

Analysis of the shots in positions 1 and 2 in even situational framework during the World Championship of Barcelona 2013

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ABSTRACT

The purpose of this study was, on one hand, to know if the left-handed players were more effective in the goal categories and getting positive actions in 1 and 2 position than the right-handed in the same offense position in Even Situational Framework (FJa). On the other hand, to know if the shots in 1 and 2 position were less effective than the rest of the positions in the goal categories. The methodology was observational, multidimensional, nomothetic and punctual. The sample was all the throws of 24 games (12 male and 12 female) in the 2013 World Championship in Barcelona using an *ad hoc* instrument for observation through the SportCode software, which was also used to record the data. Descriptives and Chi-square test were obtained and the conclusions are that the left-handed players are more effective if we relate them to the goal categories and positive actions from positions 1 and 2. However, the righties are more effective if we only see the categories related with the goal.

Keywords: Water Polo; Throw; Specific positions; Situational framework; Left-handed.

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INTRODUCTION

Water polo, for science, is practically a sport unknown and the majority of the investigations come from applied sciences to sport as physiology, biomechanics, psychology or medicine, Garcia (2009).

These studies are not able to explain how the communication between the players of the same team use the space or achieve their motor objective, do not address the parameters of the sport in behaviour issues in the real game. Although they cannot reveal the dynamics of the game action there are some interesting studies which analyse the influence in between the players and the coaches like (Becker, 2009).

This article highlights some studies carried out using observational methodology in collective sports, they have been the most supportive in carrying out. On one hand, in handball, a sport very similar to water polo, highlights the research of Gutiérrez (2006) who developed a performance observation system to assess tactical performance in handball, and Ávila (2003), who focused on an observational system for shots analysis during the World Championship 2001 in France. The qualitative study at the Norwegian European Championship 2008 of Hergeirsson (2008) who highlighted, among other things, the decrease in effectiveness of the attacks by match with the previous European; The research of Daza (2010), who investigated the skills of the pivot in the high competition, the investigation of Montoya (2010) who analysed the finalizations of the wings players in handball in the Olympic Games of Peking of 2008, and the study of Yang, Park, Kim, & Ryu (2017) who quantify the ability of the goalkeeper while defending shots from left and right sides of penalty area.

Focusing on water polo, we would like to mention the work of Lloret (1994), who provided the analysis of the game action in the water polo during the Olympic Games in 1992; the research of Argudo (2000) who performed a practical study of water polo and validated a model of tactical evaluation in opposition sports with a proven collaboration in the Sevilla European Water Polo Championships 1997; and the García (2009) investigation who evaluated quantitative simple numerical inequality with possession by systematic observation in water polo during the World Swimming Championship of Barcelona 2003.

It is possible to distinguish the computer application of Argudo, Alonso & Fuentes (2005) that allowed the analysis of the game's action in a more precise and effective way. It is also important to name the work of Cattino (1996), who studied the characteristics of the teams, the game trend and each referee in a given championship. The study of Enomoto et al. (2002), where they compared the results in relation to the final classification based on the types of releases, the result of each shot, personal mistakes, errors with and without a ball and the duration of each attack, in the Women's World Championship 2001. And the study by Mirvic, Kazazovic & Aleksandrovic (2011), who investigated the differences between winners and losers of the women's teams of the World Championships 2011 in Shanghai.

Other shot indicators analysed had included load indicators in the second offensive attack line (Lozovina, Pavicic & Lozovina, 2003), the number of actions, frequency, load levels and number of movements during the international matches of the Adriatic League of Water polo 2009/10 (Lozovina, Pavicic & Lozovina, 2010), the occurrence of technical and tactical team and centre forward indicators in the 2005/06 season, four games of the Final Four League, seven games of Serie A1 Italian and six games of Serie B Italian (Lupo et al., 2012), and on the same way, but in the female category (Lupo et al. 2011). Also, it is worth to highlight Lupo, Condello & Tessitore, (2012), in the World Championship 2009 in Rome, who analysed technical and tactical aspects of the winning teams and losers in masculine category. Prieto, Gómez & Pollard (2013) who valued the advantage of playing at home of the masculine and feminine teams of first and second Spanish Division

during four seasons, from 2007/08 to 2010/11. Platanou & Geladas (2007) who assessed exercise intensity in 20 water polo games of different duration between three field positions: centre forward, centre back, and right wing players; and De Siati, Laffaye, Gatta, Dello Iacono, Ardigò & Padulo (2015) who investigated anthropometric variables and vertical jump heights as a free throw effectiveness predictor in water-polo players of different age groups.

We would like to mention two articles more related with the water polo shots that were really inspirational for us. The study of García & Argudo (2017) where they compare the technical and tactical water polo shot indicators between medallist and non-medallist teams in the preliminary and final phases of the XV FINA Women's World Championship and from the same authors, García & Argudo (2017), where they compare the technical and tactical shot indicators in water polo between the winners and losers.

We found necessary to determine the effectiveness of the lefties and righties in position 1 and 2. It is also important to know if these two positions are less effective than the rest of positions in Even Situational Framework given the end variable (*Annex 1*), in order to work on those aspects of the game for improving their technique and tactic.

METHODS

Following the methods of Anguera (2003) it allowed us to register perceived sectors and to objectify the study quantifying it. The methodology that we used was observational, multidimensional, nomothetic and punctual.

Match analysis and participants

All the throws were studied and all the variables (*Annex 1*) were analysed according to the various categories of the Efficiency of the Ending (EF) of the national teams that play from the quarterfinals in the World Championship of Barcelona 2013. The female teams were Russia, Canada, Australia, Spain, United States, Nederland and Hungary and the male teams were Greece, Hungary, Croatia, Australia, Montenegro, Serbia, Spain and Italy.

