

Efficacy in positions 1 and 2 in simple temporary numerical inequality at 15th Water polo World Championship

Eficacia desde posiciones 1 y 2 en situación de desigualdad en el 15^o Campeonato del Mundo de Waterpolo

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Abstract. The aim of this study was twofold: to know if the left-handed players are more effective in the goal categories and getting positive actions, in 1 and 2 position, than the right-handed in the same position at numerical inequality. To ascertain if the shots in 1 and 2 position, are less effective than the rest of the positions in the goal categories. A nomothetic observational, multidimensional and punctual design was used. The sample was the 389 shots and the 182 positive actions of 24 games (12 male and 12 female) at 15th FINA World Championship held in Barcelona. To record the data was used an *ad hoc* instrument for observation through the Sport Code Version Pro V9. Descriptive and Chi-square test was applied to study the relationship between variables. Left-handed players are more effective than right-handed players are if they are related to the goal and positive action categories in position 1. Shots from position 1 are the second least effective while position 2 is the fifth most effective.

Keywords: Water polo; shot; positive actions; specific position; laterality.

Resumen. El objetivo de este estudio fue doble: saber si los jugadores zurdos son más efectivos en las categorías de gol y obtener acciones positivas, en la posición 1 y 2, que los diestros en la misma posición en la desigualdad numérica. Determinar si los lanzamientos desde posición 1 y 2 son menos efectivos que desde el resto de posiciones en las categorías de gol. Se utilizó un diseño nomotético observacional, multidimensional y puntual. La muestra fueron los 389 tiros y las 182 acciones positivas de 24 juegos (12 masculinos y 12 femeninos) en el 15^o Campeonato Mundial FINA celebrado en Barcelona. Para registrar los datos se utilizó un instrumento ad hoc para observación a través del software Sport Code Version Pro V9. Se aplicó la prueba descriptiva y de Chi-cuadrado para estudiar la relación entre las variables. Los jugadores zurdos son más efectivos que los diestros si están relacionados con el objetivo y las categorías de acción positiva en la posición 1. Los lanzamientos desde la posición 1 son los segundos menos efectivos, mientras que desde la posición 2 es la quinta más efectiva.

Palabras clave: Waterpolo; lanzamiento; acciones positivas; posición específica; lateralidad.

Introduction

Water polo first emerged in the United Kingdom at the end of the 19th century as an alternative to football during the summer months, and it was the first Olympic team sport. It is a complex team intermittent sport, comprising of high and low intensity efforts. As it is also a contact sport, complementarily to swimming, jumping in the vertical plane and receiving, passing and shooting the ball, water polo players must face their opponents through blocking, contacting and pushing (Smith, 1998; Van der Wende, 2005; Stevens et al., 2010).

The methods used to analyse technical and tactical actions in sports performance are notational analysis (Özkoç, Turunç, & Dopsaj, 2013) or match analysis (Haydée, Ferragut, & Abbraldes, 2016), where one or more experts quantify the previously selected indicators

to define sports performance factors over a set time (Hughes & Bartlett, 2002).

Traditionally, studies on water polo have focused on evaluating possible factors related to sports performance and the anthropometric characteristics of players (Ferragut et al., 2011, 2015; Kavouras et al., 2006; Steel, Adams, & Canning, 2007; Tsekouras et al. 2005; Vila et al., 2010), physiological (Kavouras et al., 2006; Platanou & Geladas, 2006; Tsekouras et al., 2005), psychological (Marlow et al., 1998), bio-mechanical (Elliot, 1988; Feltner & Nelson, 1996; Feltner & Taylor, 1997) and technical/tactical aspects (Argudo et al., 2007; Platanou, 2004; Smith, 2004).

