THEORETICAL APPROACHES ON COORDINATIVE CAPABILITIES IN WATER POLO

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Abstract

Because body activities are dominated by the motor side, the analysis and research of motor behaviour are particularly important in the game of water polo, which has a plethora of complex aspects and manifestations of athletes in training activities and competitive activities. The lack of a national approach for this discipline, water polo, drives this research. Teachers, coaches, and experts in the area do not prepare this crucial part of athlete training early on, which can make a difference between win and defeat, [or entry into the national team]. Our study's goal is to examine the approach for developing motor skills, in general, and coordination abilities for water polo. The research methodology was based on the documentary analysis and the synthesis of the specialized literature in order to clarify some essential aspects in the field. The main finding of our research was to identify the completeness of the term "coordination capacity". Thus, the term "coordinative capacity", compared to "skill", would better reflect the practical realities through the complexity of this capacity, as well as the multitude of specific components of it, avoiding the confusion that can be created by using the old term "skill".

Keywords*:* *Coordinative abilities, water polo, theoretical aspects*

JEL classification: I20, I29, M31

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1. Introduction

There is a plethora of complicated elements and manifestations of athletes in training activities as well as competitive activities in the game of Polo on water. Because the motor side of physical activities predominates, the study and research of motor behaviour are particularly significant. Instructional and educational processes would be influenced to some extent by the type of personality in which the coordinative talents play a prominent role. Given the large number of specific movements that are performed both horizontally and vertically, namely technical

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elements with and without the ball, as well as with and without an opponent, coordination skills education is important in water polo. This is reflected in the fact that training begins with the selection and progresses through the ranks of the national team.

The sport of Water Polo, on the other hand, further complicates the situation because, by definition, it involves the merging of two sports: swimming and ball-playing, which motivated us to discuss in depth the difficulty and significance of selecting this topic.

Sports performance is defined as the achievement of remarkable results, which can be measured in terms of results, medals, or participation in national, European, world, and Olympic championships and competitions. Because the fundamental aspect of sports performance is that has no bounds, numerous world or Olympic records that were deemed unbeatable in the 1990s are now long overdue to be broken. The advancement of sports performance has occurred in recent years, as has the increase in the number of athletes capable of producing great results. This is because sport is a competitive endeavour, and incentive has promoted many hours of intensive effort. Training has become more sophisticated because of the involvement of sports professionals and scientists, who have designed appropriate training plans based on a significant quantity of information regarding athletes' abilities and weaknesses. [1]

The importance and role of developing coordination abilities in athletes between the ages of 8 and 14 years has been the focus of much attention over the previous five decades, particularly among specialists. Athletes' complex growth takes place at an early age, and this is especially true for children. During this time, the athlete is extremely open and adaptable to the training process, which is particularly important in sports training.

Water polo is a difficult sport that necessitates extensive training and a high level of energy expenditure. After mastering the four swimming procedures (cradle, back, arm, and butterfly) in the first phase of selection, the kid will become familiar with the unique movements of the game without the ball. The second phase of selection includes the ball (keeping the body upright, variations of movement in the water). During the third phase, players will make their first movements with the ball (swimming, passing, throwing at the goal), which will be followed by components of individual and collective technique and tactics. As a former water polo player and now as a coach, I can tell you that the first two periods run somewhere between 12 and 24 months. The result is that to practice polo, a youngster will require two years of training before they can play with a ball in water. This is a disadvantage when compared to other sports, such as handball or basketball, in which the youngster participates in the first step of the selection process by playing with the ball.

In Romania, the number of respectable athletes at the youth and junior levels is approximately 600, while the number of legitimate athletes in the senior teams is 150-200 girls and boys. Taking this number of athletes into consideration in an Olympic discipline case, we can observe that there are very few practitioners in a

team sport when compared to Hungary, which has won many Olympic medals and has over 5,000 athletes on its roster.

Currently, there is no emphasis placed on this fundamental component of the complex growth and development of the athlete in order to achieve maximum performance in the curriculum for practical sports training, gymnasium education with integrated sports program, or in the sport of polo specialization.

