

## ANATOMIC - MORPHOLOGICAL FEATURES OF QUALIFIED WATER POLO PLAYERS DEPENDING ON GAME ROLE

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**Annotation.** *Purpose:* to analyze the anatomic - morphological features of qualified water polo players depending on game role. *Material:* the study group consisted of 41 athlete. Assessing the level of physical development was carried out in terms of water polo in body size, body weight, chest excursion, lung capacity, power brush. *Results:* it was found that the central strikers - powerful players with significant muscle mass. They are the following indicators: length of the arm (22%), the length of the tibia (11%), foot length (7%), shoulder width (10%) and vital capacity (11%). Central defenders - tall, sinewy athletes, which is characterized by long limbs. They highlighted the special role of the indicator arm's length (part of which is 34 %) and vital capacity (10%). Midfielders or moving forwards - players of medium height and basic anthropometric indicators inferior players other roles, but exceed them in the values of the indicator lung capacity. *Conclusion:* these results relate to the functions that do the athletes on the field.

**Keywords:** water polo, water polo player, morphological, defender, forward, middle.

### Introduction

Further improvement of system of Olympic reserve's training in water polo is impossible without scientific foundation of all training process's sides, including anatomic-morphological characteristics of water polo players of different age and qualification, depending on their game roles. Modern level of water polo development implies high requirements to physical condition and physical fitness, in particular to highly qualified players; besides it stipulates determination of most important factors, which to the largest extent influence on achievement of high sport results. As far as functions of players during game and competition functioning are different and, depending on narrow game specialization, have intrinsic to them peculiarities, determination of these peculiarities is an urgent problem as on to day.

Important contribution to solution of this problem was made by works of V.N. Platonov [4], V.N. Chernova [7], D.Ts. Karangjashvili [1], M.M. Ryzhak [5], N.Zh. Bulgakova [3], Tsekouras Y.E., Kavouras S.A., Campagna A. [17], Webster M.J., Morris M.E., Galna B. [18], Wheeler K., Kefford T., Mosler A., Lebedew A., Lyons K. [19] et al. [6, 8-16]. Though, wide circle of questions have still been remaining unsolved or insufficiently solved.

The work has been fulfilled in compliance with plan of scientific & research works of physical education department No.1 of National university "Law academy of Ukraine, named after Yaroslav Mudriy".

### Purpose, tasks of the work, material and methods

*The purpose of the work* is determination of anatomic-morphological characteristics of qualified water polo players, depending on game roles.

For achievement of this purpose we set the following *tasks*:

1. Studying of present state of sportsmen's training system in water polo.
2. Researching of anatomic-morphological characteristics of qualified water polo players, depending on their game roles (center back, center forward, player of central zone).

For solution of these tasks we used commonly accepted *methods of research*:

1. Theoretical analysis and generalization of scientific, methodic and special literature;
2. Pedagogic experiment with application of medical-physiological and pedagogical control procedures (anthropometry: evaluation of physical condition; physiological metering: evaluation of organism's functional abilities);
3. Methods of mathematical statistics.

*The methodic of the research:* the research was conducted in Kharkov. The tested group was formed of 41 qualified water polo players of different gamer roles: 12 central backs, 12 central forwards and 17 – players of central zone (half backs or forwards). All qualified water polo players were candidate masters of sport and participated in combined teams of Kharkivska region and Kharkov state academy of physical culture.

Evaluation of water polo players' physical condition was carried out by indicators of longitudinal dimensions of body (length of arm, forearm, hand; length of leg, shin, foot; length of body and torso), by cross dimensions of body (width of shoulders and pelvis), by mass of body, excursion of chest (EC), vital capacity of lungs (VCL) and strength of hand [2].

### Results of the research and discussion

As far as players' functions during game and competition functioning are different and, depending on narrow game specialization, have their own peculiarities, we, with the help of discriminative analysis, determined the most important anatomic-morphological indicators of qualified water polo players, depending on game role.

As per results of discriminative analysis we constructed diagrams of significance of qualified water polo players' anatomic-morphological indicators, depending on their game roles.