There has been a surge in interest in the technical/tactical aspect in recent years due to its influence on performance (Argudo et al., 2008). In particular, technical and tactical studies have been focused on team efficacy (Argudo et al., 2007, 2008; Lupo et al., 2009), tactical roles (Lozovina & Pavièia, 2004; Lupo, Minganti, et al., 2012), a competition level (Lupo et al., 2010), match outcomes (Argudo et al., 2007, 2009; Lupo et

al., 2011; Smith, 2004) and margin of victory (Gomez et al., 2014; Lupo et al., 2012, 2014). Descriptive studies of the game (Canossa et al., 2009; D'Auria & Gabbett, 2008; Platanou & Geladas, 2006), analysis of technical actions (Alcaraz et al., 2011; Hughes et al., 2006; Lupo et al., 2009; Vila et al., 2011), specific playing positions (Argudo, Gabaldón, & García, 2006; Lozovina, Pavicic, & Lozovina, 2007; Lupo, Minganti et al., 2012) and notational analysis (Argudo et al. 2007a, 2007b; García, Argudo, & Alonso, 2013; Lupo et al., 2014; Lupo, Condello, & Tessitore, 2012; Lupo et al., 2010; Lupo, et al., 2011; Saavedra et al., 2014; Smith, 2004).

Also the analysis of the playing action in water polo has looked for technical and tactical performance indicators (Escalante et al., 2011, Escalante et al., 2012; Canossa et al., 2009; Lupo et al., 2010; Lupo et al., 2011; Mirvic, Kazazovic, & Aleksandrovic, 2011), characterized the type of actions and their physical demands in relation to their intensity (D'Auria & Gabbett, 2008; Lupo et al., 2009; Platanou & Nikolopoulos, 2003; Tan, Polglaze, & Dawson, 2009), described the game profiles for each specific position (Lozovina, Pavicic, & Lozovina, 2010; 2011; Lupo, Minganti et al., 2012), found the effects of the regulatory changes (Platanou, et al., 2007), analysed the influence of time out (Platanou, 2008), game location (Prieto, Gómez, & Pollard, 2013), scoreboard result (Lupo, Condello, & Tessitore, 2012), for having the first ball possession of each period (Argudo, 2010); and, calculated the effectiveness in each situational framework (Argudo, Ruiz, & Abraldes, 2010).

For other side, scientific study of water polo is characterized by a great complexity of behaviours and actions that hinder their observation and analysis (Carling, Williams, & Reilly, 2005). It is for this reason that in order to facilitate it, it is divided into smaller units that maintain the structure and dynamics of the sport in order to analyse and transfer the results to the training and competition planning, called playing micro-situations (Argudo, 2005). These units are not all the same; developed in different contexts called situational frameworks, which according to Argudo (2005) are defined as the set of motor behaviours present in the game dynamics in team sports, determined by the factors of symmetry, organization of the game systems and ball possession. It can be distinguished in the case of water polo: numerical equality, numerical inequality, transition and penalty.

The framework of numerical inequality in water polo is a playing micro-situation determined by the rules

in which the number of players in either team is altered. Depending on the offence, a temporary duration, 20 seconds or recovery-loss of ball possession, or definitive without substitution, can be distinguished for the rest of the match. Likewise, for the first case, the number of players can be differentiated, single or double, specifying the ball possession or not (Argudo, 2005).

Specifically in this study, Simple Temporary Numerical Inequality (**STNI**) gained importance because of its relevance and impact on the final result, since it determines between 23% and 46% of the goals of a match and has a frequency of appearance of 4 to 12 times per match (Platanou, 2004; Takagi et al., 2005; García, Argudo, & Alonso, 2012, 2015). Therefore, it is essential in the field of sports performance to know and identify the motor actions that achieve the highest levels of effectiveness and justify their training in the scheduled sessions (Simoviæ et al., 2012; Hassan, 2014). In short, its analysis will provide the necessary scientific knowledge that every sport needs to evolve and progress (Borrie, Jonsson, & Magnusson, 2002).

Another few examples of previous studies in this respect is Petrov (1986), who points out the principles on which the success of the attack in **STNI** is based and analyses the different variants that can be adopted by the teams in attack. Platanou (2004) investigates the shot effectiveness in this micro-situation and looks for differences between field positions and winning or losing teams. Similarly, Soares (2004) directs his study on efficacy in **STNI** and performs an analysis of 2001-2002 Portuguese Men's League, comparing it with studies of Argudo (2000).

