

CHARACTERISTICS OF RE-GRIPPING TECHNIQUES PRECEDING SCORED THROWS IN INTERNATIONAL-LEVEL JUDO COMPETITION

Kiyoshi Ito,^{1, A, B, C, D} Nobuyoshi Hirose,^{2, D, E} Naoya Maekawa^{3, C}

¹ Faculty of Economics, Fuji University, Iwate, Japan

² Graduate School of Health and Sports Science, Juntendo University, Chiba, Japan

³ Faculty of Physical Education, International Budo University, Chiba, Japan

^A Study Design; ^B Data Collection; ^C Statistical Analysis; ^D Manuscript Preparation; ^E Funds Collection

Address for correspondence:

Kiyoshi Ito

Faculty of Economics, Fuji University

450-3, Shimoneko, Hanamaki, Iwate

025-0025 Japan

E-mail: kiyoshi@fuji-u.ac.jp

Abstract Significant changes in *kumite* tactics were verified after the 2013 International Judo Federation rule revision, which mandated that competitors initiate sparring immediately at match outset. The research contained in this paper focused on the re-gripping techniques which were affected by this rule revision, relating to the gripping targets, the use of cross gripping techniques, body rotation when executing throws, and the attacking patterns. In total, 372 men's contests from the Judo Grand Slam Paris 2016 were analyzed using All Japan Judo Federation Science and Research Department SMART Edge system. Throws resulting in scores were identified and the preceding *kumite* tactics were analyzed. Re-gripping techniques resulted in significantly higher score rates than the no re-gripping techniques when competitors grabbed the place of the competition number, and the place(s) other than the collar and sleeve with at least one hand except the place of the competition number. Re-gripping the opponent and targeting the place of the competition number might facilitate scoring. Using the re-gripping techniques could make a variety of gripping targets effective to score. We emphasize the importance of classifying *kumite* techniques into two major patterns: re-gripping and no re-gripping techniques when coaching competitors for *kumite* tactics.

Key words combat sports, throwing techniques, tactical preparation, technical effectiveness, gripping targets

Introduction

Judo's official rules have been revised by the International Judo Federation (IJF) several times in the last decade; specifically in 2009, 2010, 2013, 2014 and 2017 (International Judo Federation, 2013, 2014, 2018). According to the IJF, these changes are aimed at making judo more dynamic, entertaining and pursuant of judo's traditional goal of achieving *ippon* (Yamaguchi, 2008; Boguszewski et al., 2014). The pursuit of a more dynamic sport through new regulations forced competitors to alter their *kumite* tactics if they hoped to score. *Kumite* is

a standing technique performed by grabbing the opponent's jacket or body part(s) with one or both hands before initiating an attack (Ito, Hirose, Nakamura, Maekawa, Tamura, 2014).

N. Hirose, M. Suganami, M. Nakamura, and S. Takahashi (2000) reported the average attacking frequency per one minute of competition in standing position was 1.86 times for the men's 60 kg category and 1.71 times for the women's 48 kg category in the 1997 World Judo Championship. These results suggest the remainder of the time was, to some extent, used in different activities relating to *kumite*, such as competitors considering how to grab their opponent and attempting to gain an advantage over their opponent once *kumite* had commenced. N. Maekawa et al. (2013; 2014) created a rating scale enabling coaches and managers to determine skill level through methods other than performance in competitions. They did this by querying top level Japanese university judo coaches on factors used in selection for participation in competitions. Two of the twelve factors identified as selection criteria were the assertiveness of the athlete in applying *kumite* and proper *kumite* while practicing. H. Kajmovic, I. Rado, A. Mekic, B. Crnogorac, and E. Colakhodzic (2014) developed a method of categorizing *kumite* tactics that assists in determining its effect on competition outcomes. They created three broad *kumite* technique classifications: same grip configuration (right and right grip, left and left grip), opposite grip configuration (right vs left grip) and sleeve ends configuration (sleeve grips). Men were found to use the same grip configuration style significantly more than other configurations, while women used the opposite grip configuration significantly more, as seen in matches from the 2008 European Cadets Judo Championship. *Kumite* is an essential component of throw initiation. Therefore, it's logical that contestants would alter their *kumite* strategies to comply with the rule revisions, as opposed to discontinuing their use of *kumite* altogether. G.F. Pedrosa et al. (2015) reported on a sparring activity done by two people, with one of them attempting to grab the other one, who is aggressively attempting to break their grip. This activity is, in effect, focused on bettering the competitors' *kumite* abilities. They found that this exercise was effective in training for international competitions. R.L. Kons, J.A. Dias, and D. Detanico (2017) reported the athletes with higher isometric endurance grip strength perform a higher number of attacks and show higher effectiveness in competition.