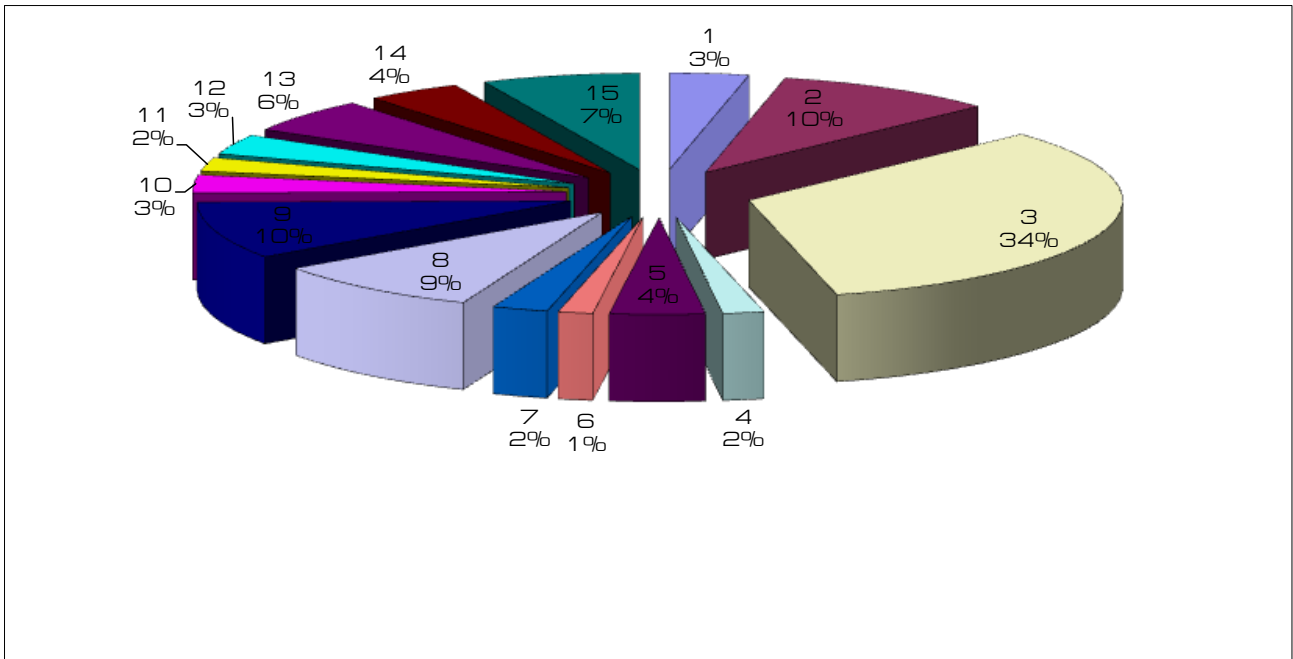


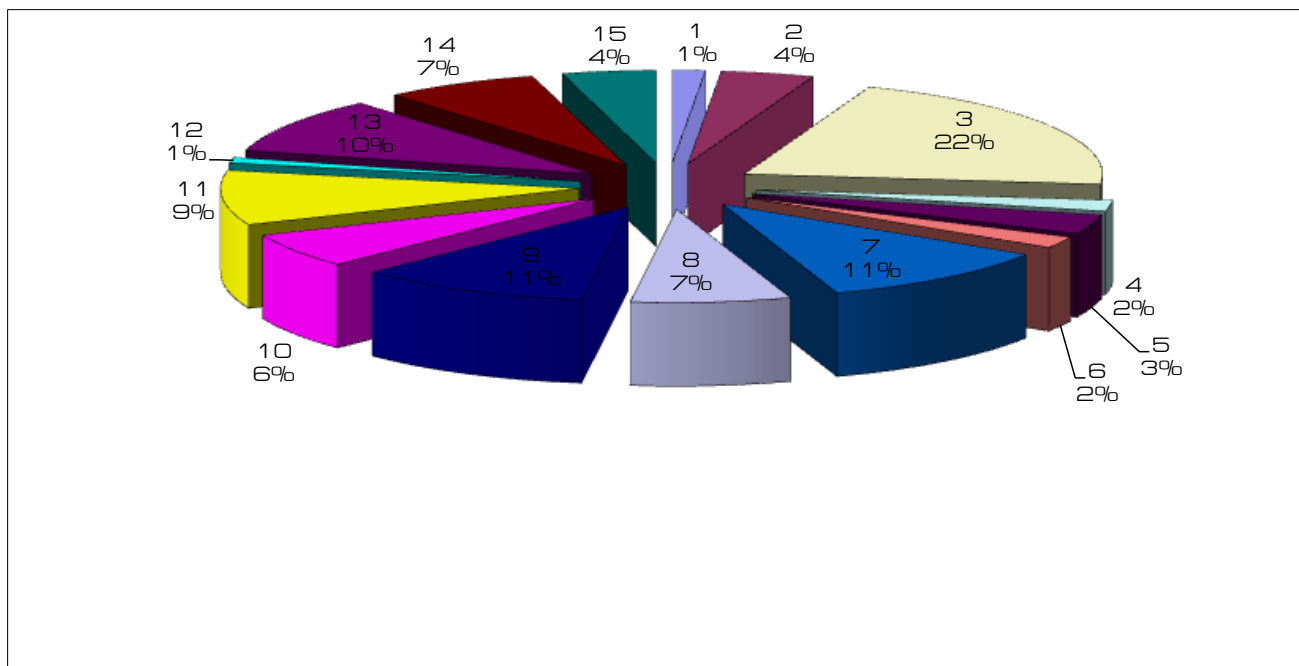
Fig.1. Diagram of significance of anatomic-morphological indicators for central backs

