

RESEARCH ARTICLE

A case series analysis of match-play performance characteristics in 2025 Grand Slam champions: Profiles of Jannik Sinner and Carlos Alcaraz

Göktürk Samet Kılıç , Mehmet Akif Gündoğdu 

Graduate Education Institute, Tokat Gaziosmanpaşa University, Türkiye.

Abstract

Aim: This study descriptively examined the in-match performance characteristics of male tennis players who won the 2025 Grand Slam tournaments. **Method:** Match data from 27 matches were collected from the official websites of the Australian Open, Roland Garros, Wimbledon, and US Open. Performance variables included aces, double faults, unforced errors, winners, first serve percentage, points won on first serve, points won on second serve, break points won, net points won, total points won, and match duration. Differences between tournaments were analyzed using one-way analysis of variance (ANOVA), with post-hoc pairwise comparisons conducted, and effect sizes were calculated using Hedges' *g*. To control for Type I error associated with multiple comparisons, a Bonferroni correction was applied. **Results:** Initial analyses suggested potential differences between tournaments for aces, winners, and unforced errors. However, after applying a Bonferroni correction for multiple comparisons, no statistically significant differences were detected. **Conclusion:** The findings should be interpreted as a descriptive overview of the match-play performance profiles observed in the players included in this study.

Keywords: Grand Slam, match analysis, men's tennis.

Introduction

Modern tennis is a dynamic, open-skill sport in which players are required to continuously adjust their technical and tactical behaviors in response to environmental and contextual constraints encountered during match play (Cui, 2018). In this respect, tennis performance cannot be explained solely by individual technical proficiency but emerges from the interaction of multiple factors, including game tempo, opponent-related demands, court surface characteristics, and specific match context (Crespo et al., 2024). Consequently, the evaluation of tennis performance should be undertaken within the framework of different competitive environments and tournament settings.

Although numerous international tournaments are held throughout the year, the most prestigious events in terms of sporting significance, ranking points, and economic value are the Grand Slam tournaments, consisting of four major events (Fernandez et al., 2006; Kilit & Balaban, 2018). These tournaments differ in terms of court surfaces, with the Australian Open and US Open played on hard courts, Roland Garros on clay, and Wimbledon on grass. Such differences influence match tempo and technical-tactical demands (Del Corral & Prieto-Rodríguez, 2010), making match analysis an important tool for understanding performance characteristics in different competitive contexts.

Competition analyses provide valid and reliable data on technical, tactical, and decision-making processes, offering

a scientific basis for performance evaluation and training optimization (Cui, 2018; Doğan et al., 2021). Previous studies have examined match performance in Grand Slam tournaments using various performance indicators (Raizada et al., 2025), which are closely related to point-winning probability and match outcomes (Prieto-Lage et al., 2023). These indicators allow for a structured evaluation of match-play characteristics.

The serve is considered a key performance component in elite tennis, as it represents the only action initiated without direct opponent interference. Accordingly, variables such as serve performance, rally outcomes, winners, unforced errors, and match duration are frequently analyzed in performance studies (Doğan et al., 2021; Xiao et al., 2025). In particular, rally-related findings suggest that a large proportion of points are decided within short sequences, emphasizing the importance of serve effectiveness and early rally performance (Prieto-Lage et al., 2023).

However, the existing literature has predominantly focused on broader player samples, while relatively few studies have specifically examined the match-play characteristics of championship-winning players within a single season. Focusing on such performances may provide a descriptive perspective on how match-related indicators manifest in players who achieved tournament success.

Therefore, the aim of the present study was to descriptively examine the match-play performance characteristics of the players who won the 2025 Grand

Slam tournaments, based on multiple performance indicators.

Methods

Study Design and Participants

This study employed a descriptive notational analysis to examine the in-match performance characteristics of the 2025 Grand Slam champions, focusing on Jannik Sinner and Carlos Alcaraz. Given the limited number of players and matches, the study is presented as a case series, providing descriptive insights into the championship performances of these two individuals. All matches from the first round to the final of the four major tournaments were included, except for one Wimbledon match that was excluded due to an opponent withdrawal (walkover). A total of 27 matches were analyzed: Roland Garros (n = 7), US Open (n = 7), Wimbledon (n = 6), and Australian Open (n = 7). The study explicitly acknowledges that tournament differences may be confounded by player-specific characteristics. Consequently, interpretations are limited to the observed performances of these two players.

