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Playing side and point-ending actions in elite women's padel: a notational analysis of professional competition

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ABSTRACT

This study aimed to analyses side-dependent technical-tactical patterns and examine their association with point outcomes in elite women's padel competition. A total of 1,020 points from eight Premier Padel matches played during the 2025 season were analysed using systematic observation. Contingency table, independent-samples t-tests, and binary logistic regression models were performed. Significant differences were found between playing sides in shots per point ($p = 0.003$, d = –0.092), shot effectiveness, type of last shot, and rally duration (all $p < 0.007$; Vc = 0.099 – 0.224). Right-side players performed fewer shots per point (5.47 ± 4.70), more errors (67.47%; ASR = 3.29), finished more points with volleys (33.62%; ASR = 3.57), and concluded more long rallies (38.86%; ASR = 3.05). In contrast, left-side players accumulated more shots per point (5.90 ± 4.97), produced more winners (42.60%; ASR = 3.29), executed more point-ending smashes (24.42%; ASR = 5.95), and finished more medium-duration rallies (35.29%; ASR = 2.20). For shot effectiveness, both sides showed differences between winners and errors ($p < 0.001$, Vc = 0.532 – 0.630). Errors were mainly associated with forehand and backhand, back-wall, lobs, half-volleys, and block volleys (21–34%; ASR = 2.39–5.18), whereas winners were primarily achieved through smashes (8–21%; ASR = 8.31–12.85). Logistic regression revealed that each additional shot increased the probability of the returning pair winning the point by 3.6–3.8% (OR = 1.036–1.038; $p < 0.001$). Overall, these findings highlight side-specific technical-tactical roles in elite women's padel.

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1. Introduction

Padel is a racket sport played in a doubles format on a 20 × 10 m court enclosed by walls and metallic mesh, where these elements are an active part of the game, and where opposing pairs are separated by a central net. Classified within net/wall sports, padel is characterized by a complex interaction of cooperative and oppositional behaviours

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between teammates and opponents, requiring continuous tactical adaptation in dynamic contexts under spatial and temporal constraints. Over the past decade, the sport has experienced exponential global growth, accompanied by increasing scientific interest in the analysis of competitive performance (Denche-Zamorano et al., 2024; García-Giménez et al., 2022; Martín-Miguel et al., 2023).

Previous studies, primarily based on observational methodologies, have systematically examined variables such as stroke effectiveness, the distribution and frequency of stroke types, the number of actions per point, rally duration, and serve-related performance, as well as various contextual factors associated with game development (Almonacid et al., 2023; Bueno-García et al., 2024; Conde Ripoll, Martín-Miguel, et al., 2024; Sánchez-Alcaraz et al., 2021). This approach has enabled the identification of recurrent patterns and characteristic behaviors in competition, highlighting the relevance of specific actions such as volleys, the *bandeja*, and the smash in competitive performance. However, most of this evidence has focused on comparisons based on point outcomes or between sexes (Conde Ripoll, Boullosa, et al., 2025; Conde Ripoll, Martín-Miguel, et al., 2025; Escudero-Tena et al., 2021), paying limited attention to court side as a structural variable that may condition tactical roles and game organization.

Regarding court side, the side of play refers to the position predominantly occupied by each player within the pair, classifying them as left- or right-side players. This classification is based on each player's usual position, irrespective of occasional positional rotations during rallies (Ampuero et al., 2024; Conde-Ripoll, Boullosa et al., 2025; Ortega-Caballero et al., 2024). Traditionally, the left-side player (in right-handed pairs) is considered to adopt a more offensive role and participate more frequently in point-ending actions, whereas the right-side player assumes a more conservative role focused on point construction and rally continuity. Previous studies partially support this distinction, showing that left-side players perform more winning shots and offensive actions, while right-side players execute more control or continuity shots, with further differences in stroke distribution (Ampuero et al., 2024; Cádiz-Gallardo et al., 2025; Ramón-Llín et al., 2020). However, these studies have predominantly examined men's padel or failed to adequately differentiate by sex, limiting their applicability to elite women's padel. This distinction may be particularly relevant in women's padel, as sex-related differences in anthropometric and game characteristics may influence the technical–tactical demands of each court side. Compared to men, female players, who are generally shorter (Pradas et al., 2021), tend to use fewer powerful overhead shots, such as smashes, and rely more on *bandejas* and other shots aimed at maintaining the rally (Escudero-Tena et al., 2025). These differences contribute to longer rallies, more frequent transitions between offensive and defensive situations, and a higher overall volume of play (Almonacid et al., 2023; Escudero-Tena et al., 2024). Consequently, the division of responsibilities in building and closing out points between players on the left and right sides may differ from the patterns described above in men's padel, which supports the need for a gender-specific analysis of elite women's competition.