2. Literature review

According to the literature and scientific research, the option for dealing with such a complicated problem at the national and international level rests in the very intricacy of the situation. The study of various sources and documentation in the literature resulted in the identification of works such as "Study on the role of coordination skills in achieving sports performance in juniors aged 14-16 in badminton" [2] and "Contributions on development coordination capacity for the representative mini handball school teams". [3]

"Water Polo" [4], a significant work in sports but no work addresses the importance of developing the coordinating components as a whole, as a whole unit, a relationship that cannot be separated. The international literature has books like "Water polo for players and teachers of aquatics" [5] (Snyder P., 2008), which describe the complexity of motor skills in polo players without making any relation to the mental side of athletes. Maglischo (2003) [6] has written an excellent book titled "Swimming Fastest," in which he discusses the basic elements of psychomotor skills, specifically in the context of swimming athletes. As a result, there is a significant deficiency in information and research on the understanding and application of coordination potential in water polo. Currently, there is no emphasis placed on this fundamental component of the complex growth and development of the athlete to achieve maximum performance in the curriculum for practical sports training, gymnasium education with integrated sports program, or in the sport of polo specialization.

Experts in the fields of sports science and physical education agree that the following considerations should be made when working to improve coordination skills: The importance of adequate rest and warming up cannot be overstated. It is not recommended that coordination and speed be addressed in the same lesson. Instead, optimal rest intervals should be programmed in between rest exercises to allow the body's major functions to return to values appropriate to the resumption of the effort. Coordination abilities depend highly on the efficient functioning of the central nervous system [7].

Athletes who strengthen their coordination abilities are better able to train and practice sports in general, and water polo in particular, because of the high degree of difficulty involved.

Water polo players' anatomy, anthropometry, and morphology were all examined by experts in the field, as well as the factors that contribute to the game's performance, individual and collective technique and tactics, and the optimization of physical training.

The attacking team's primary means of finding the back of the net is the throw-in. In the past, research has focused on the identification and description of the main types of throws used to score a goal, the analysis of throwing speed during water-polo matches, the importance of anatomical factors on ball speed, and the effects of fatigue on goal-scoring throws [8].

For each position on the field, different anthropometric measurements have been made by Argudo et al. (2009) [9]. High-level water polo players are identified by Lozovina, Durovic, and Katic (2009) [10] as having physical traits.

When comparing the anthropometric measurements of water polo players from two different generations, Lozovina, Pavii, and Lozovina (2004) [11] found a shift in the human body.

Hraste, Bebic and Rudic (2013) [12] used expert opinion and water polo player evaluation criteria to perform a study and calculated each player's contribution depending on where they played on the field during the game.

3. Material and methods

The research approach used in this study was based on documentary analysis as well as a review of specialized literature to clarify some important features of the subject matter.

4. Findings

In the sport of water polo, statistical study of game tactics, efficiency, and related performance metrics has a less developed history than it has in other sports. In 2010, Lupo, Tessitore, Minganti and Capranica [13] presented the first set of potential performance indicators, which included the number of attacks on the opposing team's goal, the number of free kicks, the ratio between shots and attacks, the percentage of shots, personal fouls, offensive "mistakes," and the length of time an attack was in progress. These statistics were compiled for the top teams competing in the FINA (Federation Internationale de Natation) World Championships to uncover significant markers of a team's ability to do well in competition. At the same time, Lupo, Condello, and Capranica, (2012) [14] laid the groundwork for the investigation of player mobility and statistics relating to physical strain in the sport. Following that, research have looked at the technical and tactical aspects of water polo games, particularly in the context of defence situations [9], game situations, swimming shots, tactical roles [14], the outcome of the game different codes [13], and international rules [9].

Because the rules of water polo are constantly changing, there has been little research into the specific impact of changing the rules on players. This includes both technical and tactical changes as well as changes in the coordinating components. There has also been little research into the volume of psychophysical work that water polo players are subjected to with each new change in the rules. Water polo in the present day, on the other hand, is still hampered by excessive physical contact and immobile attacking play [12].

