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Point construction and final shot effectiveness in men's and women's professional padel

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Abstract

Understanding match dynamics is essential for optimizing performance in professional padel. However, limited research has simultaneously examined rally length based on shot count, point construction, and finishing shot effectiveness while considering sex-based differences and within-match dynamics. The aim was to analyze the contextual and tactical characteristics of point construction and final shot outcomes in men's and women's professional padel. A total of 1082 points from eight matches played on the 2025 Premier Padel circuit were analyzed using systematic observational methodology. Variables included rally length, point outcome, finishing shot type and effectiveness, set, and point importance. Results showed that the serving pair won the majority of points in both sexes. Men played a relatively greater proportion of points in the second set, whereas women did so in the third set. Men's matches were characterized by shorter rallies and a higher proportion of winners, while women displayed longer rallies and more unforced errors. Rally length differed significantly between sexes, with men showing more short rallies and women more long rallies. Men most frequently ended points with smashes, whereas women primarily used forehand and backhand volleys. Women also exhibited a higher mean number of shots per rally. Additionally, rally length significantly influenced both point outcome and finishing shot type in both sexes. These findings reveal sex-specific tactical demands and highlight rally length as a key performance indicator, providing practical insights for designing training strategies tailored to competitive match behavior.

Keywords

Gender, match dynamics, performance analysis, racquet sports, tactics

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Introduction

Padel is a doubles racket sport played on a 20×10 meter enclosed court[1] and is currently experiencing rapid global growth.[2] Over the last decade, both popularity and participation at the federative level have increased significantly,[3] driven by its competitive accessibility and tactical complexity.[4] Alongside this growth, the game has evolved tactically[5] and now requires high levels of physical performance.[6] Despite the rise in research interest[7] and growing use of performance analysis in competitive contexts,[8] investigations remain relatively limited, particularly regarding sex-based differences and match volume expressed through rally length and shot count.

Sex differences in playing styles appear to stem primarily from physical and anthropometric traits, with men typically being taller and exhibiting superior jump height, strength, and maximum sprint speeds.[9] These characteristics shape distinct technical-tactical profiles. For instance, women tend to play more frequently through the central area of the court, while men favor lateral zones.[10] Women also finish more points from the right side, both at the net and from the baseline, whereas men do so more frequently from the left.[11] These tendencies are further reflected in match indicators: men perform more smashes and smash winners, while women record more breaks and break points.[12] Together, these patterns suggest that match dynamics, tactical choices, and decision-making are shaped

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not only by training but also by physiological and biomechanical differences. Understanding how these differences translate into rally structure and scoring patterns is crucial for optimizing performance analysis and training strategies in professional padel.

Game volumes typically reported an average of 10–11 shots per rally in World Padel Tour matches during 2020, with no notable differences between sexes.[13] However, rally intensity varied. Men displayed a higher hitting frequency (0.78 shots/second) compared to women (0.73 shots/second),[14] reflecting distinct tactical strategies and stroke preferences. In men's padel, the game is characterized by frequent smashes,[15] use of passing shots and "chiquitas" to approach the net,[16] and reduced reliance on lobs[17] resulting in a faster, more aggressive style. In contrast, women's padel involves greater use of lobs to gain offensive positioning,[18] more frequent net exchanges,[19] consistent use of bandejas,[13] and cross-court shot patterns,[20] leading to a slower pace and a more controlled playing style. Taken together, these tactical and temporal distinctions suggest that rally volume alone may be insufficient to characterize match demands and highlight the need to reassess rally metrics across sexes.

Recent changes in key performance variables such as work-to-rest ratios, shots per minute, and the distribution of winners and unforced errors[5] may have altered rally characteristics. Additionally, stroke selection seems to vary with set progression. In men, strokes like the forehand volley, backhand volley, and side-wall forehand become more common, while in women, finishing strokes such as the flat smash and smash x3 increase in use.[13] These findings suggest that rally structure and volume are not static but may shift depending on the match phase, highlighting the importance of contextualized performance analysis. Understanding these variations is essential for adapting tactical planning and training methodologies to the demands of each phase of play.

Temporal indicators have traditionally been used to assess rally length, establishing average rally durations of 9.30 s for men and 9.67 s for women,[21] with matches lasting 90–120 min across two or three sets of about 40 min each.[22] These metrics provide insights into the sport's physical demands, informing conditioning strategies.[23] Tactically, rallies are often categorized by duration,[24] with each category linked to different point outcomes. For example, men achieve more winners in medium-length rallies, while women do so in short ones.[25] More recently, Prieto-Lage et al.[26] proposed classifying rally length by the number of shots, offering more precise tactical insights. Their findings showed that in short rallies, net play yields a 74–82% chance of winning. Furthermore, combining a first serve, a long rally, and a net finish gives the receiving pair a 92% probability of winning the point. These results highlight the strategic relevance of rally length measured by shot count, suggesting that this metric may better reflect technical and tactical patterns of play than time-based indicators. However, to the best of our knowledge, only Martín-Miguel et al.[25] have examined rally duration by shot count in relation to match outcomes. Their results indicated a greater advantage for the winning pair in medium-length rallies among men and in short rallies among women, underscoring the need for further research exploring how rally length interacts with performance across different competitive contexts.

