

# Where is today's Water Polo Heading? An Analysis of the Stages of Development of the Game of Water Polo

## *Kamo ide današnji vaterpolo? Analiza etapnog razvoja vaterpola*

Mladen Hraste

Faculty of Natural Sciences  
and Mathematics, University of Split  
e-mail: mhraste@pmfst.hr

Milivoj Bebić

Croatian Water Polo Federation  
Zagreb  
e-mail: rusi@net.hr

Ratko Rudić

Croatian Water Polo Federation  
Zagreb  
e-mail: ratko.rudic@hvs.hr

UDK 797.25

Pregledni članak / Review

Rukopis primljen / Paper accepted: 11. 11. 2012.

### Summary

The aims of this review are to: (1) Identify the various phases and their characteristics throughout the historical development of the water polo game. (2) Explore the impact of changes in rules of the game on the technical-tactical structure of the current water polo game. (3) Explore the impact of the technical-tactical structure of the water polo game which has led to change in the rules of the game historically. (4) Identify possible directions for the next change of rules and development of technical-tactical structure of the water polo game. There were five distinct development stages of water polo through its history, and there will probably be another one in future. Each time the various changes in the rules of the game influenced changes to the structure of the technical and tactical game. However, in some periods the reverse happened and the technical and tactical changes in the way the game was coached and played led to changes in the rules of the game. Today's water polo belongs to the last historical stage which is characterized by a high rhythm and tempo of the game, but at the same time today's water polo is a sport with a lot of physical contact fouls and with 60% waste of time during the annoying phase of transition. By applying the suggested "new rules" the number of ordinary fouls and the time loss in the transition phase would be significantly reduced. With these new rules, the water polo games should develop a new dimension of attractiveness and creativity.

### KEY WORDS

Water Polo History  
Water Polo Future  
Technical-Tactical Structure  
Water Polo Rules

### Sažetak

*U ovom su preglednom članku utvrđene povijesne etape i njihova obilježja kroz povijesni razvoj vaterpolske igre. U radu je istražen utjecaj promjena pravila igre na tehničko-taktičku strukturu vaterpolske igre kao i utjecaj tehničko-taktičke strukture vaterpolske igre na promjene pravila igre. U radu su utvrđeni mogući pravci narednih promjena pravila i razvoja tehničko-taktičke strukture vaterpolske igre. Kroz povijesni razvoj vaterpolske igre utvrđena su obilježja pet razvojnih etapa te je predviđena jedna buduća, hipotetska etapa. Etape su se diferencirale prema obilježjima vremena i uvjeta u kojima je vaterpolo egzistirao kao i prema značajnim razlikama u pravilima i tehničko-taktičkoj strukturi igre. Različite promjene pravila u povijesti igre utjecale su na mijenjanje tehničko-taktičke strukture igre. Međutim, u nekim periodima usavršavanje i promjene tehničko-taktičke strukture igre su utjecale na mijenjanje pravila igre. Današnji vaterpolo pripada zadnjoj povijesnoj etapi koja je obilježena igrom visokog ritma i tempa, međutim u istom trenutku prevladava statičan vaterpolo u pozicijskim fazama igre s puno dosuđenih prekršaja, kontakata i duel igre "na granici incidenta", s malo uplivavanja i malo taktičke kombinatorike u fazi napada. U današnjem vaterpolu udio tranzicijske faze po utakmici je 60%. U projekciji igre primjenom „novih“ pravila značajno bi se smanjio broj običnih prekršaja kao i smanjio udjel tranzicijskih faza u ukupnoj strukturi igre. Na taj način bi se pospješila struktura igre s tendencijom postizanja ravnoteže između napada i obrane u dva bazična stanja igre, pozicije i tranzicije. Posljedica novih pravila trebala bi biti odstranjivanje grube igre, „otvaranje“ igrališta, ubrzavanje igre, što će omogućiti veći stupanj izražavanja tehničko-taktičkog znanja i vještina tijekom igre. U „novim uvjetima“, vaterpolske utakmice bi trebale doživjeti nove dimenzije atraktivnosti i kreativnosti.*