Data Collection and Verification

Match statistics were manually extracted from the official websites of the Australian Open, Roland Garros, Wimbledon, and the US Open by two independent researchers. To ensure accuracy, all data were cross-checked and any discrepancies between observers were resolved through consensus. Data were collected in January 2026. Matches with missing or incomplete data were excluded from analysis. While inter-observer reliability was qualitatively confirmed, formal reliability metrics were not calculated due to the descriptive nature of the study. These procedures ensure methodological transparency and reproducibility within the limitations of a case series design.

Performance Variables

A total of 11 performance indicators were examined: technical metrics (aces, winners, unforced errors, double faults), serve efficiency (first serve percentage, points won on first and second serve), tactical outcomes (break point conversion, net points won percentage), and overall match characteristics (total points won, match duration). Contextual factors, including tournament round, opponent

ranking, match score, and potential fatigue, were noted as limitations given incomplete availability of these data.

Statistical Analysis

Data are reported as Mean $\pm$ Standard Deviation (SD). Given the small sample size and potential confounding between player and tournament, inferential statistical tests were interpreted with caution, and the study emphasizes descriptive reporting. Hedges' g was calculated for pairwise comparisons, and 95% confidence intervals were reported to indicate the precision of effect size estimates. All analyses were conducted using SPSS 27.0, and graphs were prepared with GraphPad Prism.

Table 1. Physical characteristics of Male Grand Slam Champions.

Tournaments	Players	Age (years)	Height (cm)	Weight (kg)
Australian Open	Jannik Sinner	24	191	77
Roland Garros	Carlos Alcaraz	22	183	74
Wimbledon	Jannik Sinner	24	191	77
US Open	Carlos Alcaraz	22	183	74

Results

This section presents the descriptive and exploratory findings of performance parameters across the four Grand Slam tournaments (Roland Garros, US Open, Wimbledon, and Australian Open). A one-way analysis of variance (ANOVA) was conducted to examine potential differences, followed by Bonferroni post hoc tests for pairwise comparisons where applicable.

Findings Related to Service Performance

One-way ANOVA initially indicated differences in ace counts across the four Grand Slam tournaments ($F = 5.211$; $p = 0.007$). However, after applying a Bonferroni correction to account for multiple comparisons across 11 performance variables (adjusted $\alpha = 0.0045$), these differences no longer reached statistical significance. Post-hoc comparisons showed raw p -values of 0.007 for Roland Garros vs. Wimbledon and 0.045 for Roland Garros vs. Australian Open, both exceeding the adjusted threshold.

For service accuracy, the highest first-serve percentage was observed at Roland Garros ($68.0 \pm 7.9\%$), and the lowest at the Australian Open ($59.4 \pm 2.9\%$). No significant differences were found for other service-related metrics, including double faults, points won on first or second serves, and break point conversion rates ($p > 0.05$).

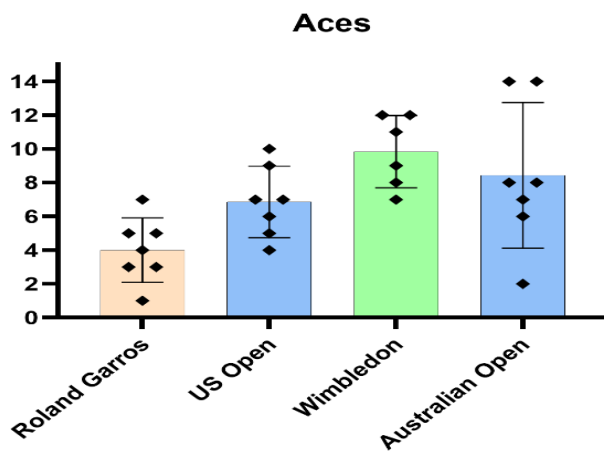
Table 2. Descriptive statistics of technical performance parameters of Grand Slam champion male tennis players by the tournaments (Mean $\pm$ SD).