García, Argudo, & Alonso (2012), analysed the 96 matches played in the X Water Polo World Championships held in Barcelona and the 1230 micro-situations in **STNI** were observed. This analysis revealed that the most used game systems were 4:2 (56.5%), followed by 4:2/3:3 (19.1%) and 3:3 systems (16.3%) discarding the (8%) of micro-situations that end without system, being penalized with the last regulatory modification approved by the FINA. In this sense, this type of micro-situation has a great relevance in the result of the encounter given its high occurrence frequency (12.81 micro-situations per match), great influence on the result (4.78 goals per match) and its high efficiency percentage (31.74% of the **STNI** finish in goal).

From the several abilities that influence water polo performance, shooting seems to be one of the most decisive technical skills (Smith, 1998; Van der Wende, 2005; McCluskey et al., 2010; Stevens et al., 2010). A

shot in water polo is the action that allows a goal to be obtained, influencing the score during a match and contributing to its result (Platanou & Varamenti, 2011; Vila et al., 2011). A shot is typically executed under the influence of fatigue and defensive pressure from an opponent (Platanou, 2009). As a result, this technical gesture has been considered one of the primary indicators of performance in water polo (Smith, 1998; Takagi et al., 2005; Tucher et al., 2014).

Regarding shooting position, in **STNI**, most of shots are executed from positions near to the goal (>60%) (Lupo et al., 2011; Platanou, 2004). Additionally, in all situational frameworks, shots from the sides of the field are more common than those from situational central positions (Lupo et al., 2014; Lupo, Condello et al., 2012; Özkol et al., 2013). Likewise, Lupo et al. (2010) demonstrated that the championship level influences the shooting positions used by the players. Other works have also corroborated that winners have greater capacity to shot from close positions more often (García, Argudo, & Alonso, 2013; Lupo, Condello et al., 2012; Lupo et al., 2011).

Based on precedents, the objectives of this study were: (1) to know if the left-handed players are more effective in the goal categories and getting positive actions, in 1 and 2 position, than the right-handed in the same position at **STNI**; and (2) to ascertain if the shots in 1 and 2 position, are less effective than the rest of the positions in the goal categories.

Methods

The FINA and the 15th Water Polo World Championship Organizing Committee approved the study in which efficacy shot indicators are compared in simple temporary numerical inequality between lefties and righties in position 1 and 2. To accomplish this objective a nomothetic, multidimensional and punctual design was used, with a nature of the frequency factor (Anguera, Blanco, Hernández, & Losada, 2011).

Match analysis

All shots, positive actions (exclusion, penalty, rebound and corner) and negative actions (turnover, out, post, save and block) in position 1 and 2, of the 24 selected matches at the 15th Water Polo World Championship, were quantified and analysed. The 389 shots and the 182 positive actions were categorized (Table 1).

No informed consent was required from players because the Word Championship is a public event, which

Table 1.

Criteria and variables

Specific position (PE)	Type of situational framework (TF)	Side of prior pass (LP)	Reception (RC)	Type of shot (TL)	Player's laterality (LJ)	Efficiency of the ending (EF)
				Common shot (TLft)		Central (EFgc) Right (EFgd) Left (EFgi)
P1 (PEP1) P2 (PEP2)				Skip shot (TLfb)		Exclusion (EFpex) Penalty (EFppe)
P3 (PEP3) P4 (PEP4) P5 (PEP5) P6 (PEP6)	STNI 4-2 (TFs42)	Weak side (LPd)	Dry pass (RCm)	Backhand (TLr)	Lefty (LJz)	Rebound (EFpre) Corner (EFpco)
P7 (PEP7) P8 (PEP8) P9 (PEP9) P10 (PEP10)	STNI 3-3 (TFs33) Other STNI (TFsot)	Strong side (LPf)	Wet pass (RCa)	Lob (TLv) Revers (TLrc) Tip (TLp) Other shot (TL0)	Righty (LJd)	Out (EFnfu) Bar (EFnpl) Save (EFnpr) Block (EFnbl)