In addition to the analysis of specific technical-tactical actions, the study of performance in padel requires consideration of structural variables of the point that helps to understand how the game is organized in competition. In this sense, aspects such as rally duration, the number of strokes performed by each player, and the status of the point-winning pair (serve vs. return) have been shown to be relevant indicators of game

development and outcome (Conde Ripoll, Boullosa, et al., 2025; Escudero-Tena et al., 2026; Martín-Miguel, Conde Ripoll, et al., 2026). Moreover, other structural conditions, such as differences between main and qualifying draws, have also been shown to influence performance in padel competition (Conde-Ripoll, Boullosa, Gómez-Carmona, et al., 2025). In elite women's padel, where rallies tend to be longer and point construction assumes greater importance, these variables and structural conditions may provide key insights into competitive dynamics and the distribution of responsibilities among players according to their court position. However, the analysis of other structural aspects, such as the relationship with the side of the court, remains limited, particularly in the context of high-level women's performance.

Therefore, the aims of the present study were twofold: (i) to analyses technical–tactical patterns according to court side and their relationship with point-ending actions in elite women's padel competition, and (ii) to identify match-related variables associated with the probability of winning the point. Specifically, the effectiveness of final actions (winners and errors), the type of last shot, rally duration, the point-winning pair, and the number of shots performed by each court side were analysed, together with the influence of these variables on point outcomes. It was hypothesized that technical–tactical demands would differ between court sides, with left-side players showing greater involvement in point-ending actions and performing a higher number of attacking and decisive shots, whereas right-side players would contribute more to rally construction. In addition, it was hypothesized that point-winning probability would be higher when rallies were resolved through offensive actions, particularly winners and attacking shots, and that rally duration and the distribution of shots between court sides would significantly influence point outcome. Through a systematic observational approach, this study seeks to provide evidence that contributes to a better understanding of performance in elite women's padel and that may be useful for coaches and players in optimizing competitive strategies.

2. Methods

2.1. Research design

A descriptive, observational, cross-sectional design was employed to examine playing patterns in elite women's padel competition. The study followed a quantitative, non-experimental approach based on retrospective analysis of previously recorded matches, with no researcher intervention in the competitive setting. Match actions were systematically observed, coded using predefined criteria, and subsequently analysed through inferential statistics (Ato et al., 2013).

2.2. Sample

A total of 1,020 points derived from eight professional women's padel matches (18 sets) were analysed. The point was considered the primary unit of analysis ($n = 1{,}020$). For analyses involving the side of the point-ending action, each point contributed a single observation according to whether the final shot was executed by the left- or right-side player. Therefore, left- and right-side observations represented mutually exclusive

subsets of the 1,020 analysed points rather than separate observations for both players within each point. Matches were selected from the quarterfinal, semifinal, and final rounds of eight tournaments on the 2025 Premier Padel circuit.

Sample size was estimated a priori using G*Power 3.1 software. For analyses involving categorical variables, chi-square tests of independence were planned. Assuming a medium effect size ($w = 0.25$), $\alpha = 0.05$, statistical power $(1 - \beta) = 0.80$, and up to 10 degrees of freedom, the minimum required sample size was 260 points. For comparisons of continuous variables between playing sides, independent-samples t-tests were planned. Under assumptions of a medium effect size ($d = 0.50$), $\alpha = 0.05$, and power = 0.80, the required minimum sample was 102 points (51 per group). The final sample of 1,020 points substantially exceeded these thresholds, providing adequate power for all planned analyses and reducing the likelihood of type II errors.

A total of 24 different players participated (age: 25.71 ± 5.91 years; height: 169.70 ± 6.11 cm), all of whom had experience competing at a professional level. Player handedness was not individually recorded; therefore, the interpretation of side-specific roles presented in the Discussion relies on the general predominance of right-handed players reported in professional padel (Courel-Ibáñez & Sánchez Alcaraz-Martínez, 2018; Ramón-Llín et al., 2021), rather than on direct verification within the present sample. Only rallies with full video visibility and clearly identifiable shot sequences were included. Points affected by camera obstruction or ambiguity in action identification were excluded to preserve data validity.

All matches were played under indoor conditions on official padel courts with a synthetic turf surface, ensuring comparable environmental conditions across observations and limiting potential confounding effects related to weather or court variability. Match footage was obtained from the official Red Bull TV platform (https://www.redbull.com/us-en/event-series/premier-padel).