### KLJUČNE RIJEČI

povijest vaterpola  
budućnost vaterpola  
tehničko-taktička struktura  
pravila

### INTRODUCTION / Uvod

Like other sports, water polo has developed due to historical development caused by changes to the rules and improvement of the material, technical and organizational conditions of the training and competition. The

development of water polo has been especially influenced by the application of new and scientifically-based training processes. All these factors have contributed so that today's water polo is moderately popular and widespread

in the world. The development of water polo from its first days, until today, was conditioned by technical-tactical innovations and changes of the rules. Water polo as a team sport has developed with continuous changing of those rules,

which often hampered the dynamics and a speed of the game. Over time, means and methods of technical-tactical and conditional training have been perfected and thus the intensity of the play and technical-tactical elements has been continuously improved too. If one looks back at how the game was played in the past, it is evident that water polo has developed especially in term of speed, strength and speed endurance. Modern water polo is characterized by rapid circulation of the play, with rapid counter attacks, powerful and precise shots to the goal, and tight duel play which requires that player abilities, skills, knowledge and habits are extremely high. The rules and the rule changes are proposed to the International Swimming Federation (FINA) by the Technical Water Polo Committee. The European Swimming Federation (LEN), regional, national, university and school leagues have accepted FINA water polo rules, though sometimes with minor modifications. Any differences in the rules are present only in the duration of the game, the time of ball possession and in the space arrangement of the playgrounds. However, there are still big difficulties in interpreting the rules of the game, which often leads to disputes and incorrect decisions of the judges in some stages of water polo development.

An analysis of the water polo game from its beginning in 1869 to today is a necessary prerequisite to understand the evolution of the water polo game. There needs to be an analysis of each stage of development from the sport's formation, through its changes and evolution which have happened throughout history until today. It is necessary to have a constant insight into the informal relationship between the sequences of the game's rules and techniques, and also between the rules and tactics. In order to develop the best types of water polo practice, it is crucial to consider these relationships and then one can create new principles of organized play which will then produce the most effective tactical systems.

The aims of the stage development of the water polo game are: (1) Identify the various phases and their characteristics throughout the historical development of the water polo game; (2) Explore the impact of changes in rules of the game on the technical-tactical structure of the current water polo game; (3) Explore

the impact of the technical-tactical structure of the water polo game which has led to change in the rules of the game historically;(4) Identify possible directions for the next change of rules and development of technical-tactical structure of the water polo game.

### **STAGE DEVELOPMENT OF THE WATER POLO GAMES / *Etapni razvoj vaterpola***

The developmental stages of water polo are differentiated according to the time and characteristics of conditions in which water polo existed at that time and to the significant changes in the rules and structure of the technical-tactical game that were introduced from time to time.

The first stage of the development of the water polo is from 1869 to 1907. This stage can be marked as the search for identity and unifying the rules of water polo games. During this period, the first water polo game was characterized by uncontrolled and wild play with a lot of diving and sinking, without particular technique and rules. The systems and rules at the start contributed to the domination of defense over attack. Carrying the ball under the water was common at matches (Juba, 2008, p 26). Water polo, as a new sport in the years of its initiation sought a true name, so it was initially called football or rugby in water because this is what it most resembled in early matches (Juba, 2008, p 10). The first water polo game was played without goals, with three players in each team. The way to score a goal was with two hands to put the ball on a platform or a boat that was at the end of the court. Attempts at such games were unsuccessful and unattractive. Often the matches were included in sea ceremony programs with rowing and swimming. Only after these early matches were played, was a committee set up to study the possibility of introducing rules. With time, the terms and rules of the game were clarified. As the sport developed matches were played with seven players in each team. The length of the court was 50 yards, and the goals were marked with flags. The first water polo rules were published in 1876. A year later the first game was played by those rules, and it was also significant because the boundary lines were marked for the first time. Also in this year the rules were supplemented with:

dimensions of goals, the players were not allowed bouncing from the bottom and a pass or shot with two hands was not allowed. Although there were uniform rules, clubs from Scotland and England played by different rules. Water polo spread to America. The game was rife with allowable activities such as diving with the ball, pulling back, sinking and holding (Lord, 2008, p 49). The game was often followed with a brutality that sometimes was the main attraction of the game. The "International Board" in 1892 established uniform rules, and entered nothing new under the existing rules. At this stage water polo was expanding beyond the borders of Great Britain and the United States. Germany, Austria, France, Belgium, Hungary and Italy adopted the water polo game before the end of the 19th Century. At this time water polo matches consisted of two 10 minutes halves.

The second stage of the sport's development covers the period from 1908 to 1949. This stage can be marked as a period of restructuring and internationalization of the game. In 1908 The International Swimming Federation FINA (Federation Internationale de Natation) was established. That year the name of "football in the water" was officially declared invalid and "water polo" was declared as the new official name. Initial rules, with amendments which referred to a penalty throw and the ejection of players who committed a foul were in effect until 1949. Water polo technique was improved in the area of individual skills.

In 1928, (Lord, 2008, p 51) Hungarian water polo coach Bela Komjadi invented the "air pass", or "dry pass", a technique in which a player directly passes the ball through the air to another player, who receives it without the ball hitting the water. Previously, players would let the ball drop in the water first and then reach out for it, but the dry pass made the offensive game more dynamic, and contributed to Hungarian dominance of water polo for the next 60 years.

At this stage the game system was based on physical strength and skill of ball control, with very limited mobility of swimming. It was played very slowly and was an extremely static version of water polo (Petanjek & Šimenc, 1988, p 7). During this period, the defenses absolutely dominated over attacking

players. The players were primarily responsible for the performance of tasks in the defense. In the game the strong and heavy players stood out as the best players but they were slow swimmers. The dominance of these players derived from the rules of the game. The players had to remain in place where they were at the moment of the game being stopped by the final whistle of the referee. Player positions in the game were conceptualized by their roles in the game. At this stage, the players were specialized as defensive players or attacking players. The duration of ball possession was unlimited and therefore led to static and slow-playing water polo. In the context of a tactical system, the game created man to man marking. The strong influence of football in the 1940-1950s was present in the design of games and player roles (Bonačić, personal communication, November 4, 2009). But gradually water polo took different types of zone and combined defense from the game of basketball (Asić, personal communication, November 7, 2009).

According to Bonačić (personal communication, November 4, 2009) the most common game system in this period was 2-1-2-1, which consisted of a defense with two central defenders in line and with one midfield defender. The primary position of midfield defender was at a distance of 7-8 meters from his goal, and his primary role was forward organization. The remaining players were two offensive midfield players and a centre forward. Such an arrangement of players and their roles had been significantly influenced by football. Tactics in the forward areas mainly consisted of passing a ball from goalkeeper to centre forward, which with various shots tried to score. Tactics in the defense was based on the coverage of all players in the game and preventing them from passing a ball to the centre forward.

The predominance in the game was often the result of the duel of central defender and centre forward (Petanjek & Šimenc, 1988, p 7). In the control of centre forwards, central defenders mostly tried to be quicker and regain the ball possession or tried to block a shot with one hand. Towards the end of this period water polo was stagnating as a sport, which was understandable, because World War 2 had just ended (Petanjek & Šimenc, 1988, p 7). By the end of this stage the play system was enriched by