P1 (PEP1): the throw is made from position 1. P2 (PEP2): the throw is made from position 2. P3 (PEP3): the throw is made from position 3. P4 (PEP4): the throw is made from the position 4. P5 (PEP5): the throw is made from the position 5. P6 (PEP6): the throw is made from the position 6 or center. P7 (PEP7): the throw is made from double center position. P8 (PEP8): the throw is made from the first post. P9 (PEP9): the throw is made from the second post. P10 (PEP10): the throw is made from another position not specified. STNI 4-2 (TFs42): when the throw is made in 4-2 structure. STNI 3-3 (TFs33): when the throw is made in 3-3 structure. Other STNI (TFsot): when the throw is made in other structure not specified. Weak side (LPd): when you receive the ball from the opposite side to your skillful arm. Strong Side (LPf): when you receive the ball from the same side to your skillful arm. Lefty (LJz): left arm. Righty (LJd): right arm. Common shot (TLft): translation of the arm back and forth from the position of armed, releasing the ball after wrist flexion with the arm extended and parallel to the surface of the water. The body is balanced and stable at all times meanwhile the other hand is in the water, most of the time, supporting and balancing the action of the throw. The trajectory of the ball produced by this type of throw it is parallel to the water. Skip shot (TLfb): similar to the previous one, however, the trajectory of the the ball is first descending and then ascending after having a skip on the water. Backhand (TLr): the ball is projected with its back to the goal. Starting from an upper or forearm grip, with rapid pronation of the hand, a position is reached lateral grip, beginning the extension of the arm backwards, the elbow being high and performing a movement of the shoulder, arm, forearm and flexion of the wrist. Lob (TLv): directing the ball over the defender and / or goalkeeper, away from his reach. It is similar to the common throw but letting out the ball in an upward direction. Revers (TLrc): by means of a static fake and twisting of the trunk with jump side to the opposite side of your skillful hand. Tip (TLp): change of direction of the ball after a tense pass from a teammate. The ball is accompanied, it is not hit or received. Other shot (TL0): Releases that are not included in the others categories due to poor appearance in actual game (skill throws, etc.). Central (EFgc): central area of the goalpost looking at it from the front. Right (EFgd): area of the right side of the goal observing it from front. Left (EFgi): area of the left side of the goal observing it from front. Exclusion (EFpex): you get a 20" expulsion. Penalty (EFppe): you get a penalty. Rebound (EFpre): you get a rebound. Corner (EFpco): you get a corner. Out (EFnfu): the ball goes out directly after a shot. Bar (EFnpl): the ball hits the post, and you lose the possession. Save (EFnpr): the goalkeeper save the throw, and you lose the possession. Block (EFnbl): The shot is blocked by the defenders, and you lose the possession.

would cover the ethical aspect.

Procedure

The shots and positive actions analysed were recorded with a video camera (SONY, FDRAXP33B.CEN, JAPAN) that was placed on one side of midfield of the pool, at a height and distance greater than 10 m. Video broadcasts, available online from the Spanish Radio Television were also obtained. Both resources made it possible to combine horizontal plane images obtained with the video camera with those of the frontal plane provided by the television operator. In all of the playing actions examined, the shooter could be clearly seen.

To ensure the quality of the data, the reliability of the observational record, which is related to validity and accuracy, must be taken into account (Anguera et al., 2011). For content validity, a survey was used, using the authority criterion, where 12 coaches (6 from male teams and the same number from female teams)

answered some questions and thus corroborated the agreement on the variables and categories to be observed. These coaches had to be active, have more than 5 years of experience in the highest national and/or international category, have the highest specific water polo qualification. The 12 coaches surveyed agreed on the variables and categories by more than 90%.

With regard to reliability, in this study, consensus agreement was first used, i.e. agreement was reached among observers prior to registration, which allowed discussion of which category or field format code each action was assigned to.

