ANALYSIS OF WINNERS AND ERRORS IN PROFESSIONAL PADEL

ANÁLISIS DE LOS GOLPES GANADORES Y ERRORES EN PÁDEL PROFESIONAL

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ABSTRACT

The objective of the study was to analyse the winners and errors in professional padel. A total of 1.927 shots were recorded in the Madrid Master Finals tournament of the official circuit of the World Pádel Tour 2021, both for men and women. Variables such as the effectiveness of the shot, the area of the court, the type of shot, the type of point and the result of the match were analysed. The 8 best couples of the male and female professional padel ranking (N=32) were evaluated. The results according to the type of shot showed that smashes and volleys are the shots with the highest percentage of winners, while groundstrokes and lobs obtained the highest percentage of errors. Also, the net zone is where a higher number of winners occur, with the winning pair getting 20% more winners than errors. Finally, the type of point does not seem to influence the effectiveness of the shot. These data can serve as a reference for coaches and players in the design of exercises and preparation of strategies and tactics in competition.

KEY WORDS: racquet sports, shots efficiency, type of shots, court's area.

RESUMEN

El objetivo de estudio fue analizar los golpes ganadores y los errores en pádel profesional. Se registraron 1.927 golpes correspondientes al Master Final de Madrid del circuito oficial World Pádel Tour 2021, tanto en categoría masculina como femenina. Se tuvieron en cuenta las siguientes variables: eficacia del golpe, la zona de pista, el tipo de golpe, el tipo de punto y el resultado del partido. Se evaluaron las 8 mejores parejas del ranking de pádel profesional masculino y femenino (N=32). Los resultados mostraron que, los remates y las voleas son los golpes con mayor porcentaje de puntos ganadores, mientras que los golpes de fondo y los globos obtuvieron mayor porcentaje de errores. Además, la zona de red es donde se produce un número mayor de golpes ganadores, mientras que la pareja ganadora obtiene un 20 % más de golpes ganadores que de errores. Finalmente, el tipo de punto no parece influir en la eficacia del golpe. Estos datos pueden servir de referencia a entrenadores y jugadores en el diseño de ejercicios y preparación de estrategias y tácticas en la competición.

PALABRAS CLAVE: raqueta, eficacia, rendimiento, táctica.

INTRODUCTION

Padel is a sport that emerged in the 1960s (1), and is currently practised in Spain by more than 5 million people (2). Such is its growth that during the year 2020 it has reached almost 100.000 federative licenses in Spain (3), with National Federations in 65 countries (4). In recent years, the number of padel players has increased exponentially due to different factors such as the possibility of playing outdoors, it's a social sport (played by 4 people) and it is easy to learn technically and tactically (5).

This increase in the number of players and their professionalisation has also led to an increase in the number of scientific publications related to padel (6). Most of this research has been focused on the field of performance analysis, since its results allow us to know the specific demands of this sport, as well as to provide information to players and coaches for the design of exercises and preparation of the competition (7). These studies have analysed, among other variables, the time structure of padel, defining that matches have an average duration of approximately 60/90 minutes, depending on the number of sets played (8). In addition, the average duration of points is between 10 and 15

seconds, although studies show that this data can vary depending on the gender or level of the players (9).

Other studies have analysed other performance analysis variables such as player movements, showing that padel players cover an average of 2,5 kms in each match, where approximately 50% corresponds to the phase where the points are played (10). On the other hand, the technical-tactical actions of the game in padel can be classified into offensive strokes, close to the net (volleys, trays and smashes) and more defensive strokes generally performed from the back of the court (forehand, backhand, wall strokes and lobs) (11). According to a study carried out with professional players, it has been shown that more than 80% of the points are won by the team in the net position (12).

In addition, the efficiency of the strokes (winners and errors) seems to be a determining variable for the performance of the players in the match. Thus, some studies have shown how the efficiency of the stroke varies depending on the type of stroke the player makes, the area of the court where it is executed or the direction of the stroke (11). With regard to the attacking strokes, although volleys are the strokes that players use most when they are in offensive positions, it is the backhands that are the strokes with which players hit the most winners (13). Moreover, the effectiveness of these attacking strokes decreases as players move away from the net, highlighting that, in men, players make more winners than errors in the first 6 meters from the net while in women this data is maintained only in the first 4 meters (14). On the other hand, with regard to the trajectory of the strokes, in both men's and women's padel, it is the cross-court strokes that win the most points (11).