Therefore, analyzing performance indicators is essential to understand player behavior in real match contexts.[27–29] Core game elements such as shot effectiveness, stroke type, match phase, and rally volume may interact differently depending on sex and match situation. Addressing this gap may enhance applied match analysis and sex-specific training design. On the other hand, this knowledge can affect the playing strategies of padel players. The aim of this study was to examine the contextual and tactical characteristics of point construction and final shot outcomes in professional padel, considering both between-sex differences and within-sex dynamics. Specifically, the study investigated how rally length, shot effectiveness, and the type of final shot used were influenced by variables such as set, point importance, and point winner.

Materials and methods

Research design

A descriptive, observational, and cross-sectional research design was adopted to analyze playing patterns in elite padel matches. The study followed a quantitative, non-experimental approach, based on the retrospective observation of previously recorded matches, with no intervention in the competitive context. Objective performance variables were systematically coded and subsequently analyzed using statistical procedures.[30]

Sample

The sample size was estimated a priori with G*Power 3.1.9.7 using a χ^2 test of independence for contingency tables of different ranges (2×2, 2×3, 2×4, 2×14, 3×13 and 3×14) ($df = 26$); setting a significance level $\alpha = 0.05$, a power $(1 - \beta) = 0.95$ and an expected effect size $W = 0.30$, the program calculated a minimum sample of $N = 375$ points, thus ensuring the ability to detect associations of moderate magnitude, minimize the risk of type I error and maintain the statistical robustness of the analysis.

Finally, the sample collected consisted of 1082 points (536 in men and 546 in women), which comfortably exceeds the minimum estimate of $N = 375$ points obtained in the a priori calculation, multiplying it by 2.88. Although 536 points were analysed in men and 546 in women, the analytical N varied slightly across variables

because some actions or sequences were not clearly visible in the video and therefore could not be coded. This oversampling increased the precision of the estimates in each cell of the contingency tables used and provided an adequate sample for detecting the categorical associations proposed.

These points correspond to 8 matches, four in the men's category and four in the women's category all of which were played over 3 sets, from the semi-final rounds of four different tournaments in the 2025 Premier Padel circuit. All matches were recorded between February and June 2025. A total of 24 different players participated (men: $n = 12$; age $= 26.89 \pm 7.02$ years; height $= 178.26 \pm 6.90$ cm; women: $n = 12$; age $= 26.01 \pm 6.67$ years; height $= 169.20 \pm 6.21$ cm), all of whom had experience competing in professional tournaments. Only rallies with complete video visibility and clearly identifiable shot sequences were included in the analysis.

All matches were played under indoor conditions on official padel courts with a synthetic turf surface, ensuring homogeneous environmental conditions across all observations. The matches were obtained from the official Red Bull TV website (https://www.redbull.com/us-en/event-series/premier-padel). The study was conducted in accordance with the principles outlined in the Declaration of Helsinki,[31] and was approved by the Ethics Committee (Ref. 166/2023). No personal data were processed, as matches were publicly available.

Variables

The following variables were defined and analyzed based on their categorical nature and degree of openness[32]:

- Point winner: Identified the pair that won the point, distinguishing between the serving and the receiving pair.
- Set: Differentiated between Set 1, Set 2, and Set 3.
- Point type (point importance): Points were classified as key (decisive) points and non-key points. Key points were operationally defined as those with the potential to directly determine the outcome of a game or produce a break, such as points played at scores of 40–15, 40–30, advantage, or break point situations. Non-key points included all remaining points that did not immediately decide the game outcome (e.g., 30–15).
- Effectiveness: A distinction was made between winners, forced errors, and unforced errors, following previous studies.[33] A winner was defined as a shot that directly ended the point without being touched by the opponent or leaving no possibility of continuation. A forced error was defined as an error committed under clear tactical or technical pressure exerted by the opponent's action, whereas an unforced error was defined as a mistake not directly attributable to the opponent's shot or pressure.
- Number of shots per point: Total number of shots played in each point was recorded.
- Number of points per set: Total number of points played per set.
- Rally length: Categorized as short (1–6 shots), medium (7–12 shots), and long (more than 12 shots) rallies, following the distribution made by Prieto-Lage et al..[26]
- Type of stroke: Categorized into different stroke actions used as the last stroke of the rally, regardless of whether it produced a winner, a forced error, or an unforced error. Operational definitions of each stroke type are provided in Table 1, based on previous observational research in professional padel.[13,34]

Procedures

The data used in this study were obtained through the observation of matches from the 2025 season of the Premier Padel circuit. These matches were streamed live and are publicly available on the Red Bull TV website (https://www.redbull.com/us-en/event-series/premier-padel). The analysis process was conducted through systematic observation carried out by a student with specific training in padel and prior preparation for accurate variable coding, using the specialized software LINCE.[35] After completing the data collection phase, an intra-observer reliability check was performed to ensure the accuracy and consistency of the recorded data. The observer conducted a second analysis on a subsample of 150 points, representing 13.9% of the total sample.[36] Additionally, a second observer holding a PhD in Sport Sciences and extensive experience in data analysis with multiple scientific publications analyzed the same sample to assess inter-observer reliability. Intra- and inter-observer reliability values ranged from 0.96 to 1.00, indicating almost perfect agreement.[37] Reliability data are presented in Table 2.

Statistical analysis

Descriptive statistics included means and percentages, as appropriate for the variables analyzed. Outliers were identified using the $1.5 \times IQR$ criterion and were excluded from the corresponding analyses. To ensure the quality and consistency of the observational data, intra- and inter-observer reliability were assessed using Cohen's kappa coefficient (κ) on a randomly selected subsample of 150 points (13.9% of the total sample). Cohen's kappa values ranged from 0.96 to 1.00, indicating almost perfect agreement and supporting the reliability of the coding procedure. Inferential analysis involved the development of contingency tables, with the Chi-square (χ^2) test applied to assess

Table 1. Definitions of stroke types.