The study was conducted in accordance with the Declaration of Helsinki (World Medical Association, 2013) and received approval from the relevant institutional Ethics Committee (Ref. 166//2023). No personal or sensitive data were processed, as all analysed material was publicly available.

2.3. Variables

The following variables were defined according to their categorical nature and degree of openness (Anguera & Hernández-Mendo, 2015).

- Side of play. Players were classified as right- or left-side players according to previous research (Ramón-Llín et al., 2021), based on their position at the beginning of each point. This classification was maintained throughout the point, irrespective of any positional switches during the rally.
- Number of shots per side. The total number of strokes executed by the left-side player and the right-side player within each point was recorded separately.
- Effectiveness. Point-ending actions were classified as *winners*, and *errors*, in line with previous performance analysis studies (Conde Ripoll, Boullosa, et al., 2025). A *winner* was defined as a stroke that directly ended the rally without being contacted by the opponent or leaving any realistic possibility of continuation (i.e.

the ball bounces correctly on the opponent's court and then bounces again, or hits the opponent's body before going out). An *error* referred to an error committed under evident tactical or technical pressure induced by the opponent's action, or as a mistake not directly caused by the opponent's shot or situational pressure (i.e. volley into the net, smash out of bounds, failed lob).

- Last shot. The final stroke used to conclude the point was categorized into specific technical actions. Operational definitions for each stroke type were established based on previous observational research conducted in professional padel contexts (Conde Ripoll, Boullosa, et al., 2025; Martín-Miguel, Almonacid, et al., 2024).
- Point winner. The pair winning each point was identified, distinguishing between the serving pair and the receiving pair.
- Point duration. Rally length was categorized as short (1–6 shots), medium (7–12 shots), or long (>12 shots), following the distribution criteria proposed in prior elite padel research (Prieto-Lage et al., 2024).

2.4. Procedures

Data were obtained through systematic observation of professional women's padel matches from the 2025 Premier Padel season. All matches were broadcast live and are publicly accessible via the Red Bull TV platform (https://www.redbull.com/us-en/event-series/premier-padel).

Observational analysis was conducted using the specialized software LINCE (Soto-Fernández et al., 2022). Data coding was performed by an observer with formal training in padel and specific preparation for the operational definitions of the study variables. Prior to data collection, the observer completed a familiarization process to minimize coding bias and ensure consistent application of the criteria.

To assess data quality, both intra- and inter-observer reliability were evaluated. For intra-observer reliability, the primary observer reanalyzed a randomized subsample of 150 points, representing approximately 10–20% of the total dataset, after a temporal separation to reduce recall bias (Schwesig et al., 2020). For inter-observer reliability, the same subsample was independently analysed by a second observer holding a PhD in Sport Sciences and extensive experience in performance analysis and scientific publication. Reliability coefficients exceeded 0.90 for all variables, which is considered very high and indicative of strong observational consistency (Altman, 1990).

2.5. Statistical analysis

Descriptive statistics are reported as mean ± standard deviation. Inferential analysis was conducted using contingency tables, with the chi-square (χ^2) test applied to examine associations between categorical variables. Corrected standardized residuals (CSR) were calculated to identify cells with observed frequencies significantly higher or lower than expected; absolute CSR values > |1.96| were considered indicative of statistically relevant deviations (Field, 2018). To quantify the magnitude of associations between categorical variables, Cramer's V coefficient (Vc) was computed (Field, 2018). The strength of association was interpreted as small (<0.10), low (0.10–0.29), moderate (0.30–0.49), or high (>0.50), in accordance with established methodological criteria (Crewson, 2006). In

addition, subsequent Z-tests were performed to compare column proportions, adjusting for p values < 0.05 according to Bonferroni. This correction was applied specifically to post-hoc pairwise comparisons within each significant omnibus test. Given the number of omnibus tests conducted across the study (nine in total, including contingency-table analyses, the independent-samples t-test, and the two logistic regression models), a sensitivity analysis was performed applying a conservative family-wise Bonferroni correction ($\alpha = 0.05/9 = 0.0056$). All significant findings remained robust under this stricter threshold, with the exception of the association between point duration and side of play, which should therefore be interpreted with additional caution. To compare the number of strokes executed between playing sides, paired-samples Student's t-tests were performed, contrasting strokes performed by right-side and left-side players, with Cohen's d (d) performance to interpreted the effect size (Cohen, 2013). Additionally, binary logistic regression models were fitted to identify contextual and technical–tactical predictors associated with the probability of the receiving pair winning the point. The dependent variable was point outcome (receiving pair win vs. loss). Independent variables included rally duration category, playing side of the final stroke, type of last shot, and effectiveness (winner and error). Results are reported as odds ratios (OR) with 95% confidence intervals. Although logistic regression enables the simultaneous examination of multiple predictors, causal inferences cannot be drawn due to the cross-sectional and observational nature of the design (Hosmer et al., 2013). The level of statistical significance was set at $p < 0.05$. All statistical analyses were conducted using JASP software (version 0.19), while graphical visualizations were created using Flourish Studio.