However, as has been observed, the studies that have analyzed the efficiency of the strokes have related it to other variables such as the area of the court, the direction or the type of stroke. However, to date, there are no studies that have compared hitting efficiency with other parameters such as game score, match result or winner-loss ratio. Therefore, the aim of this study will be to analyze the winners and errors in professional padel and to compare them with the variables of court area, match score, type of point and the type of stroke.

MATERIAL AND METHODS

Sample

The sample included 1.927 points corresponding to 14 matches (7 men's and 7 women's) of the Madrid Master Finals tournament of the official World Padel Tour 2021. The last shot each point of the tournament was evaluated (654 winners and 1.273 errors), made by the 32 participating players (16 men and 16 women). Table 1 shows the characteristics of the players participating in the research:

Table 1. Characteristics of the research sample.

	Number	Age
	N	M ± D.T.
Total sample	32	29,93 ± 6,70
Male	16	28,81 ± 7,08
Female	16	31,06 ± 6,31

Note: M = Mean; D.T. = Standard Deviation.

Variables

The variables analyzed were:

-Stroke efficiency: The last stroke of each point was studied, classifying them into winner (those shots with which players win the point) and errors (those shots which he player lose the point) (15).

-Court zone: As shown in image 1, the court was divided into 3 zones of the same size, depending on the distance to the net, distinguishing between baseline, middle and the net. In addition, a fourth zone was established for shots played outside the court.
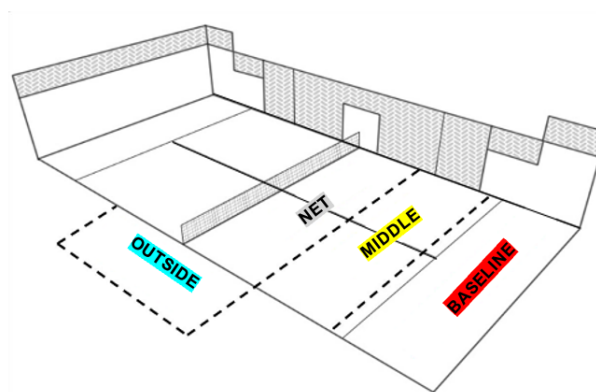
Image 1. Court zones.

-Result of the match: Winner and loser team of the match was recorded.

-Type of point: We differentiated between decisive point (point in which one of the pairs has the option of winning the game; e.g., 40-30), non-decisive point (point in which there is no option of winning the game; e.g., 30-0) and point in the tie-break (16).

-Type of stroke: The classification proposed by several authors (10) was used, distinguishing between:

- Volleys: A shot without bouncing that is made with an up to down swing, differentiating between forehand volley (hit on the player's dominant side) and backhand volley (hit on the player's non-dominant side).

- Smash: A shot without bouncing, hit above the player's head, with a powerful up to down swing and flat spin.

- Tray: A shot without a bounce that is hit on the player's dominant side. It is considered an intermediate stroke between the smash and the forehand volley, as the point of impact is lower than the powerful smash and higher than the volleys. It is a less offensive stroke than the smash, with a slide spin.

- Groundstrokes: Strokes made after the ball bounces on the ground, which can be direct (forehand and backhand), wall (forehand or backhand side wall, forehand or backhand back wall, forehand or backhand double wall) and against the wall (forehand or backhand).

- Lob: A bouncing or non-bouncing shot in which the ball makes a parabolic trajectory over the head of the opponents with the aim to recover the net position.

- Off the wall smash: A shot played at the back of the court, after the ball bounce on the floor and the glass, and it is hit over the head, with a powerful up to down swing and flat or slide spin.

