

ORIGINAL ARTICLE



The Scoring Techniques in the Final Competitions of the Karate World Championships 2016

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ABSTRACT

Background. Scoring is the main determinant factor for winning in any sport and good techniques can facilitate scoring. In Karate, there are series of punching and kicking techniques that fighters use for scoring. **Objectives.** The aim of this research was to determine the most scoring techniques and their frequencies in final kumite competitions of 2016 world karate championships. **Methods.** By the help of a video analysis software and a Microsoft excel sheet all the data referring to the scored techniques (by winners and losers" and their frequencies have been gathered and recorded. In overall, 10 Fights with total number of 70 scores were analyzed. The finalists used some predominant techniques in order to overcome their opponents. **Results.** By the help of a video analysis software and a Microsoft excel sheet all the data referring to the scored techniques (by winners and losers" and their frequencies have been gathered and recorded. In overall, 10 Fights with total number of 70 scores were analyzed. The finalists used some predominant techniques in order to overcome their opponents. **Conclusion.** This shows that speed and explosive power is an indication in recent karate especially in the world-class level and karatekas.

KEYWORDS: *Notational Analysis, Karate, Kumite, Scoring, Combat Sport*

INTRODUCTION

The term "martial arts" alludes to those codified practices and traditions whose goal is to submit or self-defend through technique. There are several styles and schools of martial arts. What differentiates martial arts from mere bellicose or physical violence (street fights) is the organization of their techniques and tactics into a coherent system, adherence to a philosophy of life or code of conduct, and the coding of effective methods tested in antiquity (1). The term Karate is comprised of two Chinese characters: Kara, which translates as "empty" and te, which means "hand" or "fist". The practice of karate served as a means to prepare the body for combat. The body became the weapon, each foot a sword, each arm a spear,

each hand a knife. The evolution of Karate has caused the word itself to acquire many definitions. For example, in the United States the term Karate might signify a particular Japanese art or be used as a generic term for fighting arts (2). Athletes use almost all muscles during training and competition, but the two forms of the sport (Kumite and Kata) differ significantly about style and corresponding muscle use. Kata consists of a predetermined series of movements that are performed with explosive swiftness against imaginary opponents, whereas kumite involves noncontact fighting. The kumite athletes perform ritualistic rather than actual fights. Although these competitions involve noncontact fighting and symbolic techniques,

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the athletes must demonstrate the potential force of their movements and execute them as if they were real, using control to stop the movements so as not to inflict damage to the opponent (3).

In Kumite 3 points (Ippon) is now awarded for kicks to the head and takedowns followed by an attack. Kicks to the trunk and punches to the back including back of the head are awarded 2 points (Waza-Ari) and punches to head and trunk are awarded 1 point (Yuko). In an examination paper for kumite referees and judges published in January 2015 by WKF (World Karate Federation), it is mentioned that senior male bouts are three minutes. A Jodan kick slightly deficient in Zanshin (awareness) may be given Ippon because it is considered to be a technically difficult technique. A fast combination of Chudan Geri (kick to the trunk) and Zuki (a punch to head and trunk) each of which score in their own right will be given Ippon. Unbalancing the opponent and scoring with Judan Zuki (punch to head) is given waza-ari. The winner is determined by the fighter with the most points at the end of the 3 minute bout or if one fighter is 8 points clear the bout will be stopped and that fighter declared the winner. The points are awarded by the referee in consultation with a minimum of 3 seated judges. (WKF rules). A score is awarded when a technique is performed according to the following criteria to a scoring area:

- a) Good form (characteristics conferring probable effectiveness within the framework of traditional Karate concepts.)
- b) Sporting attitude (a component of good form and refers to a non-malicious attitude of great concentration, obvious during delivery of the scoring technique.)
- c) Vigorous application (the power and speed of the technique and the palpable will for it to succeed.)
- d) Awareness or ZANSHIN (the state of continued commitment in which the Competitor maintains awareness of the opponent's potentiality to counter-attack. I.e.: He/she does not turn his/her face away during delivery of the technique, and remains facing the opponent afterwards.)
- e) Good timing (delivering a technique when it will have the greatest potential effect)
- f) Correct distance (delivering a technique at the precise distance where it will have the greatest potential effect. Thus, if the technique is delivered on an opponent who is rapidly moving away, the

potential effect of that blow is reduced.) (WKF rules 2019)

It is clear that working and training to anticipate movements and managing emotions is a core skill of martial artists. Training leads to improvement and forms the difference between beginners and athletes (4).

The behavior of an athlete in sport competition is the product of many complex processes. The aim of various disciplines within the sport sciences is to understand these processes at a fundamental level. Performance analysis might help to integrate the separate contributions from various disciplines.

