Alterations in Kumite Techniques and the Effects on Score Rates following the 2013 International Judo Federation Rule Revision

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Abstract

Background & Study Aim: Significant changes in kumite tactics could be expected following 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 specific areas of kumite that were likely to be affected by this rule revision.

Material & Methods: In total, 396 men’s contests were selected from All Japan Judo Federation DVDs. Throws resulting in scores were identified and the preceding kumite was analyzed. Chi-square tests were performed to determine variations in the number of scored throws between the 2012 and 2013 contests based on predetermined criteria and comparisons of kumite efficacy were made using the resulting score ratios.

Results: Re-gripping resulted in a higher score rate in aiyotsu, kenkayotsu and the total of both stances. (P=0.022, P=0.033, P=0.002; respectively). The score rate increased when both hands were used for throwing in the aiyotsu stance and the total of both stances (P=0.017, P=0.002; respectively). The score rate increased in cases where the competitor grabbed their opponents in places other than the collar or sleeve with both hands or in a place other than the collar or sleeve with one hand and the collar or sleeve with the other hand when the competitors sparred in the kenkayotsu stance and in the total of both stances combined (P=0.007, P=0.010, respectively).

Conclusions: Re-gripping the opponent and targeting locations other than the collar and sleeves for grabbing might facilitate scoring. This should be considered by trainers and competitors when preparing for competitions.

Key words: combat sports, martial arts, competition analysis, referee rules, gripping tactics, technique effectiveness, coaching methods

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INTRODUCTION

Judo, literally meaning the way of gentleness, is a combat sport that demands both physical prowess and great mental discipline. Judo is commonly described as a fighting art, spiritual discipline, a system of physical education, and a recreational activity [1].

Judo’s official rules have been revised by the International Judo Federation (IJF) several times in the last decade; specifically in 2006, 2009, 2010, 2013 and 2014 [2, 3]. According to the IJF, the rules have been revised to make judo more dynamic and pursuant of judo’s traditional goal of achieving ippon [4] and at making judo more entertaining [5].

This paper focuses on the effects of the 2013 rule revision on kumite using the rate of scored throws as a metric to assess the efficacy of the competitors’ tactics. The 2013 revision prohibits competitors from attacking or defending below the belt using arms or hands, penalizing such actions with a hansoku-make, or disqualification. Breaking the opponent’s grip using both hands, failure to immediately engage the opponent, and delaying match progression through evasive techniques is also discouraged, and results in a sbido, or minor violation [2].

We considered that one possible outcome of the 2013 rule revision would be an increase in grabbing attempts, with competitors using both hands to grab the opponent’s sleeves and collar. We also hypothesized that there would be an increase in competitors immediately attempting to throw their opponent at match outset.

Kumite is a fundamental part of judo. Because of this, it has been the subject of numerous studies. Tactical maneuvers aimed at gaining an advantage in kumite significantly enhance a competitor’s likelihood of winning [6]. Differences in kumite tactics between men and women were identified in a study of 15 matches from the 60kg category and 15 matches from the 48 kg category in the 1997 World Judo Championship. It was reported that women used both hands significantly more when attacking than men [7]. Murayama et al. [8] conducted a case study on the women’s 57 kg category 2001 World Judo Championship and found that competitors who used both hands to grab their opponent’s sleeves scored significantly more points than those who didn’t. Gutiérrez-Sanchez et al. [9] found that handgrip strength of the different podium placement winners was statistically different in women but not in men.

Among the 102 judokas (31 women and 71 men) in the 15 to 19 age class competing in the 2008 Junior Championship, Tsuruta et al. [10] found that grabbing using either a single hand or both hands were performed in the same amount of time by analyzing the 2012 London Olympic judo men’s category. Kajmović et al. [11] developed a new 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 [11]. Maekawa et al. [12, 13] created a rating scale enabling coaches and managers to determine skill level sans 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 athlete’s assertiveness in applying kumite and how well the competitor performed during kumite while practicing [12, 13].