Variables	Roland Garros (n=7)	Us Open (n=7)	Wimbledon (n=6)	Australian Open (n=7)	Total (n=27)
Aces	4.0 $\pm$ 1.9	6.8 $\pm$ 2.1	9.8 $\pm$ 2.1	8.4 $\pm$ 4.3	7.1 $\pm$ 3.4
Double Faults	3.0 $\pm$ 2.4	2.0 $\pm$ 1.9	1.6 $\pm$ 1.0	2.2 $\pm$ 2.3	2.2 $\pm$ 1.9
Unforced Errors	37.4 $\pm$ 18.1	19.1 $\pm$ 6.8	22.1 $\pm$ 10.9	26.4 $\pm$ 8.7	26.4 $\pm$ 13.3
Winners	44.5 $\pm$ 12.9	31.7 $\pm$ 5.7	36.8 $\pm$ 6.1	31.1 $\pm$ 6.8	36.0 $\pm$ 9.7
First Serve (%)	68.0 $\pm$ 7.9	62.5 $\pm$ 4.3	63.5 $\pm$ 5.9	59.4 $\pm$ 2.9	63.3 $\pm$ 6.1
1st Serve Points Won (%)	71.8 $\pm$ 8.5	77.0 $\pm$ 12.3	78.1 $\pm$ 10.8	81.1 $\pm$ 3.6	77.0 $\pm$ 9.4
2nd Serve Points Won (%)	63.7 $\pm$ 9.4	69.7 $\pm$ 11.6	68.6 $\pm$ 6.1	63.2 $\pm$ 9.7	66.2 $\pm$ 9.4
Break Points Won (%)	44.0 $\pm$ 7.3	42.1 $\pm$ 8.8	47.0 $\pm$ 10.6	43.4 $\pm$ 12.6	44.0 $\pm$ 9.5
Net Points Won (%)	74.7 $\pm$ 10.3	76.1 $\pm$ 3.9	73.5 $\pm$ 7.5	68.5 $\pm$ 4.3	73.2 $\pm$ 7.2
Total Points Won	126.4 $\pm$ 34.7	98.8 $\pm$ 8.6	101.1 $\pm$ 12.7	109.5 $\pm$ 14.7	109.3 $\pm$ 22.3
Match Duration (min)	172.5 $\pm$ 78.8	127.2 $\pm$ 23.2	127.3 $\pm$ 31.7	152.5 $\pm$ 27.5	145.5 $\pm$ 48.0

Table 2. One-Way ANOVA and Bonferroni Post-hoc comparisons of key technical performance variables of 2025 Grand Slam Champion male tennis players across tournaments.

Variables	Roland Garros (n=7)	Us Open (n=7)	Wimbledon (n=6)	Australian Open (n=7)	Total (n=27)
Aces	4.0 ± 1.9	6.8 ± 2.1	9.8 ± 2.1	8.4 ± 4.3	7.1 ± 3.4
Double Faults	3.0 ± 2.4	2.0 ± 1.9	1.6 ± 1.0	2.2 ± 2.3	2.2 ± 1.9
Unforced Errors	37.4 ± 18.1	19.1 ± 6.8	22.1 ± 10.9	26.4 ± 8.7	26.4 ± 13.3
Winners	44.5 ± 12.9	31.7 ± 5.7	36.8 ± 6.1	31.1 ± 6.8	36.0 ± 9.7
First Serve (%)	68.0 ± 7.9	62.5 ± 4.3	63.5 ± 5.9	59.4 ± 2.9	63.3 ± 6.1
1st Serve Points Won (%)	71.8 ± 8.5	77.0 ± 12.3	78.1 ± 10.8	81.1 ± 3.6	77.0 ± 9.4
2nd Serve Points Won (%)	63.7 ± 9.4	69.7 ± 11.6	68.6 ± 6.1	63.2 ± 9.7	66.2 ± 9.4
Break Points Won (%)	44.0 ± 7.3	42.1 ± 8.8	47.0 ± 10.6	43.4 ± 12.6	44.0 ± 9.5
Net Points Won (%)	74.7 ± 10.3	76.1 ± 3.9	73.5 ± 7.5	68.5 ± 4.3	73.2 ± 7.2
Total Points Won	126.4 ± 34.7	98.8 ± 8.6	101.1 ± 12.7	109.5 ± 14.7	109.3 ± 22.3
Match Duration (min)	172.5 ± 78.8	127.2 ± 23.2	127.3 ± 31.7	152.5 ± 27.5	145.5 ± 48.0

Note: Post-hoc p-values are reported without adjustment. To control for multiple comparisons across 11 variables, a Bonferroni-corrected alpha level ($\alpha = 0.0045$) was applied. After correction, no statistically significant differences were detected. Therefore, all results should be interpreted with caution. Given the small sample size and unequal group distributions, these analyses are considered exploratory in nature.

**Figure 1.** Mean ace counts across Grand Slam tournaments.

These findings describe observed trends in service performance across tournaments for the 2025 champions. Due to the small sample size ($n = 27$) and the limited number of players, these variations should be interpreted descriptively rather than as statistically robust differences.

Findings Related to Winners and Error Performance

One-way ANOVA suggested variation in winners and unforced error counts across tournaments (winners: $F = 3.704$, $p = 0.026$; Unforced Error: $F = 3.076$, $p = 0.048$). However, after applying a Bonferroni correction for 11 performance variables (adjusted $\alpha = 0.0045$), none of the observed differences reached statistical significance.

