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ORIGINAL

EFFECTIVENESS AND DISTRIBUTION OF ATTACKING STROKES TO FINISH THE POINT IN PROFESSIONAL PADEL

EFICACIA Y DISTRIBUCIÓN DE LOS GOLPES FINALISTAS DE ATAQUE EN PÁDEL PROFESIONAL

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ABSTRACT

The aim of this study was to analyze the distribution and efficacy of technical attacking actions in professional padel regarding net distance and to compare the results with players' gender. The sample included 633 attacking strokes used to finish the point in padel, corresponding to 8 matches during the official World Padel Tour 2019. The variables analyzed were: attacking strokes, effectiveness and net distance. Matches were analyzed through systematic observation. The results showed that men use significantly more powerful smashes to finish the point in padel, while women use significantly more tray strokes. In addition, the highest percentage of strokes to finish the point appears in areas close to the net, at a distance of between 2 and 4 meters, in

both the men's and women's categories. Finally, the most effective attacking action to achieve success in paddle tennis is the smash, much more than the volley, although the effectiveness of the actions is lower when players move away from the net.

KEY WORDS: Racket sport, professional sport, performance analysis, game actions.

RESUMEN

El objetivo de este estudio fue analizar la distribución y la eficacia de los golpes finalistas de ataque en el pádel profesional en función de la distancia de golpeo a la red y el género de los jugadores. La muestra incluyó 633 acciones técnico-tácticas de ataque que finalizaron el punto. Las variables analizadas fueron: acciones técnico-tácticas de ataque, eficacia del golpe y distancia a la red. Los partidos fueron analizados a través de observación sistemática. Los resultados mostraron que los hombres utilizan significativamente más el remate potente para finalizar el punto, mientras que las mujeres utilizan significativamente más la bandeja. Además, el mayor porcentaje de acciones finalistas se produce en zonas cercanas a la red (2-4metros), en ambos géneros. Finalmente, las acciones de ataque más efectivas para conseguir punto son los remates, aunque la eficacia de las acciones disminuye a medida que los jugadores se alejan de la red.

PALABRAS CLAVE: Deporte de raqueta, deporte profesional, análisis del rendimiento, acciones de juego.

1. INTRODUCTION

Padel is a racket sport born in Mexico fifty years ago (Sánchez-Alcaraz, 2013), that in the last ten years has expanded around the world, with currently more than 40 International Federations. Nowadays, Spain is considered to be the country with the highest number of players and professional tournaments (Courel-Ibáñez, Sánchez-Alcaraz, García and Echegaray, 2017; International Padel Federation, 2020). This evolution is related to several factors, such as its entertaining and social characteristic (four players per match) (Courel-Ibáñez et al. 2018; International Padel Federation, 2017). In addition, it is easy to learn the technical strokes (Sánchez-Alcaraz, Courel-Ibáñez and Cañas 2016), point duration is higher than other rackets sports (Sánchez-Alcaraz, 2014; Courel-Ibáñez, Sánchez-Alcaraz y Cañas, 2017; Ramón-Llín et al., 2021) and it is easy to play due to the large number of existing facilities (Muñoz et al., 2016).

This growth has also been reflected in a greater professionalization and an increase in scientific publications (Sánchez-Alcaraz, Cañas and Courel-Ibáñez, 2015; Villena-Serrano, Castro-López, Lara-Sánchez, and Cachón-Zagalaz, 2016), especially those related to performance analysis, due to its close relation with sport training and high performance (Sánchez-Alcaraz, Courel-Ibáñez and Cañas, 2018; Sánchez-Alcaraz et al., 2021; Sánchez-Pay, Sánchez-Castejón,

Courel-Ibáñez, and Sánchez-Alcaraz, 2020). Moreover, observational instruments have been developed to analyze the large number of technical-tactical actions during the game (Díaz, Muñoz, Muñoz and Ibáñez, 2020; Fernández de Osso and León, 2017). These studies have determined two tactical positions in padel: the offensive situation, where the players play next to the net, and the defensive one, playing near the baseline of the court (Sánchez-Alcaraz, 2013b). During the point, the players at the net try to maintain this advantageous position, while the opponents look for the way to recover it (Courel-Ibáñez, Sánchez-Alcaraz and Cañas, 2015; Courel-Ibáñez, Sánchez-Alcaraz, and Muñoz, 2019; Ramon-Llin et al., 2019). The importance of occupying this attack position has been previously reported, related to increasing the likelihood of winning the point (Courel-Ibáñez et al., 2015; Courel-Ibáñez, Sánchez-Alcaraz and Muñoz, 2019; Ramón-Llin, Guzmán, Llana, James and Vučković, 2017). In this respect, these results show that more than 80% of winners are made from the offensive position.

