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## Technical and Tactical Analysis of Men's 63kg Athlete Zhao Shuai at The 2019 World Taekwondo Championships

Yuan Lei<sup>1</sup>, Yan Hongwei<sup>2\*</sup>, Qonidah Salsabila Senja<sup>3</sup>

<sup>1,2,3</sup>Sports Coaching College, Beijing Sport University, CHINA

<sup>2</sup>Yong In University, SOUTH KOREA Indonesia

\*Correspondence: E-mail: [yanhongwei@bsu.edu.cn](mailto:yanhongwei@bsu.edu.cn)

### ABSTRACT

Taekwondo is a sport based on physical confrontation. A high level of physical fitness and skills is the basis for the growth of athletes. In Taekwondo competitions, athletes use their skills and tactics to win. This paper aims to make a statistical analysis of the techniques and tactics used by athlete Zhao Shuai in the competition to provide theoretical support and preliminary ideas for this study. The methods used in this research were carefully observing the video, statistical methods and tactical data, scientific preparation, and data use of Zhao Shuai's top 16, top 8, top 4, semi-final, and top 5 in 2019 Manchester World Taekwondo Championships at 63kg level. The software processing ensures the scientific characteristics of the research data. The results show that technology is the basis of tactics, and tactical development is closely related to technical integrity.

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## 1. Introduction

Taekwondo is a competitive sport in which two people compete against each other within the game's rules, and the final score determines the winner of the game. As the World Taekwondo Federation rules are constantly changing and the penalties are becoming stricter, the methods and means of taekwondo training are constantly being updated both at home and abroad. In recent years, we can see that domestic taekwondo is on a rising level, and many new athletes have emerged. However, it is also indispensable to study and analyze the techniques of each level. This can develop our strengths, give full play to our technical characteristics in the competition, and turn some of our weaknesses into advantages to occupy a favorable position in the competition. Then We will overwhelm our opponents and finally get the victory. The study of this video is helpful to provide technical reference and targeted training for other male athletes in China because Chinese male athletes have never won the world championship in the past. In addition, the research of other authors in the past is relatively old, so the new research provides more detailed training references for national team coaches.

## 2. Methods

The type of this research is quantitative research. Literature review, mathematical and statistic methods, video observation, expert interview, and logical analysis methods are used for this research.

### 2.1. Participant

This paper examines the techniques and tactics used by Zhao Shuai, a men's 63 kg athlete at the 2019 World Taekwondo Championships, during the competition. Three professionals of the national team shot this video from different angles during Zhao Shuai's game.

### 2.2. Instrument

#### 2.2.1. Video observation method

All videos of Zhao Shuai, a 63kg male athlete in the 2019 World Taekwondo Championship, were collected. He participated in five competitions. He watched the videos in detail through slow motion on the computer and recorded relevant technical and tactical data. Finally, the recorded relevant technical and tactical data were studied and analyzed.

#### 2.2.2. Logical analysis method

Based on the combination of video observation and data statistics, the technical and tactical characteristics of Zhao Shuai, the men's 63kg athlete of the 2019 World Taekwondo Championships, were studied in depth based on statistical data and the actual match situation. More detailed technical and tactical characteristics were analyzed, focusing on the organic combination of logic and science, summarizing the technical and tactical characteristics of the players and giving relevant feasible suggestions for the actual problems of the players

### 2.3. Procedure

#### 2.3.1. Literature method

In this paper, we reviewed the relevant literature on the study of techniques and tactics in taekwondo competition in recent years, core articles and browsed the relevant theoretical

articles and literature in the library of Beijing Sports University and other relevant sports libraries. The literature is integrated and essential information is summarized, which provides an essential theoretical basis for writing this paper.

### 2.3.2. Mathematical and statistical method

By describing the statistics of 2 aspects of the technical and tactical aspects of Zhao Shuai, inputting them into an EXCEL sheet, and using scientific, statistical methods to calculate the data in terms of the number of uses, utilization rates, success rates, success rates, scores and scoring rates of each index and after that, making them into tables and graphs to provide detailed and scientific data support for this study to better analyze its technical and tactical characteristics.

