

Technical Analysis of 323B+3 Difficulty Movement of Taijiquan

-- Based on the Wushu Routine Competition of the 14th National Games as the Research Object

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Abstract

According to the application and implementation of "Rules of Wushu Routine Competition and Referee Law (2012)", competitive Wushu Taijiquan has been implemented quite maturely in national and large-scale competitions, and more and more Taiji athletes are in the C-level section. The 323B+3 whirlwind foot 360-degree knee lift independently has become a key difficult move to achieve excellent results in major events. How to improve the success rate and movement quality of 323B+3 difficulty movements in Tai Chi is a problem that every athlete and coach has been discussing and solving, and it has also become a research topic in modern competitive Tai Chi. Through video observation and questionnaire survey of all male and female Taijiquan athletes in the 2021 National Games Qualifications and Finals, this study found that the way of taking off and landing, the different shapes of the left lower limb in the air, and the direction of the strike in the air are important for improving the success rate of difficulty and the quality of movement. significant association. The data is counted, summarized and analyzed, and the technical method with the highest 323B+3 success rate for athletes on the competition field is found out, which can provide an efficient and scientific auxiliary basis for the future training of coaches and athletes, thereby improving competition performance. Promote higher-level development of competitive Tai Chi events.

Keywords

Martial Arts; Competitive Tai Chi; 323B+3; Difficult Actions.

1. Research Object and Method

1.1. Research Object

A total of 90 male and female Taijiquan athletes in the Wushu Routine qualification competition of the 14th National Games (hereinafter referred to as the 14th National Games) and Taijiquan athletes in the final of the 14th National Games were selected as the research objects (see Table 1).

Table 1. Statistics of athletes in the qualification and final of Wushu Routine Taijiquan in the 14th National Games

The annual game	Men's	Women's	Total
Wushu Routine qualification competition of the 14th National Games	30	34	64
Wushu Routine final of the 14th National Games	13	13	26

Note: the top 12 athletes in the Wushu routine qualification competition of the 14th National Games will participate in the finals of the national Games. In the final of the National Games tai Chi men and women each added a Hong Kong team athlete.

1.2. The Research Methods

1.2.1. Video Observation Method

The Wushu routine qualification of the 14th National Games was recorded on the spot, and the final was recorded by "Central Video" software to observe and record the performance of the athletes and the completion of the 360 degree knee lifting independently of the cyclonic feet, and then analyzed.

1.2.2. Questionnaire Survey

This paper conducted a questionnaire survey on 12 outstanding athletes in the final of Taijiquan of martial arts routine in the 14th National Games, understood the master method of Taijiquan of 360 degree independent movement structure of cyclonic foot, and gave experience and suggestions on technical analysis.

1.2.3. Mathematical Statistics

Use EXCEL2007 statistical software to sort out, record and count the survey data. Make corresponding tables for description and correlation analysis.

2. Taijiquan 323B+3 Technical Analysis of Difficult Movements

2.1. Technology Introduction

Whirlwind foot is one of the most basic jumping movements in China's competitive martial arts routines. It is an important jumping movement in the three categories of Changquan, Nanquan and Taijiquan competitions in high-level competitive martial arts routines. In Taijiquan, the whirling foot with 360 degrees catching and lifting knee is a required difficulty movement that meets the requirement that the difficulty score of Group C reaches 2 points. According to the rules of Wushu Routine competition and the book of Judges in 2012, the code of the difficulty movement corresponding to this rule is 323B and the code of the connection movement is +3. The corresponding score is 0.3 and 0.1 respectively, which is the second highest difficulty movement and connection movement in Taijiquan.

The independent action structure of cyclone foot is divided into four parts in order: preparatory stage, take-off stage, air stage and support stage. Athletes are required to open their feet parallel to each other in the preparatory stage, and shoulder width or slightly wider than shoulder width. Their body is upright, and they should look ahead and take off vertically. Take off stage with half squat or squat power, upper body with hip joint as the axis, slightly forward 30 degrees to 45 degrees, visual front and bottom. In the air stage, the body rotates counterclockwise along the vertical axis. When the rotation reaches 180 degrees, the right leg forms a slanting swing leg or fan-shaped leg through the opposite side of the front, and beats with the left palm finger and the right forefoot in the range of 180 degrees to 230 degrees. The right foot is the plantar flexion inversion position, and the left lower hanging leg is bent or vertical. During the support stage, the first drop point is the right leg and calf with an Angle of 130 degrees to support, followed by squat buffering, the other leg is closed to the side of the body, the two arms are opened first and then recovered in order to grasp the balance, the body is straight, and the visual front and bottom. Left leg knees, feet straight, calf buckle, knee when the thigh is higher than the level.