introducing a second centre forward. The game system, known as the 2-2-2 system was distributed in a zigzag line with two players in the defending half of the field, two midfield players and two players in the attacking half of the field. The new tactical play system encouraged the development of quick and agile players, skilled in ball manipulation. However, the opportunity to develop a more dynamic style of water polo was prevented during this period because for the majority of athletes water polo was only a secondary sport (Bonačić, personal communication, November 4, 2009) and thus practicing and playing water polo only took place during the summer season, and it consisted mostly of applied situational training with very little swimming and strength training. Matches from this period were characterized with a very small number of ejections. Also at this stage there were the first signs of the development of zone defense, which was formed by four players who held a position at a distance about 6 meters parallel to the goal line (Bonačić, personal communication, November 4, 2009). This tactic was developed to enforce the opposing players to play in the attacking half of the field, and then after winning the ball in the defense immediately launching a counter attack. However, the radius of action of the game had become very low. Psychomotor skills in relation to today's water polo players were very low, especially in terms of speed, endurance and strength (Asić, personal communication, November 7, 2009).

The third stage covers the period from 1950 to 1969. The first significant intervention in the rules of the game which was a revolution for the further development and improvement of water polo was made in this period. Among many other rule changes, one was introduced allowing play to continue uninterrupted after the referee had whistled an ordinary foul (Lord, 2008, p 51). The new rules contributed to a faster game (Juba, 2008, p 58), in which the players had to be physically strong and good swimmers (Lord, 2008, p 51). Until 1956 the water polo usually played with leather balls which were red in color, very heavy, slippery and asymmetrical, which further slowed down the game. At this stage the yellow and rubber ball was formally introduced. That ball was rough and did not absorb water. A ball with new

characteristics allowed players to have better visibility and handling, resulting in a faster game with more goals. Regardless of the changing features of the game compared to the previous period, this phase can be considered as a period of slow and static game, in which the defense still dominated over the attack. The new rules eliminated slow players from the game. In this stage, all players in the field participated in both the attack and defense phase so that the newly formed tactical game systems no longer divided players into defense and attack. The role of the centre forward was significantly changed and was no longer related only to holding the position in front of the opponent's goal and the execution from that space. The centre forward became the organizer of the attack with an additional role of ball distributor to teammates who tried driving towards the opponent's goal to realize an advantage over the opposing team and ensure favorable conditions for ball reception and shooting. In the defense phase of the game teams usually applied man-to-man defense. According to the rules at this time, the game had 2 halftimes of 10 minutes duration without any substitution. An ejected player was out of the game until the first score. This rule slowed the development of water polo toward faster and high tempo game (Petanjek & Šimenc, 1988, p 8). From 1961 the quarters were introduced instead halftimes, and the game lasted for four quarters of 5 minutes. Each team consisted of 11 players, of which 7 were active players and 4 were reserves. Ball possession was limited to 1 minute. The new rule allowed player changes after a goal or between quarters. In this period there has been further progress in tactics. The player changes allowed frequent game system changes. The possibility of frequent changes was effective in a game against inferior swimming opponents. Under these conditions a better prepared team had the ability to counterattack and dictate a higher tempo of the game. According to the rules of 1967, the third consecutive heavy foul resulted in a penalty. The numbers of tactical combinations in games became much smaller, because players sometimes played to achieve the ejection of an opponent, rather than scoring from combinations in the game. The winning team had a good goalkeeper, trained to

defend the penalty throw and a player who was a specialist for a penalty shot. This stage produced a game with a lot of contact and fouls. Sometimes the game was rife with cruelty and brutality. Water polo stagnated in this period in all elements of the game, and was especially poor in tactical variants of defense and attack (Petanjek & Šimenc, 1988, p 11).