No informed consent was required from players because the World Championship is a public event, which would cover the ethical aspect.

Procedures and instruments

To collect data, the games were recorded from the area enabled for the media with a video camera (SONY, FDRXP33B.CEN). The researcher obtained special permission to access into this area. All data were stored in MacBook Pro computer.

We recorded the middle of the pool at the beginning of each period. From there using a technique of "sweeping" the image was centred where the ball was. For recording, it was important to have a good view of the game and be able to obtain the shot clock. At the same time, they were saying aloud the numbers of the ball handler in case the recording was not clear. We requested the official images of TVE (TVE1 or TVE2) and Teledeporte (TD) and we checked that images when we couldn't see the play clearly.

Sport Code Version Pro was used to analyse and keep all the information. Following the *ad hoc* instrument designed by Sabio, Guerra, Cabedo, Solà and Argudo (2018), already reliable and validated, the throws of the 24 games were analysed (*Annex 2*).

We focused the study on the situation Even Situational framework (FJa), when they are on Offense, taking into account the Defensive system used by the opponent (SD) which only could be: Individual pressing (SDp), Static zone (SDze), Dynamic zone (SDzd), Mixed zone (SDzm), Split defence (SDba), Zone and split defence (SDzb) or Other defence (SDot) (Table 2).

Statistical analysis

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

RESULTS

When analysing the FJa most shots were given from position 3 (27.1%), followed by position 2 (24.9%) and position 4 (21.5%). The average of the shots in FJa was 67.10 and the standard deviation was 71.44 (See Table 1).

Table 1 shows that the majority of the shots from position 2 were stopped by 6.7% and went outside (5.1%). 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 5.6% compared to the total 24.9% (See Table 3 at Annex 1).

Table 1. Specific Position (PE) and Efficiency of the Ending (EF) in Even Situational Framework (FJa).

PE	EF									Total
	Efgc	Efgd	Efgi	Efpre	Efpco	Efnfu	EFnpl	Efnpr	Efnbl	
PEP1	0	3	0	3	3	4	2	12	2	29
	.0%	.4%	.0%	.4%	.4%	.6%	.3%	1.8%	.3%	4.3%
PEP2	0	15	23	6	13	34	13	45	18	167
	.0%	2.2%	3.4%	.9%	1.9%	5.1%	1.9%	6.7%	2.7%	24.9%
PEP3	0	17	20	16	16	34	14	37	28	182
	.0%	2.5%	3.0%	2.4%	2.4%	5.1%	2.1%	5.5%	4.2%	27.1%
PEP4	1	19	11	9	6	25	16	33	24	144
	.1%	2.8%	1.6%	1.3%	.9%	3.7%	2.4%	4.9%	3.6%	21.5%
PEP5	1	6	1	4	1	3	8	11	0	35
	.1%	.9%	.1%	.6%	.1%	.4%	1.2%	1.6%	.0%	5.2%
PEP6	4	14	16	1	3	16	5	23	1	83
	.6%	2.1%	2.4%	.1%	.4%	2.4%	.7%	3.4%	.1%	12.4%
PEP7	1	2	1	0	2	0	1	1	1	9
	.1%	.3%	.1%	.0%	.3%	.0%	.1%	.1%	.1%	1.3%
PEP8	0	3	3	0	1	0	1	1	0	9
	.0%	.4%	.4%	.0%	.1%	.0%	.1%	.1%	.0%	1.3%
PEP9	0	0	0	0	0	1	0	4	0	5
	.0%	.0%	.0%	.0%	.0%	.1%	.0%	.6%	.0%	.7%
PEP10	0	1	0	0	1	2	0	2	2	8
	.0%	.1%	.0%	.0%	.1%	.3%	.0%	.3%	.3%	1.2%
Total	7	80	75	39	46	119	60	169	76	671
	1.0%	11.9%	11.2%	5.8%	6.9%	17.7%	8.9%	25.2%	11.3%	100.0%

The shots from position 1 were 4.3% of the total of shots in FJa. The majority of those shots were saved, 1.8%. Adding the categories related to the goal it showed that only 0.4% was achieved with respect to the total 4.3%, and all those goals were entered by the right side.

As we can see in Table 2, from position 1 it is observed how the right-handed players performed more total shots compared to the left-handed players (18 versus 11).

Adding the categories related to the goal, the left-handers got 3.4% and the right-handers 6.9%. When adding the categories related to positive actions (exclusion, penalty, rebound and corner), the left-handers got 23.9% while the right-handers 13.8% (See Table 3 at Annex 1).

It we add the categories that refer to negative actions (out, bar, save and block), the left-handers added up to 20.6% and the right-handers 48.2%. It was noteworthy that 31% of the throws from position 1 of a right-hander ended at the goalkeeper's save (See Table 3 at Annex 1).

Table 2. In Even Situational Framework, in position 1. Player's Laterality (LJ) and Efficiency of the Ending (EF) in Even Situational Framework (FJa) from position 1.

LJ	EF							Total
	Efgd	Efpre	Efpc	Efnfu	Efnpl	Efnpr	Efnbl	
LJz	1 3.4%	1 3.4%	3 10.3%	1 3.4%	2 6.9%	3 10.3%	0 .0%	11 37.9%
LJd	2 6.9%	2 6.9%	0 .0%	3 10.3%	0 .0%	9 31.0%	2 6.9%	18 62.1%
Total	3 10.3%	3 10.3%	3 10.3%	4 13.8%	2 6.9%	12 41.4%	2 6.9%	29 100.0%

In Table 3 we can observe how from position 2 the right-handed players make more shots compared to left-handed players (124 right-handers and 43 left-handers).

