2018-2019 Soft Tennis Player Niu Juda Men 's Singles Technical and Tactical Analysis

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Abstract: This study utilizes literature review and video analysis to investigate the technical and tactical characteristics of Niu Jvda, the top-ranked Chinese men's singles soft tennis player, in international competitions. The objective is to identify performance limitations and provide theoretical insights to enhance the competitiveness of Chinese men's singles soft tennis. The findings are as follows: (1) Niu demonstrates weaknesses in service games, with suboptimal quality in first- and second-court serves and low scoring efficiency on wide-angle placements, resulting in difficulty maintaining control. (2) His return game is superior to his serve, with the first four shots constituting the primary scoring phase. First-court returns exhibit higher quality and tactical coordination than those from the second court, with a significantly greater success rate in wide-angle transitions compared with inside-angle placements. (3) He adopts an aggressive playing style, excelling in short rallies (5–10 shots) but becoming increasingly passive in prolonged exchanges (>10 shots). His tactical repertoire is diverse, employing both forehand and backhand drives and slices during rallies, while capitalizing on opportunities to finish points with net play, including smashes and volleys. (4) His overall strategy prioritizes fast-paced attacks, balancing scoring efficiency with a heightened risk of unforced errors, necessitating strong psychological resilience.Recommendations: (1) Enhance serve quality and improve post-serve transition speed to gain control over service games. (2) Strengthen second-court backhand returns and optimize return placement strategies. (3) Refine backhand techniques and incorporate variations in placement and tempo to increase offensive efficacy. (4) Improve aerobic endurance to maintain shot quality in extended rallies.

Keywords: Soft tennis; Men's singles; Technical and tactical analysis

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1. Introduction

Soft tennis, originating in 19th-century Japan, gained global popularity and became an Asian Games event in 1994. China adopted the sport in 1986, excelling in women's singles but struggling in men's singles, where Japan and South Korea dominate. Despite growing competition from nations like Thailand and the Philippines, China has yet to secure a men's singles gold.

As the 2023 Hangzhou Asian Games nears, addressing this gap is crucial. This study analyzes Niu Jvda's 2018-2019 international performances, identifying strengths and weaknesses in serving, returning, and rallying. Key issues include backhand limitations and reduced stability in long rallies. Findings aim to refine training strategies, enhance endurance, and optimize talent development to support China's push for a breakthrough in men's singles.

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2. Results

(1) Study subjects

This study focuses on Niu Jvda, the top-ranked men's singles player on the Chinese national soft tennis team, as a case study. His technical and tactical performance was analyzed across seven major international tournaments held between 2018 and 2019, with key performance metrics recorded. A comparative analysis was conducted between Niu and his opponents across multiple performance indicators to identify his strengths, limitations, and defining technical and tactical characteristics.

(2) Research methods

1) Literature review

A systematic review of policy documents and academic literature in exercise physiology and sports training was conducted to establish a rigorous theoretical foundation. Relevant literature was retrieved from domestic and international databases, including CNKI (China National Knowledge Infrastructure), the Taiwan Academic Literature Database, SportDiscus, CiNii (Japan), and RISS (Korea). The selected studies were reviewed, analyzed, and synthesized to extract soft tennis-specific content, thereby providing a theoretical basis for this research.

2) Case study method

Niu Jvda was selected as the study subject due to his status as an internationally ranked elite soft tennis player. In 2019, he secured the men's singles championship at the Chinese National Soft Tennis Championships. Following the resumption of competitions in 2022, Niu continued to demonstrate dominance in domestic men's singles events.

To optimize preparation for the 2023 Hangzhou Asian Games, this study analyzed match recordings from international tournaments held between 2018 and 2019 Tactical and technical metrics were systematically extracted from match footage, integrating theoretical knowledge with empirical performance analysis. By synthesizing match experiences with statistical data, this study identifies Niu's technical and tactical characteristics and provides targeted recommendations based on his strengths and areas for improvement. These findings aim to support data-driven training strategies for elite international competition.