1-length of body (3%), 2-mass of body (10%), 3- length of arm (34%), 4-length of forearm (2%), 5- length of hand (4%), 6-length of leg (1%), 7-length of shin (2%), 8-length of foot (9%), 9-vital capacity of lungs (VCL) (10%), 10-strength of right hand (3%), 11- strength of left hand (2%), 12- excursion of chest (EC) (3%), 13-width of shoulders (6%), 14-length of torso (4%), 15-width of pelvis (7%).

Analysis of diagram of anatomic-morphological indicators' significance of **central backs** permitted to mark out special role of arm length indicators (part of which is 34%) and VCL (10%) (see fig. 1). It is connected, first of all, with the fact that central back plays against strong central forwards and, in order to effectively fight with them, he shall have advantage in length of arms that permits to be ahead of central forwards in struggle for ball; with the help of special swimming exercises, jerks and turns (for effective fulfillment of which length of arms and their segments have great significance) more effectively fight for choice of place. It is natural because central backs compete with physically strong central forwards and, yielding to them in physical condition, they shall have high indicators in technical and special swimming condition. Central backs play for choice of place, using their advantage in special swimming preparedness in order not to give adversary's team to pass ball to central forward. If ball is passed, central backs play in advance, because in other case, if adversary-forward received the ball, there appears dangerous situation near net, which can result in throwing in net, in removal of central back or in goal.

Analyzing the presented diagram of significance of **central forwards'** anatomic-morphological indicators, we mark out such indicators as length of arms (22%), length of shim (11%), length of foot (7%), width of shoulders (10%) and VCL (11%) (see fig.2). These indicators are significant because central forwards shall have the following abilities:

1. Strong "press" by legs for holding place on two meters area in fight with central back, instead of 4 or 5 meters area (that happens, is central backs push central forward rather far off their net).
2. Wide shoulders, in order not to give opportunity for central back to play in advance when carrying ball on "post".
3. Vital capacity of lungs, which characterizes central forwards as sportsmen with good endurance and workability.