Adding the categories related to the goal, the left-handers got 5.4% and the right-handers 17.4%. If we add the categories related to positive actions, the left-handers got 6.6% while the right-handers 26.6%.

When adding the categories that refer to negative actions, left-handers had 18.6% and right-handers 47.4%. It should be noted that 17.4% of the throws from position 2 of a right-hander ended at the goalkeeper's save.

Table 3. In Even Situational Framework, in position 2. Player's Laterality (LJ) and Efficiency of the Ending (EF) in Even Situational Framework (FJa) from position 2.

LJ	EF							Total	
	Efgd	Efgi	Efpre	Efpc	Efnfu	Efnpl	Efnpr		Efnbl
LJz	5 3.0%	4 2.4%	1 .6%	2 1.2%	6 3.6%	4 2.4%	16 9.6%	5 3.0%	43 25.7%
LJd	10 6.0%	19 11.4%	5 3.0%	11 6.6%	28 16.8%	9 5.4%	29 17.4%	13 7.8%	124 74.3%
Total	15 9.0%	23 13.8%	6 3.6%	13 7.8%	34 20.4%	13 7.8%	45 26.9%	18 10.8%	167 100.0%

To know the Specific Position (PE) and Player's Laterality (LJ) of the shots from position 1 and 2 that finish

in goal in Even Situational Framework (FJa), a Chi-square test was applied. This analysis showed a chi-square of 0.140 and a $p = .708$, that indicates there were no differences between the variables, considering a $p < .05$ (See Table 4).

Table 4. Chi-square test of the Specific Position (PE) and Laterality Player (LJ) of the shots from 1 and 2 that finish in goal in Frontcourt Offense.

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.140	1	.708		
Continuity Correction	.000	1	1.000		
Likelihood Ratio	.132	1	.717		
Fisher's Exact Test				1.000	.578
Linear-by-Linear Association	.137	1	.711		
N of Valid Cases	41				

Note: Signification $p < .005$.

DISCUSSION

In FJa, it is showed that in the position 1, the right-handers made more shots and were more effective with respect to the categories related to the goal, 11.1%, while the left-handers got 9.1% (See Table 2); And in position 2 the same happened, 23.4% for right-handers versus 20.9% for left-handers (see Table 3), although the difference was not very large.

In this study there were more right-handed players than lefties, and not all the teams have lefties players. The fact that they were more effective with respect to the goal may be due to the type of defence received by the opposing team, who could defend the left-handers with more pressing defences and dynamic defences, and the right-handed ones with zone defences.

However, lefties were more effective in adding the positive actions that were achieved through the shots. In position 1 left-handers got 45.5% compare to the right-handers who got 22.2%. And in position 2 the same happened, 48.8% for left-handers versus 36.3% for right-handers (See Table 2 and Table 3).

In the same study it was also found that the FJa was the phase where most shots were produced (57.3%) and had a goal efficiency of 24.1% (See Table 5). In this case, despite being the phase where more shots were produced, it was the least effective phase facing the goal. For this reason, it could be that many teams decided to go down to help the centre defender, bearing in mind that the centre (PEP6) at the international level is a very strong and effective position (see Table 5).

In relation to the total goals scored in FJa, it was in position 2 with 162 goals (39.8%) was behind the Power Play (FJs) or position 6 on 5. This result disagreed with García (2009) who affirmed that it was the micro situation with more influence in the result of the parties with a 63.9%.

The majority of goals in FJa were scored through the right of the cage (49.4%), followed by the goals that entered on the left (46.3%), and finally on the middle (4.3%).

From position 2, more goals went through the cross side (23) compared to 15 entered by the near side. And from position 1, 3 goals were obtained by the near side compared to 0 by the cross side. These results disagreed with Montoya (2010) who, in the case of handball, indicated that from the left wing, the right-handed

shooter presented the highest percentage of shots and goals entered by the cross side. The lower right (17.79% shots and 14.72 goals). From the right wing, the left-handed shooter (the equivalent of position 1 in water polo), the highest number of shots and goals also most entered by the cross side, lower left angle (18.08% shots and 15.25% goals). It should be noted that the author directly points to the right wing as a left-handed shooter. This may be because handball is a more developed sport than water polo, and there are more quantity and quality players to select.

On the other hand, Ávila (2003), in his study of handball shots, distinguished three shooting angles: a) the wide angle (players in the central zone, right-handed players in the left lateral zone or left-handed in the right lateral zone), b) the reduced angle (right-handed players in right lateral zone, left-handed in left wings zone, right-handed in left wings zone) and c) the minimum angle (right-handed in right wings zone or left-handed in left wings zone). Those angles were implicit in our study, right-handed players who play in position 1 had a minimum angle and those who play in position 2 a reduced angle, however left-handed players in position 1 had a reduced angle and in position 2 had a wide angle.

We interpreted Figure 1 thinking that the defence will try to promote the shots of the player that creates less dangerous. There was a tendency for PEP3 to be shot, probably because it is the player farthest from the goal, and PEP2 as it is showed most of its shots ended in a save (Efnpr), (see Table 1).

Letting the right-handed shooter choosing a zone defence could be more effective. Since they can select a better shot, they have more time to think and make the decision. It should be analysed if it leaving the right-handed decision is enough or defending with more pressing to a left-handed, leaving the Centre without so much help or forcing to descend by another position.