## 3. Result

### 3.1. Analysis of technical statistics of men's 63kg athlete Zhao Shuai of the 2019 World Taekwondo Championships

The 2019 World Taekwondo Championships officially opened in Manchester, England on May 16, 2019, where the taekwondo events were 49kg, 54kg, 58kg, 63kg, 68kg, -73kg, 73kg, -80kg, +80kg, and this paper makes a detailed statistical and analysis of the techniques and tactics used by the 63kg champion athletes in the competition. In the 2019 World Taekwondo Championships, there were 10 types of leg techniques: front leg cross-kick, rear leg cross-kick, push kick, hook kick, front leg split, rear leg split, back kick, backspin kick, whirlwind kick and double fly kick, An offensive punching technique, and 3 types of tactics, namely offensive tactics, defensive counter-attack tactics, and head-on tactics. Zhao Shuai used 9 kinds of leg techniques in these 5 games.

### 3.2. Analysis of Median Technical Statistics of Men's 63kg Athlete Zhao Shuai at the 2019 World Taekwondo Championships

**Table 1.** Median technical statistics of men's 63 kg athlete Zhao Shuai at the 2019 World Taekwondo Championships

|                  | Cross kick       |                 | Push kick | total |
|------------------|------------------|-----------------|-----------|-------|
|                  | Front cross kick | Rear cross kick |           |       |
| frequency        | 81               | 71              | 115       | 272   |
| Utilization rate | 29.8%            | 26.1%           | 42.3%     | 100%  |
| Scoring times    | 4                | 8               | 14        | 26    |

Note: usage rate = usage times / total usage times

As can be seen from Chart 1, Zhao Shuai, the 2019 World Taekwondo Champion in the men's 63 kg category, was the most used leg technique in the five matches with 152 cross kicks and 81 front leg cross kicks. The usage rate of 29.8%, 71 rear leg cross kicks with a usage rate of 26.1%, followed by 115 push kicks with a usage rate of 42.3%; due to Zhao Shuai's height advantage, the front leg Due to Zhao Shuai's height advantage, the distance of front leg strikes to the opponent is closer than the distance of back leg strikes. In addition, the amplitude of action of front leg strikes is smaller than that of back leg strikes, and the speed of front leg strikes is faster than that of back leg, in the match, Zhao Shuai mostly used front leg cross kicks and push kicks, which can be used not only to find the proper distance for himself, but also for defense to avoid being kicked by the opponent.

In terms of success rate, the front leg is lower than the back leg in all techniques, and the back leg is generally much higher than the front leg, Zhao Shuai uses the front leg to mobilize the opponent in the match, playing the role of both attacking and closing, because the front leg needs to face the opponent, so the probability of being destroyed by the opponent is high, while the back leg is often used when the opponent is in a slack mind, and the use of the back leg technique is The suddenness of the use of the back leg technique often causes more damaging blows to the opponent, and even KO the opponent. From a comprehensive point of view, Zhao Shuai has apparent differences in the use of front and back leg techniques, the front leg cross-kick and push kick, and the back leg cross kick are the most commonly used techniques, and the success rate of the use of the back leg technique is high.

In addition, there was a significant difference in the number of times used and the number of successes of the two different attacking technical approaches in the competition. The leg technique was the most used as the dominant technique in taekwondo, but with a lower success rate. In addition, the front horizontal kick and push kick techniques became the dominant techniques because:

3.2.1. The reduced playing field increased the intensity of the confrontation between players, and the front leg technique was fast and direct, with more comprehensive offensive and defensive capabilities.

3.2.2. The negative point deduction in the competition was stricter, shortening the confrontation between players, and the front leg technique could protect oneself from losing points in a safer situation.

3.2.3. The front leg technique had a long attacking distance, changeability and control ability are more robust and more conducive to implementing their tactics.