3) Video analysis method

① Match Footage Selection

A total of 20 match recordings from the following seven international tournaments were collected, observed, and analyzed:2018 China Cup International Soft Tennis Championships、2018 World Junior Soft Tennis Championships、2018 Thailand Cup International Soft Tennis Championships、2019 China Cup International Soft Tennis Championships、2019 Thailand Cup International Soft Tennis Championships、2019 16th World Soft Tennis Championships、2019 Korea Cup International Soft Tennis Championships.Among these 20 matches, Niu recorded 12 victories and 8 defeats.

② Statistical Metrics and Data Collection

Soft tennis employs a point-based scoring system, where each rally commences with a serve and concludes when the ball is ruled out of play. This study categorizes each point into three distinct phases, with corresponding performance metrics recorded:

Serve Phase: The serve initiates play and represents the only technical action entirely under the player's control. A well-executed serve is critical to gaining a competitive advantage. Soft tennis permits two serve attempts per point:The first serve (1st serve) is typically executed with maximum power and precision to exert pressure on the opponent.The second serve (2nd serve) is more conservative, designed to reduce the risk of a double fault.Unlike

hard tennis, where serves rely primarily on speed and power, soft tennis serves emphasize spin and placement due to the unique properties of the rubber ball. The primary objective is to disrupt the opponent's return quality rather than overwhelm them with pace.Return Phase: Given that soft tennis serves are less reliant on speed than those in hard tennis, returning players gain greater control over point construction. The quality of the return is pivotal in shaping subsequent point dynamics.Rally Phase: The rally phase accounts for the majority of match play, with most points being won or lost in this stage. A player's shot selection, tactical execution, and shot quality significantly influence match outcomes. Analyzing rally exchanges provides critical insights into performance trends.

③ Data Recording and Statistical Tables

Once the key performance indicators were defined, data collection was structured using standardized statistical tables. Each match was analyzed using a dedicated match observation sheet. Upon completion of video analysis for all 20 matches, raw data were aggregated into three datasets:Wins dataset、Losses dataset、Overall performance dataset.A comprehensive summary of the observational data is provided in the appendix.

4) Statistical analysis

Video-derived data were processed using Microsoft Excel, and statistical analyses were performed using SPSS 26.0. Data visualizations were generated using GraphPad Prism.One-way analysis of variance (ANOVA) was applied to compare Niu Jvda's serving performance with that of his opponents.Pearson correlation analysis was conducted to assess relationships between performance indicators and match outcomes.A 0-1 scaling method was employed, where match victories were assigned a value of 1, and losses were assigned a value of 0.Correlation coefficients (P-values) were interpreted as follows:$|P| > 0.5$: Strong correlation between the performance indicator and match outcome.$0.1 < |P| < 0.5$: Moderate correlation between the performance indicator and match outcome.

5) Comparative analysis method

Technical and tactical performance metrics of Niu Jvda and his opponents were systematically recorded, analyzed, and compared. The analysis encompassed both micro-level technical attributes and macro-level tactical strategies, highlighting performance differentials. By identifying key technical and strategic variations, this study provides valuable insights to inform training and strategic planning within the Chinese national soft tennis team.

3. Results and Analysis

(1) Technical and tactical analysis of the serve phase

1) Serve effectiveness

The serve marks the beginning of each rally and is the only stroke where the player has complete control. As the first shot, the serve directly impacts the opponent's return strategy (i.e., the second shot). A well-executed serve reduces the aggressiveness of the opponent's return, leading to a more controlled and conservative response, which allows the server to retain an offensive advantage on the third shot. This may even result in winning the point within the first three shots (serve, return, and third-shot rally). Although serves in soft tennis do not have the same offensive power as those in hard tennis, a high-quality serve can still diminish the opponent's initiative and offensive potential. Effective serving not only conserves energy during service games but also facilitates a transition from defensive to offensive play and provides a psychological edge. As such, the serve remains a crucial technical element for gaining tactical control in soft tennis matches.