The analysis of study about the positive and negative actions that were achieved by the weak side (positions 1 and 2) and the strong side (positions 4 and 5), it was observed that the weak side got 25 positive actions and 130 negative ones, while the strong side got 20 positive actions and 120 negative ones. Therefore, the weak side got more positive actions but also more negative, however the differences were not very big.

Analysing separately the Efficiency of the Ending (EF), positive and negative actions, it was obtained that in FJa, 24.1% was goal, 12.7% were positive actions and 63.1% were negative actions.

Figure 1 also shows that the category "save" was the one that happened most in almost all positions, adding a total of 169 saves with respect to the 671 shots (25.2%), which leads us to think that the goalkeepers are key players, as Escalante, Saavedra, Mansilla y Tella (2011), who pointed out that the most discriminatory event in the male category between winners and losers were the saves of the goalkeepers.

Montoya (2010) stated that in FJa the best percentages of effectiveness were the pivots, which in water polo would be equivalent to the centre, one of the most effective positions. In addition, García (2009) stated that the area where the most expulsions were obtained is the centre (63%) and Lozovina et al. (2004) assured that the high-level teams possess very strong players and with technical resources to gain the position. This is why it is so important to go down to help the centre when the player has the position won, as they are very effective and get many expulsions. Deciding where to make the support to avoid this will be the coach's job.

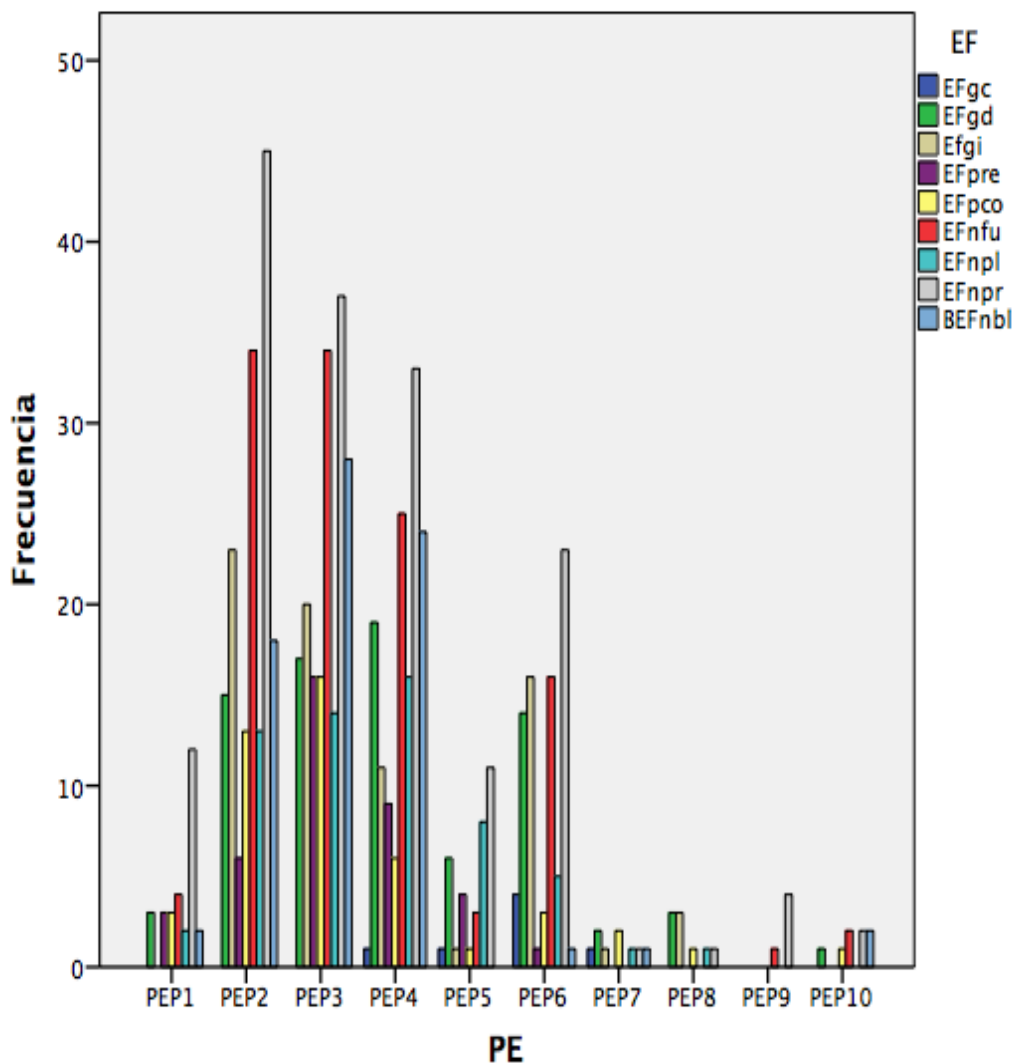


Figure 1. Graph of the shots according to the specific positions and the Efficiency of the Ending (EF) in Even Situational Framework (FJa).

Table 5. Goal effectiveness of shots in Even Situational Framework (FJa) according to the Specific Position (PE) in Frontcourt Offense.

	GOALS	TOTAL SHOTS	EFFECTIVENESS
PEP1	3	29	10.3%
PEP2	38	167	22.7%
PEP3	37	182	20.4%
PEP4	31	144	21.5%
PEP5	8	35	22.9%
PEP6	34	83	41.0%
PEP7	4	9	44.4%
PEP8	6	9	75.0%
PEP9	0	5	.0%
PEP10	1	8	12.5%
TOTAL	162	671	24.1%

Taking into account *Table 5*, in FJa it is observed that the most effective shots according to the categories related to the goal were made from position PEP8, which refers to the first post, with 75%, thanks to a straight or crossed entry. It followed the PEP7, the double posts position, with 44.4% and the PEP6 position, centre, with 41%. The least effective positions were PEP9, second post and position PEP1, with 10.3%.