### 3.3. Technical Statistical Analysis of Men's 63kg Athlete Zhao Shuai's High Position at the 2019 World Taekwondo Championships

**Table 2.** 2019 World Taekwondo Championships Men's 63kg Athlete Zhao Shuai High Level Technical Statistics

|                  | Cross kick of front leg | Cross kick of hind leg | Front leg down split | Hind leg chop | Total |
|------------------|-------------------------|------------------------|----------------------|---------------|-------|
| frequency        | 22                      | 20                     | 37                   | 2             | 81    |
| Utilization rate | 27.2%                   | 24.7%                  | 45.7%                | 2.5%          | 100%  |
| Scoring times    | 5                       | 3                      | 2                    | 1             | 11    |

Note: usage rate = usage times / total usage times

From chart 2, it can be seen that Zhao Shuai's front leg cross kick high was 22 times, accounting for 27.2%; rear leg cross-kick was 20 times, accounting for 24.7%; front leg dropkick was 37 times, accounting for 45.7%; rear leg dropkick was 2 times, accounting for 2.5%. The number of times the technique was used and the number of scores, Zhao Shuai's use of front leg cross kick high, rear leg cross kick high, front leg dropkick Zhao Shuai used different high techniques for different players. Due to his height advantage, Zhao Shuai mostly used the high position of front leg cross-kick in the competition. From this, we can conclude that Zhao Shuai should practice more success rate of high technique in future training and try to develop his core scoring technique.

In the game, it can be concluded from the low success rate of the cross-kick score, Zhao Shuai front leg cross kick technology use the success rate is not high. Front leg technology use is directly facing the opponent athletes, in the defensive side of the athlete to take dodge and

other ways to make Zhao Shuai cross-kick and other technology can not accurately hit the scoring position. Front leg technology is easy to be predicted by the opponent, front leg technology is more focused on mobilizing the opponent, to maintain a favorable attack distance.

### 3.4. Technical Statistical Analysis of Men's 63kg Athlete Zhao Shuai at the 2019 World Taekwondo Championships

**Table 3.** 2019 World Taekwondo Championships Men's 63kg Athlete Athletes' Boxing Technique Statistics

| Technical name | Usage times | Utilization rate | Success time | Success rate |
|----------------|-------------|------------------|--------------|--------------|
| Straight fist  | 20          | 6.1%             | 8            | 40%          |

Note: usage rate = usage times / total usage times success rate = success times / usage times

From Table 3, it can be seen that the straight punch technique was used 20 times with a usage rate of 6.1% and 8 times successfully with a success rate of 40%. The low usage rate of the boxing technique but the high success rate mainly lies in the fast attack speed and high hit rate of the boxing technique. Through the video, it can be found that the straight punch is mainly used when both sides stand in open position, when the distance is close to the situation, both sides attack at the same time, but when the distance is close to the leg technique but the leg technique cannot form an effective attack, the player will change the leg technique to the straight punch technique.

In the 2019 World Taekwondo Championships, Zhao Shuai used punching techniques in all five matches and scored punching techniques in each match. This indicates that the current rules are actively guiding and encouraging players to use punching techniques and should boldly develop and experiment with the application of punching techniques in training and competition to improve the scoring rate of punching techniques in competition.

### 3.5. Technical Statistical Analysis of Men's 63kg Athlete Zhao Shuai's Rotation at the 2019 World Taekwondo Championships

**Table 4.** Statistical table of rotation techniques of Zhao Shuai, the men's 63 kg athlete of the 2019 World Taekwondo Championships

|                  | Back Kick | Backspin kick | Whirlwind kick | total |
|------------------|-----------|---------------|----------------|-------|
| frequency        | 8         | 1             | 0              | 9     |
| Utilization rate | 88.9%     | 11.1%         | 0%             | 100%  |
| Scoring times    | 3         | 0             | 0              | 3     |