The fourth stage covers the period from 1970 to 1986. Towards the end of the third stage spectator interest in water polo decreased, so in 1970 the new rules were introduced. Thus, in 1970 FINA suspended the rule of a penalty after the third consecutive heavy foul. The game tactics model changed in this stage because the new rules limited the right of possession of one team to 45 seconds. According to the new rules an ejected player could enter back into the game after one minute or after the score. These rule changes significantly influenced the development of tactics in the defense and attack, especially on men-down and man-up tactics. The game seemed faster and more interesting. This stage could be marked as a stage of balance between attack and defense. The referees judging criteria favored the attackers, while defenders were heavily penalized uncompromisingly for holding, sinking or pulling back an opponent. According to Nitzukowski (2009, para. 2), after the 1968 Mexico City Olympic Games, many countries playing water polo sensed the game was in jeopardy and made a conscious effort to improve water polo through better and clearer rule interpretations and a few important rule changes. During most of the 1970s water polo was a great time for players and spectators alike. Ball transfer to the opponent's goal was fast. In a relatively short period of time the players were trying to create the opportunities for scoring. The attackers were particularly active in the interrupted play when they tried to extort an ejection for one minute from an opposing player. In this case, the team with the man-up had the right of a new attack for 45 seconds. Teams paid close attention to the tactics of attack completion with the aim of making powerful and precise shots from medium and large distances toward the upper corners of the goal, forcing the goalkeeper to reject such shots back into the playground or for a corner. In this case the attacking team obtained a

new 45 seconds attack. The repertoire of technical elements to manipulate the ball in the form of passing and shooting at goal was great. Man-up tactics particularly took into account the best use of time for making scoring attempt. The team that came into the possession of the ball after the unused man-up generally held the ball in possession until the end of time provided for the exclusion. Defense tactics, beside the pressing defense, often included zone defense, which successfully neutralized centre forward play. Zone plays mostly produced a game with no fouls and with the intention of developing a collective counter attack after ball steals. Individual defense tactics related to the development of skills to cover an opponent without unnecessary fouls. Defense tactics with a man-down developed and perfected the movement of players in certain playing positions. The new rules in 1977 brought many changes in tactics. The new limit on the time of attack from 45 to 35 seconds required quicker transfer of the ball to the attack field, and quick transfer of all players to the offensive half court. The attack phase required a lot of rapid and sudden tactical combinations. As a result, water polo became a dynamic, fluid and high tempo game, as never before. The defense phase put a high demand on being "clean", i.e. without any major fouls. Two referees were introduced at this stage. From 1981 the playing time was prolonged and the game lasted four quarters of 7 minutes. From 1986 the punishment of an ejected player was reduced to 35 seconds. The excluded player could return to the game even before the time expiration if his team would regain possession of the ball.

The fifth stage covers the period from 1987 to 2012. This stage can be marked as a high intensity game. Professionalism of water polo at this stage increased the volume and intensity of training. This led to a significant increase in the total swimming intensity in the game and improved readiness for contact in the game. At this stage, training with weights and exercise equipment gained much greater significance, which contributed to the remarkable development of all forms of strength in water polo. According to the rules of 1991 the ejection time of a player reduced to 20 seconds. The new rules also allowed the goalkeeper to score. Possession of the ball was limited to 30 seconds. Duration

of the game extended to four quarters of 8 minutes each. The seven meter line was introduced that allowed a direct shot on the goal after a foul. After few years the line of seven meters was moved to five meters. A penalty throw moved from four meters to five meters. A block with both hands within four meters of the goal by any defence player except the goalkeeper was judged a major foul. A new rule was introduced to change players during the game and have a "time out". All rules changes were made to speed up the game, and in turn these made the game more attractive. Re-entry of ejected players immediately after the change of possession, the possibility of direct shooting at goal after a foul from the 5 meters line and the possibility of flying changes and prohibition of blocking with both hands all contributed to the acceleration of the game. From 2005 the ball deflected out of the playground by defensive players after an attacker's shot, is treated as a free throw for defending team, which also contributed to a more dynamic game. Restriction of possession to 30 seconds significantly reduced the time for preparation and organization of position attack. The main characteristic of this period was high intensity water polo games with high energy consumption among participants in the game. There was a high rhythm and tempo to the game, but at the same time static play in the attacking positions still dominated and there was a lot of bodily contact with much of the game "on the border of an incident". Nowadays there are very little driving and tactical combinations in the phase of position attack. The reason for this is the fact that the judicial interpretation of water polo often tolerates a major foul in the form of a pull back, sink and hold, which contributed to the selection of players according to energy requirements but with only secondarily water-polo skills. This further resulted in the reduction of water polo technical elements which made the game less attractive. Teams were trying to create multi skilled players, plus some specialists players who had a particular role in the game. At this stage, clubs started to select high players (Lozovina & Pavičić, 2004, p 205) with high levels of psychomotor abilities (speed, explosive strength and coordination). The technology and methodology, at this stage of development, had