The analysis between the variables of goal and laterality efficiency in position 1 and 2 shots in FJa indicates a chi-square of 0.140 and a $p = .708$, indicating that there are no differences between these variables. There is no direct or indirectly proportional relationship between specific positions and goal effectiveness.

Clearly there is a predominance of right-handed shooters in position 1 (4.88% right-handed vs 2.44% left-handed) and in position 2 (70.73% right-handed vs 21.95% left-handed), but it is not enough to show significant differences between the variables.

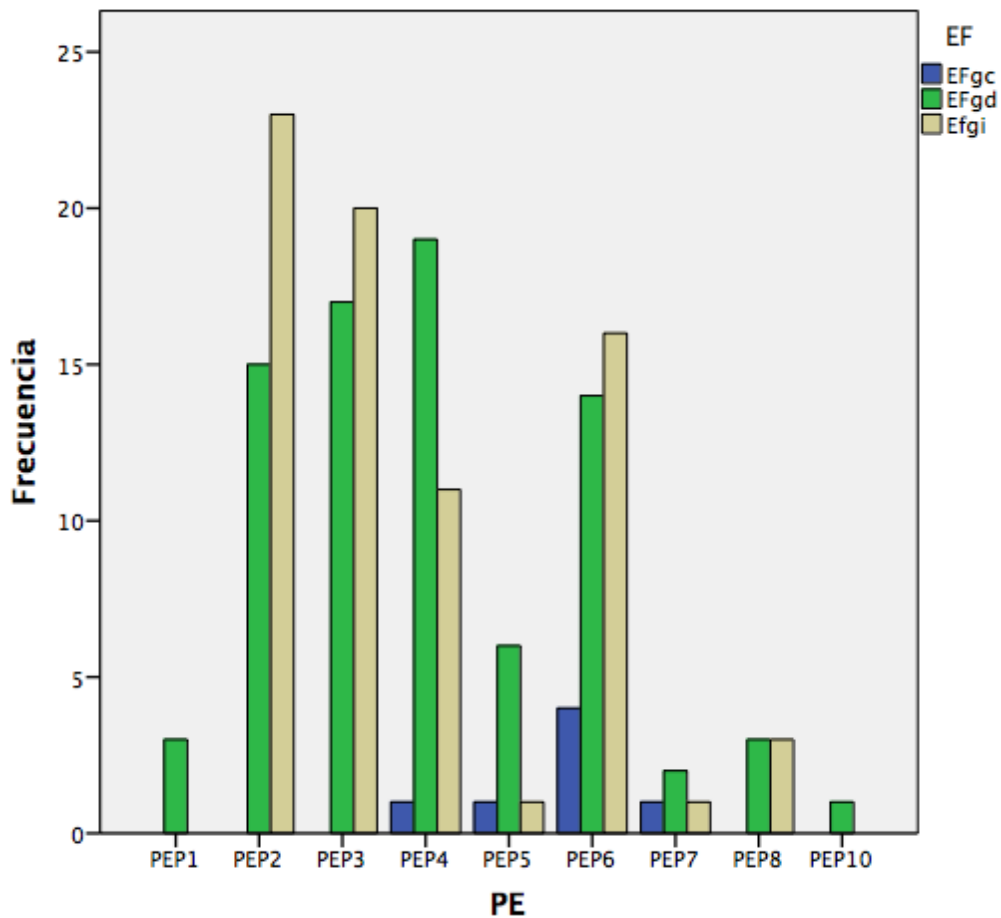


Figure 2. Graph of the shots according to the specific positions and the Efficiency of the Ending (EF) according to the goal categories (EFgci, EFgdi and EFgji) in Even Situational Framework (FJa).

