

**Original research article**

**THE COURSE OF THE JUDO FIGHT  
AT THE 2011 WORLD CHAMPIONSHIP**

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**Abstract.** *The aim of the study was to investigate the course of the judo fight in different weight categories at the 2011 Senior World Championship held in Paris. The sample consisted of 140 fights in the men's competition from the World Championship held in 2011 in Paris. From each of the seven weight categories, twenty of the most important matches were analyzed. The categories included light (-60kg and -66kg), middle (-73kg, -81kg and -90kg) and heavy (-100kg and +100kg). A total of 959 situations were observed. The following variables were analyzed: actions, group of the applied nage waza and kumikata stance. There were statistical differences ( $p \leq 0.05$ ) between the different weight categories in all the analyzed parameters. The results have shown that judokas need to conduct a great number of attack attempts in order to score (65.38% of all the actions were unsuccessful throw attempts). They preferred te waza (35.87%) and ashi waza (34.82) techniques from the kenka yotsu (37.94%) and ai yotsu (24.11%) gripping stance. As coaching advice, the number of training situations that favor attacking from the kenka and ai yotsu stance and defending from ashi and te waza attacks should be increased.*

**Key words:** *performance analysis, combat sports, refereeing rules.*

INTRODUCTION

Judo or the “gentle way” is a modern Japanese martial art and combat sport which evolved from jujutsu in 1882, a fighting art of medieval samurais (Boguszewski, 2011). Its founder, dr Jigoro Kano, realized that jujutsu needed to change into a new modern martial art that will help in building a new Japanese civil society. During the transition from martial art to combat sport, judo suffered significant changes in technique, etiquette,

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combat rules, etc. In the beginning, no weight categories existed because the common opinion was that the fighter with a superior judo technique will always prevail. In the 1950s, after a couple of defeats in a battle with huge European opponents, even stubborn Japanese traditionalists realized that the creation of weight categories was necessary. The assumption was that by dividing the fighters according to their weight, their strength will be almost equal. In these conditions they will need to use technical and tactical skills to obtain a victory during the fight (Sterkowicz, Blecharz & Lech, 2000).

Performance analysis in judo had mostly been used by coaches and athletes. One of the first articles, published in 1987, analyzed time structure, technical and tactical elements of judo fight. The rapid increase in the number of articles published in this area started with the new millennium, since most of the papers focusing on judo were published after 2000 (74.93% of the total) (Peset et al. 2013). In these articles, the authors usually analyzed the technical elements of the judo fight (e.g. the throwing technique).

Based on their structure, throwing techniques are divided into four groups: *koshi waza* (hip techniques), *te waza* (hand techniques), *ashi waza* (leg/foot techniques) and *sutemi waza* (sacrifice techniques). The main reason for first rule change in 2008 was the dominance of *te waza* (Kruszewski, Jagiello & Adamiec, 2008; Boguszewski, 2010; Carratala, Garcia, Monteiro & Diaz de Durana, 2010; Adam, Smaruj & Tyszkowski, 2011). In 2010 the International Judo Federation made important rule changes. The direct leg grab was forbidden. The leg grab techniques were allowed only in the case of a counter attack or in a combination of techniques where the leg grab technique is used like a follow-up technique. These changes were conducted in order to make the judo fight more attractive. They wanted to promote the so-called “positive judo”, where the fighters are encouraged to seek *ippon* in every match (Boguszewski, 2011; Ito, Hirose, Nakamura, Maekawa, Tamura & Hirotsu, 2013). After the rule change, it was expected that judokas would reduce their usage of *te waza*, because a direct attack with a number of *te waza* techniques was prohibited (*suku inage*, *morote gari*, *kata guruma*, *kuchiki daoshi*, etc.). This is significant because it was assumed that judokas need to adapt to a new fighting reality. However, according to authors’ knowledge, only a few studies have analyzed the course of a judo fight after this important change of competition rules. We hypothesized that the structure of the judo fight has been modified.

The aim of this study was to investigate the course of the judo fight in different weight categories at the 2011 Senior World Championship held in Paris.

## THE METHODS

### The sample

The sample consisted of 140 fights in the men's competition from the World Championship held in 2011 in Paris. After the Olympic Games, the World Championship represents the highest level of judo competition. From each of the seven weight categories twenty matches were analyzed (all of the matches starting with the 1/8 finals, ending with the final battle). The categories were in the following: light (-60kg and -66kg), middle (73kg, -81kg and -90kg) and heavy (-100kg and +100kg) according to a previous classification made by Escobar-Molina, Courel, Franchini, Femia & Stankovic (2014). Video recordings were obtained from Dartfish.tv - Channel Judo Video (Dartfish TV, 2014). The observations were conducted by three experts, professors of physical education and sport, black belts (3rd day-degree).

### Sample of measuring instruments

The following variables were included:

Actions - a) effective attacks (an attack that resulted with a score on the scoreboard); b) ineffective attacks (a failed attack where tori pulled uke out of balance); c) penalties and d) ne waza attacks that resulted in a score.

The group of applied nage waza - a) ashi waza (leg/foot techniques); b) koshi waza (hip techniques); c) sutemi waza (sacrifice techniques) and te waza (hand techniques).

Kumikata stance - a) ai yotsu (both athletes using the right or left grip at the same time); b) central grip (both athletes gripping the sleeves or lapels at the same time); c) same side kumikata (the athlete attacking is gripping the lapel and sleeve from the same side); d) kenka yotsu (each athlete using the opposite grip of the adversary (i.e., right versus left)); e) cross grip (the grip is conducted as in the ai yotsu grip, but the lapel gripped is crossed) and f) only one athlete (tori) gripping (the athlete attacking performs the grip and applies the technique before the opponent establishes his grip)..