① Analysis of serve effectiveness indicators

Serve effectiveness was evaluated using eight key indicators:First-serve success rate、First-serve winning

percentage、First-serve ace rate、Second-serve success rate、Second-serve winning percentage、Second-serve ace rate、Double-fault rate、Service hold rate

Table 1 presents a comparison of the serve performance between Niu Jvda and his opponents. The results show that the mean first-serve and second-serve success rates were relatively high at 74.70% and 87.17%, respectively. First-serve success rate: Niu Jvda's first-serve success rate was 74.44%, slightly lower than his opponents' 74.95%. First-serve winning percentage: Niu Jvda won 51.10% of his first-serve points, 4.62% lower than his opponents' 55.72%.First-serve ace rate: Niu recorded a 5.84% ace rate, 4.79% lower than his opponents' 10.62%.Second-serve success rate: Niu's second-serve success rate was 86.46%, 1.41% lower than his opponents' 87.87%.Second-serve winning percentage: Niu won 44.57% of his second-serve points, 2.75% lower than his opponents' 47.31%.Double-fault rate: Niu committed double faults in 1.49% of his serves, compared to his opponents' 1.07%, indicating a higher double-fault rate by 0.42%.Service hold rate: Niu held serve in 47.84% of his service games, 3.68% lower than his opponents' 51.52%.

Significant differences were observed ($P < 0.05$) in the first- and second-serve ace rates, with Niu's opponents demonstrating a significantly higher ace rate.

Table 1. Comparison of Serve Effectiveness Between Niu Jvda and Opponents

	Niu Juda	Opponent	Difference	Average	Sig.
First Serve %	74.44%	74.95%	-0.51%	74.70%	0.921
First Serve Win %	51.10%	55.72%	-4.62%	53.41%	0.645
First Serve Ace %	5.84%	10.62%	-4.79%	8.23%	0.031*
Second Serve Success %	86.46%	87.87%	-1.41%	87.17%	0.844
Second Serve Win %	44.57%	47.31%	-2.75%	45.94%	0.622
Second Serve Ace %	9.44%	3.57%	5.87%	6.51%	0.014*
Double Fault %	1.49%	1.07%	0.42%	1.28%	0.889
Service Hold %	47.84%	51.52%	-3.68%	49.66%	0.579

Note: * Indicates a significant difference compared to the opponent ($P < 0.05$).

As shown in Figure 1, Niu Jvda's second-serve ace rate (9.44%) is notably higher than his opponent's (3.57%), with a difference of 5.87%. However, in all other serve effectiveness indicators, Niu Jvda's performance is lower than that of his opponent.

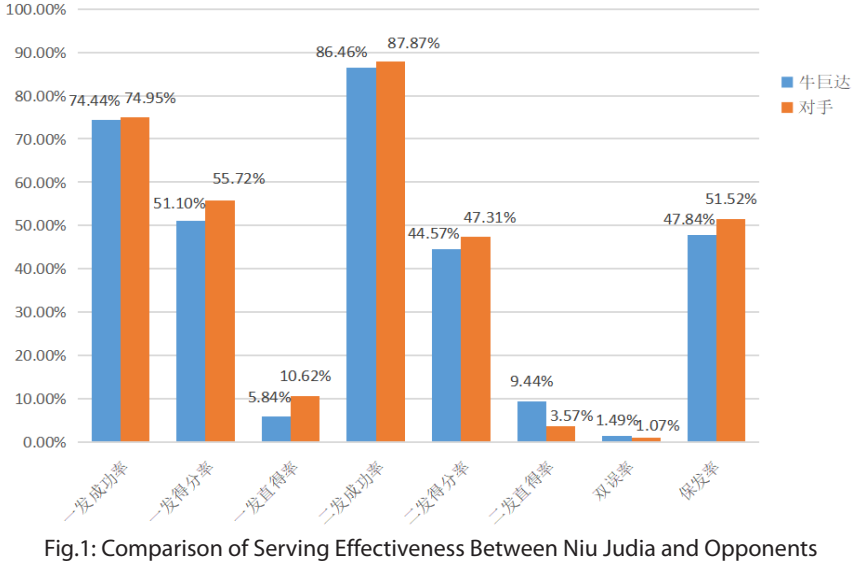

Fig.1: Comparison of Serving Effectiveness Between Niu Judia and Opponents

In soft tennis, the serve success rate, scoring rate, and direct point rate are key indicators of serving effectiveness.

The success rate reflects serve stability, the scoring rate indicates tactical execution, and the direct point rate measures the serve's threat level.