Post-hoc comparisons indicated the lowest p-values for winners between Roland Garros and the Australian Open ($p = 0.044$) and Roland Garros and the US Open ($p = 0.059$), while for unforced errors, the most notable difference was observed between Roland Garros and the US Open ($p = 0.054$). All p-values exceeded the adjusted significance threshold, and therefore these results are presented descriptively, without inferring statistically robust differences.

Findings Related to Match Characteristics

Analysis of match characteristics indicated no statistically significant differences across tournaments for match

duration ($F = 1.495$, $p = 0.242$) or total points won ($F = 2.514$, $p = 0.084$). Descriptively, the longest match durations were observed at Roland Garros (172.6 ± 78.9 min), whereas the shortest were recorded at the US Open (127.3 ± 23.2 min) and Wimbledon (127.3 ± 31.8 min). Similarly, the highest mean for total points won occurred at Roland Garros (126.4 ± 34.7), with lower values reported at the other tournaments.

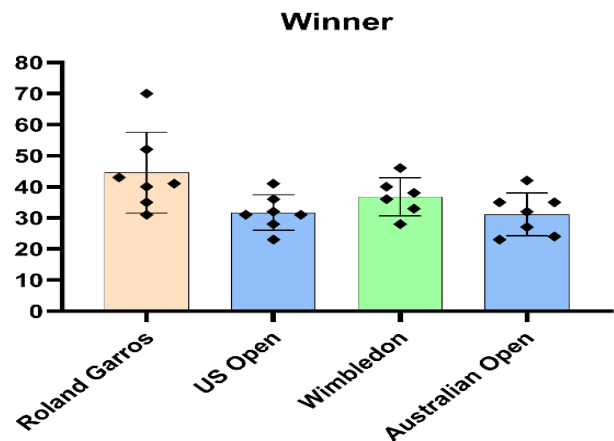
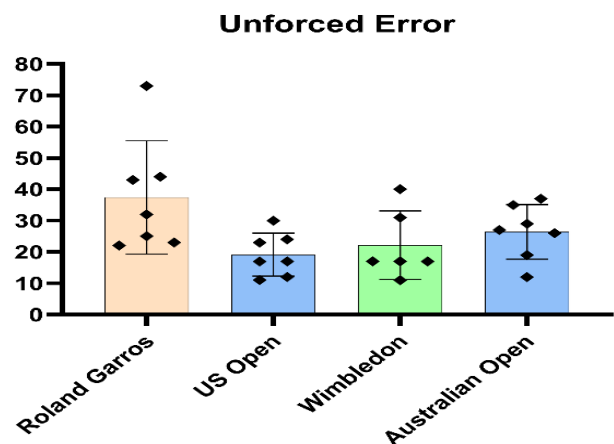
**Figure 2.** Mean winners counts across Grand Slam tournaments.**Figure 3.** Mean unforced error counts across Grand Slam tournaments.

Table 4. Effect Size.

Variable	Tournament Comparison	Hedges' g	95% CI (Lower – Upper)	Effect
Aces	Roland Garros – Wimbledon	2.69	[1.19, 4.19]	Enormous
Aces	Roland Garros – Australian Open	1.24	[0.10, 2.38]	Very Large
Winners	Roland Garros – US Open	1.20	[0.06, 2.34]	Very Large
Winners	Roland Garros – Australian Open	1.21	[0.07, 2.35]	Very Large
Unforced Error	Roland Garros – US Open	1.25	[0.10, 2.40]	Very Large

These findings are presented descriptively, as no statistically robust differences were detected, and they should be interpreted cautiously due to the small sample size ($n = 27$) and limited number of players. Apart from these findings, no statistically significant differences were observed between tournaments in terms of double faults, first serve percentage, points won on first serve, points won on second serve, break points won, net points won, total points won, and total match duration ($p > 0.05$).

For statistically significant pairwise comparisons, effect sizes were calculated using Hedges' g coefficient to account for the small sample size. According to the classifications proposed by Cohen (1988) and Sawilowsky (2009), the difference in ace count between the Roland Garros and Wimbledon was classified as enormous ($g = 2.69$), whereas the difference between the Roland Garros and the Australian Open was classified as very large ($g = 1.24$).

For the winners variable, very large effect sizes were observed for the Roland Garros compared with the US Open ($g = 1.20$) and the Australian Open ($g = 1.21$). Similarly, the difference between the Roland Garros and the US Open in the number of unforced errors was classified as very large ($g = 1.25$).