M. Tamura et al. (2012) reported following the 2009 IJF rule revision, a significant increase in the number of times that competitors grabbed the collar and sleeves when attacking their opponent; however the result did not relate gripping targets to scored throw. We reported that *kumite* performed before a scored throw showed a significant increase in attack efficacy when a competitor gripped their opponent three times prior throwing them after the 2013 rule revision, implying that reestablishing a grip on the opponent was more effective than attempting to throw the opponent after only one or two grasps (Ito et al., 2014). In addition to this, we clarified scoring rates significantly increased when competitors re-gripped their opponents in *aiyotsu*: both competitors standing with closed stance, *kenkayotsu*: both competitors standing with open stance and the total of both stances after the 2013 rule revision (Ito, Hirose, Maekawa, Tamura, Nakamura, 2015).

Given these examples of research performed on different aspects relating to *kumite*, the authors feel that research focused solely on *kumite* tactics should be performed to make throwing techniques more effective and judo more attractive as a whole. The authors of this paper take the position that a competitor's *kumite* skills are vital to their success in judo, as it is the primary method in setting up a throw. However, in order to enhance the effectiveness of the technique, no prior research has been conducted to investigate the relationship between the number of gripping attempts and the cross grip techniques preceding the scored throws. In addition, there is no previous study on the relationship between the number of gripping attempts and the scored throw involved body

rotation. The aim of present study was to identify the characteristics of *kumite* re-gripping techniques preceding the scored throws relating to gripping targets, the use of cross gripping techniques, throws that require body rotation, and the attacking patterns. This analysis was based on a comparison of score ratios between re-gripping and no re-gripping techniques preceding scored throws in international-level competitive matches. The results of this research clarified the effectiveness of throwing techniques through linking the use of selected re-gripping techniques to other *kumite* maneuvers. This research was conducted with the intention of improving coaching quality for international judo competitors. It is the authors' intention that this research support a more dynamic judo style that the IJF is seeking, specifically in regards to throwing technique effectiveness.

Yuko is not a point designation under current competition rules (International Judo Federation, 2018); however, this research was carried out on competitions under previous rules (International Judo Federation, 2014), so it was considered in our analyses. Because *yuko* is included in *waza-ari*, a point-yielding maneuver under current competition rules, the analyses results regarding *yuko* usage are valid under the current rules and *yuko* should still be considered worthwhile. Thus, those results containing data concerning *yuko* should be considered valid.

Material and Methods

Analysis data and analysts

In total, 372 men's contests from the Judo Grand Slam Paris 2016 were analyzed using All Japan Judo Federation Science and Research Department SMART Edge system. Three analysts took part in this research. One analyst is "7th *dan*" (sex: male; age: 66; practice frequency: 4 times a week), and the other two analysts are "6th *dan*" (sex: male; age: 53; practice frequency: 5 times a week/sex: male; age: 55; practice frequency: 6 times a week). *Dan* is a ranking system indicating comprehensive skill level. In judo, there are examinations for the ranks from the first-*dan* to the tenth *dan*, with the tenth *dan* being the highest (Ito et al., 2015). Each analyst has at least 30 years of experience in judo practice and is qualified as a judo instructor with an A-rating, the highest level in Japan, as specified by the All Japan Judo Federation. Each instructor is currently active in judo instruction.

