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# A Comparative Analysis of Technical Characteristics Between Top World Ranking vs. Top-One Malaysian Athlete in Men's Single Badminton Matches 2023 World Tour



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**Abstract** | This study conducts a comparative analysis of technical characteristics between top world-ranking and Top 1 Malaysia Athletes in men's singles badminton matches during the 2023 World Tour. The objective of this research is to analyse gameplay between two players, providing insights for coaches and athletes to enhance their training and performance techniques. The focus of this study is Viktor Axelsen, the top 1 world ranking, and Lee Zii Jia, the Malaysian athlete. The technical characteristics that frequently been analysed were (serve, drop, net, smash, lob, defence, drive and clear). Variables were obtained using YouTube videos and notational analysis  $r = 0.99$  and % of error 0.3%. Mann-Whitney U was used to describe and to determine the difference of the technical characteristic that used by the Top 1 World Ranking and Top 1 Malaysia Athletes, between the groups analyses, significant found out only seven out of 16 (success and unsuccess) which was lob unsuccess ( $p = 0.03$ ,  $r = 0.252$ ), clear success ( $p = 0.001$ ,  $r = 0.60$ ), clear unsuccess ( $p = 0.021$ ,  $r = 0.28$ ), drive unsuccess ( $p = 0.001$ ,  $r = 0.46$ ), defend unsuccess ( $p = 0.001$ ,  $r = 0.51$ ), drop unsuccess ( $p = 0.35$ ,  $r = 0.23$ ) and smash unsuccess ( $p = 0.016$ ,  $r = 0.29$ ). The study revealed that technical characteristics can improve player performance for better tournament results. It highlights the importance of using these characteristics as guides for improving performance. Effective play increases the chances of winning, while poor performance leads to losing matches.

**Keywords:** *Technical characteristics, men's singles badminton, comparative analysis, notational analysis, performance strategies.*

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## I. INTRODUCTION

Badminton is a two-person sport where players use rackets to hit a shuttlecock over a net. Originating from the ancient Chinese game of battledore and shuttlecock, it has evolved into a popular racquet sport [1]. Known for its fast pace and precise shots, badminton demands excellent conditioning and a high level of tactical, technical, and psychological skill [2]. Matches involve intense, short bursts of activity with rest periods [3]. The game, played in singles or doubles, focuses on hitting the shuttlecock where the opponent can't return it [1]. Singles matches are more demanding than doubles, requiring more movement and higher heart rates [4]. Badminton includes five categories, which are men's singles, men's doubles, women's singles, women's doubles, and mixed doubles. In doubles, success also depends on the partners' compatibility. To quantify movement in play, computerized notational analysis is a useful tool for evaluating match characteristics [3]. Over the past 20 years, badminton has undergone significant changes since the Badminton Association of England established official rules in 1893. Notational analysis with video recordings helps coaches and players improve performance [3]. Key performance indicators include serves, drops, nets, smashes, unforced errors, and drives, with past studies noting differences between singles and doubles in timing factors [4]. Successful smashes are particularly challenging for opponents to return [5].

## II. METHODS

A purposive sampling technique was used to select participants based on traits essential for this study, comparing the Top-World player with the Top-One Malaysian athlete. For the 2023 Men's Singles Badminton Matches, which took place from January to December, 87 matches ( $N = 87$ ) from 10 tournaments were analyzed. Data was collected from the BWF official website (<https://bwf.tournamentsoftware.com/>) and videos on YouTube. Matches include all rounds, from the first to the final. The key technical characteristics analyzed were smash, drive, lob, drop, net, defend, clear, and serve.

## III. RESULTS AND DISCUSSION

The Mann-Whitney U test was used to check for differences in technical characteristics because many variables didn't follow a normal distribution [3]. This study aimed to find significant differences in technical characteristics like serve, lob, clear, net, drive, defend, drop, and smash between Viktor Axelsen and Lee Zii Jia. The probability level of 0.05 was used to determine significance [6]. Based on Table 1, it was found that seven technical characteristics (both success and unsuccess) showed significant differences between Viktor Axelsen and Lee Zii Jia in men's singles badminton matches in 2023. However, nine technical characteristics (both success and unsuccess) did not show significant differences. Significant differences between both players can be seen at lob unsuccess, clear success, clear unsuccess, drive unsuccess, defend unsuccess, drop shot unsuccess, and smash unsuccess ( $p < 0.05$ ), while other indicators showed insignificant differences ( $p > 0.05$ ).