Note: usage rate = usage times / total usage times

The new rules of taekwondo are modified for the spinning technique, and each score is increased by 1 point compared to the old rules. From the chart, we can see that the spinning technique was used a total of 9 times and scored 3 times; the back kick was used a total of 8 times. The accounting for 88.9% and 3 times successfully; the backspin kick was used a total of 1 time, with a usage rate of 11.1% and 0 times successfully; the spin kick was used a total of 0 times, with a usage rate of 0% with 0 successes. Although the number of times the above techniques were used was low, the above techniques were technically challenging to use, and

the concealment performance was poor, so it was easy for the opponent to catch the loopholes in the defense. Zhao Shuai was good at seizing the opportunity in the game with the opponent, and scored high with the back kick technique. Zhao Shuai should increase the proportion of the use of backspin kick and whirlwind kick in the next training. In order to be better able to use in the game.

In addition, the reason for the low usage rate of spin technology in the game is due to the change of new rules. Athletes are standing on the front leg, more front leg attack and blocking to destroy the opponent's action, the backspin kick and spin kick have large amplitude and long trajectory, which are easy to be caught by the opponent to score in the game. In addition, the push kick technology restrains the opponent's athletes from using spin technology in the game, which finally leads to the athlete falling to the ground after. In addition, the push-kick technique restrains the opponent from using the spin technique in the match, which leads to a direct deduction of points after the athlete falls to the ground. From the above data, it can be found that Zhao Shuai rarely used the backspin kick and spin kick techniques in the matches, and in all five matches, Zhao Shuai used the back kick technique, and almost all of them were used in the last game.

### 3.6. Total score of Zhao Shuai, the athlete of men's 63 kg category in 2019 World Taekwondo Championships

**Table 5.** Score statistics of men's 63 kg athlete Zhao Shuai at the 2019 World Taekwondo Championships

| Technology Classification    | Score | Scoring rate |
|------------------------------|-------|--------------|
| Cross kick before cross kick | 12    | 14.6%        |
| Back kick                    | 16    | 19.5%        |
| Push kick                    | 16    | 19.5%        |
| Hook kick                    | 0     | 0%           |
| Split on the front leg       | 3     | 3.7%         |
| Split on hind legs           | 0     | 0%           |
| Back kick                    | 12    | 14.6%        |
| Spin kick                    | 0     | 0%           |
| Whirlwind kick               | 0     | 0%           |
| Double kick                  | 0     | 0%           |
| Straight punch               | 8     | 9.8%         |
| foul                         | 15    | 18.3%        |
| total                        | 82    |              |

Note: scoring rate = scoring times / total times

The new rules of Taekwondo competition have substantially adjusted the scoring techniques. 1-point techniques are only positive punches, 2-point techniques are horizontal kicks, push kicks, double flying kicks, 3-point and 4-point techniques are downward slashes, high horizontal kicks, push kicks high, double flying kicks, back kicks, spin kicks, back spinning kicks. The distribution of Zhao Shuai's scoring success rate can be seen that 2-point techniques are the highest, followed by 4-point techniques, 1-point techniques and 3-point techniques are used with low success rate. From the perspective of usage rate, Zhao Shuai has the most use of 2-point technique, followed by 3-point technique, and the most minor use of 4-point technique. The use of each scoring technique requires Zhao Shuai to have speed, strength, explosive power, agility, and the fighting opportunity of the match, etc. The 1-point technique of square punch is a technique that many taekwondo players ignore, and Zhao Shuai has a

better effect in the use of square punch. The new rule provide that "5 seconds without attacking, 10 seconds without attacking will be "warned" by the penalty", which accelerates the attacking rhythm of the taekwondo competition, and the attacking of the square punch can assist the use of the legs, especially in the close attack can effectively suppress the opponent. Zhao Shuai should strengthen the success rate of the 2-point and 1-point techniques in future training and competition, significantly improve the horizontal kick technique's success rate, and increase the number of times the 3-point and 4-point techniques are used. In the future training and competition, Zhao Shuai should strengthen the success rate of 2-point and 1-point techniques, especially improve the success rate of cross-kick techniques, increase the number of 3-point and 4-point techniques, increase the number of high cross-kick and push-kick techniques, and prevent the opponent from using 3-point and 4-point techniques.