Stroke type	Definition
Bajada	An offensive shot executed from the back of the court after the ball rebounds off the back wall, contacting the ball at or above shoulder height and directing it into the opponent's court with the aim of gaining an offensive advantage or finishing the point.
Bandeja	An overhead shot performed without a bounce, typically after a lob, executed with controlled power and trajectory to maintain net position and limit the opponents' attacking options.
Contrapared	A defensive shot intentionally played against the player's own back or side wall so that the rebound redirects the ball into the opponent's court, usually under time or space constraints.
Forehand	A groundstroke executed after one bounce on the dominant side of the body, used to control ball direction, speed, and placement during the rally.
Lob	A shot played with a high vertical trajectory intended to pass over opponents positioned near the net, forcing them to move toward the back of the court.
Out-court	A shot directed deep or wide into the opponent's court, targeting back or lateral zones, with the purpose of creating space or placing the opponents in a defensive position.
Smash	A powerful overhead shot executed without a bounce, aimed at finishing the point or producing a decisive advantage through speed and placement.
Serve-return	The shot used to return the opponent's serve, executed after the bounce and from behind the service line, initiating the rally under controlled conditions.
Backhand	A groundstroke executed after one bounce on the non-dominant side of the body, commonly used in both defensive and offensive situations.
Back wall forehand	A forehand shot executed after the ball rebounds off the back wall and before the second bounce, typically used in defensive or transition phases of play.
Back wall backhand	A backhand shot performed after the ball rebounds off the back wall and before the second bounce, allowing the player to maintain the rally under defensive conditions.
Serve	The opening shot of each point, executed from behind the service line, in which the ball must bounce on the server's court before being hit diagonally into the opponent's service box.
Forehand volley	A forehand shot executed before the ball bounces, usually close to the net, intended to apply offensive pressure and control the rally.
Backhand volley	A backhand shot executed before the ball bounces, generally near the net, used to maintain offensive positioning and rally control.

associations between sexes. Corrected standardized residuals (CSR) were used to detect over- or under-represented categories within the tables; residuals > |1.96| indicated a significantly higher or lower frequency than expected.[38] Cramer's V coefficient (Vc) was calculated to determine the strength of association between categorical variables.[38] According to Crewson,[39] the strength of association is classified as small (< 0.100), low (0.100–0.299), moderate (0.300–0.499), or high (> 0.500). For quantitative analyses, separate one-way analyses of variance (ANOVA) were conducted depending on the research question. First, a one-way ANOVA was performed to compare the number of shots per rally across match sets. Additionally, separate one-way ANOVAs were carried out using the number of shots per point as the dependent variable to examine differences according to point type, point winner, match set, and effectiveness. When significant main effects were detected, Tukey's post hoc test was applied to identify pairwise differences. Prior to conducting ANOVA, the assumptions of normality and homogeneity of variances were verified using the Shapiro–Wilk test and Levene's test, respectively. In all cases, these assumptions were met, supporting the use of parametric statistical procedures. The significance level was set at $p < 0.05$. All statistical analyses were performed using JASP software (version 0.19). Visualizations were created using Flourish Studio.

Table 2. Inter-observer and intra-observer reliability.

Study variables	Intra-observer K	Inter-observer
Point winner	1.00	1.00
Set	1.00	1.00
Point type	1.00	1.00
Effectiveness	0.98	0.96
Number of shots	0.96	0.97
Number of points per set	0.98	0.98
Rally length	0.96	0.97
Type of stroke	0.97	0.96
Total	0.98	0.98

Results

Table 3 shows descriptive statistics by sex. The distribution of points across sets showed a non-significant trend ($p = 0.081$), with a relatively higher proportion of points in the second set in men's padel and in the third set in women's

Table 3. Descriptive and inferential statistics according to the sex.

	Male			Female			Inferential	
	N	%	CSR	N	%	CSR	$\chi^{2(df)}$	p
Set								
Set 1	157	29.34	−0.51	168	30.76	0.51	$\chi^2_{(2)}$	0.081
Set 2	212	39.43	**2.15**	181	33.15	**−2.15**		
Set 3	167	31.21	−1.69	197	36.08	1.69		
Rally length								
Short rallies	215	40.18	**4.15**	154	28.20	**−4.15**	$\chi^2_{(2)}$	<0.001
Medium rallies	186	34.76	0.94	175	32.05	−0.94		
Long rallies	134	25.04	**−5.15**	217	39.74	**5.15**		
Shots number								
1–4 shots	123	22.99	**3.09**	85	15.56	**−3.09**	$\chi^2_{(3)}$	<0.001
5–8 shots	185	34.57	**3.47**	136	24.90	**−3.47**		
9–15 shots	138	25.79	**−2.26**	175	32.05	**2.26**		
+15 shots	89	16.63	**−4.29**	150	27.47	**4.29**		
Point winner								
Serve pair	321	60.00	0.71	316	57.87	−0.71	$\chi^2_{(1)}$	0.478
Serve-return pair	214	40.00	−0.71	230	42.12	0.71		
Type of point								
Non key point	383	71.58	0.65	381	69.78	−0.65	$\chi^2_{(1)}$	0.514
Key point	152	28.41	−0.65	165	30.22	0.65		
Effectiveness								
Winner	232	43.36	**3.26**	184	33.70	**−3.26**	$\chi^2_{(2)}$	0.003
Unforced error	166	31.02	**−2.62**	211	38.64	**2.62**		
Forced error	137	25.60	−0.76	151	27.65	0.76		
Shot type								
Bajada	14	2.62	−1.28	22	4.02	1.28	$\chi^2_{(13)}$	<0.001
Bandeja	41	7.69	−0.96	51	9.34	0.96		
Contrapared	18	3.37	**2.53**	6	1.09	**−2.53**		
Forehand	14	2.62	**−1.99**	27	4.94	**1.99**		
Lob	17	3.18	−1.72	29	5.31	1.72		
Out-court	9	1.68	**2.58**	1	0.18	**−2.58**		
Smash	170	31.89	**6.87**	78	14.28	**−6.87**		
Serve-return	31	5.81	1.66	20	3.66	−1.66		
Backhand	18	3.37	−1.94	32	5.86	1.94		
Back wall forehand	25	4.69	−0.85	32	5.86	0.85		
Back wall backhand	18	3.37	**−2.76**	39	7.14	**2.76**		
Serve	2	0.37	1.43	0	0.00	−1.43		
Forehand volley	72	13.50	**−3.56**	119	21.79	**3.56**		
Backhand volley	84	15.76	−0.32	90	16.48	0.32		