When the International Federation of Natation (FINA) announced that it would change the rules in 2013, it was with the goal of allowing for greater movement, more creativity and more explosive speed while also eliminating static situations and providing greater clarity in the correct application of the rules. When it comes to the current game of water polo, competitors might employ a variety of different approaches. Ball handling techniques are the primary means of putting the proposed tactics into action, and they are based on the ability of water polo players to coordinate their efforts to streamline the game, particularly through swimming, high-quality technical baggage, and movements that are based on competitive swimming methodologies [15, 16].

Dynamic balance is a critical component of physical fitness, and it presents itself in two ways: as static and as dynamic balance. In this article [17, 18]. Body balance and implicit physical condition are both influenced and determined by static balance, which is a key component of both. Other physical abilities, such as body balance [19] the proper functioning of the vestibular system and the plasticity of the cerebral cortex [20, 21, 24]as well as by the level of physical condition and the baggage of individual sports skills [22, 23, 25], and by the level of physical condition and the baggage of individual sports skills.

Athletes that participate in team games in their current activity, as opposed to those who participate in individual sports, can be associated with more coordination complexity, which can have a favourable impact on the body's overall balance and coordination.

5. Conclusions

"Coordination skills" are mentioned in a variety of different terms throughout the literature. Other specialists (who are becoming more and more numerous) have moved away from the term "skill", which is understood as dexterity or ability, to the term "coordination ability", which is new and supported by some well-defined arguments, of which we mention:

- the complexity of the task in question;
- one's ability to coordinate several tasks at the same time.

When the term "skill" was used, it was intended to refer specifically to the ability to work with something.

Coordination skills (abilities), which are widely considered to be the foundation of all motor learning skills, play an important role in the occurrence described above. Coordination skills are critical in situations where the subject needs to act quickly and logically, as is the case in many situations. These skills are the basis of learning ability; they play a critical role in accident prevention and can help save energy by performing low-strength motor acts and activities, which reduces the need for mechanical assistance. This "complex of predominantly psycho-motor attributes that requires the ability to quickly acquire new movements, to adapt quickly and efficiently by rebuilding the current motor fund" is defined as "the ability to quickly acquire new movements, to adapt quickly and efficient by rebuilding the current".

"A psychomotor trait, based on the connection between the central nervous system and the muscles during a movement" is what is used to describe similar abilities in academic circles. According to the philosophy of physical education, coordination skills are considered to be one of the fundamental motor skills that students learn in school.

Authors' Contributions

All authors have equally contributed to this study and should be considered as main authors.

References

1. Bompa, Tudor, (1990). Theory and Methodology of Training. *Kendall/ Hunt Publishing Company*, Yowa
2. Timofte, D., (2016). Studiu privind rolul capaciăților coordinative în obținerea performanței sportive la juniorii de 14-16 ani în badminton- *teză de doctorat*, București;
3. Mihăilă, I., Mihăilă V., A., (2014). Contribution for preparation unit level teams minihandbal, Scientific report physical education and sport, volume 18 (2/2014), Piteşti, ISSN: 1453-1194, pp. 416-419
4. Marinescu, Gh., Frăţilă, C., Bălan, V., (2004). Polo pe Apă, Ed. Bren, Bucureşti;
5. Snyder, P., 2008. *Water polo for players & teachers of aquatics*. LA Olympic Foundation.
6. Maglischo, E.W., (2003). Swimming Fastest, Ed. Human Kinetics Publishers, Inc;
7. Nae CI, Pop CL.(2022) Improving university students' coordinating skills in physical education lessons with basketball focus. Physical Education of Students, 26(1):41–47. https://doi.org/10.15561/20755279.2022.0106
8. Van der Wende, K., 2005 The effects of game-specific task constraints on the outcome of the water polo shot. *Faculty of Health and Environmental Science. Auckland University of Technology. New Zealand.*