caused a transformation of the skills required, especially procedures for the development of relevant anthropological characteristics, as well as the adoption, improvement, stabilization and automation of technical and tactical knowledge, without which it was not possible to successfully perform in a game where each player in the team was given a defined role to complement the tactics selected by each team for the particular game (Hraste, 2010, p 9).

The sixth stage of changing rules will cover the period from 2013 to 2020. During this period, the rule changes will probably improve the structure of the water polo game with the aim of trying to establish equilibrium between attack and defense phases. The authors of this paper have ideas how to change the existing rules in water polo as follows:

- Increasing the possession of the ball from 30 to 35 seconds. Since the transition from defense into an attacking position lasts on average between 15 and 18 seconds, by increasing the possession time this rule would allow more time to create an attack. Under the current rules a lot of effort goes into forcing multiple fouls to allow a direct goal shot. This is reducing the possibility of good combination play and the beauty of performance.
- Restoring the penalty shot to 4 meters. "The Four-meter shot" was a synonym for water polo, and the current rules did not reduce the efficiency of a penalty shot
- Establishment of a 6 meters line instead of 5 meters line. Establishing a line of 6 meters would partly reduce the possibility of receiving a forced foul and a shot after the foul behind the line of 5 meters. The line of 5 meters is too close to the goal which allows players forced shots and the search for solutions in the attack is less important at the moment. Such a rule would eliminate disturbance to the four meters penalty performer by moving all other players beyond the line of six meters. Successful examples already exist in handball (a penalty throw is taken from seven meters, and all players other than the penalty shot performer and the goalkeeper must be located behind the line of nine meters) and in soccer, the penalty kick is a real "penalty",

and all players other than the penalty performer and goalkeeper must be outside the penalty area, which is 16 meters).

- Eliminate the rule "of a new 35-second" of ball possession after the ejection of a player. With this rule the man-up time would last much shorter. This would increase the combination and imagination of an attack and avoid stereotypical "man-up" play. This rule would force the players to move faster and more often trying to force the defender to make a major foul at an earlier stage of transition and position attack. In this way attackers would be allowed more time to prepare an attack with a man-up. The assumption is that the shortening of the time to implement man-up attack would force the players into riskier passing play. Playing a riskier game would contribute to a bigger number of forced errors which would further make the water polo game more interesting.
- The introduction of bonuses for a number of ordinary fouls for each quarter, which would lead to a six meters penalty shot. Water polo is a collective sport in which an ordinary foul is awarded too often. In today's water polo ordinary fouls break up the game which makes the game slower and less interesting (Wigo, 2012 a, para. 3). The introduction of the bonus (the accumulated number of ordinary fouls) would probably force players not to make unnecessary ordinary fouls. In such circumstances, the defensive players would react strongly in situations of direct danger of scoring which would lead to an exclusion foul or penalty which would not go into the bonus total of ordinary fouls.