N: frequency; %: percentage; CSR: corrected standardized residuals; χ2: chi-squared test; $^{(df)}$: degrees of freedom; p: p-value.

padel. The corrected standardized residual for the second set in men's padel (CSR = 2.15) was considered an exploratory finding. Rally length shows that rallies with few shots are more common among men (40.18%) than women, whereas longer rallies are more prevalent in women's matches (39.74%), indicating differences between sexes ($\chi^2 = 29.937$, $p < 0.001$). Serving pair tend to win the point in most cases (57–60%). There is no significant difference in point importance between sexes, with the majority of points being non-key in both ($\chi^2 = 0.426$, $p = 0.541$). Shot effectiveness differs between sexes ($\chi^2 = 11.480$, $p = 0.003$). In men's padel, winners are the main way to end the point (43.36%), while unforced errors are more frequent in women's padel (38.64%). Shot type, defined as the last stroke of the rally regardless of whether it produced a winner, a forced error, or an unforced error, indicates that the smash is the primary finishing shot in men's padel, followed by backhand and forehand volleys (31.89%–15.76%–13.50%), with significant sex differences ($\chi^2 = 84.767$, $p < 0.001$), including more finishes than expected using the smash, contrapared, and out-of-court shot. In women's padel, forehand volley (21.79%), backhand volley (16.48%), and smash (14.28%) are the most frequent finishing shots, with statistical differences for the forehand volley, forehand and backhand wall shot compared to men padel.

The influence of the set on the number of shots per point (Figure 1) shows a mean of 9.92 shots per point in men's

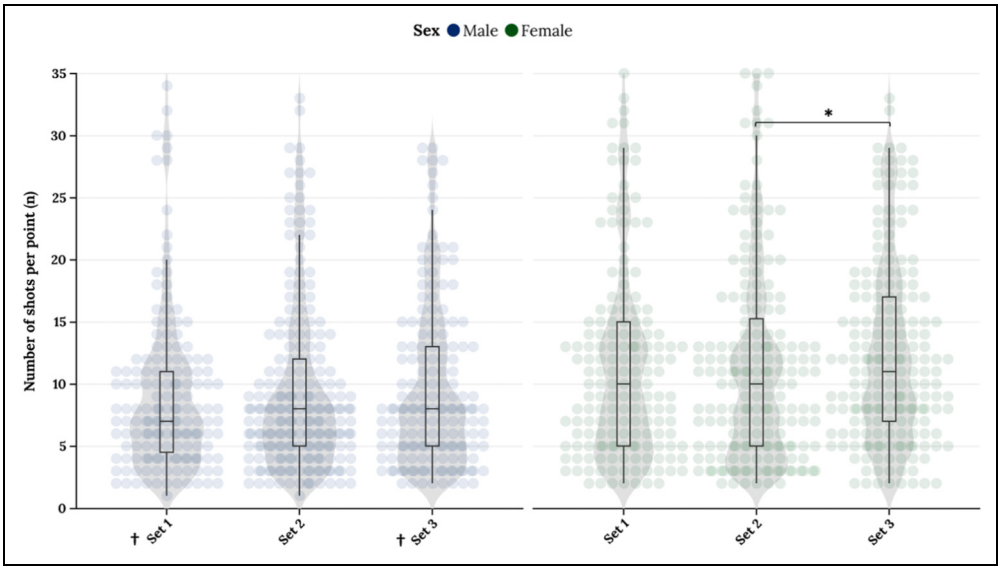

Figure 1. Number of shots per point in males and females according to the set. * = significant differences between sets in females. † = Significant differences between sexes within each set.

padel and 12.91 in women's padel. Although the ANOVA in women's padel did not indicate significant differences between sets ($F(2) = 2.837$; $p = 0.059$), the Tukey post hoc test showed an exploratory difference between Set 3 and Set 2, with a higher number of shots in Set 3 (Mean difference = 2.468; SE = 1.036; t = 2.382; pTukey = 0.046). Independent samples tests indicate significant differences in the number of shots between men and women in Set 1 (Mean difference = −3.394; t = -3.260; df = 323; p = 0.001) and Set 3 (Mean difference = −4.189; t = -4.276; df = 362; $p < 0.001$), with no differences in Set 2 (Mean difference = −1.381; t = -1.588; df = 390; p = 0.113).