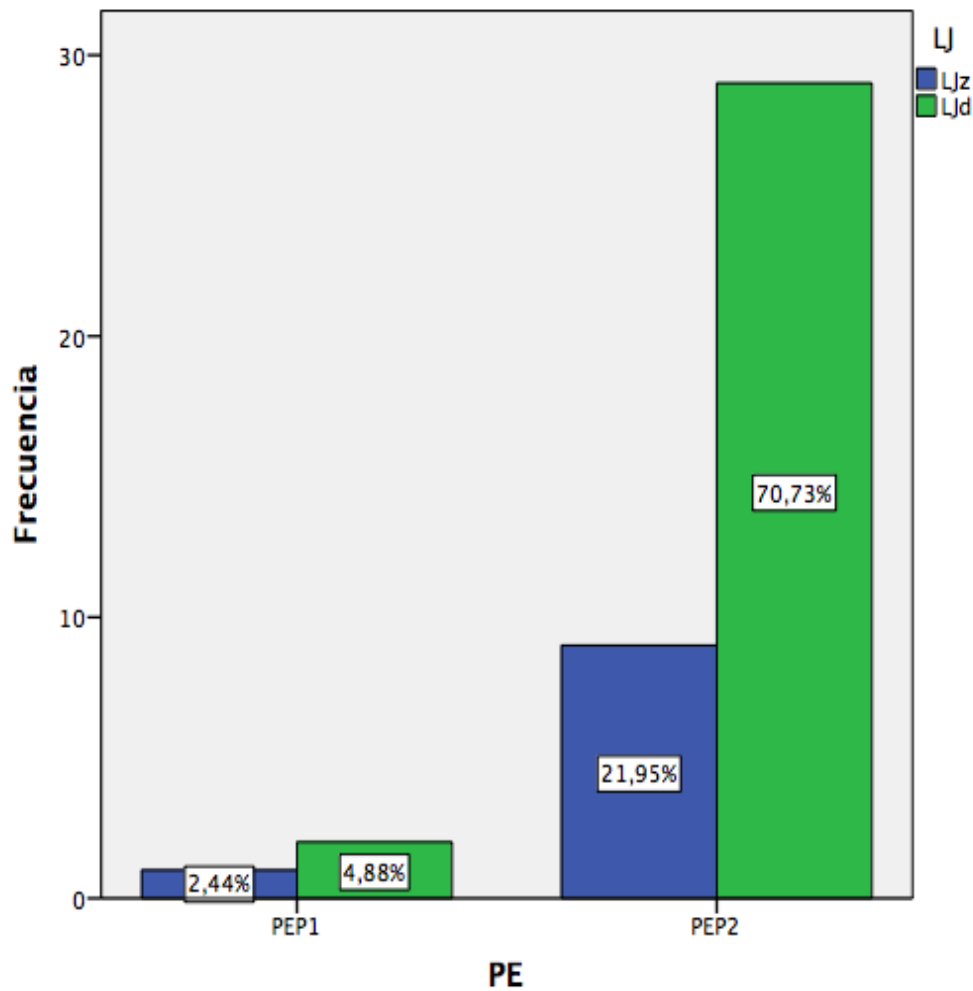


Figure 3. Graph of the shots by positions 1 and 2 according to the Efficiency of the Ending (EF) according to the goal categories (EFgc, EFgd and EFgi) and the Player's Laterality (LJ) in Even Situational Framework (FJa).

CONCLUSIONS

- Left-handed players are more effective if we relate them to the goal categories and positive actions from positions 1 and 2. However, the righties are more effective if we only analyse the categories related to the goal.
- Position 2 is more effective than position 1. Position 1 is the 9th more effective and position 2 is the 5th most effective.

REFERENCES

Anguera, M.T. (2003). La observación. En C. Moreno Rosset (Ed.), Evaluación psicológica. Concepto, proceso y aplicación en las áreas del desarrollo y de la inteligencia (pp. 271-308). Madrid: Sanz y Torres. [I.S.B.N. 84-96094-16-2].

- Argudo, F. (2000). Modelo de evaluación táctica en deportes de oposición con colaboración. Estudio práctico del waterpolo. Tesis doctoral, Universitat de València, Valencia, España.
- Argudo, F., Alonso, J.I. & Fuentes, F. (2005). Computerized registration for the tactical quantitative evaluation in water polo. Polo partido v1.0. 5th International Symposium Computer Science in Sport, Hvar, Croatia.
- Ávila Moreno, F. M. (2003). Application of an observational system for analysis of handball shots in the French World Championship 2001. *Apunts. Educación Física y Deportes*, 71, 100-108.
- Becker, A. (2009). It's Not What They Do, It's How They Do It: Athlete Experiences of Great Coaching. *International Journal of Sports Science & Coaching*, 4, 93-119. <https://doi.org/10.1260/1747-9541.4.1.93>
- Cattino, S. (1996). Quando i numeri sono utili. *La tecnica del nuoto*, 23(1), 15-21.
- Daza, G. (2010). Las habilidades del pivote en la alta competición del balonmano. Tesis Doctoral no publicada. Universitat de Barcelona.
- De Siati, F., Laffaye, G., Gatta, G., Dello Iacono, A., Ardigò, L. & Padulo, P. (2015). Neuromuscular and technical abilities related to age in water polo players. *Journal of Sports Sciences*, 34 (15), 1466-1472. <https://doi.org/10.1080/02640414.2015.1119298>
- Enomoto, I., Suga, M., Takahashi, M., Komori, Y., Minami, T., Fujimoto, M., Saito, M., Suzuki, S. & Takahashi, J. (2002). A Notational Match Analysis of the 2001 Women's Water Polo World Championship. En *World Swimming Science Congress*, 487-493.
- Escalante, Y., Saavedra, J.M., Mansilla, M. & Tella, V. (2011). Discriminatory power of water polo game-related statistics at the 2008 Olympic Games. *Journal of Sports Sciences*, 29:3, 291-298. <https://doi.org/10.1080/02640414.2010.532230>
- García, P. (2009). Evaluación cuantitativa de la desigualdad numérica temporal simple con posesión mediante observación sistemática en waterpolo. Tesis doctoral, Universidad Autónoma de Madrid, Madrid, España.
- García, P. & Argudo, F. (2017). Water polo: technical and tactical shot indicators between winners and losers according to the final score of the game. *International Journal of Performance Analysis in Sport*. <https://doi.org/10.1080/24748668.2017.1339258>
- García, P. & Argudo, F. (2017). Water Polo shot indicators according to the phase of the championship: medallist versus non-medallist players. *International Journal of Performance Analysis in Sport*. <https://doi.org/10.1080/24748668.2017.1382215>
- Gutiérrez, O. (2006). Valoración del rendimiento táctico en balonmano a través de los coeficientes de eficacia. Aplicación del software Sortabal V.1.0. Tesis Doctoral no publicada. Universidad Miguel Hernández. Elche. Facultad de Ciencias Sociales y Jurídicas.
- Hergeirsson, T. (2008). Qualitative trend analysis 8th men's European handball championship. EHF Publication. Retrieved from: <http://www.eurohandball.com/>
- Montoya, F. (2010). Análisis de las finalizaciones de los jugadores extremos en balonmano. Tesis doctoral, Universitat de Barcelona, Barcelona, España.
- Mirvic, E., Kazazovic, B., & Aleksandrovic, M. (2011). Differences between winning and losing teams from World water polo championship for women. *Homo Sporticus*, 2, 41-43.
- Lloret, M. (1994). Análisis de la acción del juego en waterpolo en la olimpiada de Barcelona '92. Tesis doctoral, Universidad de Barcelona, Barcelona, España.
- Lozovina, V. Pavicic, L. & Lozovina, M. (2003). Analysis of indicators of load during the game in activity of the second line attacker in water polo. *Collegium antropologicum*, 27, 343-350.
- Lozovina, V., Pavicic, L., & Lozovina, M. (2004). Analysis of indicators of load during the game in the activity of the center in waterpolo. *Nase more*, 51 (3- 4), 135-141.