The first technical characteristic discussed was lob unsuccess. Data showed that Lee Zii Jia ( $mean = 0.468$ ) makes fewer mistakes compared to Viktor Axelsen ( $mean = 1.075$ ), indicating Lee Zii Jia is better

at executing lobs with fewer errors [7]. Next was a clear success, where Lee Zii Jia ( $mean = 17.128$ ) outperformed Viktor Axelsen ( $mean = 8.975$ ), showing better performance in clear shots. Previous research states that clear shots are crucial, despite not being the most frequent [3]. For clear unsuccess, Viktor Axelsen ( $mean = 1.550$ ) had fewer mistakes than Lee Zii Jia ( $mean = 2.468$ ), suggesting Lee Zii Jia may take more risks with his clears [8]. In drive unsuccess, Viktor Axelsen ( $mean = 0.550$ ) was more consistent than Lee Zii Jia ( $mean = 1.574$ ), indicating better execution of drive shots [2]. For defensive unsuccess, Viktor Axelsen ( $mean = 4.025$ ) performed better than Lee Zii Jia ( $mean = 6.383$ ), showing Lee Zii Jia struggles more with defensive shots [9]. In drop unsuccess, Viktor Axelsen ( $mean = 0.325$ ) had fewer mistakes compared to Lee Zii Jia ( $mean = 0.766$ ), reflecting better control over drop shots. Lastly, in smash unsuccess, Viktor Axelsen ( $mean = 1.425$ ) showed better accuracy than Lee Zii Jia ( $mean = 2.043$ ), indicating Lee Zii Jia might face more challenges with smashes [10].

TABLE 1  
COMPARISON OF PERFORMANCE INDICATORS BETWEEN PLAYERS

Test	Statistic	<i>p</i> -value		Effect Size
Serve Success	Mann-Whitney U 871	0.516	Rank Biserial Correlation	0.0739
Serve Unsuccess	Mann-Whitney U 814	0.143	Rank Biserial Correlation	0.1340
Lobbing Success	Mann-Whitney U 892	0.685	Rank Biserial Correlation	0.0511
Lobbing Unsuccess	Mann-Whitney U 704	0.027	Rank Biserial Correlation	0.2316
Clear Success	Mann-Whitney U 375	< 0.001	Rank Biserial Correlation	0.6016
Clear Unsuccess	Mann-Whitney U 674	0.021	Rank Biserial Correlation	0.2835
Netting Success	Mann-Whitney U 841	0.103	Rank Biserial Correlation	0.1245
Netting Unsuccess	Mann-Whitney U 729	0.066	Rank Biserial Correlation	0.2245
Drive Success	Mann-Whitney U 506	< 0.001	Rank Biserial Correlation	0.4617
Drive Unsuccess	Mann-Whitney U 914	0.798	Rank Biserial Correlation	0.0477
Defend Success	Mann-Whitney U 502	< 0.001	Rank Biserial Correlation	0.4617
Defend Unsuccess	Mann-Whitney U 462	< 0.001	Rank Biserial Correlation	0.5085
Drop Shot Success	Mann-Whitney U 819	0.135	Rank Biserial Correlation	0.1374
Drop Shot Unsuccess	Mann-Whitney U 727	0.035	Rank Biserial Correlation	0.2201
Smash Success	Mann-Whitney U 748	0.023	Rank Biserial Correlation	0.2371
Smash Unsuccess	Mann-Whitney U 666	0.016	Rank Biserial Correlation	0.2915

$p < 0.05$

According to [3], descriptive statistics like mean, minimum, maximum, and standard deviation were used to present the collected data. Figure 1 shows the mean for each variable measured in this study for Viktor Axelsen and Lee Zii Jia. The data reveal that the highest mean and standard deviation were for net success, with Viktor Axelsen at ( $mean \pm SD = 41.100 \pm 17.047$ ) and Lee Zii Jia at ( $mean \pm SD = 43.809 \pm 14.243$ ). The lowest mean and standard deviation were for serve unsuccess, with Viktor Axelsen at ( $mean \pm SD = 0.325 \pm 0.526$ ) and Lee Zii Jia at ( $mean \pm SD = 0.179 \pm 0.380$ ).



Fig. 1 Values for performance indicators

## IV. CONCLUSIONS

To conclude, the study found that several technical characteristics, such as serve, drop, net, smash, lob, defense, drive, and clear, affect performance in men's singles badminton. Good performance leads to wins; poor performance leads to losses.

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