Niu Judia's serve success rate is slightly lower than that of his opponents, with minimal disparity, indicating similar stability. However, his second serve success rate is higher than his first, reflecting a more aggressive approach, where improving the first serve quality helps create tactical opportunities. Regarding scoring, both his first and second serve scoring rates are lower than his opponents', especially the first serve, suggesting a reduced ability to capitalize on opportunities and insufficient tactical transitions. Niu Judia's first serve scoring rate is higher than the second, due to better speed, power, and placement, while his second serve focuses on success rate, making subsequent shots more defensive. In terms of direct points, Niu Judia's first serve direct point rate is lower than his opponents', but his second serve direct point rate is higher, as a high success rate with a slightly lower quality of second serves can lead to opponents' errors. Niu Judia also exhibits a higher double fault rate, which increases the difficulty of winning matches, reflecting higher demands on serve quality. In holding serve, Niu Judia performs worse than his opponents, likely due to difficulty transitioning to offensive play when in a defensive position.

② Relationship between serving effectiveness and match results

Serve quality influences both the opponent's return and the initiative in the rally. A comparison of victories and losses (Table 3) reveals that, except for the scoring rate, which is higher in losses, other indicators favor victories. Specifically, the first serve scoring rate in victories (67.11%) is 30.52% higher than in losses (36.59%), and the direct point rate in victories is also higher for both first (4.14%) and second serves (8.86%). Double faults are more frequent in losses, with a double fault rate of 1.78% compared to 0.73% in victories. Interestingly, the first serve success rate in victories (73.05%) is slightly lower than in losses (75.93%), and the second serve success rate is also lower in victories (75.76%) compared to losses (93.33%). Correlation analysis shows that the first serve scoring rate (P=0.703) is highly correlated with match outcomes, while the first serve success rate (P=-0.24), first serve direct point rate (P=0.221), and second serve success rate (P=-0.331) show moderate correlations with match outcomes.

Table 2 The correlation analysis of the serve effect index and the result of the game

	Pearson	Significance (Two-Tailed)	Wins	Losses	Difference
First Serve %	-0.24	0.992	73.08%	75.93%	-2.85%
First Serve Win %	0.703**	0.001	67.11%	36.59%	30.52%
First Serve Ace %	0.221	0.350	6.58%	2.44%	4.14%
Second Serve %	-0.331	0.154	75.76%	93.33%	-17.57%
Second Serve Win %	-0.075	0.755	48.00%	35.71%	12.29%
Second Serve Ace %	-0.031	0.896	16.00%	7.14%	8.86%

Note : ' * * ' means significant correlation at the 0.01 level (two-tailed).

Niu Judia's scoring rate shows a significant difference between wins and losses. In victories, his first and second serve scoring rates, as well as direct point rates, are higher than in losses, with the first serve scoring rate being the key factor. This suggests that improving first serve quality helps Niu Judia reverse disadvantages, gain initiative, and effectively execute tactics in the service phase. In losses, while his serve success rate is relatively high, especially with a second serve success rate of 93.33%, the scoring and direct point rates are low. This indicates a more conservative approach in the second serve phase, where prioritizing stability over quality limits the threat to opponents and hinders counterattack tactics.

2) Serve placement

The speed of soft tennis service is slower than that of hard tennis, and it is difficult to win by speed. The placement and line of service are more important. According to the area where the ball lands in the service area, the placement of the ball can be divided into three types : outer corner (near the side line), inner corner (near the

middle line) and middle road (middle of the service area).

① Analysis of service placement utilization rate

The utilization rate of Niu Juda 's serve placement, the utilization rate of Niu Juda 's three placements in District 1 and District 2 respectively. From Table 3, it can be seen that, in general, the proportion of Niu Juda 's serve falling to the outer corner and middle road of the serve area is equal, and the proportion of the inner corner is the least ; in terms of zoning, the middle road of the first area has the highest proportion (35.71 %), followed by the outer corner (32.47 %), and the outer corner of the second area has the highest proportion (39.44 %), followed by the middle road (35.21 %).