Sports performance are complex dynamic situations that yield a potentially large volume of quantitative and qualitative information. Coaches need to identify and act on the most critical information to help players improve. The role of performance analysis within the coaching process is to produce quantitative information allowing areas requiring attention to be quickly identified (5). Performance analysis involves the investigation of actual sports performance or training. One of the most important variables affecting learning and subsequent performance of a skill is feedback. Feedback involves sensory information resulting from a particular movement and one source of feedback is from the athlete's own sensory channels (i.e. sight, hearing, touch, etc.), known as intrinsic or inherent feedback. A second source of feedback usually comes from an outside source, typically a coach, and is meant to complement the intrinsic feedback. This information is known as extrinsic feedback and helps the athlete compare what was done to what was intended. This is usually achieved by drawing the attention of the performer to some key element of performance error. It is accepted that feedback, if presented at the correct time and in the correct quantity, plays a great part in the learning of new skills and the enhancement of performance. Recent research, however, has shown that the more objective or quantitative the feedback, the greater effect it has on performance (6).

The implementation of new WKF rules and scoring system has led to dramatic changes in the way karate fights are conducted, however this has yet to be evidenced and there is therefore a need for a comprehensive notational analysis study to be undertaken highlighting predominant

technique(s) and strategies executed as this would allow a better understanding of how karateka can become more successful fighters by altering training accordingly (7).

Previous Studies. Koropanovski and Jovanovic (2007) conducted a study in which they analyzed 110 subjects throughout 55 fights at various WKF events. The aim was to analyze the characteristics of elite karate performers in order to develop effective training strategies (8). They found that the most predominant scoring technique was Gyaku-Zuki to the body by 34.91% of all scores. The second scoring technique that was almost as prevalent was Gyaku-Zuki to the head at 32.0%. In another research which was done in 2009, 17 fights (34 elite male karate competitors) with total number of 67 scores have been analyzed. The result indicates that there was significantly predominant scoring technique, which separates winners from losers. The most frequently scored technique for all the fighters was Gyaku-Zuki to the body, with 43.28% rate among all the other scoring techniques (9). There were other researches in Karate in recent years as well, for example Macan and his colleagues (2006) in karate injuries (10), the influence of facial expressions on attack recognition and response behavior in karate kumite (11), A needs analysis of karate *kumite* with recommendations for performance testing and training (12), a metric to determine success in elite karate bouts (13), kinematic and dynamic analysis of a karate straight punch (14), technical and tactical discriminatory factors between elite karate athletes (15), dynamic balance in elite karateka (16); however, they will give good insight about the reasons why Karate techniques are used in their current frequencies as they should be.

MATERIALS AND METHODS

Kinovea video analysis software alongside with Microsoft Excel 2013 were used as means for analyzing and recording frequencies and techniques. The data that was related to individual and team final competitions of adult male category in Karate World Championships 2016 has been gathered. Five individual and five team competitions was held in 2016. Team final competition was between Japan and Iran. It is worthy to be mention that two of the participants of team final competitions were the people who actually participated in individual final as well (so total rate of participants was 18 persons out of 10 competitions). By the help of Download Manager

software all the 10 matches have been downloaded from the internet in HD quality, and for further analysis, they were transferred to a laptop. Every successful and unsuccessful pointing scenes for each competition have been extracted and saved to the computer separately. Combined techniques (for example: Oi Zuki Kizami Zuki) have not been recorded to our system, only the last technique which led to scoring has been recorded. For the accuracy of our method and data, 3 random competitions were selected for double checking. The result was the same either in successful and or in unsuccessful techniques recording. Actually, a version of the data related to these competitions were sent to a USB device for further analysis in SPSS software.

Table 1. Hand Notation Table Used in Microsoft Excel 2013

Techniques in Japanese	Techniques in English
Ashi Barai	Foot Sweep
Mae Geri	Front Kick
Jodan Mawashi Geri	Upper Roundhouse Kick
Chudan Mawashi Geri	Middle Roundhouse Kick
Ura Mawashi Geri	Hook Kick
Ushiro Ura Mawashi Geri	Back spinning hook kick
Ushiro Geri	Back Kick
Yoko Geri	Side Kick
Kizami Zuki	Jab Punch
Oi Zuki	Lunge Punch
Gyaku Zuki	Reverse Punch
Uraken	Back Fist
Haito Uchi	Ridge Hand Strike

Table 2. Point Value of each Technique – WKF Rules

Technique	Value
Ashi Barai	3
Mae Geri	2
Jodan Mawashi Geri	3
Chudan Mawashi Geri	2
Ura Mawashi Geri	3
Ushiro Ura Mawashi Geri	3
Ushiro Geri	2
Yoko Geri	2
Kizami Zuki	1
Oi Zuki	1
Gyaku Zuki	1
Uraken	1
Haito Uchi	1

