polo players of this group is equal to 64% of the maximum.

Among the indicators of technical readiness, the biggest discrepancy recorded in the results of the throw range (Fig. 3).

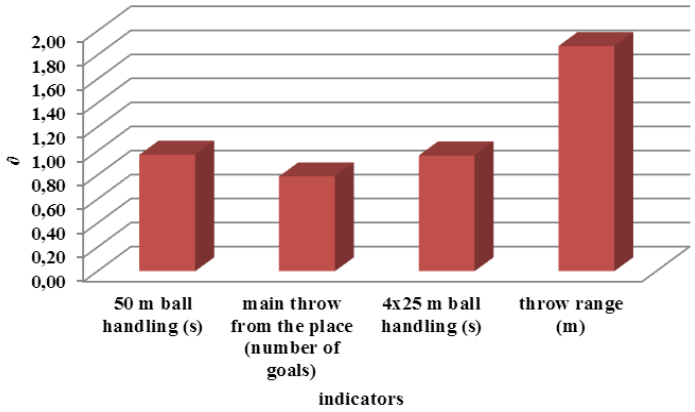

Fig. 3 Values of standard deviation of indicators of technical preparedness of central defenders

The main criteria of special swimming preparedness were the results of such tasks as: «10 jumps», «10 shifts», «30 jumps», «100 m crawl», «200 m crawl».

As can be seen from the results, the values of the studied parameters of players of this role are at the level of average values. Thus, 10 jumps are performed by athletes in 12,03 ± 0,36 s, 30 jumps are performed in 38,32 ± 1,9 s, the time required for them to overcome 100 and 200 meters by water polo crowl is 60,76 ± 11,97 s and 132,35 ± 2,57 s, respectively.

The largest scatter of values was recorded in such parameters as: «30 jumps», «100 m crawl», «200 m crawl» (Fig. 4).

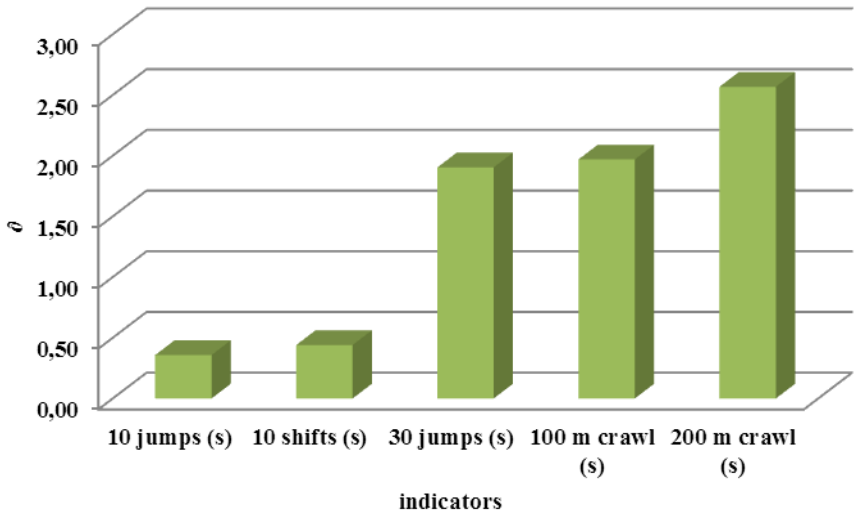

Fig. 4 Values of standard deviation of indicators of special swimming preparedness of central defenders

Thus, the analysis of the components of the structure of special preparedness allows us to state that the players who perform the functions of central defenders have significant values of the linear dimensions of the lower extremities and their segments, brush strength, which allows them to make powerful motor actions during the game, quickly cover the distance with the ball, show good results in throwing range.

After examining the degree of relationship between the indicators of the level of physical development, special swimming and technical preparedness of defensive players, we received the next picture (Table 1-3).