3. Results

Inferential analysis of the number of shots per side revealed significant differences ($p = 0.003$; $d = -0.092$), with a greater number of strokes performed by the left-side player (5.90 ± 4.97) compared with the right-side player (5.47 ± 4.70) (Figure 1). Moreover, side

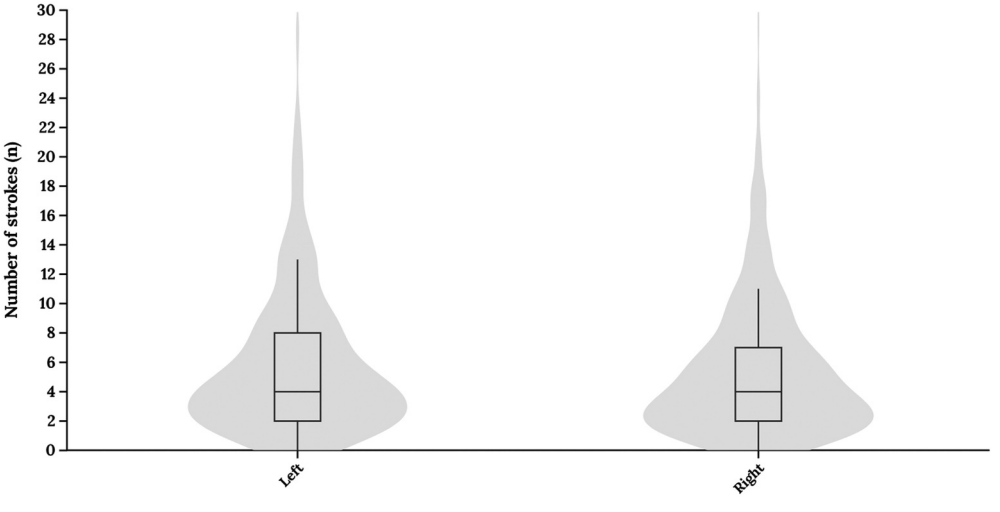


Figure 1. Number of shots per point according to the side of play.

of play revealed significant differences in shot effectiveness between the right and left sides ($\chi^2 = 10.84$, $p < 0.001$, Vc = 0.103). Errors predominated on both sides (left: 57.40%; right: 67.47%), with a higher-than-expected incidence of errors on the right side (ASR = 3.29) and a higher incidence of winners on the left side (ASR = 3.29). Significant differences were also observed for the type of last shot used to finish the point ($\chi^2 = 51.12$, $p < 0.001$, Vc = 0.224). Volleys, smashes, and *bandeja* strokes accounted for approximately 54–60% of rally-ending shots. Volleys occurred more frequently than expected on the right side (ASR = 3.57), whereas smashes were overrepresented on the left side (ASR = 5.95). Regarding point winner, no significant differences were found between sides of play ($\chi^2 = 0.027$, $p = 0.870$, Vc = 0.005). Across both sides, the serving pair won approximately 57% of the points, irrespective of which player executed the final shot. Point duration was significantly associated with the player finishing the rally ($\chi^2 = 9.939$, $p = 0.007$, Vc = 0.099). Medium-length rallies were more frequently ended by the left-side player (ASR = 2.20), whereas longer rallies showed a higher-than-expected frequency of being finished by the right-side player (ASR = 3.05) (Table 1).

Table 2 presents stroke effectiveness according to side of play, distinguishing between errors and winners. The analysis includes the same observations and number of point-ending actions as those reported in Table 1. On the right side ($\chi^2 = 129.5$, $p < 0.001$, Vc = 0.532), errors showed significant ASR for forehand/backhand (ASR = 3.82), backwall shots (ASR = 2.88), lobs (ASR = 4.60), half-volley (ASR = 2.39), and block volley (ASR = 2.78). In contrast, winners on the right side were primarily associated with smashes (ASR = 8.31), volleys (ASR = 2.30), and recovery smashes (ASR = 2.21).

On the left side of play, a clearer differentiation between errors and winners was observed ($\chi^2 = 222.5$, $p < 0.001$, Vc = 0.630). Errors were significantly associated with backwall shots (ASR = 4.01), forehand/backhand shots (ASR = 4.48), lobs (ASR = 4.91), half-volley (ASR = 3.02), block volley (ASR = 5.18), and *contrapared* shots (ASR = 2.29). Winners on the left side were strongly associated with smashes (ASR = 12.85).

