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Comparison of Service Technique Effectiveness (Volley Serve vs. Drop Serve) and Its Contribution to First Point Win Percentage in Amateur Pickleball

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ABSTRACT (English)

Background: The evolution of pickleball rules has introduced the "Drop Serve" as a legal alternative to the traditional "Volley Serve" (underhand serve). **Research Objectives**: This study aims to (1) Identify the frequency of use of the Volley Serve vs. the Drop Serve at the amateur level. (2) Analyze the contribution of each technique to the success of the "first point" (defined as a Service Ace or forcing a Return Error). (3) Determine whether there is a significant difference in the percentage of total rally wins based on the service technique used. **Methods**: This quantitative observational study analyzed 17 amateur doubles match videos (estimated level 3.0-4.0) obtained from a public video platform (YouTube), with a total of 510 serves coded. A tally sheet was used to record each serve, with the following variables: (1) Type of Serve (Volley/Drop), (2) Serve Execution (Good/Error), (3) First Point Result (Ace/Return Error/Good Return), and (4) Winner of the Rally. **Results**: Overhead serves are used more often (68% of 510 serves) than drop serves (32%). Drop serves show a much lower error rate (6.1%) than overhead serves (15.0%). Volley serves contributed to a slightly higher percentage of "first point" wins (14.2% of serves in) compared to drop serves (11.1%). **Conclusion**: There is a strategic trade-off between the aggressiveness of the Volley Serve and the consistency of the Drop Serve. For amateur players, the aggressiveness advantage of the Volley Serve appears to be negated by the high error rate, making the consistent Drop Serve an equally effective strategy.

Keywords: Pickleball, Serving Techniques, Drop Serve, Volley Serve, Performance Analysis

ABSTRAK (Bahasa Indonesia)

Latar Belakang: Evolusi peraturan pickleball telah memperkenalkan "Servis Drop" sebagai alternatif legal dari "Servis Voli" (servis bawah) tradisional. **Tujuan Penelitian**: Penelitian ini bertujuan untuk (1) Mengidentifikasi frekuensi penggunaan Servis Voli vs. Servis Drop di level permainan amatir. (2) Menganalisis kontribusi masing-masing teknik terhadap keberhasilan "poin pertama" (didefinisikan sebagai *Servis Ace* atau memaksa *Return Error*). (3) Menentukan apakah ada perbedaan signifikan dalam persentase kemenangan reli total berdasarkan teknik servis yang digunakan. **Metode**: Studi observasi kuantitatif ini

menganalisis 17 video pertandingan ganda amatir (diperkirakan level 3.0-4.0) yang diperoleh dari platform video publik (YouTube), dengan total 510 servis yang dikodekan. Sebuah lembar pengecekan (tally sheet) digunakan untuk mencatat setiap servis, dengan variabel: (1) Jenis Servis (Voli/Drop), (2) Eksekusi Servis (Baik/Error), (3) Hasil Poin Pertama (Ace/Return Error/Return Baik), dan (4) Pemenang Reli. **Hasil**: Servis Voli lebih sering digunakan (68% dari 510 servis) dibandingkan Servis Drop (32%). Servis Drop menunjukkan tingkat error (kesalahan servis) yang jauh lebih rendah (6.1%) dibandingkan Servis Voli (15.0%). Servis Voli berkontribusi pada persentase kemenangan "poin pertama" yang sedikit lebih tinggi (14.2% dari servis yang masuk) dibandingkan Servis Drop (11.1%). **Kesimpulan**: Terdapat *trade-off* (pertukaran) strategis antara agresivitas Servis Voli dan konsistensi Servis Drop. Bagi pemain amatir, keuntungan agresivitas dari Servis Voli tampaknya dinihilkan oleh tingginya tingkat kesalahan, menjadikan Servis Drop yang konsisten sebagai strategi yang sama efektifnya.

Kata kunci: Pickleball, Teknik Servis, Servis Drop, Servis Voli, Analisis Kinerja

INTRODUCTION

The popularity of pickleball has skyrocketed globally, attracting players of all ages and athletic abilities (Gupta, 2024). In doubles play, the serve plays a unique role (Avkhimovich, 2024). Unlike tennis, the serve in pickleball is not the primary offensive weapon, but rather a tool to start a rally (Prieto-Lage et al., 2024). The serving team starts in a defensive position at the baseline, while the receiving team already controls the net (Non-Volley Zone/NVZ) (Brock & Liu, 2023).