Table 1

The degree of correlation between indicators of physical development and technical preparedness of qualified water polo players who perform the function of central defenders

Indicators	50 m ball handling	Main throw from the place	4×25 m ball handling	Throw range
Height	-0,35	-0,25	0,15	0,62
Weight	0,40	-0,60	0,69	0,69
Arm length	-0,18	-0,28	0,29	0,72
Leg length	-0,10	-0,25	0,09	0,40
Brush length	-0,46	-0,08	-0,24	0,07
Foot length	-0,20	-0,18	0,02	0,32
Brush strength of left hand	0,00	0,15	-0,20	0,02
Brush strength of right hand	-0,37	0,38	-0,43	0,28
Pull-up	-0,36	0,75	-0,70	-0,59
Barbell press 30 kg	-0,47	0,48	-0,56	-0,10
Running on 1 km	0,72	-0,55	0,55	-0,39

As can be seen from table 1, there is a certain connection between the indicators of physical development and technical preparedness of water polo players who have the role of central defenders.

Thus, the height of the athlete and the length of his upper limbs significantly affect the throwing distance (r=0,62 and 0,72, respectively), which is associated with the biomechanical structure of the throwing movement.

The weight of the player correlates with the effectiveness of the main throw from the place, the range of the throw and the test performance «4x25 meters ball

handling» (r=-0,60, 0,69 and 0,69, respectively). Athletes with a lot of weight while moving gain inertial acceleration in the water, which allows them to have an advantage over other players in the specified indicators of technical skill.

The results of tests that reflect the level of physical preparedness of water polo players, namely pull-ups and running on 1 km, are closely related to all technical parameters.

In turn, the number of barbell press significantly correlates only with the test «4x25 meters ball handling» (r=-0,56).

Conducted correlation analysis of the relationship between indicators of physical development and special swimming training in skilled central defenders showed that there is a relationship between parameters such as height and length of the brush and the time to overcome the distance of 100 and 200 meters by water polo crowl (r is - 0,62, - 0,60 and -0,64, -0,54, respectively) (Table 2).

Table 2

The degree of correlation between indicators of physical development and special swimming preparedness in qualified water polo players who perform the function of central defenders

Indicators	10 jumps	10 shifts	30 jumps	100 m by water polo crowl	200 m by water polo crowl
Height	-0,05	0,05	0,04	-0,62	-0,60
Weight	0,76	0,53	0,71	0,35	0,47
Arm length	0,04	0,06	0,21	-0,45	-0,48
Leg length	0,10	0,20	0,04	-0,30	-0,24
Brush length	-0,29	0,02	-0,41	-0,64	-0,54
Foot length	0,00	-0,08	0,06	-0,30	-0,15
Brush strength of left hand	-0,16	-0,45	-0,11	-0,10	-0,03
Brush strength of right hand	-0,36	-0,55	-0,32	-0,38	-0,27
Pull-up	-0,64	-0,41	-0,69	-0,20	-0,07
Barbell press 30 kg	-0,39	-0,47	-0,46	-0,37	-0,16
Running on 1 km	0,56	0,51	0,39	0,57	0,49

Obviously, the high height and large area of the support surface, which is achieved due to the length of the brush, allows the athlete to increase the «step» of the rowing cycle, which improves his speed parameters.

High weight and high level of strength give water polo players an advantage in performing jumps and active motor actions in the water.

The value of r between such parameters as «body weight» - «10 jumps», «body weight» - «10 shifts», «body weight» - «30 jumps» is equal to 0,76; 0,53; 0,71 respectively.

Indicators of brush strength and time spent on 10 shifts are correlated at the level of r=-0,55. The average degree of correlation exists between the pull-up and the result of the test «10 jumps» (r=-0,64) and «30 jumps» (r=-0,69).

Also related are the results of running on 1 km and the time of 10 jumps (r=0,56), 10 shifts (r=0,51), overcoming 100 meters by water polo crawl (r=0,57).