Table 1. Inferential analysis according to the side of play.

		Left			Right			Inference		
		N	%	ASR	N	%	ASR	X2 (df)	p	Vc
Effectiveness	Error	323	57.40b	−3.29	309	67.47a	**3.29**	10.84 (1)	<0.001	0.103
	Winner	239	42.60b	**3.29**	149	32.53a	−3.29			
Last shot	Backwall shot	47	8.38	−1.70	53	11.57	1.70	51.12 (11)	<0.001	0.224
	Out court	1	0.18	0.90	0	0.00	−0.90			
	Forehand-Backhand	38	6.77	−1.05	39	8.52	1.05			
	Volley	132	23.53b	−3.57	154	33.62a	**3.57**			
	Smash	137	24.42b	**5.95**	46	10.04a	−5.95			
	Lob	35	6.24	−1.52	40	8.73	1.52			
	Bajada	25	4.46	−0.10	21	4.59	0.10			
	Half-volley	12	2.14	−1.50	17	3.71	1.50			
	Bandeja	73	13.01	0.91	51	11.14	−0.91			
	Block volley	34	6.06	1.04	21	4.59	−1.04			
	Contrapared	7	1.25	−0.38	7	1.53	0.38			
	Recovery smash	20	3.57	1.53	9	1.97	−1.53			
Point winner	Serve-return pair	236	42.07	−0.16	195	42.58	0.16	0.027 (1)	0.870	0.005
	Serve pair	325	57.93	0.16	263	57.42	−0.16			
Point duration	Short	196	34.94	0.88	148	32.31	−0.88	9.939 (2)	0.007	0.099
	Medium	198	35.29b	**2.20**	132	28.82	−2.20			
	Large	167	29.77	−3.05	178	38.86	**3.05**			

Table 2. Shot effectiveness according to the side of play.

	Left						Right					
	Error			Winner			Error			Winner		
Last shot	N	%	ASR	N	%	ASR	N	%	ASR	N	%	ASR
Backwall shot	40	7.13a	**4.01**	7	1.25b	−4.01	45	9.83a	**2.88**	8	1.75b	−2.88
Out court	1	0.18	0.86	0	0.00	−0.86	NA	NA	NA	NA	NA	NA
Forehand-Backhand	35	6.24a	**4.48**	3	0.53b	−4.48	37	8.08a	**3.82**	2	0.44b	−3.82
Volley	77	13.73	0.25	55	9.80	−0.25	93	20.31a	−2.30	61	13.32b	**2.30**
Smash	14	2.50a	−12.85	123	21.93b	**12.85**	6	1.31 a	−8.31	40	8.73b	**8.31**
Lob	34	6.06a	**4.91**	1	0.18b	−4.91	40	8.73a	**4.60**	0	0.00b	−4.60
Bajada	15	2.67	0.27	10	1.78	−0.27	13	2.84	−0.56	8	1.75	0.56
Half-volley	12	2.14a	**3.02**	0	0.00b	−3.02	16	3.49a	**2.39**	1	0.22 b	−2.39
Bandeja	44	7.84	0.53	29	5.17	−0.53	29	6.33	−1.71	22	4.80	1.71
Block volley	34	6.06a	**5.18**	0	0.00b	−5.18	20	4.37a	**2.78**	1	0.22b	−2.78
Contra pared	7	1.25a	**2.29**	0	0.00b	−2.29	7	1.53	1.85	0	0.00	−1.85
Recovery smash	9	1.60	−1.14	11	1.96	1.14	3	0.66a	−2.21	6	1.31b	**2.21**

NA = not applicable because no out-court shots were observed on the right side.

Table 3. Logistic regression analysis predicting the probability of the returning pair winning the point based on rally characteristics.

Predictor	OR	95% CI	p
Total strokes	1.038	[1.022, 1.054]	<.001
Last stroke outcome (winner)	0.788	[0.606, 1.025]	.075
Side of last stroke (left)	1.061	[0.822, 1.370]	.649

Odds ratios (OR) greater than 1 indicate a higher likelihood of the receiving pair winning the point. Reference categories were error for last stroke outcome and right side for side of play.

Two binary logistic regression models were conducted. The first model examined rally-related contextual variables and significantly predicted point outcome ($\chi^2 = 26.08$, $p < 0.001$; Table 3). Rally length was positively associated with the probability of the receiving pair winning the point, with each additional stroke increasing the odds by 3.8% (OR = 1.038). No significant effects were observed for side of play or last shot outcome. Although executing a winner tended to reduce the probability of the returning pair winning the point compared with committing an error, this effect did not reach statistical significance (OR = 0.788, $p = 0.075$).