9. Argudo Itturriaga F.M., J.L. Arias, E. Ruize, and J.I. Alonso (2009). Were there differences in tactical efficacy between the winning and losing teams and the final classification in the 2003 water polo world championship? *Journal of Human Sport and Exercise*, pages 142-153.
10. Lozovina, M., Đurović, N., & Katić, R., (2009). Position specific morphological characteristics of elite water polo players. *Collegium antropologicum, 33*(3), 781-789.
11. Lozovina V., Pavii L., and Lozovina M., (2004). Analysis of indicators of the load during the game in the activity of the centre in waterpolo. Nae More, (51):135–141, 2004.
12. Hraste M., Bebic M., Rudic R., (2013). Where is today's Water Polo Heading? An Analysis of the Stages of Development of the Game of Water Polo, Our Sea, Scientific-Professional Journal for Sea and Marine, 60 (2013) 17-22.
13. Lupo C, Tessitore, A., Minganti, C. and Capranica L., (2010). Notational analysis of elite and sub-elite water polo matches. Journal of Strength and Conditioning Research, (24):223– 229
14. Lupo C., Minganti C., Cortis C., Perroni F., Capranica L., and Tessitore A,. (2012). Effects of competition level on the centre forward role of mens water polo. Journal of Sports Sciences, pages 889-897
15. Kolosov, YU.V., (2003). Water polo player preparation. Study guide. 128p. KOLOSOV, YU.V. M., 2003, 128p
16. Bulgakova, N., (2003). Water sports. Textbook for universities. Ed. N. Bulgakova. M., 2003, 350p
17. Micarelli, A.; Viziano, A.; Granito, I.; Micarelli, R.X.; Felicioni, A.; Alessandrini, M., (2021). Changes in body composition in unilateral vestibular hypofunction: Relationships between bioelectrical impedance analysis and neuro-otological parameters. Eur. Arch. Oto-Rhino. Laryngol, 1-9, doi:10.1007/s00405-020-06561-z
18. Schedler, S.; Tenelsen, F.; Wich, L.; Muehlbauer, T., (2020). Effects of balance training on balance performance in youth: Role of training difficulty. BMC Sports Sci. Med. Rehabilit.12, 1–10, doi:10.1186/s13102-020-00218-4
19. Muhlfay, G.; Fabian, Z.; Neagoe, R.; Horvath, K.U., (2018). Applications of 3D planning, 18. plastic materials and additive manufacturing in functional rehabilitations in the head and neck surgery. Mater. Plast. 55, 431-433, doi:10.37358/mp.18.3.5044. 7.
20. Paillard, T., (2017). Plasticity of the postural function to sport and/or motor experience. Neurosci. Biobehav. Rev. 2017, 72, 129-152, doi:10.1016/ j.neubiorev.2016.11.015. 9
21. Paillard, T., 2019. Relationship between sport expertise and postural skills. Front. Psychol. 2019, 10, doi:10.3389/fpsyg.2019.01428
22. Raicea, V.; Kovacs, J.; Moraru, L.; Suciu, H., 2015. Coronary sinus lactate as marker of myocardial ischemia in cardiac surgery: Correlation with morbidity

and mortality after cardiac surgery/Lactatul din sinusul coronarian-marker al ischemiei miocardice în chirurgia cardiacă: Corelaţii cu morbiditatea şi mortalitatea postoperatorie. Rev. Romana Med. Lab. 2015, 23, 189-197, doi:10.1515/rrlm-2015-0019.

23. Sarto, F.; Cona, G.; Chiossi, F.; Paoli, A.; Bisiacchi, P.; Patron, E.; Marcolin, G., (2020). Dual-tasking effects on static and dynamic postural balance performance: A comparison between endurance and team sport athletes. PeerJ, 8, e9765, doi:10.7717/peerj.9765.
24. Seidel, O.; Carius, D.; Kenville, R.; Ragert, P., (2017). Motor learning in a complex balance task and associated neuroplasticity: A comparison between endurance athletes and nonathletes. J. Neurophysiol. 2017, 118, 1849-1860, doi:10.1152/jn.00419.2017
25. Zemková, E., (2014). Sport-specific balance. Sports Med. 44, 579-590, doi:10.1007/s40279-013-0130-1