The intention of the new rules is to try to make water polo more similar to other popular team sports using and passing a ball. The most obvious need for changes is when the statistical data of water polo matches (the quantity and frequency of fouls and information about the transitional phase) are compared and analyzed with the matches of basketball, football and ice hockey (Wigo, 2012 b, para. 3). According to the survey, an average of 60% of water polo matches at the higher levels waste time during the annoying phase of transition which

is twice as long as in the games of basketball, football and ice hockey. This surprising fact is caused because in a water polo match there are on average approximately 120 ordinary fouls which is three times more than in football, four times more than in basketball, and even twelve times more than in ice hockey!!

By applying the new rules suggested above, it would significantly reduce the number of ordinary fouls and the amount of time lost in the phase of transition. With these new rules, the water polo games should develop a new dimension of attractiveness and creativity. A good example of an attractive and creative water polo match was the experience of the NCAA (National Collegiate Athletic Association) league in the period from 1940 to 1970 (Wigo, 2012 c, para. 2). During this period the schools and the university's' water polo in the United States were playing using rules that were significantly different from the FINA water polo rules (Wigo, 2012 d, para. 1). Thus the further development of water polo is most likely to propose new rules and their interpretation would facilitate a balance between attacking and defensive positions in both the positional and the transition game (Hraste, 2010, p 11).

## CONCLUSION / Zaključak

Throughout history it was not always possible to achieve rapid formulation and adaptation of new rules and trends for water polo games. By analyzing the development of water polo as a sport one can see the presence of continuous change (Aleksandrović & Donev, 2008, p 16). The first changes were directed at standardization of the rules, while the subsequent changes were made to improve the dynamism and attraction of the sport which enabled and encouraged progress in both the game and in the training processes. Improved training produced an increase in the tempo the game and the radius of player action. In history water polo took elements from other team sports and their styles. Today's water polo bears very little similarity to the original game. Evolutionary achievements brought significant changes to the rules and hence changes in the tactical game and in the process of sport training. At the beginning of each stage there were advances in technical and tactical

characteristics. However, by the end of each stage there was an obvious “lack” of opportunity for further development of the game. The various changes in the rules of the game influenced the changing structure of the technical and tactical game. However, in some periods the reverse happened and the technical and tactical changes in the way the game was coached and played led to changes in the rules of the game. From the historical genesis of the development of water polo games it is clear that water polo has significantly progressed in the rhythm and tempo of the game and in the level of the vertical player position. The beginnings of water polo were marked with diving of water polo players and low vertical position players in the water. During the evolutionary process all the players gradually took a higher vertical position in the water. It can be argued that today’s top water polo players “float” above the water. The attacking part of the game was only given its respective importance in the fourth stage, because at that stage the attack was balanced with the defensive game. In the fifth stage, as in the first three stages, the water polo defense again dominated over attack. Today’s water polo is a sport with a lot of contacts in the form of holding, sinking and pulling back, which are not all penalized, even though the rules provide for them to be major fouls. Thus, water polo can still be wrestling in the water which reduces the attractiveness of the game. The water polo game will not be popular and interesting if strength of the body dominates over skilled play. An average of 60% of water polo matches at the higher levels waste time during the annoying phase of transition. This is the reason why, by applying “the new rules”, it would significantly reduce the number of ordinary fouls and the time loss in the phase of transition.

Water polo is a game that is played in water, which naturally, further restricts the dynamics of the game. According to Lozovina and Lozovina (2009, p 88) today’s rules and their interpretation do not allow the game to develop its true and full potential. Water polo is perhaps in danger of losing its prestigious Olympic status, unless new changes to the rules make it more attractive to the viewing spectators. The new rules should contribute to the reduction of “violence” in the game, which would directly impact on the reduction of physical contact fouls. The consequence of all this should be the removal of rough games resulting in a more “open” playground and acceleration of the game, which will allow a greater degree of skill expression during the game. Changing the rules of the game as suggested here should also contribute to the reduction of the importance of physical force in the game, which would increase the need for the implementation of improved technical-tactical knowledge (Hraste, 2010, p 12). Hypothetically, by changing the rules, absolute strength will have a smaller effect on the result of water polo matches, and the speed, precision and coordination will become more important. The new rules create a requirement for technical-tactical innovation in the game and more efficient and skilful play in the phase of the attack. The rules and interpretation of the rules in most other team sports rooted out the roughness from the sport and encouraged the expression of performance skills, lucidity and imagination, which made the sport much more interesting.