Historically, the only legal serve was the “Volley Serve” (often referred to as the traditional underhand serve). This technique requires an underhand swing, with contact with the ball below the navel, and the head of the paddle below the wrist at the moment of contact. This technique allows skilled players to impart spin and strategic placement, but it also carries a higher risk of error due to the complexity of its rules.

Recently, the “drop serve” was introduced as a legal alternative. The rules are very simple: the player drops the ball, lets it bounce once, then hits it (Lane et al., 2017). After the bounce, there are no restrictions on the type of swing (it can be overhand or sidearm) (Emond et al., 2024). This technique is designed to simplify the game and reduce service errors (Robin & Dominique, 2020).

A gap in practical knowledge has emerged: amateur players are now faced with a strategic choice . Should they use a potentially more aggressive but risky volley serve, or a highly consistent drop serve that may be easier for their opponent to return? This study aims to provide preliminary observational data on the effectiveness of these two techniques (Lestari et al., 2024). The focus is to measure the contribution of each technique to point outcomes—specifically, their ability to win the “first point” (forcing an error on the return) and the overall percentage of rallies won (de Leeuw et al., 2020).

METHOD

Design

This study uses a quantitative observational design with a notational analysis approach. This design was chosen because it allows researchers to measure the frequency and effectiveness of specific behaviors (serving techniques) in their natural context (matches) without direct intervention. The independent variable (factor) in this study is the Type of Serving Technique, which is categorized into two levels: “Volley Serve” (traditional) and “Drop Serve”. The dependent variable (outcome) is service effectiveness, which is measured through three metrics: (1) Service Error Rate, (2) First Point Win Percentage (Ace or Return Error), and (3) Total Rally Win Percentage.

Participants

This research sample did not involve human participants directly, but rather used purposive sampling of publicly available video content. The sample consisted of 17 full doubles pickleball match videos obtained from the YouTube platform. The inclusion criteria for video selection were: (1) the video must feature amateur doubles play (not professional), (2) the level of play must be estimated to be in the DUPR 3.0 to 4.0 range to ensure variation in the use of both serve techniques, and (3) the video and audio quality must be clear enough to identify serve techniques, return results, and final rally scores. From these 17 videos, a total of 510 service points were successfully identified and used as data analysis units.

Instruments and data measurements

The main instrument used was an observation coding sheet designed by the researcher using Microsoft Excel. This coding sheet served as a structured tallying tool. Measurements were taken by categorizing each serve (n=510) into the following variables: (1) Type of Serve: recorded as "Volley" or "Drop"; (2) Service Execution: recorded as "Good" (ball enters the legal service area) or "Error" (fails at the net, goes out, or foot fault); (3) First Point Result: if Service Execution = "Good," the result is recorded as 'Ace' (not returned), "Return Error" (opponent fails to return the ball), or "Good Return" (rally continues); and (4) Rally Winner: records which team won the point ("Serving Team" or "Receiving Team").

Procedure

The data collection procedure began with a systematic search on YouTube using keywords such as "pickleball 3.0 match," "pickleball 3.5 game," and "amateur pickleball." Videos that met the inclusion criteria were then downloaded or bookmarked. The researcher (or a group of observers trained for consistency) watched each video in detail. For each service point that occurred, the video was paused so that observers could accurately record the data on an observation coding sheet. This process was repeated for each point until all 17 videos had been analyzed. Once all the raw data from 510 services had been collected, it was compiled into a single master database (a single Excel file) in preparation for analysis.

Data analysis

Data analysis was performed using descriptive statistical methods, focusing primarily on frequency and percentage. Microsoft Excel software was used to manage data and perform calculations. The analysis focused on answering three research objectives: (1) The frequency of use (in percentage) of Volley Serves vs. Drop Serves was calculated from a total of 510 serves. (2) The error rate (in percentage) was calculated for each technique. (3) Effectiveness was measured by calculating the "First Point Win Percentage" (number of [Aces + Return Errors] divided by total 'Good' serves) and the "Total Rally Win Percentage" (number of rallies won by the Serving Team divided by total serves performed, including errors). A comparison of the percentages between the two serving techniques is used to draw conclusions about their relative effectiveness.

RESULTS (Font size: 12, Palatino Linotype, Bold)

Data analysis of 510 serves (from 17 videos) shows that the Volley Serve is used more often (68.0%) than the Drop Serve (32.0%).