As a b-level difficulty movement and connection movement in Taijiquan, cyclonic foot 360 degrees catching and raising knee has been one of the key points for athletes to improve the quality of completion of difficult movements for many years, and the quality of completion of

movements is the main factor to determine the performance of athletes. The movement takes off in place and requires swinging legs to strike while rotating in the air. After landing, the single-leg support is in a static state. For high-level Taijiquan athletes, the most difficult part of this difficulty is that when rotating in the air, the clapping sound increases the centrifugal force of rotation, leading to the failure of single-leg support to remain static and lose points. Compared to male athletes, female athletes are lower in the air.

According to the rules of Wushu Routine competition and the book of judges in 2012, there are three cases in which the difficulty category, content and completion of whirlwind foot 360 degrees in Taijiquan and Taiji sword do not meet the requirements. The first is running more than one step before the jump, the second is not turning enough, and the third is hitting the leg below level. Any one or more of the above conditions will not be given a confirmation difficulty score of 0.3. In the confirmation that the difficulty category, content and completion of Taijiquan and Taiji sword are not in conformity with the regulations, there are also three cases in which the cyclonic foot 360 degrees + knee lift is independent, the first is that the percussion leg does not land on one foot, the second is that the foot moves or jumps, and the third is that the knee lift leg and foot touch the ground. In any one or more of these cases, no score of 0.1 will be given for confirming connection difficulty.

2.2. Penalty Points for Action Quality

Table 2. Men's and women's 323B+3 action quality points deduction table

Points Code	Men's				Women's			
	Qualifying		Final		Qualifying		Final	
	Number	%	Number	%	Number	%	Number	%
70	17	56.67%	4	30.77%	24	70.59%	2	15.38%
30	0	0	0	0	0	0	0	0
71	3	10%	0	0	1	3.03%	2	15.39%
Connection points+ 3	10	33.33%	1	7.69%	3	9.1%	3	23.08%
Total	30		5		28		7	

Cyclone foot 360 degree connection system independent, code 323B+3. In the whole set of Taijiquan, each athlete will be placed in different positions of the routine. The main factors affecting the success rate are technology, physical strength, psychology and physical quality. Compared with previous years, the success rate of the 14th National Games preliminary 323B+3 has a great range of decline, there are two main reasons, one is that most of the athletes have short training years, the technical movement is not mature; The other is the increase of psychological pressure of the competition, which has led to the increase of difficult action quality points this year. In 323B, the action quality is usually deducted, and the deduction code is 70, which refers to the "shaking, foot grinding, moving or jumping" score of 0.1 points; Penalty code 71 refers to the "additional support" score of 0.2 points. According to the data in Table 2, the most deducted points of men's 323B movement quality in the qualification competition of this year's National Games are shaking, foot rolling, movement or jumping. Among the 30 people, 17 people have deducted points 70, accounting for 56.7%, and 3 people have deducted points 71, accounting for 10%. According to the rules, once additional support occurs, The corresponding 323B difficulty link score is not confirmed, nor is the foot grind, move, or jump difficulty link score. The success rate of the men's Taijiquan event improved significantly in the final of the National Games, with 3 athletes out of 13 showing shaking and 1 jumping and losing connection points. According to the data in Table 2, the difficulty error rate of 323B+3 is higher than that of men in the national Games qualifying competition, which is as high as 70.59%. There is 1 female athlete with the point deduction code 71, and 24 female

athletes with the point deduction code 70. In the final, the success rate of female tai chi athletes improved, with their error rate reduced to 15.38 percent. The competition was very fierce.

2.3. Male Taijiquan 323B+3 Technique and Success Rate Analysis

In 323B+3 difficult moves, the athletes according to their own training and coaching to form their own means of takeoff and landing phases, sums up four different combination way, low jump refers to the thigh is lower than the level off and is close to full squat jump way, muscle forcibly to share rectus muscle, shares, the skeletons of lumbar participation is more, the muscle is longer than the other. Perch jump refers to is taller than or close level jump, show close to half squat jump means, exert oneself muscle is muscle outside muscle inside femora's muscle, femora's thin muscle more. Low landing refers to the landing support leg is lower than the level when the single leg is supported, which is close to the full squat landing. High landing refers to the landing support leg is higher than or close to the level when a single leg is supported, is close to or higher than half squat landing. Because of the different take-off and landing ways, it directly affects the quality of the difficult movement to complete the results, so we have carried on the statistics and sorting of the athletes in the qualification and final of the national games of high level men's tai chi. As shown in Table 3, male tai chi athletes choose the combination of low jump and low landing the most, and the success rate is the highest. This was followed by the combination of low take-off and high landing, with a success rate of less than half. Few athletes choose the combination of high take-off and landing. Reflects the strong physical fitness of male athletes, in the competition, the center of gravity is low, is conducive to muscle control balance, if a high jump or landing, it is easy to appear insufficient buffer, the center of gravity offset, balance is not easy to grasp, so as to appear shaking or jumping wrong action.