#### ACKNOWLEDGMENTS / Zahvala

The authors wish to thank Vlaho Asić - Mišo and Mitjan Bonačić, two former Yugoslav water polo national team players and

coaches who through personal interviews made an exceptional contribution to the explanation of water polo events in the period from 1940 to 1975.

#### REFERENCES / Literatura

1. Donev, Y. & Aleksandrović, M. (2008). History of rule changes in water polo. *Sport Science*, 1(2), 16-22.
2. Hraste, M. (2010). Konstrukcija i evaluacija ekspertnog sustava za procjenu stvarne kvalitete vaterpoliste. [Construction and evaluation of an expert system for assessing actual quality of water polo players. In Croatian.]. (Unpublished doctoral dissertation, University of Split). Split: Kineziološki fakultet Sveučilišta u Splitu.
3. Juba, K. (2008). A short history of water polo. Luxembourg: LEN.
4. Lord, C. (2008). *Aquatic 1908 – 2008*. Lausanne: Federation Internationale de Natation.
5. Lozovina, M., & Lozovina V. (2009). Attractiveness lost in the water polo rules. *Sport Science*, 2, 85-89.
6. Lozovina, V., & Pavičić L. (2004). Anthropometric changes in elite male water polo players: survey in 1980 and 1995. *Croatian Medical Journal*, 45 (2), 202-205.
7. Nitzkowski, M. (2009). History of the rules in relation to the physicality of the game. Retrieved February 16, 2010 from: <http://www.nswwaterpolo.com.au/coaching.php?coachID=336>
8. Petanjek, D., & Šimenc, Z. (1988). Razvoj vaterpola kroz promjene pravila igre. [Development of the water polo game through the changes of the rules. In Croatian]. *Vaterpolski savez Hrvatske, Biblioteka – stručni prilozi*, 8, 1-18.
9. Wigo, W. (2012 a). Why we need to rewrite the rules of water polo? Water polo articles by visiting coaches, players and referees. Retrieved May 9, 2012 from: [http://www.waterpoloplanet.com/HTML\\_guest\\_pages/20\\_guest\\_wolf\\_wigo1.html](http://www.waterpoloplanet.com/HTML_guest_pages/20_guest_wolf_wigo1.html)
10. Wigo, W. (2012 b). The future of water polo and all sports comparison. Water polo articles by visiting coaches, players and referees. Retrieved May 9, 2012 from: [http://www.waterpoloplanet.com/HTML\\_guest\\_pages/20\\_guest\\_wolf\\_wigo2.html](http://www.waterpoloplanet.com/HTML_guest_pages/20_guest_wolf_wigo2.html)
11. Wigo, W. (2012 c). Why FINA rules should be changed and why we should take the lead? Water polo articles by visiting coaches, players and referees. Retrieved May 9, 2012 from: [http://www.waterpoloplanet.com/HTML\\_guest\\_pages/20\\_guest\\_wolf\\_wigo3.html](http://www.waterpoloplanet.com/HTML_guest_pages/20_guest_wolf_wigo3.html)
12. Wigo, W. (2012 d). Historical comparison of the evolution of American NCAA rules
13. and FINA water polo rules major differences. Water polo articles by visiting coaches, players and referees. Retrieved May 9, 2012 from: [http://www.waterpoloplanet.com/HTML\\_guest\\_pages/20\\_guest\\_wolf\\_wigo4.html](http://www.waterpoloplanet.com/HTML_guest_pages/20_guest_wolf_wigo4.html)