A second logistic regression model assessed the influence of the stroke type used to finish the rally on point outcome (Table 4). The overall model was statistically significant ($\chi^2 = 69.24$, $p < 0.001$). Compared with the reference category (backwall shot), volleys (OR = 1.85, 95% CI [1.15–2.97], $p = 0.011$), bajadas (OR = 2.11, 95% CI [1.03–4.31], $p = 0.041$), and bandejas (OR = 2.05, 95% CI [1.18–3.53], $p = 0.010$) were associated with higher odds of the receiving pair winning the point. No significant effects were observed for the remaining stroke types, including backwall shots, half-volleys, block volleys, smashes, lobs, recovery smashes, or counter-wall strokes (all $p > 0.05$), nor for the side of the last stroke ($p = 0.475$). Total number of strokes remained a significant covariate, with each additional stroke increasing the odds of the receiving pair winning the point (OR = 1.04, 95% CI [1.02–1.05], $p < 0.001$).

Table 4. Logistic regression analysis examining the influence of the stroke type used to finish the rally on the probability of the returning pair winning the point.

Stroke type (ref. backwall shot)	OR	95% CI	p
Drive/Backhand	0.659	[0.340, 1.276]	.216
Volley	1.851	[1.151, 2.977]	.011
Smash	0.843	[0.500, 1.423]	.523
Lob	0.692	[0.356, 1.345]	.277
Bajada	2.107	[1.029, 4.310]	.041
Half-volley	1.915	[0.826, 4.440]	.130
Bandeja	2.048	[1.185, 3.538]	.010
Block volley	1.346	[0.683, 2.654]	.392
Contra pared	0.391	[0.101, 1.513]	.174
Recovery smash	1.365	[0.584, 3.187]	.473
Out-of-court stroke	<0.001	[<0.001, >999]	.971
Side of last stroke (left)	1.102	[0.845, 1.435]	.475
Total strokes	1.036	[1.020, 1.053]	<.001

Odds ratios (OR) greater than 1 indicate a higher likelihood of the receiving pair winning the point. The reference category for stroke type was backwall shot. The model was adjusted for total strokes and the side of the final stroke.

4. Discussion

Through the perspective of understanding technical–tactical behaviours associated with point-ending actions in elite women's padel, this study analysed side-specific performance patterns and identified match-related variables associated with winning probability. The findings revealed a clear differentiation between playing sides. Right-side players performed fewer total strokes, committed more errors, finished more points with volleys, and concluded a higher proportion of long rallies. In contrast, left-side players accumulated more strokes per point, produced more winners, executed more point-ending smashes, and finished more medium-duration rallies. Across both court sides, errors were mainly associated with forehand and backhand, back-wall shots, lobs, and half-volley shots, whereas winners were predominantly achieved through smashes, with volleys and recovery smash also contributing substantially on the right side. Similarly, key performance indicators showed that each additional stroke increased the probability of the receiving pair winning the point by 3.8–4.0%. Compared with background stroke, points ending with volleys, *bandejas*, and *bajada* shots by the returning pair increased the likelihood of winning the point, whereas points ending with a winner tended to reduce this probability. Collectively, these findings suggest that court side plays a key role in shaping technical–tactical behaviours in elite women's padel and influences how players contribute to point construction and resolution.

Player side differences provide novel evidence regarding side-specific roles in elite women's padel and support the main hypothesis that technical–tactical demands are not distributed equally between players. Left-side players performed a greater number of shots per point than right-side players. However, despite the statistical significance of this difference, its magnitude was trivial, with an absolute difference of only 0.43 shots per point (5.90 ± 4.97 vs. 5.47 ± 4.70), limiting its practical relevance. Nevertheless, given that padel rallies generally involve relatively few shots (Almonacid et al., 2023), even small differences may reflect subtle variations in how participation is distributed during rally construction rather than a substantial tactical advantage. To our knowledge, the only available evidence considering both playing side and sex-related differences is

physiological rather than technical–tactical: Cádiz-Gallardo et al. (2025) examined acute cytokine dynamics according to playing side and found sex-related differences in the physiological demands associated with each court position. However, no previous study has examined whether these side-based asymmetries extend to technical–tactical behaviors and point-ending actions in elite women's padel. The present study addresses this gap by providing the first side-specific technical–tactical analysis conducted exclusively in elite women's padel competition.