The study of the degree of correlation between the indicators of technical and special swimming preparedness of water polo players allowed to determine that they significantly affect each other (Table 3).

Table 3

The degree of correlation between the indicators of technical and special swimming preparedness in qualified water polo players who perform the function of central defenders

Indicators	50 m ball handling	Main throw from the place	4×25 m ball handling	Throw range
10 jumps	0,84	-0,80	0,89	0,20
10 shifts	0,66	-0,81	0,81	0,00
30 jumps	0,84	-0,71	0,90	0,27
100 m by water polo crowl	0,78	-0,32	0,48	-0,07
200 m by water polo crowl	0,65	-0,17	0,40	0,02

As can be seen from table 3, the central defenders have a close relationship with the parameters: «10 jumps» - «50 m ball handing» (r=0,84), «10 shifts» - «50 m ball handing» (r=0,66), «30 jumps» - «50 m ball handing» (r=0,84), «100 m crawl» - «50 m ball handing» (r=0,78) , «200 m crawl» - «50 m ball handing» (r=0,65).

Such indicators of technical skill as «main throw from the place» and «4x25 m

ball handing» essentially influence efficiency of movement of players in water (r at the level of values - 0,71 - 0,90).

The study provided an opportunity to determine the parameters of the level of physical development, technical and special swimming preparedness, which are most interconnected and compliance with which will allow athletes to best realize themselves as a central defender.

So among the most important indicators that can be used as a guide in choosing the game role of the central defender, we can consider such parameters as: height, body weight, hand length, number of pull-ups, «10 jumps», «30 jumps», «100 m crawl», the accuracy of the main throw from the place, «50 m ball handing», «4x25 m ball handing».

Based on the obtained digital material, became possible to develop model characteristics of certain parameters (Table 4).

Table 4

Model characteristics of the most significant preparedness of the structure of special training of central defenders in men's water polo

№	Indicator	Model value
1	Body length, sm	184,1 ±5,69
2	Body weight, sm	81,6±8,04
3	Brush length, sm	21,31±1,57
4	Pull-ups, number	12,5±3,21
5	10 jumps, s	12,03± 0,36
6	30 jumps, s	38,32± 1,9
7	100 m crawl, s	60.76±11,97
8	Main throw from the place, number	3,2±0,79
9	50 m ball handling, s	32,64±0,97
10	4x25 m ball handling, s	78,51±0,96

Comparing the individual characteristics of the indicators of the structure of special preparedness with the model will allow athletes to determine the expediency of the choice of this role, which in turn will provide an opportunity to right build the training process.

Conclusions / Discussion

The results of the study confirm the opinion of many experts that the main components of the structure of special preparedness of qualified water polo players, which determine the effectiveness of their game activities, are physical, technical and special swimming preparedness.

It is determined that the central defenders differ of the significant values of the linear dimensions of the lower extremities and their segments, brush strength, powerful motor actions during the game, fast overcoming of segments of different lengths with and without the ball, long throws.

It was found that defensive players have a close correlation between such indicators of technical and special swimming preparedness as: «10 jumps» - «50 m ball handing» (r=0,84), «30 jumps» - «50 m ball handing» (r=0,84), «100 m crawl» - «50 m ball handing» (r=0,78). «Main throw from a place» and «4x25 m ball handing» are connected with efficiency of movement of players in water at the level of values r– 0,71 - 0,90.

It is proved that among the parameters that allow to choose the role of the central defender, can be used: height, body weight, hand length, number of pull-ups, «10 jumps», «30 jumps», «100 m crawl», the accuracy of the main throw from the places, «50 m ball handing», «4x25 m ball handing». In turn, determining the features of the structure of special preparedness of players of different roles on the basis of a comprehensive analysis of the structure of special preparedness allows you to effectively differentiate the training process in modern water polo.

Prospect of further research is study of the features of the structure of special training of qualified water polo players who perform the functions of midfielders and mobile strikers.

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