Players use different strokes in order to keep this advantageous position (Torres-Luque, Ramírez, Cabello-Manrique, Nikoladis and Alvero-Cruz, 2015). The most commonly used strokes by players in this offensive situation are trays, volleys and smashes (García-Benítez, Pérez-Bilbao, Echegaray and Felipe, 2016; Priego-Quesada et al., 2013; Ramon-Llin et al., 2017; Torres-Luque et al., 2015). However, no studies have been found about the effectiveness of the actions individually, an aspect that could be very important for the final score (Sánchez-Alcaraz et al., 2020). It has been previously demonstrated that the winners perform a higher number of total attacking actions per point and per match. Also, more than 80% of the points finish in under three attacking actions (Sánchez-Alcaraz et al., 2020).

Players in the defensive position (at the baseline of the court) also perform different types of technical actions such as the lob, with the aim of displacing the attacking pair so that they hit from more forced positions and further from the net (Muñoz, et al, 2017). Thus, this distance could determine the effectiveness of the different actions for the attacking pair.In addition, differences could exist between men and women players in relation to the distribution of the offensive and defensive shots (Torres-Luque et al., 2015). So, the effectiveness of these actions could vary, both due to the area where they are performed and the gender of the players.

Therefore, the aim of this study was to analyze the distribution and efficacy of technical attacking actions in professional padel regarding net distance and to compare the results with the players' gender.

2. METHOD

2.1. Sample and variables

The sample included 633 attacking strokes used to finish the point in padel, corresponding to 8 matches (2 men's finals and 2 women's finals, 2 men's semifinals and 2 women's semifinals) during the official World Padel Tour 2019.

Master tournaments were selected due to the participation of the best ranked players in the world. Attacking actions were carried out by 24 professional padel players: 12 men (Age = 34.12 ± 5.41 years; Height: 1.78 ± 0.05; Laterality: 11 right-handed and 1 left-handed) and 12 women (Age = 30.27 ± 5.95 years; Height: 1.70 ± 0.04; Laterality: all right-handed). The following variables were analyzed:

- Attacking technical-tactical actions in padel: Strokes were classified following the proposal of Sánchez-Alcaraz et al. (2020), distinguishing between volleys (a shot without a bounce that is performed with a short movement of the racket from top to bottom, hitting the ball at the height of the head, on the player's dominant or non-dominant side), powerful smashes (shots without a bounce that are made on the dominant side of the player, hitting the ball with the arm extended, above the head, with flat or topspin effect) and trays (shots without a bounce that are made on the dominant side of the player, hitting the ball halfway between the volley and the powerful smash with a slice effect).

- Shot Effectiveness: Only the technical-tactical attacking strokes that finished the point were analyzed. In this way, only two categories were distinguished: point won (the attacking player achieves a direct winner) and error (the attacking player makes a mistake), following the proposal of Courel-Ibáñez and Sánchez-Alcaraz (2017).

- Distance to the net: Each side of the court was divided into 5 zones, depending on their distance from the net, each two meters wide and 10 meters long (Figure 1).

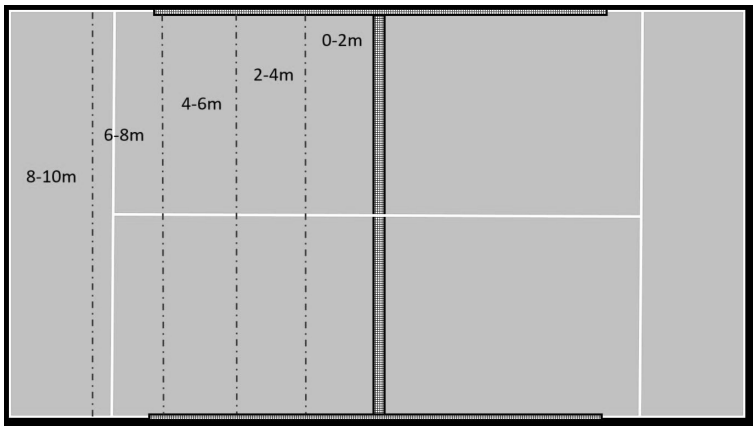

Figure 1. Court delimitation into 5 zones regarding distance from the net.