Following the 2009 IJF rule revision, research found a significant increase in the number of times that competitors grabbed the collar and sleeves when attacking their opponent [20]. After the 2010 IJF rule revision that restricted competitors from grabbing another below the belt, a statistically significant increase in the use of kata-guruma (throwing the opponent by levering them over the shoulder) was found, as well as a statistically significant increase in the frequency of using sukui-nage to counter cross-guard grabbing [21]. A comparative analysis on kumite performed before a scored throw showed a significant increase in attack efficacy when a competitor re-gripped their opponent three times prior throwing them, implying that reestablishing a grip on the opponent was more effective than attempting to throw the opponent after only one or two grasps [22].

The numerous studies on kumite until now indicate that its mastery is fundamental to being a successful judo competitor and supports our decision to
undertake the analysis discussed in this paper. We specifically wanted to understand how the 2013 ruling affected competitors’ implementation of kumite. The research focused on these specific aspects of kumite: re-gripping tactics, use of one or both hands to grasp the opponent when initiating a throw, and grabbing targets used when throwing. The kumite was analyzed as it was used throughout the matches with the objective of discovering the relationship between kumite tactics used and their effect on scores. This was done by analyzing the men’s category of 2012 and 2013 world class contests. Through this study, we endeavored to identify kumite methods that facilitated successful outcomes in terms of scoring.

MATERIAL AND METHODS

Subjects
In total, 386 men’s contests from the Grand Slam Tokyo 2012 and the Grand Slam Paris 2013 were analyzed and validated using All Japan Judo Federation Reinforcement Committee Science and Research Department DVDs. Specifically, 154 matches from the Grand Slam Tokyo competition and 232 matches from the Grand Slam Paris competition were chosen. Because the 2012 Grand Slam Tokyo competition did not use preliminary matches, the 2013 Grand Slam Paris preliminary matches were excluded from the study. Furthermore, one match from the 2013 competition was not recorded perfectly, and so was excluded from the study. Contests occurring two months apart were chosen in order to minimize the possibility that variables outside the scope of this study would affect the results. The 2013 competition was held one month after the 2013 rule revision.

Analysts
Three analysts took part in this research. One of the analysts was “6th dan”, and the other two analysts are “7th dan”. Dan is a ranking system indicating 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 [22]. Each analyst has at least 40 years of experience in judo practice, and they are all currently active in judo instruction. All data relating to competitors’ use of kumite were confirmed unanimously by all three analysts as part of the validation process.

Procedure
Videos of 396 scored (yuko, waza-ari, ippon) throws and the preceding kumite were analyzed: 144 scored techniques from the 2012 contest and 252 scored techniques from the 2013 contest.

The stance that competitors took while engaged in kumite at the competition’s outset was recorded as being either aiyotsu or kenkayotsu, referring to previous studies of Yano et al. [23] and Sogabe et al. [24].

Re-gripping attempts were then documented. 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-grip. Kumite in which grabbing occurred less than three times in a continuous motion was considered to be kumite with no re-gripping.

Use of one or both hands in the kumite preceding a scored throw was documented, as was the stance of the competitors in terms of aiyotsu or kenkayotsu. Those instances of kumite in which only one hand was used were eliminated from further analysis. Finally, gripping targets of both hands were identified. The gripping target categories appear as follows: collar and sleeve (CS grip), collar and collar (CC grip), sleeve and sleeve (SS grip), others and collar (OC grip), other and sleeve (OS grip) and other and other (OO grip).

All data were coded using both the revision of tactical analysis sheet for throwing techniques developed by Hirose et al. [7] and the kumite parts table developed by Wakawama et al. [25] using MS Excel software.

Statistical Analysis
Chi-square tests were used to determine differences in the ratio of scored throws between 2012 and 2013 contests 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 [26].

RESULTS

Scoring rates significantly increased when competitors re-gripped their opponents in aiyotsu, kenkayotsu, and the total of both stances (P=0.022, P=0.033, P=0.002; respectively) (Table1).

Analysis revealed that scored throws in which the competitor used both hands significantly increased in the aiyotsu stance and the total of both stances after the 2013 rule revision (P=0.017, P=0.002;
respectively). The rate of scoring also increased in kenkayotsu. However, this increase was not significant (Table 2).