Table 3 Usage rate of Niu Juda serve placement

	Zone 1	Rank	Zone 2	Rank	Average	Rank
Wide	32.47%	2	39.44%	1	35.96%	1
Center	35.71%	1	35.21%	2	35.46%	2
Inside	31.82%	3	25.35%	3	28.59%	3

Serve placement is influenced by the player's serving technique, power, and the opponent's receiving and returning abilities. Fixed or predictable serve placements make it easier for opponents to prepare and return the ball effectively. Therefore, serving technique should have a degree of concealment, and placement should vary based on the match situation and the opponent's characteristics. Niu Judia’s serve placement is relatively scattered, and the inner corner serve is not commonly used in tennis tactics.

② Analysis of serve placement effectiveness

Table 4 presents Niu Judia's scoring and losing rates for serves placed at the wide, middle, and inner angles in Zones 1 and 2. Overall, serves to the middle and inner angles yield higher scoring rates, while wide-angle serves result in more losses. This is because, in soft tennis, wide serves give opponents better attacking opportunities, increasing the threat to the server’s third shot.

In Zone 1, the scoring and losing rates for wide and middle serves are nearly equal, while inner-angle serves have a 25.46% higher scoring rate than losing rate. The scoring rates from highest to lowest are: Zone 1 inner angle (61.82%), Zone 2 middle (52.78%), Zone 1 wide (50.00%), Zone 1 middle (48.98%), Zone 2 inner angle (44.00%), and Zone 2 wide (37.50%).

In Zone 2, both wide and inner-angle serves result in more losses than points, with differences of 25% and 12%, respectively. Middle serves in Zone 2, however, have an 8.34% higher scoring rate than losing rate. This suggests that inner-angle serves in Zone 1 are advantageous as backhand returns are generally less threatening than forehand returns, aiding defensive play on the third shot. In contrast, wide serves in Zone 2 allow opponents to return with greater depth and variation, making it harder for the server to execute planned tactics.

Table 4 Niu Juda 's scoring rate of different serve placements

		Area 1	Area 2	Mean	Difference
Outer Angle	Scoring Rate	50.00%	37.50%	43.75%	12.50%
	Scoring Loss Rate	50.00%	62.50%	56.25%	-12.50%
	Difference	0.00%	-25.00%	-12.50%	
Center Line	Scoring Rate	48.98%	52.78%	50.88%	-3.80%
	Scoring Loss Rate	51.02%	44.44%	47.73%	6.58%
	Difference	-2.04%	8.34%	3.15%	
Inner Angle	Scoring Rate	61.82%	44.00%	52.91%	17.82%
	Scoring Loss Rate	36.36%	56.00%	46.18%	-19.64%
	Difference	25.46%	-12.00%	6.73%	

The average usage rate of wide-angle serves shows that this is Niu Judia's most frequently chosen placement. However, in terms of effectiveness, wide serves rank only third and sixth in scoring rates across the six regions, indicating that the quality of his wide serves is not high and does not provide many opportunities for a successful

counterattack. In Zone 2, the three serve placements rank second, fifth, and sixth, with both wide and inner-angle serves having lower scoring rates than losing rates, and the middle placement also lacking a clear advantage. Therefore, Niu Judia's serving quality in Zone 2 needs improvement.

(2) Reception tactics and analysis

1) Reception effectiveness

In soft tennis, weaker serve aggression gives the receiver a scoring advantage. A high-quality return helps gain control in rallies by limiting the opponent's third-shot options, increasing the chance of winning the point or even breaking serve outright. Effective receptions are crucial for taking the initiative and setting up strong service games.

① Reception performance analysis

Table 5 presents Niu Judia's reception performance. His reception success rate is high, with an 88.84% success rate against first serves and 92.59% against second serves. His first-serve return scoring rate (57.59%) is slightly higher than his second-serve return scoring rate (54.67%), with a direct return winner rate of 7.23%. Notably, his break rate exceeds 50%, reaching 62.22%. These results, combined with his serving performance, highlight his advantage in the receiving game.

Table 5 Niujuda 's success rate and scoring rate

Receive First Serve		Receive Second Serve		First Serve Return Direct Scoring Rate	Break Point Conversion Rate
Success Rate	Scoring Rate	Success Rate	Scoring Rate		
88.84%	57.59%	92.59%	54.67%	7.23%	62.22%

② Correlation between reception performance and match outcomes

Table 6 shows a strong correlation between Niu Judia's reception performance and match results. Key indicators, including direct return winner rate (P=0.877) and break success rate (P=0.914), significantly impact match outcomes.