Procedure

The analyzed matches were broadcast in streaming and later hosted on the World Padel Tour website, from where they were downloaded for observation, collection and analysis of the data. The specialized software LINCE® (Gabin, Camerino, Anguera, & Castañer, 2012) was used for this data recording and collection process, designing an ad-hoc instrument to analyze the variables of the type of technical-tactical attacking action, hit efficiency and the distance to

the net when the player hits the ball. Kinovea® software (V.08.26; www.kinovea.org) was used to place a visual grid over the video image in order to record the data related to the distance to the net when players hit the ball. Data were collected through systematic observation, carried out by two observers, specifically trained for this task, who were studying the Degree in Sports Sciences at the University of Valencia and specialized in padel. At the end of the training process, each observer analyzed the same two sets in order to calculate the inter-observer reliability using the Multirater Kappa Free (Randolph, 2005), obtaining values above .80. To ensure the consistency of the data, the intra-observer reliability was evaluated at the end of the observation process, obtaining minimum values of .80. Following Altman (1991, p.404), the kappa values obtained allowed us to consider the degree of agreement as very high (> .80).

Data analysis

Data were analyzed with the statistical package IBM SPPS 20.0 for Macintosh® (Armonk, NY: IBM Corp. U.S.A.) A descriptive analysis was performed to calculate frequencies and percentages (column). Chi square analysis was performed to identify differences in players' gender, net distance and shot effectiveness. Column proportions were compared using a Z test, with adjustment of significance according to Bonferroni. The effect size was calculated using Crammer's V, where values of 0.1 represented a small effect, 0.3 a medium effect and from 0.5 a large effect. Fisher's test was used for the comparison between genders and net distance, selecting the Monte Carlo method, and adjusting the CI to 95%. The effect from the contingency coefficient initially, and in the comparison between the categories where significant differences were observed, the Ø statistic was used in the same way as Crammer's V. Finally, Chi square analysis was performed to identify differences in players' gender and net distance regarding the different attacking technical-tactical strokes. A significance level of p <.05 was established.

RESULTS

Table 1 shows the descriptive results of the type of attacking actions, shot effectiveness and net distance according to players' gender. The gender of the players significantly determined the type of attacking action with which the PADEL players finished the point (χ^2 = 15.77; *gl* = 2; *p* < .01; V = .158). Thus, men performed a significantly higher percentage of smashes (*p* = .025; Ø = -.089) than women, while women performed a significantly higher percentage of trays than men (*p* < .001; Ø = .152). Regarding shot effectiveness, no significant differences were found between men and women (χ^2 = 2.01; *gl* = 1; *p* > .05), both obtaining percentages between 50-60% of points won when performing the attacking actions. Moreover, no significant differences were found between men and women (χ^2 = .78; *gl* = 4; *p* > .05) with respect to the distribution of attacking actions regarding net distance. With regard to this variable, it can be observed that approximately 60% of the attacking actions to finish the point in padel are made between 2 and 6 meters from the net, 15 and 18% are made between 6 and 8 meters from the net, and only approximately

12% of these strokes are made in a position very close to the net (from 0 to 2 meters).

Table 1. Descriptive results of type of attacking actions, shot effectiveness and net distance regarding players' gender.

	Gender				
	Men		Women		
	N	Percentage (%)	N	Percentage (%)	Sig.
Type of attacking action					
Powerful smash	125	37.7**a**	88	29.2**b**	
Tray	39	11.7**a**	70	23.3**b**	.000**
Volley	168	50.6	143	47.5	
Shot effectiveness					
Winner	194	58.4	159	52.8	.156
Error	138	41.6	142	47.2	
Net distance					
0-2 meters	39	11.7	36	12.0	
2-4 meters	148	44.6	140	46.5	
4-6 meters	82	24.7	75	24.9	.941
6-8 meters	61	18.4	49	16.3	
8-10 meters	2	0.6	1	0.3	

Note: N = number; * $p < .05$; ** $p < .01$; a,b = significant differences indicated in the Z tests for comparison of column proportions from $p < 0.05$, adjusted according to Bonferroni.