Inter-observer and intra-observer matching using the same variables, categories and code system was used to control data quality. The men's quarterfinal between Greece and Hungary was chosen for intra-observer matching. It was observed on three occasions, by a previously trained specialist, with an interval of seven days between each analysis. For inter-observer matching, the women's quarterfinal between Spain and the United States was chosen. This was observed by a previously trained expert with more than 10 years of experience as a coach and by the expert mentioned above. They both performed the test-retest on a computer at the same time, in the same room, each with a laptop and an isolated.

Cohen's Kappa test (1960) was used to establish the matches with IBM® SPSS® (version 21.0). The results of the inter-observer and intra-observer concordance calculation (Table 2) showed that the instrument was reliable, since the values obtained were greater than 0.80, and therefore the validity of the contents could be guaranteed.

Table 2. Results of the calculation of the inter-observer and intra-observer agreement.

Criteria	Value	Inter-observer			Intra-observer			
		Error tip. Asint. ^A	T. Approx	Sig. Approx	Error tip. Asint. ^A	T. Approx	Sig. Approx	
Specific position (PE)	1,000	,000	18,547	,000	1,000	,000	18,330	,000
Type of situational framework (TF)	,965	,035	14,162	,000	1,000	,000	13,856	,000
Side of prior pass (LP)	1,000	,000	9,274	,000	1,000	,000	9,798	,000
Reception (RC)	1,000	,000	9,274	,000	1,000	,000	9,798	,000
Type of shot (tl)	,972	,020	15,614	,000	,950	,025	16,122	,000
Player's Laterality (LJ)	1,000	,000	9,274	,000	1,000	,000	9,798	,000
Efficiency of the ending (EF)	1,000	,000	18,547	,000	1,000	,000	19,596	,000

Sport Code Version Pro V9 was used to analyse and keep all the information. Following the ad hoc instrument designed by Sabio, Guerra, Cabedo, Solà, & Argudo (2018), already reliable and validated, the shots of the 24 games were analysed (Figure 1).

Statistical analysis

The statistical analysis was obtained using the



Figure 1. Final instrument ad hoc.

statistical program IBM® SPSS® Statistics version 21.0. Descriptive for all variables were obtained. Chi-square test was applied to study the relationship between variables.

Results

The most shots in STNI were from position 2 (19.3%), followed by position 5 (18.3%) and position 4 (17%).

Analyzing the shots from position 2, the majority of them were stopped or finished in goal 4.1% (right side). Adding the categories related to the goal (goals scored at the central, right or left part of the cage) it is observed that from this position it is achieved 7.2% compared to the total 19.3%. The negative actions were 8,7% and the positive ones were 10,5%. We also focus on the shots from position 1, which were the 13.4% in STNI. The majority were finished in goal 4.1% (left side). Adding the categories related to the goal (goals scored at the central, right or left part of the cage) it is observed that from this position it is achieved 7.1% compared to

Table 3. Specific Position (PE) and Efficiency of the Ending (EF) in STNI.

PE	EF									Total
	Efgc	Efgd	Efgi	Efpre	Efpco	Efnfu	Efnpl	Efnpr	Efnbl	
PEP1	1	11	16	5	2	3	4	6	4	52
	0.3%	2.8%	4.1%	1.3%	0.5%	0.8%	1.0%	1.5%	1.0%	13.4%
PEP2	0	16	12	7	6	5	7	16	6	75
	0.0%	4.1%	3.1%	1.8%	1.5%	1.3%	1.8%	4.1%	1.5%	19.3%
PEP3	2	11	6	6	1	4	2	2	7	41
	0.5%	2.8%	1.5%	1.5%	0.3%	1.0%	0.5%	0.5%	1.8%	10.5%
PEP4	1	11	15	5	5	5	5	11	8	66
	0.3%	2.8%	3.9%	1.3%	1.3%	1.3%	1.3%	2.8%	2.1%	17.0%
PEP5	4	20	14	6	4	4	2	13	4	71
	1.0%	5.1%	3.6%	1.5%	1.0%	1.0%	0.5%	3.3%	1.0%	18.3%
PEP6	0	3	1	0	0	0	0	2	0	6
	0.0%	0.8%	0.3%	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	1.5%
PEP8	1	8	13	5	0	4	3	6	2	42
	0.3%	2.1%	3.3%	1.3%	0.0%	1.0%	0.8%	1.5%	0.5%	10.8%
PEP9	1	8	6	4	2	3	5	5	1	35
	0.3%	2.1%	1.5%	1.0%	0.5%	0.8%	1.3%	0.3%	0.3%	9.0%
PEP10	0	0	1	0	0	0	0	0	0	1
	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%
Total	10	88	84	38	20	28	28	61	32	389
	2.6%	22.6%	21.6%	9.8%	5.1%	7.2%	7.2%	15.7%	8.2%	100.0%