Table 3. The combination of take-off and landing techniques and the success rate analysis

Take-off mode + landing mode	Qualifying		Finals	
	Number	The success rate%	Number	The success rate %
Low take-off + low landing	14	42.86%(6)	9	88.89%(8)
Low take-off + higher landing	12	33.33%(4)	3	33.34%(1)
Higher take-off + low landing	4	25%(1)	0	0
Higher take-off + higher landing	0	0	1	0%
Total	30		13	

In the air stage of 323B+3 difficulty movement, the left lower limb will also present different shapes, including straight knee shape without bending knee, certain requirements for the height of the air, and half knee shape, which is more relaxed in the air, reserving more space for the height of the air for landing buffer. Full knee form, refers to the left lower limbs bend knees, big leg folding, greatly improve the height of the air, some athletes intentionally, some athletes are unintentional. The results are shown in table 4, found in the statistics, most of male athletes chose straight knee technology method, the success rate is not high, the qualification to the high level athletes in the final success rate increase is extremely obvious, all technical method of knee athletes choose the least, have appeared in the lowest qualifying success rate, the success rate of the highest contrast. There are also some athletes who choose the technique method of half knee, the success rate is about half, relatively stable. It can be seen that the technique of total knee retraction has the greatest risk and is not recommended. If the straight knee technique is mastered for a long time, elite athletes can play a very high success rate. The method of half knee retraction is relatively stable, so straight knee or half knee retraction is recommended for training.

Table 4. Analysis of different morphology and success rate of left lower limb in air

Aerial form of left lower limb	Qualifying		Finals	
	Number	The success rate %	Number	The success rate %
Straight knee	19	26.32%(5)	7	71.43%(5)
Half closed knee	6	66.67%(4)	4	50%(2)
All of the knee	5	20%(1)	2	100%(2)
Total	30		13	

In the air stage of the difficult movement, the Angle of the striking azimuth is also one of the important factors determining the success rate of the difficult movement. Because the male tai chi athletes generally have strong physical ability and sufficient height in the air, there are basically two tendencies in the selection of the striking azimuth. As can be seen from Table 5, Men's athletes in the qualification and final selection of striking azimuth 180-270 degrees is the most, in the final success rate is also the first; The second is to choose the firing range of 90 degrees -180 degrees, the success rate in the preliminary and final is relatively moderate; Only one player can choose the range of 0 degrees to 90 degrees. Failure is negligible. Been smacked the azimuth Angle of athletes for air rotating speed, choose to empty the after been smacked of time and is closely connected with ground support, through the data, suggest man tai chi athletes choose 180-270 degrees been smacked of bearing, can effectively control the rotation speed, reduce been smacked and azimuth Angle to the ground and to set aside enough time after been smacked aloft, Balance.

Table 5. Analysis of azimuth and success rate of air strike

Been smacked of bearing	Qualifying		Finals	
	Number	The success rate %	Number	The success rate %
0-90 degrees	1	0	0	0
90-180 degrees	16	31.25%(5)	2	50%(1)
180-270 degrees	23	26.09%(6)	11	72.73%(8)
270-360 degrees	0	0	0	0
Total	30		13	

2.4. Female Taijiquan 323B+3 Technique and Success Rate Analysis

Due to the great difference in physical function between female athletes and male athletes, the success rate of the 323B+3 difficulty movement is lower than that of the male tai chi project, and it will be more difficult to complete this difficulty, which is obviously lower and faster from the air height and rotation speed. According to the data collected from high-level female tai chi athletes in the 14th National Games, as shown in Table 6, female tai chi athletes chose the combination of low takeoff and high landing the most, with a success rate of 20% in the qualification and 75% in the final. The second most popular combination was the low take-off and landing, with the success rate rising from 37.5% in the qualification to 66.67% in the final. There are also some athletes will choose the combination of high jump and high landing, the success rate is more general. 323B+3 is risky and has a high degree of difficulty, so there is a big difference in the success rate between the qualification and final. The technical way of low rise and high fall is more suitable for the general female athletes. The aerial height is not high, but the method of movement needs to be mastered more skillfully. The technical way of low rise and low fall is more suitable for the female athletes with strong jumping ability. They have high requirements for air height and enough stagnation in the air to adjust the balance of landing.