From Table 5, we can see that in terms of technical scores, the most scores are rear leg cross- kick, push kick, front leg cross-kick, and rear kick, with 16, 16, 12, and 12 points respectively, and the score rate is 19.5%, 19.5%, 14.6%, and 14.6%, and the scores of these four techniques account for 68.2% of the total score. The score rate was 3.7%. Hook kick, back leg chop, spin kick, double flying kick and backspin kick scored 0 points, with 0%. Push kick and cross kick scored the highest, but the higher technique and the accuracy rate made the technique score more points. In addition, the cross-kick technique is also the technique most used in taekwondo competition, the cross-kick has the characteristics of fast movement, strong concealment, small body energy consumption and both offense and defense, the push kick technique has the technical characteristics of slight body movement, fast linear attack and good defense, the push kick technique is the main offensive tactics The use of legwork, Zhao Shuai is 1.88 meters tall, in the -63 kg game height advantage is outstanding, the use of push kick technology is the most practical. The new rules of taekwondo increase the score of the rotating leg technique, which also increases the proportion of Zhao Shuai's rotating leg technique to a certain extent. Furthermore, it is also encouraging players to increase the use of rotational techniques.

The front leg chop and back leg chop are not used as many times and therefore scoreless, while the straight punch and back kick score comes from the technical score. Hook kicks, back spinning, double flying, and spin kicks were hardly used and therefore scored almost zero points.

The highest scores for cross kicks and push kicks are due to the high usage of the 2 techniques and therefore the highest scores. The number of times the back leg cross-kick is used is not high, but the high success rate of the technique results in more scores for the technique. The number of hook kicks, back spinning, and double flying kicks were used and their success rate were low and, therefore, scored the lowest.

According to the latest Taekwondo competition rules, the following situations are ruled as fouls giving the opponent one point. The biggest controversial call in this year's World Championships was when Zheng Shuyin, leading 16-6 in the first two games, was awarded 10 fouls by the referee in the last game. However, when one player reaches 10 fouls the opponent is awarded the win. Therefore, Zhao Shuai avoided allowing the referee to catch a foul call in the match. The statistics in Table 5 show that Zhao Shuai only committed 15 fouls in 5 games. The reduction in the number of fouls committed by Zhao Shuai in the game is also related to Zhao Shuai's active and aggressive attack in the game, which largely reduces the chances of being penalized. Zhao Shuai was called for a foul after his opponent was down by a large margin in the first two sets and often made a desperate move in the third set.

### 3.7. Analysis of Tactical Characteristics of Men's 63kg Athlete Zhao Shuai at the 2019 World Taekwondo Championships

**Table 6.** Tactical usage statistics of men's 63 kg athlete Zhao Shuai at the 2019 World Taekwondo Championships

|                  | Offensive tactics | Counter-attack Tactics | Attack tactics | Defensive tactics | Close tactics |
|------------------|-------------------|------------------------|----------------|-------------------|---------------|
| frequency        | 182               | 10                     | 56             | 60                | 21            |
| Utilization rate | 55.3%             | 0.3%                   | 17%            | 18.2%             | 0.6%          |

Note: usage rate = usage times / total usage times

Taekwondo tactics are strategies and methods that athletes choose to limit the opponent's performance and give full play to their strengths according to the actual situation of the opponent during the match. According to the literature and combined with increased interviews, we know that the tactics adopted by Zhao Shuai in the competition are divided into: offensive tactics, counter-attack tactics, welcoming tactics, and defensive tactics. As can be seen from the table in Figure 6, Zhao Shuai, the champion athlete in the men's 63 kg category at the 2019 World Taekwondo Championships, used tactics 329 times. Offensive tactics being used the most often, accounting for 55.3% of the time, while welcoming tactics and defensive tactics accounted for 17% and 18.2%, respectively, and counter- attack tactics and close tactics were 0.3% and 0.6%, respectively. With the change of new rules, most of the athletes use front leg as offensive tactics and counter-tactics are used less often. Zhao Shuai used front leg as offensive techniques in most of the 2019 World Championships, and due to the limitation of height, Zhao Shuai seldom started his legs after close up in order to be caught by the opponent, so most of Zhao Shuai used close up after close up.