P1 (PEP1): the throw is made from position 1. P2 (PEP2): the throw is made from position 2. P3 (PEP3): the throw is made from position 3. P4 (PEP4): the throw is made from position 4. P5 (PEP5): the throw is made from position 5. P6 (PEP6): the throw is made from position 6 or center. P7 (PEP7): the throw is made from double center position. P8 (PEP8): the throw is made from the first post. P9 (PEP9): the throw is made from the second post. P10 (PEP10): the throw is made from another position not specified.

the total 13.4%. The negative actions were 4,3% and the positive ones were 9% (Table 3).

Table 4 show the results from position 1. It is observed how the left-handed players performed more total shots compared to the right-handed players (31 vs. 21). Adding the categories related to the goal, the left-handers got 30.8% and the right-handers 23.1%, in total 53,9%. When adding the categories related to positive actions (exclusion, penalty, rebound and corner), the left-handers got 42.3% while the right-handers 25%, in total 67,3%. Adding the categories that refer to negative actions (out, bar, save and block), the left-handers added up to 17.2% and the right-handers 15.3%, in total 32,5%. It has to be noted that the 30% of the shots were goals scored on the left side and the 11,5% were saved.

Table 4.
Player's Laterality (LJ) and Efficiency of the Ending (EF) in STNI from position 1.

LJ	EF									Total
	Efgc	Efgd	Efgi	Efpre	Efpc	Efnfu	Efnpl	Efnpr	Efnbl	
LJz	1	7	8	4	2	2	1	4	2	31
	1.9%	13.5%	15.4%	7.7%	3.8%	3.8%	1.9%	7.7%	3.8%	59.6%
LJd	0	4	8	1	0	1	3	2	2	21
	0.0%	7.7%	15.4%	1.9%	0.0%	1.9%	5.8%	3.8%	3.8%	40.4%
Total	1	11	16	5	2	3	4	6	4	52
	1.9%	21.2%	30.8%	9.6%	3.8%	5.8%	7.7%	11.5%	7.7%	100.0%

LJz: left arm. LJd: right arm.

In Table 5 can observe how from position 2 the right-handed players make more shots compared to left-handed players (50 right-handers and 25 left-handers). Adding the categories related to the goal, the left-handers got 10.7% and the right-handers 26.7%, in total 37,4%. Adding the categories related to positive actions, the left-handers got 16% while the right-handers 38.7%, in total 54,7%. When adding the categories that refer to negative actions, left-handers had 17.3% and right-handers 28%, in total 45,3%. It has to be noted that the 21,3% of the shots were goals scored on the right side and the 21,3% were saved.

Table 5.
Player's Laterality (LJ) and Efficiency of the Ending (EF) in STNI from position 2.

LJ	EF									Total
	Efgd	Efgi	Efpre	Efpc	Efnfu	Efnpl	Efnpr	Efnbl		
LJz	2	6	4	0	3	3	6	1	25	
	2.7%	8.0%	5.3%	0.0%	4.0%	4.0%	8.0%	1.3%	33.3%	
LJd	14	6	3	6	2	4	10	5	50	
	18.7%	8.0%	4.0%	8.0%	2.7%	5.3%	13.3%	6.7%	66.7%	
Total	16	12	7	6	5	7	16	6	75	
	21.3%	16.0%	9.3%	8.0%	6.7%	9.3%	21.3%	8.0%	100.0%	

LJz: left arm. LJd: right arm.