Procedures

Videos of 329 scored throws (*yuko*, *waza-ari*, *ippon*) and the preceding *kumite* were identified in the data and analyzed. All data were coded using both the revision of tactical analysis sheet for throwing techniques developed by N. Hirose et al. (2000) and the *kumite* parts table developed by H. Wakayama et al. (2003) using MS Excel software.

We analyzed the following items to be examined.

- Score rates of gripping targets preceding scored throws according to re-gripping behavior.
- Score rates of the scored throws that involve cross gripping techniques according to re-gripping behavior.
- Score rates of the scored throws that require body rotation according to re-gripping behavior.
- Score rates by the attacking patterns of the scored throws according to re-gripping behavior.

Kumite preceding a scored throw was analyzed to see if re-gripping was attempted, and if so, how many of these attempts were made. This was done according to the method documented by K. Ito et al. (2015). *Kumite* preceding a scored throw was considered to include a re-gripping attempt if the competitor released their opponent with either hand and grabbed their opponent again with the same hand without a break in sparring. Thus, *kumite*

that included more than two instances of a competitor grabbing their opponent in a continuous sequence was categorized as a re-gripping. *Kumite* in which grasping occurred less than three times in a continuous motion was considered to be *kumite* with no re-gripping.

Grabbing an opponent by using the opposite side of a judo jacket or a body part, usually stretching an arm diagonally, was categorized as cross gripping techniques. Executing their techniques with their body rotating, facing their back to the opponents chest and belly, and throwing the opponents to the front direction of the opponents, was categorized as techniques with body rotation; for example, the techniques of *seoi-nage*, *tai-otoshi*, and, *harai-goshi* were included (Sogabe et al., 2008; Adam, Tyszkowski, Smaruj, 2011; Adam, Laskowski, Smaruj, 2012; Daigo, 2005).

Attacking patterns were classified into three categories as direct single, combination, and counter attacks following the previous research (Ito et al., 2012).

All data relating to competitors' use of the *kumite* techniques were confirmed unanimously by all three analysts as part of the validation process.

Statistical analysis

Chi-square tests were used to determine differences in the ratio of scored throws between the re-gripping and no re-gripping techniques with regards to the variables selected for the study. The statistical significance level was set at $p < 0.05$ for all analyses. Statistical Package for Social Science (SPSS) for Windows 21.0 was used to compute the statistics.

Results

Table 1 contains the classification of the gripping targets, Table 2 contains the gripping targets preceding the scored throws confirmed from the present study and Table 3 contains the scored throws that involved body rotation confirmed from the present study.

Table 1. Classification of gripping targets

Gripping Categories	Gripping targets
Collar and Sleeve	Collar, Sleeve, Collar & Sleeve, Collar & Collar, Sleeve & Sleeve
Competition Number	Number, Number & Number, Number & Collar, Number & Sleeve, Number & Others
Other Areas	Collar or Sleeve and the place other than Collar, Sleeve and Number, Place(s) other than Collar, Sleeve, and Number

Table 2. Gripping targets preceding scored throws confirmed from the present research

Gripping categories	Gripping targets
Collar and Sleeve	Collar, Sleeve, Collar & Sleeve, Collar & Collar, Sleeve & Sleeve
Competition Number	Number, Number & Number, Number & Sleeve, Number & Collar, Number & Armpit, Number & Upper Arm
Other Areas	Collar & Shoulder, Collar & Neck, Collar & Wrist, Collar & Upper Arm, Collar & Skirt, Collar & Side, Collar & Finger, Collar & Armpit, Sleeve & Shoulder, Sleeve & Neck, Sleeve & Waist, Sleeve & Upper Arm, Sleeve & Wrist, Sleeve & Side, Sleeve & Finger, Sleeve & Armpit, Belt & Collar, Belt & Neck, Belt & Upper Arm, Belt & Side, Belt & Armpit, Belt & Sleeve, Armpit & Side, Armpit & Shoulder, Armpit & Neck, Armpit & Armpit, Armpit & Finger, Upper Arm & Upper Arm, Upper Arm & Side

Table 3. Techniques that require body rotation confirmed from the present research