The above data shows that Zhao Shuai's tactics taken in the match are mainly offensive tactics. Offensive tactics are Zhao Shuai's superior tactics. In contrast, the lowest in the use of counter-attack tactics and score rate, which means that Zhao Shuai's defensive counter-attack taken when he is passive is not adequate, which is also the reason why Zhao Shuai was passive in the third set after the fourth round against, Nazayan, Ferhat, Iordanis, Ahmadi and other strong players. Once the opponent makes a crazy counter-attack, Zhao Shuai's defensive ability and defensive counter-attack ability shortcomings are exposed, so in future training and matches Zhao Shuai should strengthen the counter-attack tactics and the ability to change tactics to improve the ability to reverse the passive situation of the match.

### 3.8. The use of scoring tactics of Zhao Shuai, a men's 63 kg athlete in the 2019 World Taekwondo Championship

**Table 7.** Statistics of the use of scoring tactics by Zhao Shuai, a player in the men's 63 kg category of the 2019 World Taekwondo Championships

|                  | Offensive tactics | Counter-attack Tactics | Attack tactics | Close tactics | total |
|------------------|-------------------|------------------------|----------------|---------------|-------|
| score            | 44                | 2                      | 14             | 2             | 62    |
| Utilization rate | 80%               | 0.3%                   | 13%            | 0.3%          | 100%  |



From the chart, it can be seen that Zhao Shuai has the most significant percentage of offensive score in the 2019 World Championships, reaching 80%, 13% of the score of meet and greet, and 0.3% of both the score of counter and close score, which can be seen that Zhao Shuai is an offensive player in the game, and due to the advantage of Zhao Shuai's height, the front leg offensive tactics have an excellent advantage for Zhao Shuai in the game.

It can be analyzed that Zhao Shuai made full use of his advantage in the match to control his safe distance by playing short front leg offensive tactics with high, so that his opponent could not approach him. Zhao Shuai close tactics used less because the opponent to short to play high, Zhao Shuai certainly will not quickly close to give the opponent distance to hit, but to pull away and control their own attack distance; In addition, due to the new rule changes, the athletes rarely use counter-attack tactics in the game, but converted to meet tactics as well as offensive tactics to reduce the counter-attack tactics to bring the athletes lost points situation.

#### **4. Discussion**

In the 2019 World Taekwondo Championship, Zhao Shuai's back kick technique timing is accurate and poses a significant threat to the opponent, while the backspin kick and spin kick have a high risk factor of falling to the ground due to the difficulty of the movement, so Zhao Shuai uses these two spin techniques less in the competition.

In terms of tactics, the use of offensive tactics and welcoming tactics were dominant, and the best players were more inclined to take the initiative to attack. Due to the new rule changes and the rules of narrowing the field and adverse foul penalties, counter-attacking tactics were lower.

In the 2019 World Taekwondo Championships, Zhao Shuai should be careful of the loss of points due to the sudden attack of the backhand punch after the opponent gets close in the closed standing standoff.

#### **5. Conclusion**

It is recommended that China's men's taekwondo should strengthen the main scoring techniques in future training, improve the technical scoring rate, strengthen the use of horizontal kick technique and push kick technique and grasp the timing of attack.

Due to the change and development of the new rules, it is recommended that players focus on the overall development of techniques in future training, and pay attention to the use of punches, especially the use of other techniques in close situations, and the practice of mastering the timing of punches and striking effects.

It is recommended that players practice enriching scoring methods, especially punching and back-kicking techniques represented by 1 and 4 points, in their training.

Encourage the best players to use more spinning techniques and apply them in combinations to break the traditional risky perception of spinning techniques. Players can gain more advantages in the competition.

#### **6. AUTHORS' NOTE**

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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