Table 2 shows the descriptive results of gender differences in the distribution of strokes according to net distance. Players' gender showed significant differences in the performance of the powerful smash regarding net distance (Fisher value = 39.24; *gl* = 4; Contingency coefficient = 0.39; p <.001). Thus, women performed more than 70% of their powerful smashes in positions close to the net (between 0 and 4 meters), with a significantly higher percentage than men in distances of less than 2 meters from the net (p = .014; Ø = -.169) and between 2 and 4 meters (p <.001; Ø = .275). However, men performed almost 65% of their powerful smashes in intermediate positions on the court (between 4 and 8 meters from the net), with significantly higher percentages than women in distances between 4 and 6 meters from the net (p = .034; Ø = -.145) and between 6 and 8 meters (p <.001; Ø = -.309). Similarly, significant differences were found between men and women in the performance of the tray regarding net distance (Fisher's value = 7.621; *gl* = 3; Contingency coefficient = 0.265; p <.037). Although between 65-70% of the trays were made between 6-8 meters from the net by both men and women, it was observed that women made a significantly higher percentage of trays at between 2 and 4 meters from the net (p = .012; Ø = -.239). Also, although not significantly, women hit 15% more trays between 4-6 meters from the net than men. However, men performed approximately 10% more trays between 0-2 meters from the net than women. Finally, no significant differences were found between men and women in the distribution of the volleys according to net distance (Fisher's value = 2.574; *gl* = 2; p = .286). Thus, both men and women performed approximately 70% of the volleys between 2-4 meters from the net.

Table 2. Gender differences in stroke distribution according to net distance.

Type of attacking action	Net distance	Gender				Sig.
		Men		Women		
		N	Percentage (%)	N	Percentage (%)	
Powerful smash	0-2 meters	15	12.0**a**	22	25.0**b**	.000**
	2-4 meters	27	21.6**a**	42	47.7**b**	
	4-6 meters	47	37.6**a**	21	23.9**b**	
	6-8 meters	34	27.2**a**	3	3.4b	
	8-10 meters	2	1.6	0	0.0	
Tray	0-2 meters	0	0.0	0	0.0	.042*
	2-4 meters	5	12.8**a**	1	1.4**b**	
	4-6 meters	7	17.9	22	31.4	
	6-8 meters	27	69.2	46	65.7	
	8-10 meters	0	0.0	1	1.4	
Volley	0-2 meters	24	14.3	14	9.8	.272
	2-4 meters	116	69.0	97	67.8	
	4-6 meters	28	16.7	32	22.4	
	6-8 meters	0	0.0	0	0.0	
	8-10 meters	0	0.0	0	0.0	

Note: N = number; * $p < .05$; ** $p < .01$; a,b = significant differences indicated in the Z tests for comparison of column proportions from $p < 0.05$, adjusted according to Bonferroni.

Table 3 shows the results of the point effectiveness of each attacking action in padel, depending on players' gender. No significant differences were found between men and women in the percentages of shot effectiveness in the different attacking actions. Specifically, it was observed that the powerful smash is the attacking action with a higher percentage of winners, close to 90%. On the other hand, only 35% of the volleys hit to finish the points are winners.

Table 3. Gender differences in shot effectiveness according to type of attacking shot

Type of attacking shot	Shot effectiveness	Gender				Sig.
		Men		Women		
		N	Percentage (%)	N	Percentage (%)	
Powerful smash	Winner	116	92.8	79	89.8	.434
	Error	9	7.2	9	10.2	
Tray	Winner	20	51.3	30	42.9	.397
	Error	19	48.7	40	57.1	
Volley	Winner	58	34.5	50	35.0	.935
	Error	110	65.5	93	65.0	

Note: N = number.

Figure 2 shows the percentage of the attacking actions effectiveness regarding the hitting distance to the net. In this respect, the distance to the net significantly determined the effectiveness of the attacking action ($\chi^2 = 20.12$; $gl = 4$; $p < .01$), It can be observed how when players hit farther away from the net

the percentage of winners decreases. Thus, between 0 and 6 meters from the net, the percentage of winners is higher than errors, while in the area of 6-8 meters from the net, the percentage of winners is practically the same as errors, and between 8- and 10-meters distance, the percentage of errors is higher than winners.