In men's padel (Figure 2), rally length did not differ significantly by point type (p = 0.427), set (p = 0.476), or effectiveness (p = 0.165). However, point winner showed a significant association with rally length ($\chi^2 = 25.779$, df = 2, $p < 0.001$), with more short rallies won by the serving pair (44.18%) and more long rallies won by the receiving pair (8.96%).

The influence of rally length on point type, point winner, set, and effectiveness differed by sex. Among women (Figure 3), rally length significantly affected point type ($\chi^2 = 6.333$, df = 2, p = 0.042), with more short rallies in key points (–25.98%) and more long rallies in non-key points (50.22%). Point winner also varied with rally length ($\chi^2 = 24.344$, df = 2, $p < 0.001$), with more short rallies won by the serving pair (44.16%) and more long points won by the receiving pair (6.92%). Regarding effectiveness ($\chi^2 = 10.307$, df = 4, p = 0.036), short rallies were more likely to end in unforced errors (46.75%), while long rallies showed a higher proportion of winners (36.87%) and fewer unforced errors than expected.

Number of shots per point influences the type of finishing shot in men's ($\chi^2 = 79.433$; df = 26; $p < 0.001$; Vc = 0.273) (Table 4) and women's padel ($\chi^2 = 84.192$; df = 24; $p < 0.001$; Vc = 0.278) (Table 5). In both sexes, regardless of rally length, the smash, forehand volley, and backhand volley are the main finishing shots. In men's padel, the return is the second most frequent finishing shot in short rallies (14.01%); the backhand volley is more frequent in medium rallies as well as the bajada; and the forehand volley is used more than expected in long rallies. In women's padel, the return is the third most frequent finishing shot in short rallies (12.98%). Medium-length rallies showed an increase in points ending with a back wall forehand. Finally, in long rallies, the backhand volley was the most frequent finishing shot, displaying the largest difference compared to short and medium rallies (23.96%).

Discussion

The aim of this study was to examine the contextual and tactical characteristics of point construction and final shot outcomes in professional padel, considering both between-sex differences and within-sex dynamics. Rally length, shot effectiveness, and finishing shot type were analysed across sets, point importance, and point winners.

The results revealed clear sex-dependent patterns. The distribution of points across sets showed a non-significant trend, with men's matches showing a relatively higher proportion of points in the second set and women's matches in the third set. This pattern should be interpreted cautiously, as the corresponding corrected standardized residual was exploratory. While previous studies reported a similar number of points across sets,[40] this non-significant trend may reflect variations in rally characteristics, such as rally length and shots per point, rather than changes in game pace. Men

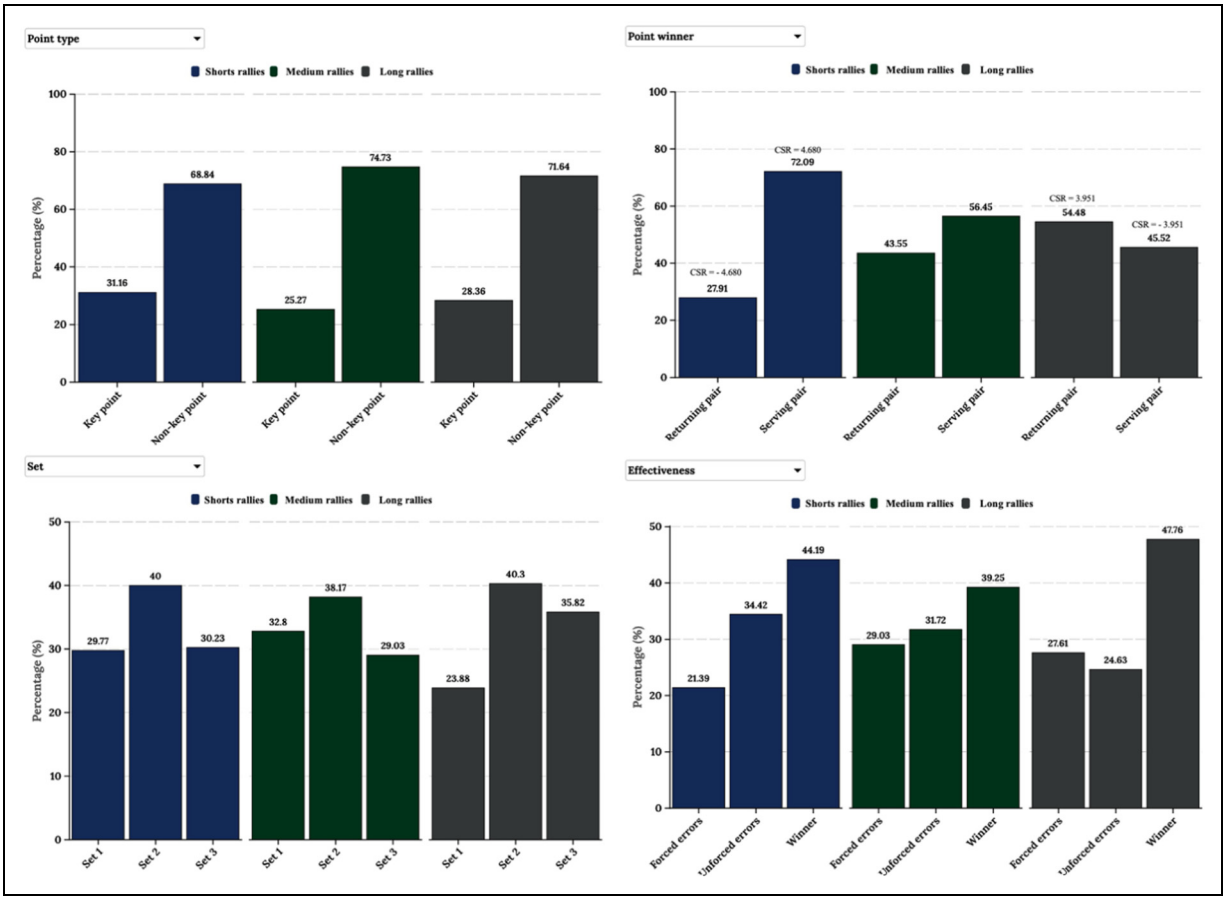

Figure 2. Point type, point winner, set and effectiveness according to the rally length in men's padel.