Throwing technique classification		Techniques with body rotation	
<i>Te-waza</i> (hand-technique)	<i>seoi-nage</i>	<i>seoi-otoshi</i>	<i>ippon-seoi-nage</i>
	<i>tai-otoshi</i>		
<i>Ashi-waza</i> (leg-technique)	<i>uchi-mata</i>		
<i>Koshi-waza</i> (hip-technique)	<i>turi-goshi</i>	<i>harai-goshi</i>	<i>koshi-guruma</i>
	<i>o-goshi</i>	<i>sode-turikomi-goshi</i>	
<i>Sutemi-waza</i> (sacrifice-technique)	<i>uchimata- makikomi</i>	<i>harai-makikomi</i>	<i>soto-makikomi</i>

As Table 4 contains, the results indicate that the no re-gripping techniques prior to throwing resulted in a significantly higher score rate than the re-gripping when competitors grabbed their opponents in the place(s) of collar(s) and sleeve(s) (no re-gripping: 69.9%, re-gripping: 32.5%; $\chi^2 = 45.642$; $df = 2$; $p = 0.000$). Re-gripping techniques resulted in significantly higher score rates than the no re-gripping techniques when competitors grabbed the place of the competition number (re-gripping: 41.5%, no re-gripping: 15.0%; $\chi^2 = 45.642$; $df = 2$; $p = 0.000$; Table 4) and the place(s) other than the collar and sleeve with at least one hand except the place of the competition number (re-gripping: 26.0%, no re-gripping: 15.0%; $\chi^2 = 45.642$; $df = 2$; $p = 0.000$; Table 4).

Table 4. Score rates of gripping targets preceding scored throws according to re-gripping behavior

	N (%)			χ^2	df	P
	collar & sleeve	competition number	other areas			
Re-gripping	40 (32.5)	51 (41.5)†	32 (26.0)†	45.642*	2	0.000
No re-gripping	144 (69.9)†	31 (15.0)	31 (15.0)			

n = 329; * - $p < .05$; † - Significantly higher.

Re-gripping techniques resulted in higher score rate than the no re-gripping when competitors used cross gripping techniques; however, it was not significant (re-gripping: 24.4%, no re-gripping: 19.9%; $\chi^2 = 0.916$; $df = 1$; $p = 0.338$; Table 5). In addition to the result, regardless of using either re-gripping or no re-gripping techniques, the score rates of no cross gripping techniques were higher than that of cross gripping (re-gripping: 75.6%, no re-gripping: 80.1% ;Table 5).

Table 5. Score rates of scored throws that involve cross gripping techniques according to re-gripping behavior

	N (%)		χ^2	df	P
	cross gripping	no cross gripping			
Re-gripping	30 (24.4)	93 (75.6)	0.916	1	0.338
No re-gripping	41 (19.9)	165 (80.1)			

n = 329.

Re-gripping techniques resulted in higher score rate than the no re-gripping when competitors used techniques without body rotation; however, it was not significant (re-gripping: 61.8%, no re-gripping: 51.9%; $\chi^2 = 3.025$; $df = 1$; $p = 0.082$; Table 6).

Table 6. Score rates of the scored throws that require body rotation according to re-gripping behavior

	N (%)		χ^2	df	P
	body rotation	no body rotation			
Re-gripping	47 (38.2)	76 (61.8)	3.025	1	0.082
No re-gripping	99 (48.1)	107 (51.9)			

n = 329.

Re-gripping techniques resulted in higher score rate than the no re-gripping when competitors used direct single techniques; however, it was not significant (re-gripping: 74.8%, no re-gripping: 71.4%; $\chi^2 = 0.550$; df = 2; p = 0.760; Table 7). In addition to the result, regardless of using either re-gripping or no re-gripping techniques, the score rates of direct single techniques were higher than those of combine and counter attacks (re-gripping: 74.8%, no re-gripping: 71.4%; Table 7).

Table 7. Score rates by attacking patterns of scored throws according to re-gripping behavior

	N (%)			χ^2	df	P
	direct single	combine	counter attack			
Re-gripping	92 (74.8)	9 (7.3)	22 (17.9)	0.550	2	0.760
No re-gripping	147 (71.4)	19 (9.2)	40 (19.4)			

n = 329.