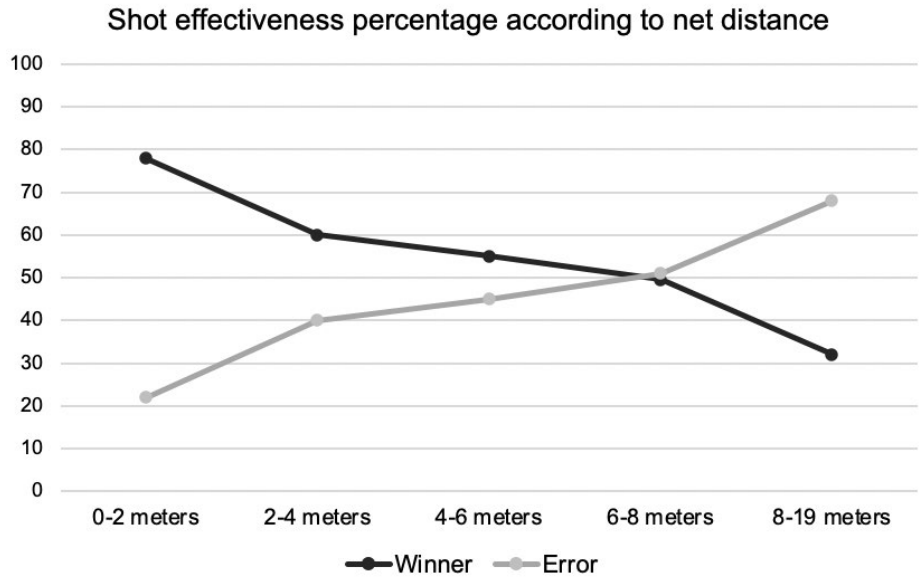

Figure 2. Effectiveness percentage of attacking actions according to net distance

4. DISCUSSION

The aim of this study was to analyze the distribution and effectiveness of the attacking technical actions in professional padel, according to the hitting distance from the net and players' gender. In this respect, the type of attacking action with which they end the point is different in the men's and women's categories. Men use significantly more powerful smashes to finish the rally while women use significantly more trays. Thus, and because the smash is a more powerful shot than the tray, its greater use in the men's category would produce an increase in the pace of the game that could mean the end of the rally in less time and would explain the shorter duration of the rallies in men than in women (García-Benítez et al., 2016; Sánchez-Alcaraz, 2014). In addition, the greater use of the lob in the women's category could be the cause of women using the tray shot more (Muñoz et al., 2017; Torres-Luque et al., 2015).

Similarly, differences were found between men and women in the use of these two types of shots depending on the player's distance from the net. Thus, women performed more than 70% of their powerful smashes to finish the point in positions close to the net (between 0 and 4 meters), while men performed almost 65% of their powerful smashes in intermediate positions on the court (between 4 and 8 meters from the net). These results related to the hitting zone may be due to anthropometric and strength differences between elite men's and women's category players in padel (Castillo-Rodríguez, Hernández-Mendo and Alvero-Cruz, 2014; Sánchez-Muñoz et al., 2020). The results of these studies show that men padel players are taller, with a higher muscle percentage, and have higher levels of vertical jump and grip strength than women players, which

would allow them to use the powerful smash successfully in positions further from the net.

In addition, with respect to the area of the court, it was observed how, in both men and women, almost 60% of the finishing shots of the point are made in positions close to the net (between 0 and 4 meters). However, when the effectiveness of the attacking actions in padel is compared with the distance to the net, the results show how, as the players move away from the net, the percentage of winning shots decreases. Thus, while between 0 and 6 meters from the net, the percentage of winners is higher than errors, from 6 meters the percentage of errors is higher than that of winners. These data confirm the results of several studies that have shown that 80% of points in padel are obtained from close to the net (Courel-Ibáñez et al., 2015), which also increases the chances of winning the game in professional paddle tennis (Courel-Ibáñez et al., 2017).

On the other hand, the last shot efficacy data based on the type of attacking action performed did not show significant differences between men and women. However, it was specifically observed that the powerful smash is the attacking action with a better percentage of effectiveness, close to 90%. In contrast, only 35% of the volleys used to finish the point are won by the player who performs them. These data confirm that, although studies show that volleys are the most used attacking shots in padel (Carrasco, Romero, Sañudo & De Hoyo, 2011; Priego-Quesada et al., 2013; Sánchez-Alcaraz et al., 2020), it seems that the tactical objective of these shots should be to build the point and keep the advantageous position at the net, and that when they are used with the aim of winning the point, the percentage of errors is much higher than points won. Thus, the data from this study suggest the use of smashes for successfully ending the rally in padel.