played a higher proportion of short rallies (<6 shots), whereas women showed more long rallies (>12 shots). In men's padel, short rallies reflect an aggressive style with early point resolution through powerful strokes,[40] supported by greater upper-body strength, explosive power, and higher smash velocity.[9] In contrast, women constructed longer rallies with greater emphasis on control, positional play, and error minimization, consistent with previous research.[13,15,19]

Regarding point effectiveness, sex differences were observed ($\chi^2 = 11.480$, $p = 0.003$). The serving pair won most points (57–60%) due to their initial net position, which facilitates control and limits opponents' attacking options.[41] Since ~70% of points finish without net exchanges,[19] this positional advantage strongly influences point resolution. Sex-specific trends showed that in men's padel, points ended most often with winners, followed by unforced and forced errors. The smash, together with back-glass and out-of-court shots, was the main finishing stroke and more frequent than in women. In women's padel, unforced errors were the most common outcome, followed by winners and forced errors. The most frequent finishing strokes were the forehand volley (21.79%), backhand volley (16.48%), and smash (14.28%). Compared with men, women showed significantly higher frequencies of forehand volley, forehand wall shot, and backhand wall shot. The recurrent use of volleys, smashes,[13] and out-of-court strokes in men reflects a highly offensive style aimed at rapid resolution. In women, anthropometric and physiological differences[9] may influence stroke selection. Although the smash yields the highest percentage of winners,[42] it is used less often; instead, women rely more on the bandeja, a lower-effectiveness stroke,[15] emphasizing net maintenance, inducing errors, and reducing risk.

Regarding match dynamics, mean shots per point were 9.92 in men's matches and 12.91 in women's matches. Earlier studies (2020 data) reported 10–11 shots with no sex differences,[13] but the present results showed a non-significant overall set effect in women's padel. An exploratory Tukey comparison indicated a higher number of shots in Set 3 than in Set 2. Thus, previous reports[13] appear applicable mainly to the second set, reinforcing the value of set-specific analyses. These results show that female players face higher shot volumes in certain phases. Women's matches also displayed an exploratory increase in shots per point from the second to the third set. Although previous work found no set-based differences,[13] the current data reveal longer rallies in the final set,