RESULTS

There were 7 different successful techniques (52 total frequencies) with 70 scores in 10 matches. By analyzing these fights, the most frequently used techniques for scoring and their differences between winners and losers have been unveiled. The quantitative data collected via Microsoft Excel 2013 is nominal and non-parametric in nature. Table 3 shows the frequency of scoring techniques for both winners and losers. The most frequently scored techniques in total (winners + losers) is Kizami Zuki (23 Out of 70) and the second most is Oi Zuki (17 out of 70)

Table 3. Frequency of scored Techniques

Technique	Value of technique in points awarded	Frequency of scored technique by winners	Frequency of scored technique by losers	Total frequency of scored technique for both winners and losers
Ashi Barai	3	2	1	3
Mae Geri	2	0	0	0
Jodan Mawashi Geri	3	4	0	4
Chudan Mawashi Geri	2	0	0	0
Ura Mawashi Geri	3	2	0	2
Ushiro Ura Mawashi Geri	3	0	0	0
Ushiro Geri	2	0	0	0
Yoko Geri	2	0	0	0
Kizami Zuki	1	16	7	23
Oi Zuki	1	13	4	17
Gyaku Zuki	1	2	0	2
Uraken	1	1	0	1
Haito Uchi	1	0	0	0

Table 4. Frequencies of scored Techniques in Percentage

Technique	Value of technique in points awarded	Frequency of all scored techniques in percentage	Frequencies of scored techniques by winners in percentage	Frequencies of scored techniques by losers in percentage
Ashi Barai	3	5.7%	66.6%	33.3%
Jodan Mawashi Geri	3	7.6%	100%	0%
Ura Mawashi Geri	3	3.8%	100%	0%
Kizami Zuki	1	44.2%	69.5%	30.4%
Oi Zuki	1	32.6%	76.4%	23.5%
Gyaku Zuki	1	3.8%	100%	0%
Uraken	1	1.9%	100%	0%

Table 4 shows the percentage frequency for all the scored techniques, either separately for winners and losers or both together. The most frequently scored technique among all fighters is Kizami Zuki with 44.2% (Among 52 numbers of successful technique). The pie chart below (Figure 1) shows the frequency of the scored techniques in percentage for the winners only. As it can be seen by the chart, the most frequently used technique for scoring among winners is Kizami Zuki (40%) and in second place is Oi Zuki (33%).

Most frequently scored techniques for winners only

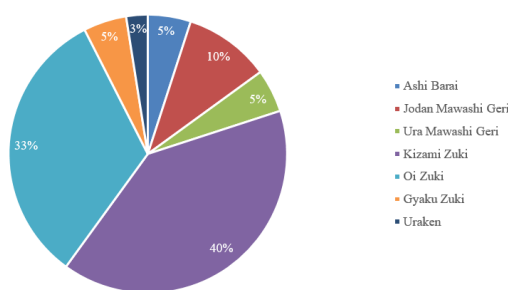


Figure 1. Frequency of most frequently scored Techniques for Winners Only

The pie chart below (Figure 2) shows the frequency of the scored techniques in percentage for the losers only. As it can be seen by the chart,

the most frequently used technique for scoring among losers is Kizami Zuki (58.33%).

Most frequently scored techniques for losers only

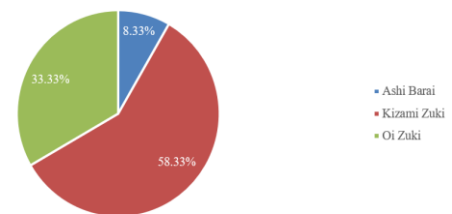


Figure 2. Frequency of most frequently scored Techniques for Losers Only

In table 5 you can see the frequency of the scoring techniques by weight divisions and also final matches done in team competitions in World Karate Championship 2016, Austria. As it is clear from table 5, the most frequent technique scored was Kizami Zuki (23 out of 52), and amongst all the matches, this was 3rd competition in final team competitions which had the most scored Kizami Zuki (9 out of 23). The blank spaces in table 5 means that there happened no scoring by those techniques in those weight divisions or team competitions.

In table 6, you can see the frequency of successful and unsuccessful techniques. It can be seen from table 6 that the most frequently

used technique is Oi Zuki (120) and the second most frequently used technique is Kizami Zuki (96).

DISCUSSION

Frequency of Scored Techniques among Kumite Finalists in 2016. There were total 70 scores in the 10 fights which occurred by 18 different participants. The most frequently scored technique was Kizami Zuki (Jab Punch), 32.85% of all scores registered were through execution of this technique. This result was different from the ones which was researched by Peter Laird & Kirsty McLeod (9) and also by Koropanovski and Jovanovic (2007) who found that Gyaku-zuki to the body was the most predominantly scored technique.