Procedure

The matches analyzed are broadcast in streaming and subsequently hosted on the World Padel Tour website, from where they were downloaded and saved for the observation, collection and analysis of the data. For this process, the specialized software LINCE (17) was used, designing an ad-hoc instrument to analyze the following variables: team that hit the ball, type of stroke, direction, efficiency, court zone and the number of strokes per point. The Kinovea software (V.27.1; Kinovea open source Project, kinovea.org) was used to draw the dividing lines into which we divided the court area (baseline, middle and net). The data were analyzed by systematic observation, carried out by two students of the Degree in Sports Science, both specialized in padel and trained for this task. At the end of the training process, each observer analyzed the same set with the aim of calculating the inter-observer reliability through the Multirater Kappa Free (18), obtaining values above .80. To ensure the consistency of the data, intra-observer reliability was assessed at the end of the observation process, obtaining minimum values of .80. The kappa values obtained allowed the degree of agreement to be considered very high (> .80) (19).

Statistic analysis

First, a descriptive exploration of the data obtained was carried out and the mean (M), standard deviation (SD), frequency (n), percentage (%), minimum and maximum (min-max) were calculated. Subsequently, Kolmogorov Smirnov tests were performed for the study of normality and Levene's test for homogeneity

of variances. A comparison of winner and errors statistics by match result was performed using Pearson's Chi-square test, with subsequent Z-tests for comparison of column proportions with Bonferroni significance adjustment. Corrected typed residuals (CTRs) were calculated to analyze the significance of these relationships (20). Effect size was calculated from Crammer's V, where values of 0.1 represented a small effect, 0.3 a medium effect and 0.5 and above a large effect (21). A significance level of $p<.05$ was set. All data were analyzed with the statistical package IBM SPSS 20.0 for Macintosh (Armonk, NY: IBM Corp.).

RESULTS

Table 2 shows the relationship between the type of stroke executed by the player and the effectiveness of the stroke. As we can see, there were significant differences in the percentages of strokes between all the stroke types ($X2 = 648,18$; DF = 6; Sig = .000; V= .601). Thus, the smash is the type of stroke that produces the highest number of points won along with volleys, while the lob is the stroke with which the fewest points are won. On the other hand, the strokes with the highest percentage of errors are groundstrokes and volleys, followed by lobs. Thus, the strokes with a significantly higher percentage of errors than winners were lobs and groundstrokes, while the strokes with a significantly higher percentage of winners than errors were backhands.

Table 2. Differences between winning strokes and errors according to stroke type

Type of stroke	Winners N (%)	RTC	Errors N (%)	RTC	Sig
Lob	2 (0,03) a	-10,5	189 (14,8) b	10,5	
Groundstrokes	39 (6,0) a	-12,8	384 (30,2) b	12,8	
Tray	83 (12,7) a	1,0	134 (10,5) a	-1,0	.001
Volley	186 (28,4) a	-1,6	385 (30,2) a	1,6	
Off the wall smash	23 (3,5) a	1,9	25 (2,0) a	-1,9	
Smash	281 (43,0) a	22,4	30 (2,4) b	-22,4	

Note: N = Number; % = Percentage; RTP = Corrected Typed Residuals; a,b = Bonferroni adjusted differences in column percentages; Sig. = significance.

Table 3 shows the relationship between the court zone in which the shot was executed and its effectiveness. As we can see, there were significant differences in the percentages between the different court zones established (X2 = 242,196; DF = 3; Sig = .000 / V = .355). 56,6% of the winning shots are executed at the net, also known as the attack zone, while 42% of errors can be found in the baseline zone. Furthermore, the comparison of errors and winners showed a significantly higher percentage of errors than winners at the back court, while at the net the percentage of winning shots is significantly higher than the percentage of errors.

Table 3. Differences between winning strokes and errors according to court zone

Court Zone	Winners N (%)	RTC	Errors N (%)	RTC	Sig
Baseline	69 (10,6) a	-14.1	535 (42,0) b	14,1	
Middle	210 (32,1) a	.7	389 (30,6) a	-0,7	.001
Net	370 (56,6) a	12.9	339 (26,6) b	-12,9	
Outside	5 (0,8) a	0,0	10 (0,8) a	0,0	

Note: N = Number; % = Percentage; RTP = Corrected Typed Residuals; a,b = Bonferroni adjusted differences in column percentages; Sig. = significance.