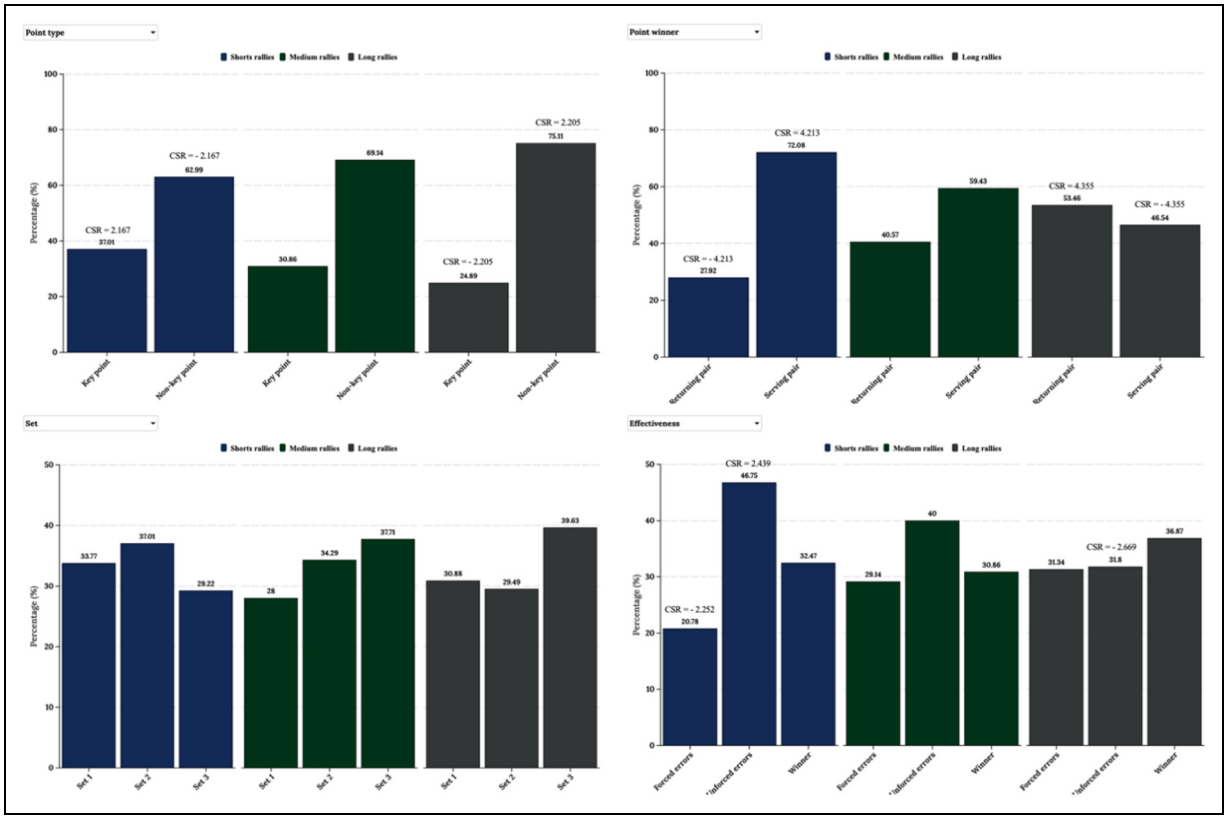

Figure 3. Point type, point winner, set and effectiveness according to the rally length in women's padel.

Table 4. Last shot used to end the point according to the rally length in men's padel.

	Short rallies		Medium rallies		Long rallies	
Shot type	N(%)	CSR	N(%)	CSR	N(%)	CSR
Bajada	3 (1.40)	−1.45	9 (4.86)	**2.35**	2 (1.50)	−0.93
Bandeja	12 (5.60)	−1.48	14 (7.56)	−0.08	15 (11.27)	1.78
Contrapared	9 (4.20)	0.86	5 (2.70)	−0.63	4 (3.00)	−0.27
Forehand	2 (0.93)	**−2.00**	5 (2.70)	0.07	7 (5.26)	**2.18**
Lob	8 (3.73)	0.58	6 (3.24)	0.04	3 (2.25)	−0.71
Out-court	1 (0.46)	−1.79	5 (2.70)	1.32	3 (2.25)	0.58
Smash	70 (32.71)	0.30	51 (27.56)	−1.585	49 (36.84)	1.39
Serve-return	30 (14.01)	**6.87**	0 (0.00)	**−4.11**	0 (0.00)	**−3.25**
Backhand	6 (2.80)	−0.60	8 (4.32)	0.87	4 (3.00)	−0.27
Back wall forehand	13 (6.07)	1.23	6 (3.24)	−1.15	6 (4.51)	−0.11
Back wall backhand	8 (3.73)	0.37	6 (3.24)	−0.13	4 (3.00)	−0.27
Serve	2 (0.93)	1.72	0 (0.00)	−1.03	0 (0.00)	−0.81
Forehand volley	25 (11.68)	−1.02	32 (17.29)	1.85	15 (11.27)	−0.87
Backhand volley	25 (11.68)	**−2.13**	38 (20.54)	**2.19**	21 (15.78)	0.00

N: frequency; %: percentage; CSR: corrected standardized residuals.

suggesting greater physical, neuromuscular, and cognitive demands late in matches. Training in women's padel should therefore emphasize managing neuromuscular fatigue, psychological resilience, and tactical adaptability.

Moreover, in women's padel, key points showed more short rallies, whereas non-key points involved longer exchanges. This aligns with research showing strategic adjustments in critical moments,[13] with serving pairs adopting a more aggressive approach to preserve their advantage. As in men's padel, serving pairs were more successful in short rallies, while receiving pairs benefited from longer exchanges. This pattern is influenced by initial

Table 5. Last shot used to end the point according to the rally length in women's padel.

	Short rallies		Medium rallies		Long rallies	
Shot type	N(%)	CSR	N(%)	CSR	N(%)	CSR
Bajada	4 (2.59)	−1.066	10 (5.71)	1.375	8 (3.68)	−0.331
Bandeja	19 (12.33)	1.508	15 (8.57)	−0.424	17 (7.83)	−0.982
Contrapared	2 (1.29)	0.281	1 (0.57)	−0.812	3 (1.38)	0.516
Forehand	6 (3.89)	−0.709	12 (6.85)	1.415	9 (4.14)	−0.698
Lob	6 (3.89)	−0.924	14 (8.00)	1.924	9 (4.14)	−0.985
Out-court	0 (0.00)	−0.627	1 (0.57)	1.457	0 (0.00)	−0.813
Smash	25 (16.23)	0.815	22 (12.57)	−0.786	31 (14.28)	0.000
Serve-return	20 (12.98)	**7.269**	0 (0.00)	**−3.129**	0 (0.00)	**−3.700**
Backhand	11 (7.14)	0.799	9 (5.14)	−0.491	12 (5.53)	−0.267
Back wall forehand	6 (3.89)	−1.225	16 (9.14)	**2.242**	10 (4.60)	−1.012
Back wall backhand	8 (5.19)	−1.108	12 (6.85)	−0.178	19 (8.75)	1.188
Forehand volley	30 (19.48)	−0.821	42 (24.00)	0.857	47 (21.65)	−0.062
Backhand volley	17 (11.03)	**−2.149**	21 (12.00)	−1.939	52 (23.96)	**3.826**

N: frequency; %: percentage; CSR: corrected standardized residuals.

positioning[41] and the frequent use of lobs, especially in women's padel, to gain net control.[16] These factors promote more open play in extended rallies, increasing receivers' success. Short rallies were also more often associated with unforced errors, whereas long rallies tended to end with winners and fewer mistakes. As previously noted,[33] early errors are common in short points due to limited construction, whereas longer rallies facilitate offensive buildup and effective resolution.