To know the Specific Position (PE) and Player's Laterality (LJ) of the shots from position 1 and 2 that finish in goal in STNI, a Chi-square test was applied. This analysis showed a chi-square of 4.667 and a $p = 0.031$, that indicates there were differences between the variables, considering a $p < .05$ (Table 6).

From a total of 389 shots in STNI, 182 ended in goal (46,8%) and 61 were saved (15,7%). In position 1, the

Table 6.
Chi-square test of the Specific Position (PE) and Laterality Player (LJ) of the shots from 1 and 2 that finish in goal in STNI.

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4,667	1	,031		
Continuity Correction	3,573	1	,059		
Likelihood Ratio	4,740	1	,029		
Fisher's Exact Test				,058	,029
Linear-by-Linear Association	4,583	1	,032		
N of Valid Cases	56				

Table 7.
Goal effectiveness of shots in STNI according to the Specific Position (PE).

	Goals	Total shots	Effectiveness
PEP1	28	52	53.9%
PEP2	28	75	37.3%
PEP3	19	41	46.3%
PEP4	27	66	41.0%
PEP5	38	71	53.5%
PEP6	4	6	53.3%
PEP7	0	0	0%
PEP8	22	42	52.0%
PEP9	25	35	43.0%
PEP10	1	1	100.0%
TOTAL	182	389	46.8%

P1 (PEP1): the throw is made from position 1. P2 (PEP2): the throw is made from position 2. P3 (PEP3): the throw is made from position 3. P4 (PEP4): the throw is made from position 4. P5 (PEP5): the throw is made from position 5. P6 (PEP6): the throw is made from position 6 or center. P7 (PEP7): the throw is made from double center position. P8 (PEP8): the throw is made from the first post. P9 (PEP9): the throw is made from the second post. P10 (PEP10): the throw is made from another position not specified.

effectiveness was 53,9% and in position 2, was 37,3%, in a total of 91,2% (Table 7).

Discussion

The position 1 and 2 are weak side without left-handed players in these positions (García, 2009), which gives relevance to this study. Argudo, García, & Ruiz (2016) and García & Argudo (2017) affirmed that the capacity to circulate the ball with long passes from one side of the field to the other, with receptions by hand, and to positions close to the goal are shot indicators to discriminate winner from losers and the efficiency of the shots.

The results obtained are close to Garcia's (2009), who shows a 12.2% from position 1 and 22.2% from position 2, while in this study are 13.4% in position 1 and 19.30% in position 2. However, García (2009) does not get any shot from position 3 and in this study; there is a 10.5% from the same position.

The results do not match with Argudo, Ruiz & Borges (2016) who found a direct and negative relationship between scoring efficacy (a 7,4% decrease) and increasing shooting distance, nevertheless it should be noted that the angle in position 1 is worst.

Platanou (2004) obtains the 43.71% of shots from positions 1 and 5 and the 36.44% of shots from positions 2 and 4, while García (2009) in reverse, shows more shots from the lateral positions (2 and 4), the 44.8%, than from the wings (1 and 5), the 34%. In this study, also get more shots from the lateral positions, but the results are closer together, the 36.3% of the laterals

and the 31.7% from the wings.

In position 1, the right-handers are more effective with respect to the categories related to the goal, the 51.6% for the lefties and the 57.1% for the right-hander, and in position 2 the same happened, the 32% for left-handers versus the 40% for right-handers. It is worth mentioning that from position 1 there are more shots with left-handers than with right-handers, that shows that even though most players are right-handed, coaches have a tendency to select left-handers in position 1 in **STNI**, since up to the analysed have always been more shots in position 1 of right-handed than of left-handed.