The results of this study have an important practical application for the training of padel players, allowing the design of tasks and training sessions, as well as preparing the competition, taking into account the differences between the men's and women's categories. In addition, knowledge of the effectiveness of the different padel attacking actions at the end of the rally depending on the player's distance to the net, will allow the training of perceptual and decisional mechanisms during the game by the player and the application of feedback on behaviors by the coach (Del Villar, González, Iglesias, Moreno & Cervelló, 2007; Nielsen & McPherson, 2001). However, this research has some limitations that must be taken into account when interpreting the results. Firstly, although a high number of attacking actions that end the rally in padel have been analyzed, other very important variables that can influence the effectiveness or distribution of these actions, such as the previous sequence of shots (both offensive and defensive), their trajectory (down the line or cross court) or the side of the court where they are performed (right or left), have not been taken into account. In addition, only the attacking actions that ended the rally were analyzed, without taking into account those that produced the continuity of the rally, and which may also be an indicator of the effectiveness of this type of shots (Courel-Ibáñez and Sánchez-Alcaraz, 2017) Therefore, it is suggested that future investigations try to include the analysis of temporal

patterns or “t-patterns” to contribute to the discovery of those behaviors that are most effective through the study of complex interactions (Borrie, Jonsson & Magnusson, 2002). In addition, some studies have shown how the influence of the “match status”, that is, the status of the scoreboard (winning, drawing or losing) depending on the moment of the match (point, game and set), can influence decision-making in moments of pressure (choking), affecting performance (Mesagno, Geukes, & Larkin, 2015). It is therefore suggested that future research take into account the influence of the scoreboard on the variables of distribution and effectiveness of the players' finishing actions.

5. CONCLUSIONS

In conclusion, men use the flat smash shot to finish the rally in padel to a greater extent, while women use the tray more. In addition, the highest percentage of rally ending actions occurs in areas close to the net, between 2 and 4 meters, both in the men’s and women’s categories. The distance from the net from which men make more trays than powerful smash shots is 6 meters, while in women it is 4 meters. Finally, the most effective attacking actions to achieve success in padel are smashes, much more than volleys, although the effectiveness of attacking actions decreases as players move away from the net.

6. REFERENCES

Altman, D. G. (1991). *Practical statistics for medical research*. Chapman and Hall. https://doi.org/10.1201/9780429258589

Borrie, A., Jonsson, G. K., y Magnusson, M. S. (2002). Temporal pattern analysis and its applicability in sport: an explanation and exemplar data. *Journal of Sports Sciences, 20*(10), 845-852. https://doi.org/10.1080/026404102320675675

Carrasco, L., Romero, S., Sañudo, M., y De Hoyo, M. (2011). Game analysis and energy requirements of paddle tennis competition. *Science & Sports, 26*, 338-344. https://doi.org/10.1016/j.scispo.2010.12.016

Castillo-Rodriguez, A., Hernández-Mendo, A., y Alvero-Cruz, J.R. (2014). Morfología del jugador de élite de pádel – comparación con otros deportes de raqueta. *International Journal of Morphology, 32*(1), 177-182. https://doi.org/10.4067/S0717-95022014000100030

Courel-Ibáñez, J., y Sánchez-Alcaraz, B. J. (2017). Efecto de las variables situacionales sobre los puntos en jugadores de pádel de élite. *Apunts Educación Física y Deportes, 127*(1), 68–74. https://doi.org/10.5672/apunts.2014-0983.es.(2017/1).127.07

Courel-Ibáñez, J., Sánchez-Alcaraz, J. B., y Cañas, J. (2015). Effectiveness at the net as a predictor of final match outcome in professional padel players. *International Journal of Performance Analysis in Sport, 15*(2), 632–640. https://doi.org/10.1080/24748668.2015.11868820

Courel-Ibáñez, J., Sánchez-Alcaraz, B.J., y Cañas, J. (2017). Game performance and length of rally in professional padel players. *Journal of Human Kinetics, 55*, 161-169. https://doi.org/10.1515/hukin-2016-0045

Courel-Ibáñez, J., Sánchez-Alcaraz, B. J., García, S., y Echegaray, M. (2017). Evolución del pádel en España en función del género y edad de los practicantes. *Cultura, Ciencia y Deporte, 34*, 39-46. https://doi.org/10.12800/ccd.v12i34.830