The interaction between point length and stroke type offers insight into offensive–defensive balance and the serve–return dynamic. In men's padel, rally length strongly influenced the final stroke. Short rallies often ended with the return, which, as the second stroke, showed high incidence. Although returns were traditionally not linked to winners or errors,[43] recent evidence indicates that ∼9% of points now finish with return-related errors,[44] suggesting more aggressive serving or returning aimed at gaining early control. While this increases winner opportunities, it also elevates unforced-error risk. Medium-length rallies were more frequently resolved with the bandeja and forehand volley, strokes repeated within rallies[13] whose effectiveness may decline with fatigue. In long rallies, the forehand after the bounce became more influential. Given its higher error rate,[33] prolonged defensive exchanges may heighten error likelihood, although larger samples are needed to confirm stroke-specific reliability. Rally length also influenced outcomes: serving pairs had a markedly higher probability of winning short rallies, whereas receiving pairs held a slight advantage in long ones. Exchanges typically ranged from 0–1,[19] with zero-exchange rallies favouring servers and longer rallies favouring receivers, confirming previous patterns.[45]

In women's padel, stroke selection also varied with rally length. The return remained influential in short rallies, though slightly less than in men, reflecting reduced serving advantage.[45] Medium-length rallies were most often finished with the back-wall forehand, associated with a high rate of forced errors,[46] and used to prolong play and induce mistakes. In long rallies, the backhand volley became the most common finishing stroke. As the backhand is generally more error-prone than the forehand,[8] its prominence may reflect attempts to exploit opponent weaknesses within a more conservative tactical framework.

Limitations and future prospects

This study has several limitations. All matches were analyzed indoors, so the findings may not fully apply to outdoor conditions, where wind, temperature, surface, or altitude can alter ball behavior and player performance. Additionally, the observations were nested within matches and players, with some players appearing in more than one match. Although the analyses were conducted at the point level, the assumption of independence required by the chi-square tests and ANOVAs may not have been fully met. Therefore, the effective statistical power may be lower than the nominal power estimated a priori, and future studies should consider multilevel approaches to account for the hierarchical structure of the data.

Another limitation relates to rally length analysis. While this study focused on number of shots, previous research examined rally duration in seconds, limiting direct comparisons and highlighting the need to explore how rally length interacts with other technical–tactical variables. Additionally, rallies involving lets or point replays were excluded, potentially omitting relevant situations. Furthermore, although high inter-observer agreement was observed, the distinction between forced and unforced errors involves an interpretative component that may affect the classification of these actions.

Future research should analyze matches under more diverse conditions, including outdoor settings and different altitudes, and include larger samples with unique players. It would also be valuable to examine sex-based differences across other competitive levels. Incorporating rally classifications based on positional configurations, such as whether one or both pairs reach the net, could improve understanding of tactical determinants of point success. Further work should also investigate how rally length influences stroke selection, fatigue, and match outcomes to refine performance strategies.

Practical applications

This study enhances current understanding of the key performance determinants in professional men's and women's padel by providing a detailed analysis of variables such as point winner, set, point type, effectiveness, rally length, and stroke type. The findings offer a valuable foundation for developing tactical approaches tailored to each sex and specific match contexts, whether based on the set being played or the duration of the rally. Such information can support in-match decision-making aimed at optimizing competitive performance.

Furthermore, the results can guide the design of training sessions that replicate the precise tactical and technical demands of competition. Coaches and practitioners are encouraged to implement game-based drills that simulate real match scenarios, focusing on rally length, stroke selection, and match phases to develop players' adaptability, efficiency, and strategic execution under realistic conditions. For example, training for male players may prioritize explosive net-finishing drills and aggressive return scenarios, whereas training for female players should emphasize prolonged rally construction, error management, and backhand volley efficiency during long exchanges.

Conclusion

This study identified clear technical-tactical differences between men's and women's professional padel. Serving pairs consistently held an advantage, highlighting the need for distinct serving and returning strategies. The distribution of points across sets showed a non-significant trend, with men showing a relatively higher proportion of points in the second set and women in the third, which should be interpreted as an exploratory finding. Men played more short rallies, while women engaged more often in long rallies, reflecting greater demands for explosive actions in men and endurance-based play in women.

Serving pairs were more successful in short rallies, while receiving pairs held an advantage in longer ones. In women's padel, short rallies prevailed in key points and often ended in unforced errors, whereas long rallies in non-key situations produced more winners.

Stroke outcomes also diverged: men finished points more often with winners, whereas women showed more unforced errors. Training should therefore emphasize decisive actions in men and consistency and error reduction in women. Stroke selection further reflected sex-specific tendencies. In women's padel, the most frequent finishing strokes were the forehand volley, backhand volley, and smash, while forehand wall shots and backhand wall shots were significantly more frequent than in men.

Women produced more shots per point overall, with an exploratory increase from the second to the third set, reinforcing the need for tailored tactical and physical preparation. Rally length also shaped stroke choice, with returns and transitional strokes dominating short and medium rallies, and volleys more influential in long rallies, with sex-specific patterns.

These insights underscore the relevance of context-specific tactical planning based on sex, point importance, and rally structure.

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Ethical considerations

Ethical approval was not required for this study, as the research involved the analysis of publicly available video recordings of professional padel matches and did not involve direct interaction with or intervention on human participants.

Consent to participate

Not applicable.

Consent for publication

Not applicable.

CRediT author statement

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The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data availability

The data used in this study were obtained from publicly available video recordings of professional padel matches. The datasets generated and/or analysed during the current study are not publicly available due to restrictions related to the ownership and use of the original video material but are available from the corresponding author on reasonable request, subject to any applicable restrictions.

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