- Lozovina, V., Pavicic, L., & Lozovina, M. (2010). Analysis of certain indicators of the load in the play of guard in today water polo. *Acta Kinesiologica*, 4, 90-97.
- Lupo, C., Condello, G., & Tessitore, A. (2012). Notational analysis of elite men's water polo related to specific margins of victory. *Journal of Sports Science and Medicine*, 11, 516-525.
- Lupo, C., Minganti, C., Cortis, C., Perroni, F., Capranica, L., & Tessitore, A. (2012). Effects of competition level on the centre forward role of men's water polo. *Journal of Sport Science*, 30(9), 889-897. <https://doi.org/10.1080/02640414.2012.679673>
- Lupo, C., Tessitore, A., Minganti, C., King, B., Cortis, C., & Capranica, L. (2011). Notational analysis of american women's collegiate water polo matches. *Journal of Strength and Conditioning Research*, 25(3), 753-757. <https://doi.org/10.1519/jsc.0b013e3181cc245c>
- Platanou, T. & Geladas N. (2007). The influence of game duration and playing position on intensity of exercise during match-play in elite water polo players. *Journal of Sports Science*, 24 (11), 1173-1181. <https://doi.org/10.1080/02640410500457794>
- Prieto, J., Gómez, M. A., & Pollard, R. (2013). Home Advantage in Men's and Women's Spanish First and Second Division Water Polo Leagues. *Journal of Human Kinetics*, 37, 137-143. <https://doi.org/10.2478/hukin-2013-0034>
- Sabio, Y., Guerra, M., Cabedo, J., Solà, J. & Argudo, F. (2018). Diseño, validación y fiabilidad de un instrument para analizar acciones técnico-tácticas en waterpolo. *Retos*, 34, 57-65.
- Yang, J., Park, Y., Kim, K., & Ryu, J.-K. (2017). Goalkeeper's position for defending short range shots. *International Journal of Sports Science & Coaching*, 12(5), 603-610. <https://doi.org/10.1177/1747954117727686>



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ANNEX 1

Table 1. Criteria and variables of the conditional/contextual area

CRITERIA	CONDICIONAL/CONTEXTUAL AREA									
	TEAM (EQ)	GENDER (GE)	PLAYER (J)	FINAL SCORE (RF)	TIME OF POSSESSION (TP)	ACTUAL SCORE (EM)	PERIOD (CP)	AFTER TIME OUT (TM)	CLASIFICATION (CS)	GAME (PT)
CATEGORIES	Russia (EQfru)	Male (GEm)	Player number 1 (1J)	Won (RSg)	30"-20" (TPp)	Winning (EMg)	1st period (CP1)	Yes (TMs)	First (CS1)	Quarter final (PTc)
	Canada (EQfca)	Female (GEf)	Player number 2 (2J)	Lost (RSp)	19"-8" (TPm)	Tie (EMe)	2nd period (CP2)	No (TMn)	Second (CS2)	Semi-finals (PTs)
	Australia (EQfau)		Player number 3 (3J)	7"-0" (TPf)	Losing (EMp)	3rd period (CP3)			Third (CS3)	
	Greece (EQfgr)		Player number 4 (4J)				Fourth (CS4)			
	Spain (EQfes)		Player number 5 (5J)	Fifth (CS5)						
	United States (EQfeu)		Player number 6 (6J)	Sixth (CS6)						
	Nederland (EQfho)		Player number 7 (7J)	Seventh (CS7)						
	Hungary (EQfhu)		Player number 8 (8J)	Eighth (CS8)						
	Greece (EQmgr)		Player number 9 (9J)							
	Hungary (EQmhu)		Player number 10 (10J)							
	Croatia (EQmcr)		Player number 11 (11J)							
	Australia (EQmau)		Player number 12 (12J)							
	Montenegro (EQmmo)		Player number 13 (13J)							
Serbia (EQmse)										
Spain (EQmes)										
Italy (EQmit)										
TOTAL	16	2	13	2	3	3	4	2	8	3
FINAL TOTAL	56									