Scoring rates differ notably between wins and losses. In victories, first-serve return scoring (67.21%) is 26.63% higher, and second-serve return scoring (59.26%) is 16.40% higher. Direct return winners (11.03% vs. 1.11%) and break success rate (75.00% vs. 30.77%) further emphasize the importance of strong receptions in securing wins.

Table 6 Correlation analysis of receiving and sending effect indexes and competition results

	Pearson	Significance (Two-Tailed)	Wins	Losses	Difference
First Serve %	0.031	0.795	88.41%	89.61%	-1.20%
First Serve Win %	0.655	0.007	67.21%	40.58%	26.63%
First Serve Ace %	0.015	0.912	91.53%	95.45%	-3.92%
Second Serve %	0.579	0.035	59.26%	42.86%	16.40%
Second Serve Win %	0.877**	0.001	11.03%	1.11%	9.92%
Second Serve Ace %	0.914**	0.001	75.00%	30.77%	44.23%

The data indicates that return scoring rate and direct return winner rate are key factors influencing match outcomes. Niu Judia performs better in return games than in service games, making break opportunities crucial for victory. To further improve win rates, maintaining a strong return game while enhancing serve quality and stability will help gain more control in service games.

③ Return effectiveness analysis

Table 7: Return Technique Performance

Forehand and forehand-side returns are stable, though the latter struggles due to increased footwork demands. Zone 1 forehand returns have higher scoring and direct point rates than Zone 2, indicating better quality.

Backhand returns perform better in Zone 2 but remain less effective than forehands. Despite frequent use, their scoring efficiency is low, requiring improvement. Slice returns excel in Zone 2, leading in success and scoring rates,

and ranking second in direct points.

Table 7 Success rate, scoring rate and direct rate of Niujuda 's receiving and sending methods

	Area 1			Area 1			Average		
	Success Rate	Scoring Rate	Direct Scoring Rate	Success Rate	Scoring Rate	Direct Scoring Rate	Success Rate	Scoring Rate	Direct Scoring Rate
Forehand	91.77%	66.01%	12.34%	89.33%	55.06%	5.46%	90.55%	60.54%	8.90%
Forehand Side	82.91%	48.25%	1.98%	81.57%	39.54%	0.00%	82.24%	43.90%	0.99%
Backhand	86.54%	33.97%	6.77%	92.21%	47.28%	11.33%	89.38%	40.62%	9.05%
Slice	87.79%	48.23%	8.95%	94.57%	60.35%	9.71%	91.18%	54.29%	9.33%

Data analysis shows that Niu Judia's most frequently used return in Zone 1 is the forehand, which demonstrates high stability and effectiveness across success, scoring, and direct point rates. In Zone 2, the most used return is the backhand, but its quality is average. The second most used, the slice return, proves more effective, as it not only forces opponent movement but also enhances offensive play, creating better scoring opportunities. Moving forward, while maintaining the strengths of the slice return, Niu Judia should focus on improving backhand return quality.

4. Research Conclusions and Suggestions

(1) Research conclusions

1) Niu Judda's serve lacks aggression, with a weak second serve and ineffective outer-corner placement, making it hard to control service games.

2) His return game is stronger, excelling in the first four shots. Zone 1 returns are slightly better, with effective outer-corner connections but higher errors on inner-corner returns.

3) He favors an aggressive style, excelling in 5-10 shot rallies but struggling in longer ones. His varied tactics transition to offensive shots like volleys and smashes with high success.

4) His fast-paced play yields quick points but also high errors, requiring strong psychological stability.

(2) Research suggestions

1) Niu Judda's stronger serve and first shot improve his win rate. Enhancing serve quality and quick transitions is crucial.

2) Second-serve returns, especially backhand, impact match results. Improving return quality and strategic placement is key.

3) His aggressive style pressures opponents but increases errors. Better shot placement and rhythm variation can boost success. Strengthening his backhand is essential.

4) His fast pace requires better endurance for long rallies. Consistent aerobic training is necessary.

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