Table 4 shows the relationship between the effectiveness of the shot depending the score in the game. As we can see, no significant differences were found in the percentage of winner and errors depending on the type of point in padel (X2 = 1,321; DF = 2; Sig = .517 / V = .026).

Table 3. Differences between winners and errors according to the type of point

Type of point	Winners N (%)	RTC	Errors N (%)	RTC	Sig
Key point	187 (28,6) a	1,0	226 (26,4) a	-1,0	
No key point	440 (67,3) a	-1,1	889 (69,8) a	1,1	.517
Tie break	27 (4,1) a	0,4	48 (3,8) a	-0,4	

Note: N = Number; % = Percentage; RTP = Corrected Typed Residuals; a,b = Bonferroni adjusted differences in column percentages; Sig. = significance.

Table 5 shows the relationship between the winning points and the match result. As can be seen, significant differences were found in the percentage of winners and errors between the winning and losing pairs of the match (X2 = 21,918; DF = 1; Sig = .000 / V = .104). Thus, the winning pair made almost 20% more winners than errors, while the losing pair made approximately 12% more errors than winners.

Table 4. Differences between winning and errors strokes depending on the outcome of the match.

Match result	Winners N (%)	RTC	Errors N (%)	RTC	Sig
Winning pair	387 (59,2) a	4,6	613 (48,2) b	-4,6	.000
Lossing pair	267 (40,8) a	-4,6	660 (51,8) b	4,6	

Note: N = Number; % = Percentage; RTP = Corrected Typed Residuals; a,b = Bonferroni adjusted differences in column percentages; Sig. = significance.

DISCUSSION

The aim of this study was to analyze the winners and errors in professional padel and to compare them with the area of the court, the result of the match, the type of point and the type of stroke. The results of this work with respect to the type of stroke show that smashes and volleys were the strokes with the highest rate of winning points while groundstrokes and lobs were the strokes with the highest rate of errors. These results are consistent with other studies that have shown that overhead strokes are the most effective in professional padel (11, 22), as, by hitting the ball at a higher point of impact, they allow players to hit with more power and score more winners.

The area of the court has also been shown to be a variable that influences the effectiveness of the strokes. Thus, 56,6% of the winners are executed at the net, also known as the attack zone, while 42% of errors can be found in the baseline. These data agree with the data obtained in other studies that analyze the stroke according to the area where the player is located, and which have shown that as the player moves away from the net, the number of errors committed increases significantly (12).

On the other hand, the analysis of the score or type of point did not show significant differences in the efficiency of the strokes. However, although some studies have shown that at key points of the game the players' previous rest time increases, and a greater number of strokes are produced (14), it does not seem that the efficiency of the strokes is conditioned. Furthermore, it was observed that the players who won the match had 20% more winners than the losing pair. These data are in line with other studies that have also shown that the winning pair performs a greater number of total attacking actions per match, as well as a greater number of total attacking actions per point (23). These data can serve as a reference for players and coaches to define playing styles and develop competition strategies.

The information obtained in this study provides us with certain values that can be useful in the preparation of competition strategies with your players. Knowing the type of stroke or the area of the court will help us to be able to design specific padel exercises adapted to the demands of the competition. In addition, knowing the different playing styles of the players will be fundamental for the

application of feedback in training sessions and during matches, with the aim of improving their performance and decision making.

LIMITATIONS AND FUTURE PROPOSALS

This work has certain limitations that must be taken into account when interpreting the results. Firstly, although the study sample is large (32 players), only the results of one tournament have been analysed. Thus, it would be interesting for future studies to analyze a larger number of tournaments in order to generalize these results. On the other hand, only the last shots of each player were analyzed, without taking into account certain variables, such as the shots prior to the last shot (winners and errors) that may be important for the succession of the last point. Thus, it is suggested that future studies should sequence stroke by stroke to find out how the succession of strokes influences the final result of the point.

CONCLUSION

In conclusion, the data show that, in professional padel, smashes and volleys are the strokes with the highest number of winners while the strokes with the highest number of errors are volleys and groundstrokes. The area of the court where most winning points are produced is the net area and the area where most errors are produced is the back court area. The score or type of point does not seem to affect the efficiency of the strokes. On the other hand, depending on the outcome of the match, the winning pair has more winners and fewer errors than the losing pair.

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