Courel-Ibáñez, J., Sánchez-Alcaraz, B.J., y Muñoz, D. (2019). Exploring game dynamics in padel. Implications for assessment and training. *Journal of Strength and Conditioning Research, 33*(7), 1971-1977. https://doi.org/10.1519/JSC.0000000000002126

Courel-Ibáñez, J., Sánchez-Alcaraz, B. J., Muñoz, D., Grijota, F. J., Chaparro Herrera, R., y Díaz, J. (2018). Gender Reasons for Practicing Paddle Tennis. *Apunts. Educación Física y Deportes, 133*, 116-125. https://doi.org/10.5672/apunts.2014-0983.es.(2018/3).133.08

Del Villar, F., González, L. G., Iglesias, D., Moreno, M. P., y Cervello, E. M. (2007). Expert-Novice Differences In Cognitive And Execution Skills During Tennis Competition. *Perceptual and Motor Skills, 104*(2), 355-365. doi:10.2466/pms.104.2.355-365. https://doi.org/10.2466/pms.104.2.355-365

Díaz, J., Muñoz, D., Muñoz, J., e Ibañez, S. J. (2020). Diseño y validación de un instrumentos observacional para acciones finalistas en pádel. *Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte*, *21*(81), 197-210. https://doi.org/10.15366/rimcafd2021.81.013

Federación Internacional de Pádel. (2017). *Reglamento de Juego del Pádel*.

Retrieved on March 1 2020: https://www.padelfip.com/es/rules/.

Federación Internacional de Pádel. (2020). Lista de paises asociados a la Federación Internacional de Pádel (FIP). Retrieved on March 1 de 2020, de https://www.padelfip.com/federations/.

Fernandez de Osso, A. y Leon, J. A. (2017) Herramienta de evaluación técnico-táctica en padel. *Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte, 17*(68), 693-714. https://doi.org/10.15366/rimcafd2017.68.008

Gabin, B., Camerino, O., Anguera, M. T., y Castañer, M. (2012). Lince: Multiplatform Sport Analysis Software. *Procedia - Social and Behavioral Sciences, 46*, 4692–4694. https://doi.org/10.1016/j.sbspro.2012.06.320

García-Benitez, S., Pérez-Bilbao, T., Echegaray, M., y Felipe, J.L. (2016). Influencia del género en la estructura temporal y las acciones de juego del pádel profesional. Cultura, Ciencia y Deporte, 33(11), 241-247. https://doi.org/10.12800/ccd.v11i33.769

Mesagno, C., Geukes, K., y Larkin, P. (2015). Choking under pressure: A review of current debates, literature, and interventions. En S. D. Mellalieu & S. Hanton (Eds.), *Contemporary advances in sport psychology: A review*. New York: Routledge.

Muñoz, D., Sánchez-Alcaraz, B.J., Courel-Ibañez, J., Díaz, J., Grijota, F., y Muñoz, J. (2017). Análisis del uso y eficacia del globo para recuperar la red en función del contexto de juego en pádel. *Retos, 31*, 19–22. https://doi.org/10.47197/retos.v0i31.48988

Muñoz, D., Sánchez-Alcaraz, B. J., Courel-Ibáñez, J., Romero, E., Grijota, F. J., y Díaz, J. (2016). Estudio sobre el perfil y distribución de las pistas de pádel en la Comunidad Autónoma de Extremadura. *E-Balonmano.com: Revista de Ciencias del Deporte, 12*(3), 223-230.

Nielsen, T. M., y McPherson, S. L. (2001) Response selection and execution skills of professionals and novices during singles tennis competition. *Perceptual and Motor Skills, 93*, 541-555. https://doi.org/10.2466/pms.2001.93.2.541

Ramón-Llin, J., Guzmán, J. F., Llana, S., James, N., y Vučković, G. (2017). Analysis of padel rally characteristics for three competitive levels. *Kinesiologia Slovenica, 23*(3), 39-49.