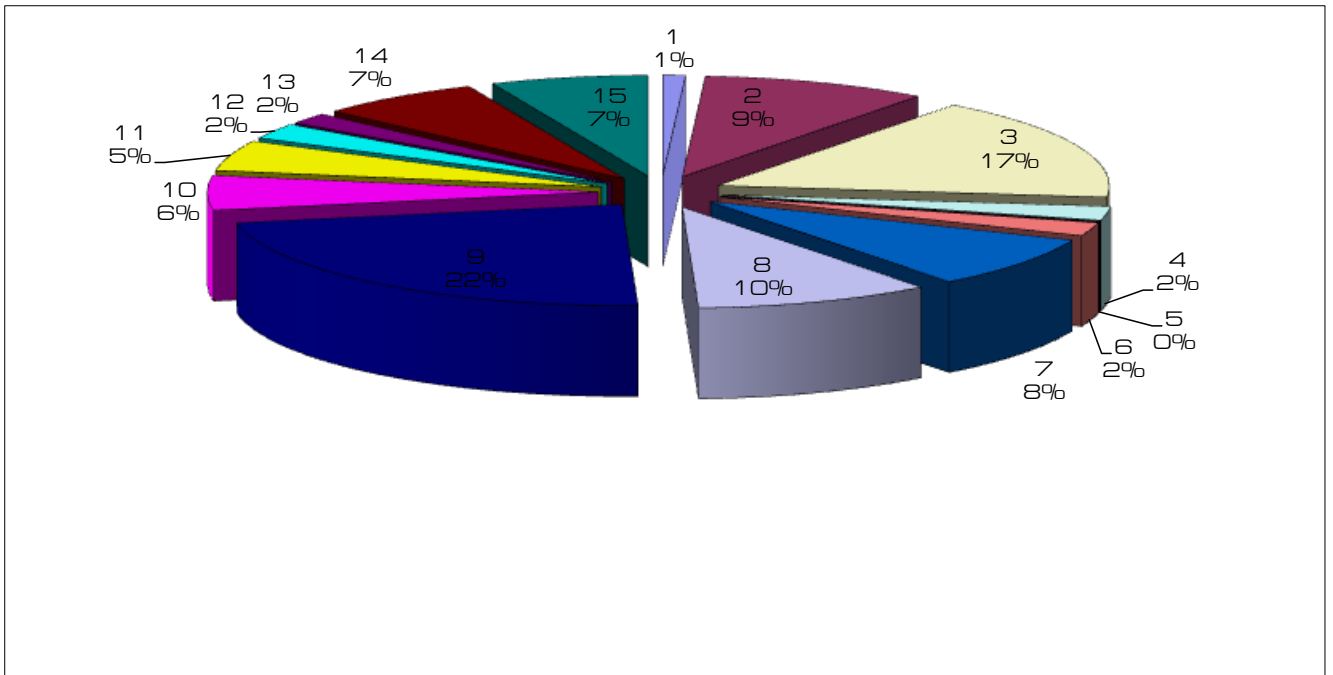


*Fig.2. Diagram of significance of anatomic-morphological indicators for central backs*

1-length of body (1%), 2-mass of body (4%), 3- length of arm (22%), 4-length of forearm (2%), 5- length of hand (3%), 6-length of leg (2%), 7-length of shin (11%), 8-length of foot (7%), 9-vital capacity of lungs (VCL) (11%), 10- strength of right hand (6%), 11- strength of left hand (9%), 12- excursion of chest (EC) (1%), 13-width of shoulders (10%), 14-length of torso (7%), 15-width of pelvis (4%).

The obtained results, first of all, are connected with functions, which are fulfilled by central forwards. They are main participants of game, they are strong, have good physical condition and for successful attack they shall have great arsenal of techniques as far as they throw ball in net overcoming resistance of central back; they, in many cases, compete with all adversary's team, if it plays "safety net", zone defense or "pulling" to own net.

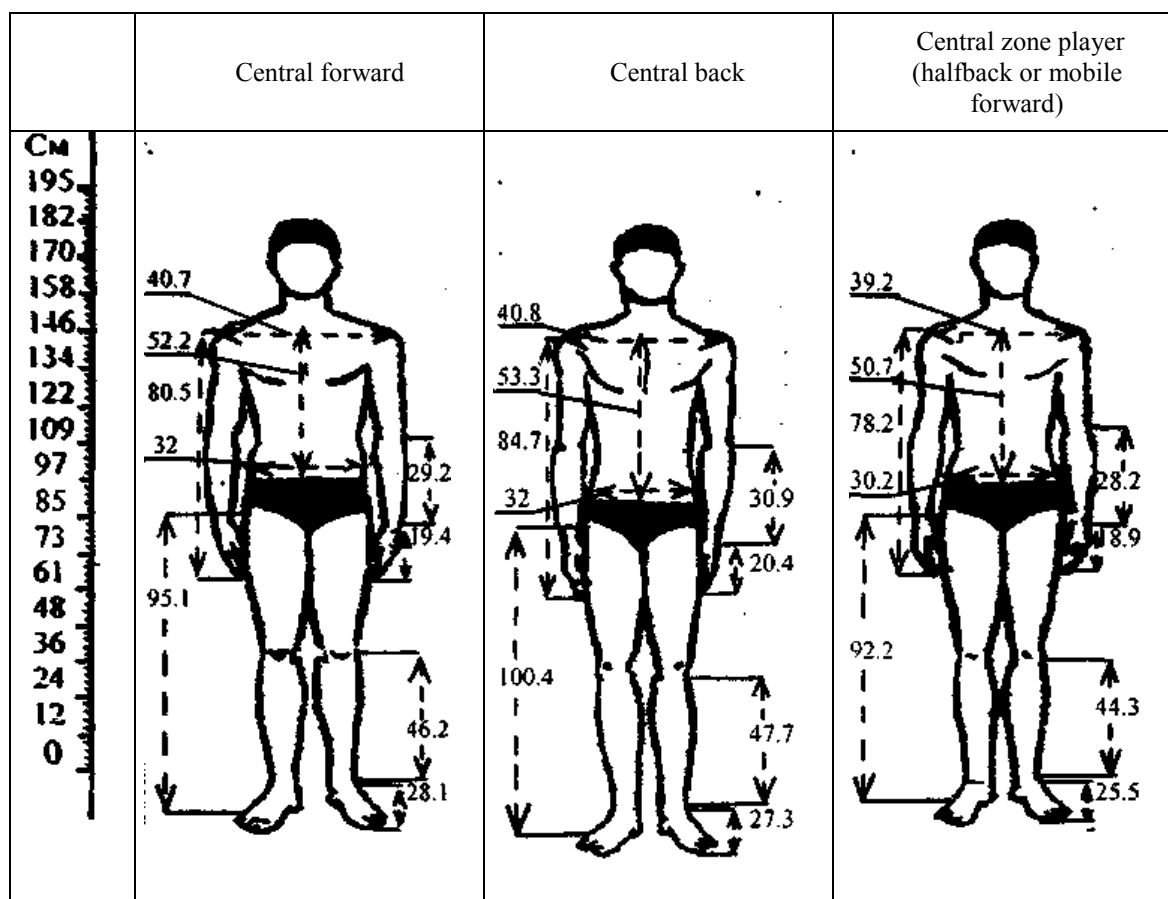
Analyzing the presented diagram of significance of **central zone players'** (half backs or forwards) anatomic-morphological indicators, we mark out that VCL (see fig.3) is of substantial importance. It is connected with the fact that central zone players are the most mobile players, who carry out great scope of work in water, including "rough" work, which requires significant endurance and physical workability that is indirectly depends on VCL. Mobile forwards are, mainly, in constant movement (mobile players), have great arsenal of special swimming techniques in order to outplay "patronizing" him adversary and go to free place, receive ball and throw it in net.