Although comparable evidence in elite women's padel is scarce, these findings are broadly consistent with observations in male players, where left-side players have been reported to assume a more active role in offensive actions and point resolution (Ramón-Llín et al., 2020). However, this comparison should be regarded as tentative rather than directly transferable to women's padel, as recent evidence has identified sex-specific differences in rally length and final-shot effectiveness, suggesting that technical–tactical behaviours may not develop equally in male and female players (Escudero-Tena et al., 2026). Moreover, previous research has shown that play through the central corridor predominates across all court zones in women's padel (Sánchez-Alcaraz, Muñoz, Escudero-Tena, et al., 2022). Given the predominance of right-handed players and the tactical advantage of covering the centre with the dominant side (Courel-Ibáñez & Sánchez Alcaraz-Martínez, 2018; Ramón-Llín et al., 2021), left-side players may have greater opportunities to intervene in rallies and adopt a slightly more active role during play.

Regarding effectiveness, although errors were the most frequent outcome, in line with previous investigations (Sánchez-Alcaraz, Muñoz, Sánchez-Pay, et al., 2022), the preferred shot used to finish points and its effectiveness differed by court side. These findings likely reflect side-specific technical–tactical functions within the pair, influenced by players' dominant stroke profiles. Although evidence in women's padel remains limited, a broadly similar side-specific pattern has been reported in male players, with right-side players tending to use more volleys and left-side players performing more smashes (Ramón-Llín et al., 2020). Nevertheless, this comparison should be considered tentative, as sex-specific technical–tactical differences may limit the direct transferability of findings from men's to women's padel. As a plausible, though untested, hypothesis, given that handedness was not individually recorded in the present sample, the predominance of right-handed pairings may partly explain this pattern, as the left-side position would facilitates smash execution with the dominant side and provides more favourable offensive angles (Sánchez-Alcaraz et al., 2020). Considering the high effectiveness traditionally associated with smashes in padel (Conde Ripoll, Sánchez-Alcaraz, et al., 2024), left-side players may generate more winners through this stroke. Conversely, right-side players appear to adopt a playing style focused on maintaining rally continuity and creating offensive opportunities through frequent volleys (Ampuero et al., 2024). Given that volleys are also associated with a considerable proportion of errors (Conde Ripoll, Martín-Miguel, et al., 2025), the performance profile of right-side players seems characterized by greater involvement in point construction rather than point resolution, assuming a supportive role that facilitates the offensive actions of the left-side player. Moreover, although evidence linking court side and rally duration is currently lacking, previous studies have shown that most points are won during medium-length rallies, whereas longer exchanges are associated with a greater incidence of errors and sustained

rally construction (Courel-Ibáñez et al., 2017). This may partly explain why left-side players more frequently finish medium-length rallies, whereas right-side players become more involved in prolonged exchanges, although the association between court side and rally duration did not survive a conservative family-wise correction and should therefore be interpreted cautiously.

Shot effectiveness followed similar patterns across both court sides. Background strokes, including back-wall shots, forehand and backhand, lobs, block volley, and half-volley shots, were most frequently associated with errors, consistent with previous research identifying these strokes as major sources of unsuccessful outcomes during rally construction (Conde Ripoll, Martín-Miguel, et al., 2024). In contrast, volleys and smashes accounted for most winning shots (Martín-Miguel et al., 2025). Nevertheless, some side-specific differences emerged. On the left side, *contrapared* were associated with a higher-than-expected frequency of errors, whereas on the right side, volleys and recovery smashes generated more winners than expected. This may be related to the lob–*contrapared* and lob–recovery smash sequences previously identified in padel, which are commonly associated with errors and winners, respectively (Martín-Miguel et al., 2025). Therefore, the present findings may suggest that each player assumes a different role within these tactical sequences, although further research is needed to confirm this interpretation.

Finally, the influence of specific match-related variables on the probability of winning the point supports the second hypothesis and highlights several key performance indicators associated with success in elite women's padel. Previous research has suggested that longer rallies tend to reduce the advantage traditionally enjoyed by the serving pair (Martín-Miguel, Romero-Maraver, et al., 2026). Evidence from men's padel has shown that this advantage may disappear at approximately the eleventh shot of the rally (Martín-Miguel, Muñoz, et al., 2024), although this finding should only be considered as a tentative reference when interpreting women's competition. The present findings provide complementary evidence specific to elite women's padel, showing that each additional shot increased the probability of the returning pair winning the point by approximately 3.8–4.0%, indicating that success becomes progressively more balanced as rally length increases. Based on the observed odds ratios, point outcome appears to approach parity at around the thirteenth shot, suggesting that prolonged exchanges gradually diminish the tactical benefits associated with the serve. From a practical perspective, serving pairs may benefit from maintaining their initial advantage during the early phases of the rally, whereas returning pairs may seek to prolong the exchange until this advantage is progressively reduced. Accordingly, coaches could consider rally length when designing tactical training scenarios that reproduce the demands of the early and later phases of the point.