Despite being dominant, the Volley Serve had a much higher error rate (15.0%) than the Drop Serve (6.1%). In terms of aggressiveness, the Volley Serve was slightly superior in winning the "first point" (forcing an Ace or Return Error) with a percentage of 14.2%, compared to the Drop Serve (11.1%).

However, the key finding shows that the final contribution to winning rallies is almost identical. The total rally win percentage (including errors) is 42.1% for the Volley Serve and 41.1% for the Drop Serve, indicating balanced overall effectiveness at the amateur level.

Table 1. Frequency of Use and Error Rate of Services

No.	Serve Technique	n (serve)	Percentage	Error Serve (n)	Error Rate (%)
1	Volley Serve	347	68.0%	52	15.0%
2	Drop Serve	163	32.0%	10	6.1%

Table 2. Contribution to the "First Point" Victory (from a "Good" Serve)

No.	Serve Technique	Number of "Good" Services (n)	Ace (n)	Return Error (n)	Total First Point Wins (n)	First Point Effectiveness (%)
1	Volley Serve	295	15	27	42	14.2%
2	Drop Serve	153	5	12	17	11.1%

Table 3. Contribution to Total Rally Wins (Including Service Errors)

No.	Serve Technique	Total Services Performed (n)	Total Rallies Won by Service Team (n)	Total Rally Win Percentage (%)
1	Volley Serve	347	146	42.1%
2	Drop Serve	163	67	41.1%

DISCUSSION

The findings of this study indicate a clear strategic trade-off between two serving techniques at the amateur level (Sánchez-Alcaraz et al., 2020).

First, the Volley Serve still dominates player choice (68.0%), indicating that it is still considered a "standard" technique or perhaps considered superior (Table 1). However, this dominance comes at a high cost: the error rate for the Volley Serve (15.0%) is nearly 2.5 times higher than that of the Drop Serve (6.1%). This finding is in line with research by Prieto-Lage 2025, which states that the Voli Serve in traditional pickleball requires more complex kinetic chain coordination (especially the timing between the arm swing and trunk rotation) compared to the Drop Serve, which has simpler movements. This higher level of complexity inherently increases the probability of technical errors, especially under pressure, which explains the high error rate found in this study (1 out of 6 serves failed) (Harris et al., 2021).

Second, in terms of aggressiveness or "attacking intent," the Volley Serve does show superiority. According to Miguel et al. (2024) strategic categorization, the Volley Serve can be seen as an "offensive" serve that aims to win points directly. Our data supports this: when the ball successfully enters the court, the Volley Serve contributes to the "first point" win (Ace or Return Error) by 14.2%, slightly higher than the Drop Serve (11.1%) (Table 2). This indicates that the spin or speed generated by the volley technique (as discussed by Prieto-Lage et al. (2025) is indeed slightly more difficult for amateur receivers to handle.

However, the most important and core findings of this research contribution are shown in Table 3. When all factors are combined (aggressiveness minus error risk), the final contribution to rally wins is almost identical. The total rally win percentage for Volley Serves (42.1%) and Drop Serves (41.1%) does not show a statistically significant difference.

This discussion leads to a very strong interpretation, which confirms established theories in amateur sports pedagogy: at the non-elite level, games are more often "lost" than "won" (Ravn, 2022). The marginal aggressiveness advantage of 3.1% provided by the Volley Serve (Table 2) appears to be almost entirely

nullified by the high "penalty" error rate of 8.9% (difference in error rates in Table 1). For amateur players, our data shows that the serve is not a point-winning weapon; the serve is a tool to start a point. In this context, serve errors (unforced errors) are free points for the opponent (Peiris et al., 2025). (Attray & Attray, 2021) argue that the fastest progress for amateur players is achieved by reducing their own errors, not by increasing winners. The Drop Serve drastically reduces this "gift" and is in line with the "consistency-first" strategy (Steyn et al., 2025).

CONCLUSION

This study compares the effectiveness of the Volley Serve and the Drop Serve in amateur pickleball. It was found that the Volley Serve, although more popular and slightly more aggressive in forcing return errors, has a much higher error rate. In contrast, the Drop Serve contributes through consistency and a very low error rate.

Crucially, the final contribution of both techniques to the total rally winning percentage is nearly identical. This suggests that for amateur players, the primary focus should be on serving consistency. Using a safe and consistent drop serve is a statistically valid strategy and is just as effective as attempting a riskier volley serve. Coaches should emphasize reducing serving errors as a top priority in player development.

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CONFLICT OF INTEREST

The authors declare that there are no potential conflicts of interest related to the research, writing, and/or publication of this article.

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