*Fig.3. Diagram of significance of anatomic-morphological indicators for central zone players*

1-length of body (1%), 2-mass of body (9%), 3- length of arm (17%), 4-length of forearm (2%), 5- length of hand (0%), 6-length of leg (2%), 7-length of shin (8%), 8-length of foot (10%), 9-vital capacity of lungs (VCL) (22%), 10- strength of right hand (6%), 11- strength of left hand (5%), 12- excursion of chest (EC) (2%), 13-width of shoulders (2%), 14-length of torso (7%), 15-width of pelvis (7%).

Thus, analysis of obtained data permitted to determine anatomic-morphological peculiarities of qualified water polo players of different game role. In fig. 4 we can see that central forwards are strong players with significant muscular mass. Central backs are tall, wiry sportsmen with long limbs. Half backs or mobile forwards are of middle height and by main anthropological indicators yield the players of other roles, but have advantage in VCL indicator, the part of whose significance for whom is maximal (22%).



Note: one partition is 2.44 cm.

Fig.4. Anatomic-morphological characteristics of qualified water polo players of different game roles

#### Conclusions:

1. For central backs length of arm (part of which is 34% and VCL – 10%) plays special role. It is natural because central backs compete with well conditioned and strong central forwards and, in order to fight with them effectively, they shall have advantage in length of arms, which permits to be ahead of central forwards in struggle for ball; with special swimming exercises, jerks and turns (which can be the most effectively fulfilled with long arms and their segments) to more effectively fight for choice of place.

2. For central forwards special role is placed by such anatomic-morphological indicators as length of arm (22%), length of shin (11%), length of foot (7%), width of shoulder (10%) and VCL (11%). The obtained results, first of all are connected with functions, fulfilled by central forwards on water. They built game itself, they are strong and physically well-developed, as far as they attack net overcoming resistance of central back; in many cases they compete with all adversary's team, if it plays "safety net", zone defense or "pulling" to own net.

3. Analysis of anatomic-morphological indicators' significance of central zone players (halfbacks or mobile forwards) permitted to determine that for this game role VCL is of greatest importance. It is connected with the fact that central zone players are the most mobile players, who carry out great scope of work in water, including "rough" work, which requires significant endurance and physical workability that is indirectly depends on VCL.

The prospects of further work in this direction can touch interconnection of anatomic-morphological indicators with indicators of special fitness's structure (special swimming and technical fitness) both of junior and qualified water polo players of different game roles.

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**Cite this article as:** Poproshaiev O. V., Chumakov O. V. Anatomic–morphological features of qualified water polo players depending on game role. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2011, vol.1, pp. 51-56. doi:10.6084/m9.figshare.894391

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Received: 22.10.2013  
Published: 28.12.2013