Table 2. Criteria and variables of the attitudinal/action area

CRITERIA	ATTITUDINAL/ACTION AREA									
	SPECIFIC POSITION (PE)	SITUATIONAL FRAMEOWRK (FJ)	KIND OF SITUATIONAL FRAMEOWRK (TF)	SIDE OF PRIOR PASS (LP)	RECEPTION (RC)		DEFENSIVE SYSTEM USED BY THE OPPONENT (SD)	PREPARATION OF THE THROW (PL)	KIND OF THROW (TL)	PLAYER'S LATERALITY (LJ)
CATEGORIES	P1 (PEP1)	Even (offense) (FJa)	Direct (TPcd)	Weak side (LPd)	Dry (RCm)	pass	Individual pressing (SDp)	With fake (PLsf)	Common shot (TLft)	Lefty (LJz)
	P2 (PEP2)	Counterattack (FJc)	First line (TPcp)							
	P3 (PEP3)	Power play (FJs)	Second line (TPcs)	Strong side (LPf)	Wet (RCa)	pass	Static zone (SDze)	Without fake (PLcf)	Skip shot (TLfb)	Righty (LJd)
	P4 (PEP4)		Other counterattack (TPco)							
	P5 (PEP5)		Dynamic zone (SDzd)							
	P6 (PEP6)	Penalty (FJp):	Power play 4-2 (TFs42)				Mixed zone (SDzm)		Backhand (TLr)	
	P7 (PEP7)		Power play 3-3 (TFs33)							
	P8 (PEP8)		Other power play (TFsot)							
	P9 (PEP9)		Penalty by a rightly (TFpdl)							
	P10 (PEP10)		Penalty by a lefty (TFpzl)							
TOTAL	10	4	9	2	2		10	2	7	2
FINAL TOTAL	48									

Table 3. Criteria and variables of the resolute/ending area

		RESOLUTIVE/ENDING AREA
CRITERIA		EFFICIENCY OF THE ENDING (EF)
CATEGORIES		
	GOAL CATEGORIES	Central (EFgc) Right (EFgd) Left (EFgi)
	POSITIVE CATEGORIES	Exclusion (EFpex) Penalty (EFppe) Rebound (EFpre) Corner (EFpco)
	NEGATIVE CATEGORIES	Out (EFnfu) Bar (EFnpl) Save (EFnpr) Block (EFnbl)
FINAL TOTAL		11

ANNEX 2

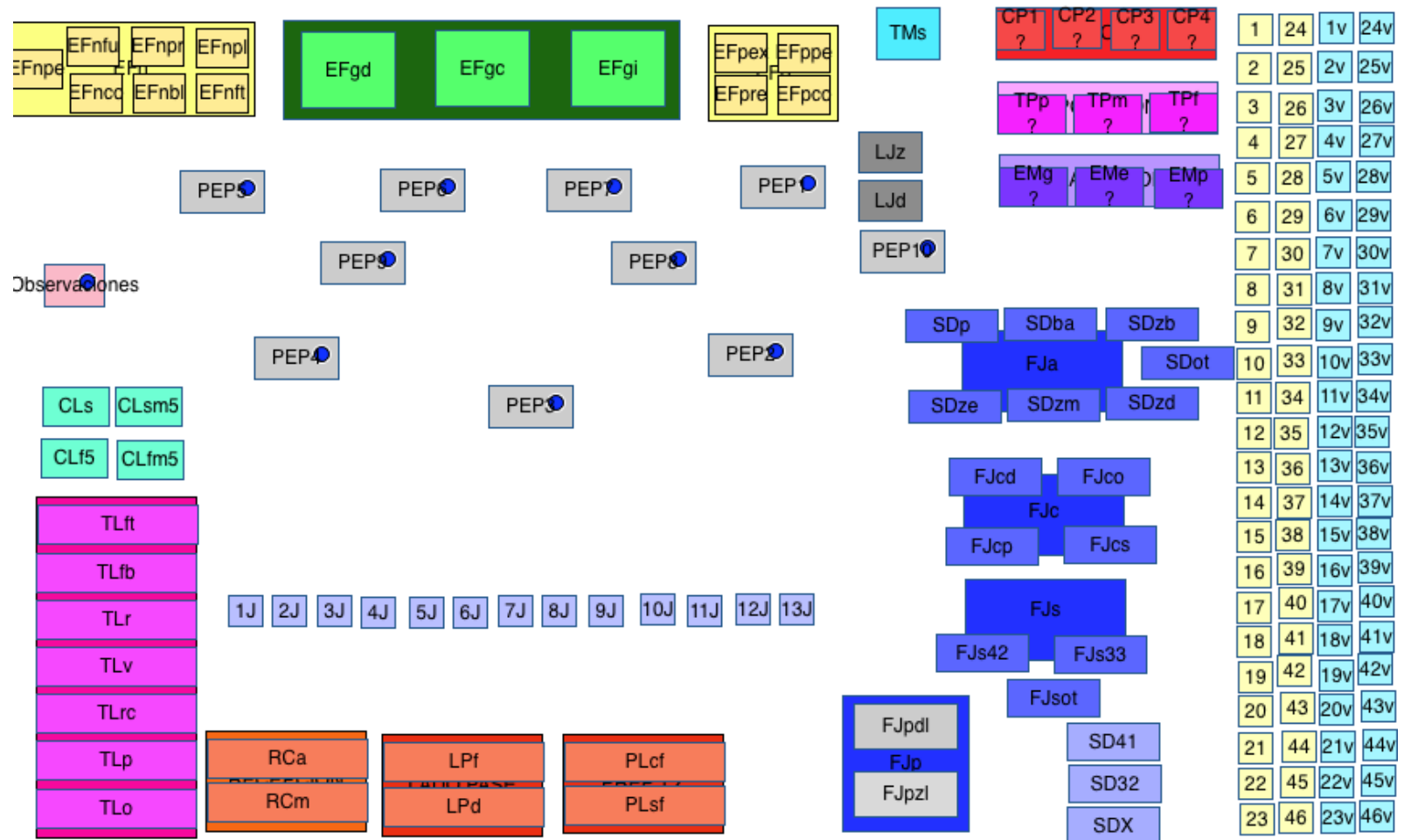


Figure 1. Final instrument ad hoc