In position 2, adding the positive actions by the different shots, the right-handers get better results against lefties, 58% versus 48% respectively. However, from position 1, left-handers get positive actions, with the 70.7% compared to the 61.9% of right-handers.

We must think about how the defenders use to act. The defence will generally make in a manner that promotes the shot of the player and/or the area, which they believe is weaker or less dangerous. That may explain it why the majority of shots in **STNI** are from position 2, since most of those shots were saved and that the right-handers are more effective than the left-handers are, since the teams in inferiority will incite to shot to the righties from that position.

Analysing the positive and negative actions that are achieved by the weak side (1 and 2) and the strong side (4 and 5) is observed that the weak side gets 20 positive and 51 negative actions, and the strong side, 20 positive actions and 52 negatives. Therefore, the weak side gets the same positive and one less negative actions, but the differences are minimal. Considering separately the effectiveness in terms of the goal, positive and negative actions, the 46.8% ends in a goal, the 14.9% are positive actions and the 38.3% are negative actions.

The position that scores the most goals is position 5 and the categories «goals by the right and by the left» are the most frequent in **STNI**, the 22.6% on the right and, the 21.6% on the left. The **STNI** is the second phase of the game where more shots occur (33.3%) and it has a goal efficiency of 46.7%. It is the third most effective phase. In reference to the total of goals scored in **STNI**, it is where most of the goals happen, 182 goals (44.7%).

STNI is very important in the game (García, 2009). In his study got a 31.74%, while Soares (2004) registered a 29.4%. However, the results agree more with the influence of the **STNI** indicated by Platanou (2004), with the 40.2%, and with Canossa (2001), with the 46%.

The majority of goals in **STNI** are scored by the right (88, the 48% of the goals in **STNI**), followed by the goals that enter from the left (84, the 46.2% of the goals in **STNI**) and by last the central positions closest to the goalpost ones (10, the 5.5% of the goals in **STNI**). We agree with García (2009), who in his study states that most shots are made by the right, followed by those made to the left and finally the central ones, although with different values. Following Alcaraz et al. (2012) it could happen not only due to the laterality but also due to the anthropometrical characteristics and the previous study of the opponent.

In **STNI** is observed that the most effective shots according to the categories related to the goal are made from position PEP6, the goalpost position, with the 67%, followed by PEP1, which refers to position 1, with the 53.9%, and PEP5, position 5, with the 53.5%. The least effective position is PEP2, position 2, with the 37.3%.

It is worth mentioning that the rules at that time allowed, by getting an exclusion in the perimeter and pass it quickly to the centre forward to shot directly. That is why surely the percentage of goal efficiency is high, since they can shot hardly without opposition. In this same line, García (2009) points out that the most notable difference in the **STNI** between winning teams and losers is when it ends without a system, where the winning teams get the 66.1%.

Conclusions

The results of this study lead us to believe that in **STNI** the left-handed players are more effective if relate them to the goal categories and positive actions. However, in position 2, the right-handed players are more effective if only the categories related to the goal are taken into account in position 1 as in 2. The position 1 is the second least effective, but in the case of position 2, which achieves the 22.7% efficiency, is the fifth most effective position.

Future studies could separate women's and men's shots, taking into account García, Ruiz, Argudo, & Borges (2017) who found differences depending on distance and micro- situations variables. In addition, the effect of the regulatory changes proposed by FINA in 2019 can be analysed. Argudo, García, Borges, & Sillero (2020), comparing the 2003 Water polo World Championship with the one held in 2013 found differences in the **STNI**. Specifically, the frequency of shots decreased and more goals were scored at close range, from the side and with rebound.

It is necessary to emphasize and teach right-handed players the importance of technique and body position in the water. It is very important everywhere, but especially in 1 and 2 positions, since it is the weak side and it will be essential to play around. It will also be important for these players to perform many tasks that involve shooting and/or assisting attacking the opposite arm, as demonstrated, they receive many zonal defenses of different types. Provide it with enough technical resources to overcome the arm, either above, inside and outside to assist and to shot.

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