In the kumite preceding the scored throw, the score rate of the OC grip, OS grip, and the OO grip significantly increased in kenkayotsu and the total of the two stances after the 2013 rule revision (P=0.007, P=0.010, respectively). Score rates of the OC grip, OS grip, and OO grip also increased in aiyotsu; however, this increase was not significant (Table 3).

Table 1. Score rate classified according to re-gripping behavior

<table>
<thead>
<tr>
<th></th>
<th>No re-gripping</th>
<th>Re-gripping</th>
<th>( \chi^2 )</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9.696</td>
<td>0.002**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>144</td>
<td>74.31</td>
<td>25.69</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>252</td>
<td>58.73</td>
<td>41.27</td>
<td></td>
</tr>
<tr>
<td>Aiyotsu</td>
<td>5.209</td>
<td>0.022*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>77</td>
<td>71.43</td>
<td>28.57</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>135</td>
<td>55.56</td>
<td>44.44</td>
<td></td>
</tr>
<tr>
<td>Kenkayotsu</td>
<td>4.530</td>
<td>0.033**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>67</td>
<td>77.61</td>
<td>22.39</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>117</td>
<td>62.39</td>
<td>37.61</td>
<td></td>
</tr>
</tbody>
</table>

\*P<0.05  **P<0.01

Table 2. Score rate categorized according to whether the competitor used one or both hands

<table>
<thead>
<tr>
<th></th>
<th>Single hand grip</th>
<th>Two hand grip</th>
<th>( \chi^2 )</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9.335</td>
<td>0.002**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>144</td>
<td>18.75</td>
<td>81.25</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>252</td>
<td>8.33</td>
<td>91.67</td>
<td></td>
</tr>
<tr>
<td>Aiyotsu</td>
<td>5.670</td>
<td>0.017*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>77</td>
<td>18.18</td>
<td>81.82</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>135</td>
<td>7.41</td>
<td>92.59</td>
<td></td>
</tr>
<tr>
<td>Kenkayotsu</td>
<td>3.757</td>
<td>0.053, n.s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>67</td>
<td>19.40</td>
<td>80.60</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>117</td>
<td>9.40</td>
<td>90.60</td>
<td></td>
</tr>
</tbody>
</table>

\*P<0.05  **P<0.01

Table 3. Score rate of gripping targets preceding scored throws

<table>
<thead>
<tr>
<th></th>
<th>Collar and Sleeves †</th>
<th>Other areas, C&amp;S ‡</th>
<th>N</th>
<th>%</th>
<th>( \chi^2 )</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>6.705</td>
<td>0.010*</td>
<td>2012</td>
<td>117</td>
<td>51.28</td>
<td>48.72</td>
</tr>
<tr>
<td>2013</td>
<td>231</td>
<td>36.80</td>
<td>63</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aiyotsu</td>
<td>1.067</td>
<td>0.302, n.s</td>
<td>2012</td>
<td>63</td>
<td>41.27</td>
<td>58.73</td>
</tr>
<tr>
<td>2013</td>
<td>125</td>
<td>33.60</td>
<td>66</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kenkayotsu</td>
<td>7.188</td>
<td>0.007**</td>
<td>2012</td>
<td>54</td>
<td>62.96</td>
<td>37.04</td>
</tr>
<tr>
<td>2013</td>
<td>106</td>
<td>40.57</td>
<td>59</td>
<td>41</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\*P<0.05  **P<0.01
† CS,CC,SS grips that did not include targets in the other category
‡ OC,OS,OO grips that included at least one location in the other category