In addition, the tendency for winners to reduce the probability of the returning pair winning the point is consistent with the tactical structure of padel. Previous studies have shown that most winning shots are executed from offensive positions near the net (Courel-Ibáñez et al., 2015; Escudero-Tena et al., 2023). Given the relatively low net exchanges (Escudero-Tena et al., 2023), returning pairs that fail to gain access to the offensive zone are likely to lose the point through a winner executed by their opponents. Conversely, when the returning pair successfully establishes a net position, the use of strokes such as volleys and *bandejas* significantly increases their probability of winning

the point. As these shots are commonly employed in the net and transition zones to maintain the rally (Ampuero et al., 2025), they allow players to sustain control of the net and create additional opportunities to win the point. Collectively, these findings reinforce the importance of rally length and net dominance as critical factors influencing point outcomes in elite women's padel.

4.1. Limitations and future research

Despite the valuable findings of this study, several limitations should be considered when interpreting the results. First, the limited body of research currently available in elite women's padel restricted the possibility of directly comparing and contextualizing the findings. Consequently, several interpretations were supported by evidence obtained from men's padel, which may not fully reflect the specific characteristics of the women's game. Future research should therefore focus on expanding the scientific knowledge of elite women's padel, given the current lack of evidence in this population. Second, players were not classified according to handedness. As right- and left-handed players may assume different tactical roles and court positioning, this factor could influence the observed performance patterns. However, all players were included to maximize sample size and ecological validity. Future studies should examine side-specific behaviours according to players' dominant hand. Third, the potential lack of independence between observations should be acknowledged, as multiple points were obtained from the same matches and pairs. Although a large number of points were analysed, they were derived from relatively few matches, potentially limiting the generalizability of the findings across pairs and playing styles. Future studies should include a larger and more diverse sample of matches and pairs to improve representativeness and generalizability. Finally, future investigations should explore technical–tactical sequences according to court side to better understand the mechanisms underlying the positional differences observed in point-ending actions.

4.2. Practical applications

The identification of side-specific tactical roles in elite women's padel provides valuable information for the design of training programmes tailored to the demands of each playing position. Coaches may individualize training according to players' involvement in rally construction, point-ending actions, preferred shot selection, and the influence of rally duration on performance. Furthermore, these findings may assist practitioners in developing position-specific tactical strategies for both serving and receiving situations, thereby improving decision-making and enhancing competitive performance.

5. Conclusion

In conclusion, elite women's padel is characterized by distinct side-specific roles, with left-side players showing greater involvement in rally construction and a higher capacity to generate winning shots. In contrast, right-side players appear to adopt a more complementary role, with more errors committed and a possible, though weak and non-robust, association with longer rallies. Regardless of court side, baseline shots are the main source

of errors, whereas volleys and smashes account for most winning shots. Nevertheless, some side-specific differences were observed, which may indicate that the effectiveness of certain shots is influenced by the specific tactical demands of each position. Although several of these differences were statistically significant, their generally small-to-low effect sizes suggest that their practical relevance should be interpreted cautiously. Finally, rally length and the type of finishing shot appear to be key performance indicators in elite women's padel. Longer rallies progressively reduce the serving pair's advantage and increase the likelihood of success for the receiving pair, while winning shots are predominantly associated with the serving pair, and the use of volleys, *bajadas* and *bandejas* by the receiving pair increases their probability of winning the point. Overall, these findings extend the predominantly male-based padel literature by providing specific evidence on the tactical and technical demands of elite women's competition, highlighting patterns that should not necessarily be extrapolated from men's padel.

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Author contributions

CRediT: **Diego Muñoz:** Conceptualization, Data curation, Formal analysis, Investigation, Writing – original draft, Writing – review & editing; **Alejandro Palomino-García:** Data curation, Formal analysis, Writing – review & editing; **Adrián Escudero-Tena:** Formal analysis, Methodology, Writing – original draft; **Bernardino Javier Sánchez-Alcaraz:** Data curation, Methodology, Supervision, Validation, Writing – review & editing; **Iván Martín-Miguel:** Conceptualization, Data curation, Formal analysis, Methodology, Visualization, Writing – original draft.

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Ethical considerations

The study was conducted in accordance with the Declaration of Helsinki (World Medical Association, 2013) and received approval from the relevant institutional Ethics Committee (Ref. 166//2023).

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