Discussion

Grabbing the collar and sleeve is considered traditional, standard and the most effective *Kumite* style in Japan (Matsumoto, 1985). This theory seemed to be still alive in international-level competition even today. Probably, the competitors may have chosen grabbing the collar and sleeve as the most effective places following the traditional style of *kumite*, and immediately initiated their techniques without any hesitation. And if competitors felt inadequate to execute an ideal throw when grabbing the collar and sleeve, they could try to re-grip the place of the competition number in order to close the distance between them. In addition to grabbing the competition number, re-gripping techniques were able to increase the other gripping targets that could contribute to broadening competitors mind for bettering throwing techniques.

The hypothesis of our research team on the purpose of using re-gripping techniques was using cross gripping techniques to create unexpected *kumite* tactics; therefore, the score rates of re-gripping techniques could become significantly higher when competitors used cross gripping techniques. However the score rate of re-gripping techniques was higher than no re-gripping, but it was not significant. Besides that, the score rates of both re-gripping and no re-gripping techniques were very high when competitors did not use cross gripping techniques. According to the IJF referee rules of 2014–2016 (International Judo Federation, 2014), cross gripping should be followed by an immediate attack; if not so, competitors will be penalized with *shido* or a minor violation. Therefore, competitors didn't intentionally and aggressively use cross gripping techniques to avoid being penalized. They may have used cross gripping techniques in contingent occasions only.

We hypothesized that when re-gripping, the score rate of techniques without body rotation would be significantly higher than no re-gripping techniques. Because, re-gripping techniques may require grabbing the places other than

the collar and sleeve, so using re-gripping could result in closing competitors distance when grabbing. In this case, it would be difficult for competitors to make body rotation due to the close distance between them and naturally competitors may choose the techniques without body rotation. However, this research data indicated that though the score rate of re-gripping techniques was higher than no re-gripping when competitors used techniques without body rotation, however it was not significant. We assume that even being in the close distance to opponents, according to the opponent movements, competitors could have used sacrifice techniques with their bodies rotating forcibly; the techniques could be *yoko-sutemi-waza: harai-makikomi, uchimata-makikomi* and *soto-makikomi* (Daigo, 2005).

Score rates of attacking patterns were almost the same as the results of previous research we performed in 2015 (Ito et al., 2015). The lowest score rate of the three attacking patterns was combined attacking, while, the highest rate of the three was the direct single attacking technique. We think that the quality of techniques could be an important factor to score in international-level competitions. We thought re-gripping opponents means successfully grabbing better place(s) to execute their ideal techniques than the first grabbing; therefore, competitors wouldn't need to combine their techniques and to use counter techniques. Therefore, the score rate of re-gripping techniques would be significantly higher than no re-gripping when competitors used direct single attacking. However the score rate of re-gripping technique was not significantly higher when competitors used direct single attacking. We assume no re-gripping techniques was effective to score when both competitors' skill level was totally different, especially in the first round matches, because of unnecessary for superior competitors to re-grip opponents.

Limitations of the study include the inability to compare across the rounds due to the lack of applicable samples. Future studies should include an increased research sample size to accommodate for this limitation. Furthermore, similar research accounting for weight categories and difference between men and women is advisable.

Conclusions

Based on this study's findings, when using re-gripping techniques, targeting the place of the competition number and the place (s) other than the collar and sleeve with at least one hand except the place of the competition number for grabbing might facilitate scoring. That is to say, using the re-gripping techniques could make a variety of effective gripping targets.

On the other hand, we found out that the use of re-gripping techniques did not affect the score rates of the use of cross gripping techniques, techniques with body rotation, and attacking patterns.

If the complicated movements of judo in international-competition further develop in the future, re-gripping techniques could be more needed and become effective. We emphasize the importance of introducing two major gripping patterns: re-gripping and no re-gripping techniques, into coaching manuals and should research on the characteristics of the two gripping techniques to facilitate scoring and make judo more dynamic in the international-level competitions.

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