Also in the 2009 research by Laird and McLeod the second most scored technique among all techniques was Chudan Mawashi Geri (Mawashi Geri to body) which is very different with the findings of the recent research. The recent research on final competitions of World Karate Championships in 2016 showed that the most frequently

scored technique is Kizami Zuki and the second most one is Oi Zuki (Table 5 & 6). According to Marques Junior (17), punches in Karate are more likely to be applied (in comparison to kicks) because they offer better opportunities for successful striking. The speeds which karate hand-fighting techniques are performed, as well as the fact that they are executed with a person facing the opponent, increase the chance of successful strikes (Marques, 2014).

Hand punches are easier to perform than kicks because they allow for keeping balance, which provides a more stable support. If the technique is performed correctly, its power, speed, precision, and the damage on the opponent cannot be denied (18).

Chabebne (2015) reported that the time needed to execute Kizami Zuki was 0.11s which is shorter than the time necessary for the gyaku-zuki execution (around 0.15s) (19). The speed of Kizami Zuki can be a crucial reason that fighters in world-class level perform it for scoring.

Table 5. Frequency of scored Techniques by Weight Divisions and Team Competitions in Details

Techniques	Team 5 th Match	Team 4 th Match	Team 3 rd Match	Team 2 nd Match	Team 1 st Match	Individual +84 Kg	Individual -84 Kg	Individual -75 Kg	Individual -67 Kg	Individual -60 Kg
Ashi Barai						1	1			1
Jodan Mawashi Geri	1			2						1
Ura Mawashi Geri		1							1	
Kizami Zuki	1	5	9	1	1	1	1		3	1
Oi Zuki	5		1	1		2		4	1	3
Gyaku Zuki							1	1		
Uraken									1	

Table 6. Frequency of Successful and Unsuccessful Techniques performed by both Winners and Losers

Techniques	Successful	Unsuccessful	Total Amount
Ashi Barai	3	29	32
Mae Geri	0	0	0
Jodan Mawashi Geri	4	29	33
Chudan Mawashi Geri	0	35	35
Ura Mawashi Geri	2	6	8
Ushiro Ura Mawashi Geri	0	3	3
Ushiro Geri	0	1	1
Yoko Geri	0	1	1
Kizami Zuki (Jab)	23	73	96
Oi Zuki (Lunge Punch)	17	103	120
Gyaku zuki	2	11	13
Uraken (Back Fist)	1	2	3
Haito Uchi (Ridge Hand)	0	0	0

In this research, the second most scored technique and also the most frequently used one is Oi Zuki which is a punch delivered at the end of a long forward step, the forward momentum of the body gives additional force to the lunge punch

(20). This technique recorded 24.28% of all registered scored technique in the 2016 final competitions. It also included 34.78% of all successful and unsuccessful techniques performed by both winners and losers.

In the third place of the most frequently scored techniques is Jodan Mawashi Geri, with 5.71% of all scored techniques. As it can be seen in Table 2, its point value is three and it comes to mind that this technique should be used more than this rate among all scored techniques; however, this technique requires a high degree of control and flexibility in order to avoid excessive contact and still be close enough to achieve the score, the fighters tend to miss more often than the other techniques which require less control such as the punching techniques (20).

In this research, there were some techniques that had no score at all such as Mae Geri, Chudan Mawashi Geri, Ushiro Ura Mawashi Geri, Ushiro Geri, Yoko Geri and Haito Uchi. The reason can be for the speed of these techniques, which can either lead to performers' unbalancing or put them into danger while performing them and even losing point.

Frequency Differences between Winners and Losers. As it can be seen in table 3, there are difference between winners and losers in using scoring techniques; for example, winners scored 4 times Jodan Mawashi Geri, 2 times Ura Mawashi Geri and 2 times Gyaku Zuki while there were no scoring of these techniques among losers. Of course, there are few Kizami Zuki (7) and Oi zuki (4) scored by the losers; however, this rate of scoring is much more

among winners by scoring 16 successful Kizami Zuki and 13 successful Oi Zuki. There may be other factors that affect performing successful or unsuccessful technique like timing, distancing, footwork, opponent's defensive ability and so on which is not related to the subject of our research.

CONCLUSION

The use of punches such as Kizami Zuki and Oi Zuki in world-class competitions are safer than punches like Gyaku zuki (with more time to transfer) or kicks like Jodan Mawashi Geri which is risky to perform in front of a quick fist striker. The nature of technique in how much danger a fighter would face while performing it and also the speed of technique and the distance, which should be taken, are all crucial factors in using a technique by a fighter and gets scores out of it. The fighters used Kizami Zuki and Oi Zuki more frequently and scored by them most likely because they have shortest execution time and/or reaction time.

APPLICABLE REMARKS

Our research shows that in the new era of Karate Kumite, it's better for both athletes and coaches to focus on punching skills whether in attacks or in defense; however, having a good ability of kicking techniques would be a plus.

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