Table 6. The combination of take-off and landing techniques and the success rate analysis

Take-off mode + landing mode	Qualifying		Finals	
	Number	The success rate %	Number	The success rate %
Low take-off + low landing	8	37.5%(3)	3	66.67%(2)
Low take-off + higher landing	15	20%(3)	8	75%(6)
Higher take-off + low landing	1	0	0	0
Higher take-off + higher landing	10	30%(3)	2	50%(1)
Total	34		13	

Women's tai chi athletes in 323B+3 difficulty action air stage, according to data collection are shown in table 7, the left leg is straight knee state and the highest success rate, choice is the most athletes, reflects the fact that in 323B+3 difficulty, air keep straight knee, without too much change shape, is helpful to keep the balance of the air, enhance the success rate. The second part of the athletes choose half knee, the success rate is general, very few female athletes will choose the full knee, the success rate is also the lowest. The total knee tuck method increases the height from the ground, but by too much, it is more difficult to maintain balance.

Table 7. Analysis of different morphology and success rate of left lower limb in air

Aerial form of left lower limb	Qualifying		Finals	
	Number	The success rate %	Number	The success rate %
Straight knee	20	35%(7)	8	62.5%(5)
Half closed knee	11	18.18%(2)	5	60%(3)
All of the knee	3	0	0	0
Total	34		13	

In terms of the Angle of striking azimuth, according to the statistics shown in table 8, 24 female athletes adopted the striking azimuth range of 90-180 degrees, and the success rate increased from 20.83% in the qualification to 90% in the final. Four athletes used a range of 180-270 degrees, and their success rate increased from 25 percent in qualifying to 50 percent in the final. The results suggest that the range of 90 degrees to 180 degrees can effectively improve the success rate of the movement by adjusting the range of 90 degrees to 180 degrees. The female athletes can choose this range to better coordinate with the stagnation and rotation in the air stage.

Table 8. Analysis of azimuth and success rate of air strike

Been smacked of bearing	Qualifying		Finals	
	Number	The success rate %	Number	The success rate %
0 -90degrees	6	50%(3)	1	0
90-180degrees	24	20.83%(5)	10	90%(8)
180-270degrees	4	25%(1)	2	50%(1)
270-360degrees	0	0	0	0
Total	34		13	

3. Conclusion and Recommendations

3.1. Conclusion

323B+3 action is difficult for many years, has been a great problem for the coaches and athletes, most athletes because of the action of failure, and missed the final ticket, through the 14th

national games, video observation and questionnaire of male athletes and female athletes of 323B+3 difficulty technology is analyzed, the study found that Take-off mode and landing mode, different forms of left lower limbs in the air and the direction of air strike are significantly correlated to improve the success rate of difficulty and the quality of action. Male tai chi athletes generally choose the combination of low take-off and low landing, the left lower limb straight knee in the air and hitting the range of 180 degrees to 270 degrees of difficulty movement success rate is the highest. The combination of high take-off and high landing has the lowest success rate in the range of 0 ° -90 °. Female taiji athletes generally choose the combination of low jump and high landing, the left lower limb straight knee in the air and hitting the range of 90 degrees to 180 degrees of difficulty movement success rate is the highest. The combination of high take-off and low landing has the lowest success rate in the range of 0 ° -90 °.

3.2. Recommendations

Since the 323B+3 difficulty movement plays a decisive role in the score of the complete set of movements of athletes, in daily training, it is necessary to make targeted records of athletes, observe the relationship between technical methods and success rate, and quantify the statistical data, so as to formulate the most appropriate technical methods for each athlete. According to the data of male and female athletes of Martial arts Routine Taijiquan in the 14th National Games in 2021, it is suggested that in daily training, male athletes should practice with low rise and low fall, the left lower limb straight at the knee in the air, and the percussion direction ranging from 180 degrees to 270 degrees. Female athletes use low up and down, the left leg straight knee in the air and hit the range of 90 degrees -180 degrees of the technical method to practice. And need to cooperate with physical training and psychological quality of stress training, for different physiological characteristics of athletes can be adjusted accordingly.

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