Ramón-Llin J., Guzmán J. F., Llana S., Martínez-Gallego, R., James, N., y Vučković, G. (2019) The Effect of the Return of Serve on the Server Pair's Movement Parameters and Rally Outcome in Padel Using Cluster Analysis. *Frontiers in Psychology, 10*(1194). https://doi.org/10.3389/fpsyg.2019.01194

Ramón-Llín, J., Guzmán, J., Llana, S., Vuckovic, G., Muñoz-Marín, D., y Sánchez-Alcaraz, B.J., (2021). Análisis de la distancia recorrida en pádel en función del nivel de juego y el número de puntos por partido. *Retos, Nuevas Tendencias en Educación Física y Deportes, 39*, 205-209. https://doi.org/10.47197/retos.v0i39.79322

Randolph, J. J. (2005). *Free-marginal multirater kappa: An alternative to Fleiss' fixed-marginal multirater kappa*. Talk presented at the Joensuu University Learning and Instruction Symposium 2005, Joensuu, Finlandia.

Priego-Quesada, J. I., Olaso-Melis, J., Llana-Belloch, S., Pérez-Soriano, P., González-García, J. C., y Sanchís-Almenara, M. (2013). Padel: a

quantitative study of the shots and movements in the high-performance. *Journal of Human Sport and Exercise, 8*(4), 925–931. https://doi.org/10.4100/jhse.2013.84.04

Sánchez-Alcaraz, B. J. (2013). Historia del pádel. *Materiales para la historia del deporte, 11*, 57-60.

Sánchez-Alcaraz, B.J. (2013b). Táctica del pádel en la etapa de iniciación. *Trances. Revista de transmisión del conocimiento educativo y de la salud, 5*(1), 109-116.

Sánchez-Alcaraz, B.J. (2014). Diferencias en las acciones de juego y la estructura temporal entre el pádel masculino y femenino profesional. *Acción Motriz, 12*, 17-22.

Sánchez-Alcaraz, B. J., Cañas, J. y Courel-Ibáñez, J. (2015). Análisis de la investigación científica en pádel. *Agón, International Journal of Sport Sciences, 5*(1), 44-54.

Sánchez-Alcaraz, B. J., Courel-Ibáñez, J. y Cañas, J. (2016). Valoración de la precisión del golpeo en jugadores de pádel en función de su nivel de juego. *RICYDE. Revista Internacional de Ciencias del Deporte, 12*(45), 324-333. https://doi.org/10.4100/jhse.2013.84.04

Sánchez-Alcaraz, B. J., Courel-Ibáñez, J. y Cañas, J. (2018). Estructura temporal, movimientos en pista y acciones de juego en pádel: revisión sistemática. *Retos, 33*, 129-133. https://doi.org/10.47197/retos.v0i33.55025

Sánchez-Alcaraz, B.J., Courel-Ibáñez, J., Muñoz, D., Infantes, P., Sáenz de Zumarán, F., y Sánchez-Pay, A. (2020). Análisis de las acciones de ataque en el pádel masculino profesional. *Apunts, Educación Física y Deportes, 142*, 36-41.

Sánchez-Pay, A., García-Castejón, A., Courel-Ibáñez, J., y Sánchez-Alcaraz, B.J. (2020). Influencia de las pelotas de baja presión en la iniciación al pádel. *Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte, 20*(79), 419-434. http://doi.org/10.15366/rimcafd2020.79.003

Sánchez-Alcaraz, B.J., Siquier-Coll, J., Toro-Román, V., Sánchez-Pay, A. y Muñoz-Marín, D. (2021). Análisis de los parámetros relacionados con el marcador en el circuito World Padel Tour 2019. *Retos, Nuevas Tendencias en Educación Física y Deportes, 39*, 200-204. https://doi.org/10.47197/retos.v0i39.78402

Sánchez-Muñoz, C., Muros, J.J., Cañas, J., Courel-Ibáñez, J., Sánchez-Alcaraz, B.J., y Zabala, M. (2020). Anthropometric and physical fitness profiles of world-class male padel players. *International Journal of Enviromental Research and Public Health, 17*(508), 1-14. https://doi.org/10.3390/ijerph17020508

Torres-Luque, G., Ramirez, A., Cabello-Manrique, D., Nikolaidis, T. P., y Alvero-Cruz, J. R. (2015). Match analysis of elite players during paddle tennis competition. *International Journal of Performance Analysis in Sport, 15*(3), 1135–1144. https://doi.org/10.1080/24748668.2015.11868857

Villena-Serrano, M., Castro-López, R., Lara-Sánchez, A., y Cachón-Zagalaz, J. (2016). A Systematic Review of the Characteristics and Impact of Paddle Tennis in Spain. *Apunts. Educación Física y Deportes, 126*, 7-22. https://doi.org/10.5672/apunts.2014-0983.es.(2016/4).126.01

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