Discussions

This study evaluated the match-play performance profiles of the 2025 Grand Slam champions using a multidimensional set of indicators. Structured as a descriptive case series focusing on Jannik Sinner and Carlos Alcaraz, the analysis provides a detailed account of championship-level performance across distinct competitive environments. The primary findings indicate that, although descriptive differences were observed for variables such as aces, winners, and unforced errors, no metric demonstrated statistically robust differences across tournaments after applying the Bonferroni correction ($\alpha = 0.0045$). These observations suggest that elite-level performance is highly individualized and multidimensional, with components adapting to specific environmental and tactical constraints.

Match analyses remain an essential tool for the detailed evaluation of elite tennis performance. Previous literature emphasizes that court surface, ball characteristics, and player skill levels significantly shape both physiological demands and technical-tactical outputs. In this study, service performance analyses showed the highest descriptive ace counts at Wimbledon (9.8 ± 2.1) and the lowest at Roland Garros (4.0 ± 1.9), consistent with the notion that faster surfaces enhance serve effectiveness while slower surfaces constrain it. Likewise, the higher first-

serve percentage at Roland Garros ($68.0 \pm 7.9\%$) may reflect strategic adaptation to slower courts, favoring serve accuracy over speed.

Analyses of winners and unforced errors must consider the confounding between player identity and tournament characteristics. Elevated counts at Roland Garros likely reflect a combination of clay court rally dynamics and the aggressive playing style of Carlos Alcaraz. While previous research (Doğan et al., 2021) reported the fewest unforced errors on grass courts, the present study observed the lowest descriptive average at the US Open, highlighting the substantial influence of individual player form and tactical selection within a single season.

Regarding match characteristics, no statistically significant differences were detected for match duration ($p = 0.242$); however, the descriptive peak at Roland Garros (172.6 ± 78.9 min) aligns with the longer rallies typical of clay courts. Similarly, the highest first-serve point-winning percentages at Wimbledon suggest the strategic advantage conferred to servers on faster surfaces.

Finally, although Hedges' g indicated large effect sizes for certain comparisons (e.g., $g = 2.69$ for aces), these estimates should be interpreted cautiously due to potential instability arising from the small sample size ($n = 27$). These values reflect strong descriptive trends within this specific group of champions but should not be generalized to the broader elite tennis population.

In conclusion, this study provides a comprehensive descriptive account of championship performance in professional tennis, reinforcing the notion that success at the Grand Slam level is multidimensional, context-dependent, and shaped by both environmental conditions and individual player strategies.

Limitations

This study has several inherent limitations that require careful consideration when interpreting the findings. First, the analysis is based on a relatively small sample size ($n = 27$), limiting statistical power and increasing susceptibility to the influence of individual match variations. Most importantly, as the dataset reflects the performances of only two players (Jannik Sinner and Carlos Alcaraz), there is an inherent confounding between player identity and tournament characteristics. For example, descriptive trends observed at Roland Garros may primarily reflect the specific playing style of Alcaraz rather than generalizable clay-court demands. Second, the use of secondary notational data from official tournament websites precluded direct assessment of physiological or biomechanical variables. Finally, contextual factors—such as opponent ranking, tournament round, match scoreline, fatigue, and weather conditions—were not included, despite their known

influence on performance outcomes. Consequently, the present findings should be interpreted as descriptive profiles of these specific champions during a single season and should not be generalized to the broader population of elite tennis players.

Recommendations / Future Directions

To address these limitations, future research should incorporate longitudinal data across multiple seasons and include a larger cohort of players to distinguish individual performance signatures from environmental constraints. Comparative analyses between championship-winning players and elite players who did not achieve titles could further clarify the determinants of professional tennis success. Additionally, integrating match statistics with physiological monitoring and contextual variables such as opponent ranking, fatigue, head-to-head history, and tournament stage would allow for a more comprehensive, multidimensional exploration of elite performance. Finally, for small and unequal samples, future studies may benefit from employing non-parametric statistical methods or Bayesian approaches to enhance the robustness of the findings.

Conclusion

In summary, this study provides a descriptive account of the multidimensional performance profiles of the 2025 Grand Slam champions. While descriptive trends were observed in technical metrics such as aces, winners, and unforced errors, rigorous Bonferroni corrections indicate that these differences are not statistically robust enough to establish general tournament-specific principles. These results underscore that championship success at the elite level arises from individualized tactical adaptations to specific competitive environments, rather than a uniform performance pattern. Overall, the study contributes a detailed case report of peak professional tennis performance, highlighting the complex interplay of multidimensional factors that shape success in the sport.

Authors' Contribution

Study Design: GSK; Data Collection: GSK; Statistical Analysis: MAG; Manuscript Preparation: GSK, MAG; Funds Collection: -

Ethical Approval

This study does not require ethics committee approval.

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Conflict of Interest

The authors declare no conflict of interest.

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