Discussion

Regardless of the kumite stance being aiyotsu or kenkayotsu, re-gripping resulted in a significant increase in the score ratio, while kumite in which there was no attempt to re-grip resulted in a significant decrease in the score ratio. The new regulations encourage competitors to grip the opponent’s judo jacket above the belt quickly and aggressively while concurrently carrying out defensive techniques over a smaller area due to the 2013 rule which bans competitors from grabbing their opponents below the belt. This rule change gives competitors enough time to attempt re-gripping, while their opponents could concentrate their attention on defensive techniques against attacks targeting the upper torso. Thus, re-gripping sets the stage for successful throwing and scoring. It also aids in surprising opponents by increasing the variety of possible grasp combinations. The study revealed that after establishing the initial grip, competitors often re-gripped then threw their opponents and scored. Before the rule revision, competitors relied on a standard set of actions to initiate a throw. After the rule revision, competitors developed strategies to include re-gripping as a way to facilitate catching their opponent off guard. Hirosaki et al [27] state that lesser used combinations of kumite are most effective when combined with ashi-waza (foot techniques): ouchi-gari, osoto-gari, deashi-harai, kouchi-gari, uchi-mata, and kosoto-gari among the Japanese competitors. Hirosaki’s findings support our conclusion that
applications of kumite which use re-gripping resulted in an increase in score ratios.

Two variables were considered when analyzing the kumite that immediately preceded scoring attempts. First, it was noted if one hand or both hands were used. Second, the places on the opponent’s body that were grabbed during kumite were documented and classified as collar, sleeve, or someplace other than the collar or sleeve. The following observations were made.

Scoring attempts after kumite performed with only one hand resulted in a significant decrease in the score ratio and a corresponding increase in the score ratio for those attempts following kumite performed with both hands in the aiyotsu stance and the total of both stances combined. In 2009, Ishikawa reported a significant decline in competitors’ use of both hands during kumite from 1995 to 2005 using data from the World Judo Championships [28]. During this period, rule revisions were introduced with the objective of increasing the use of both hands during kumite. For example, in 1998, the IJF created a rule prohibiting evasive techniques meant to delay match progression and in 1999 the thickness of the judo jacket, particularly the collar, was thinned down so that competitors could more easily grip their opponents [29]. We inferred that the 2013 rule revision had a greater impact on judo, and specifically kumite, than any other rule changes that have been implemented in the last decade. The significant increase in the scoring rate of throws performed after kumite using both hands supports this.

Analysis of the target areas for grabbing during kumite yielded the following observations. The score ratio of throws following kumite in which the competitor performed an OC, OS, or OO grip while in the kenkayotsu stance significantly increased. Matsumoto noted that the collar and sleeves are natural targets for grabbing during kumite because grabbing the opponent in these areas allows one to break their opponent’s balance and effectively control their opponent’s arm movements [30]. We concluded that competitors began to choose targets other than the collar and sleeves because they found these targets to also be effective in allowing them to gain an advantage over their competitor.

Yano et al. [23] clarified that aiyotsu produced a higher rate of scoring ippon than kenkayotsu in the men’s category of the 1988 Kodokan Judo Cup in Japan. The reason for this is that the wider space between the competitors in the kenkayotsu stance makes it more difficult to perform techniques leading to a score. Based on the observations from our study, competitors are attempting to score more often in the kenkayotsu stance by grabbing their opponents in places other than the traditional targets, introducing the element of surprise in their attacks.

Competitors succeeded in creating new kumite styles without compromising their technical accuracy and effectiveness by choosing not only collar and sleeve grips after the rule revision, but also targets in the other category. This means that coaching methods and manuals should include information about kumite which employs grips targeted at not only the collar and sleeves but other locations as well.

We confirmed that re-gripping resulted in a higher score ratio after the rule revision; however we didn’t investigate the patterns of gripping orders. Additionally, while we could clarify that grabbing the opponent in places other than the collar or sleeves prior to a scoring attempt became more effective after the 2013 rule revision, we did not identify the particular target areas that were chosen. We will explore these topics in later research.

**CONCLUSION**

In conclusion, the 2013 rule revision greatly changed the use of kumite in world class judo contests. The use of re-gripping in competitions was found to enhance scoring for competitors. Furthermore, we could confirm an evolution in the use of kumite to include an increase in competitors grabbing their competitors in places other than the collar and sleeves. Coaches should consider these points when developing their kumite strategies and coaching plans.

**COMPETING INTERESTS**

The authors declare that they have no competing interests.
REFERENCES


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