### Procedure

Data collection was conducted by using Lince 1.2.1 software (Gabin, Camerino, Anguera & Castaner, 2012). Before the start of the analysis, the observer needed to load the observational instrument. The second step was to upload a video of the match into the software. After uploading the video it appeared on the left side of the screen. Video tools are located under the video. The Category Set is placed on the right side of the screen (Figure 1). While analyzing the fight, the observer simultaneously inserts data by clicking on the variable name in the Category Set.

The screenshot shows the 'Eficiencia' category set in the Lince 1.2.1 software. The interface is organized into several sections:

- Eficiencia:** A row of four buttons: SCORE (highlighted in blue), NO SCORE, SHIDO, and NE WAZA.
- CATEGORY:** A row of seven buttons representing weight classes: 60 Kg, 65 Kg, 73 Kg, 81 Kg, 90 Kg, 100 Kg, and >100 Kg.
- KUMIKATA STANCE:** A row of six buttons: AI YOTSU, KENKA YOTSU, C/S AI YOTSU, NO GI, CROSS GUARD, and SAME SIDE.
- WAZA:** A row of four buttons: ASHI WAZA, TE WAZA, KOSHI WAZA, and SUTEMI WAZA.

At the bottom of the interface, there are two buttons: 'Clear selection.' and 'Search'.

Fig. 1 Category set

### Statistical analysis

After obtaining the data, it was exported to the IBM SPSS 22.0 statistical package. Frequencies and percentages were calculated, both for the complete sample and for different weight categories. The nonparametric statistic procedure Chi-square test with a level of significance of 0.05 was conducted to check if there are significant differences between the weight categories.

### RESULTS

A total of 959 actions were observed during the 2011 World Championship of which 143 (14.91%) were attacks in tachi waza that resulted in a score on the scoreboard, 627 (65.38%) were unsuccessful attack attempts, 180 (18.77%) were penalties and 9 (0.94%) of them were successful ne waza attacks.

The results of the Chi-square test ( $\text{sig}=0.01$ ) have shown the existence of significant differences between the different weight categories in actions conducted during the World Championship. As we can see from table 1, highest percentage of all the actions were unsuccessful attack attempts where judokas from middle (70.73%) and light (68.69%) categories had a higher percentage than judokas from the heaviest weight categories (54.74%). We can notice that in the heaviest weight categories all of the other observed parameters had higher percentages.

**Table 1** Actions conducted in different weight categories

	Score	Without score	Penaltie	Ne waza	Total
Light	45 (15.15%)	204 (68.69%)	47 (15.82%)	1 (0.34%)	297
Middle	45 (11.66%)	273 (70.73%)	65 (16.84%)	3 (0.78%)	386
Heavy	52 (18.98%)	150 (54.74%)	67 (24.45%)	5 (1.82%)	274

In 761 attack attempts, both effective and ineffective, te waza (35.87%) and ashi waza (34.82) techniques were used most frequently. The techniques where the attacker "sacrifices" his balance in order to throw his opponent had been used 167 times (21.94%), while the techniques from the koshi waza group were used occasionally (7.36%). The Chi - square test ( $\text{sig}=0,01$ ) also showed significant differences in the group of applied Nage waza.

**Table 2** Group of applied Nage waza for different weight categories

	Ashi waza	Koshi waza	Sutemi waza	Te waza	Total
Light	77 (31.17%)	23 (9.31%)	43 (17.41%)	104 (42.11%)	247
Middle	107 (33.75%)	13 (4.1%)	66 (20.82%)	131 (41.32%)	317
Heavy	81 (41.12%)	20 (10.15%)	58 (29.44%)	38 (19.29%)	197

The traditional grip configurations ai yotsu and kenka yotsu combined made up 62.05% of all the used grip configurations, while all the other had approximately the same values (Table 3). As for actions and the waza group, kumikata stance also differed among the different weight categories ( $\chi^2=28.69$ ;  $\text{sig}<0,001$ ).

**Table 3** Total grip configuration

	Ai yotsu	Central grip	Same side grip	Kenka yotsu	Cross grip	Only tori grips	Total
All	183 (24.11%)	78 (10.28%)	37 (4.87%)	288 (37.94%)	85 (11.2%)	88 (11.59%)	759

As we can see from table 4, The middle and heavy categories used kenka yotsu more frequently, while judokas from the light categories had a significantly higher percentage of attacks where only one fighter held the kumikata.

**Table 4** Grip configuration for different weight categories

	Ai yotsu	Central grip	Same side grip	Kenka yotsu	Cross grip	Only tori grips	Total
Light	56 (22.76%)	28 (11.38%)	13 (5.28%)	76 (30.89%)	26 (10.57%)	47 (19.11%)	246
Middle	83 (26.43%)	34 (10.83%)	11 (3.5%)	125 (39.81%)	38 (12.1%)	23 (7.32%)	314
Heavy	44 (22.11%)	16 (8.04%)	13 (6.53%)	87 (43.72%)	21 (10.55%)	18 (9.05%)	199

## DISCUSSION

The results have shown that more than 2/3 of all the actions in the light and medium categories were unsuccessful throwing attempts. In the heaviest categories, this percentage was lower (54.74%). On the contrary, heaviest fighters had a higher percentage of penalties. We can conclude that heavyweights had a slower pace of fight, with more prohibited actions, which was in accordance with the results of other authors (Franchini & Sterkowicz, 2003; Pujso, Adam, Kuzminska & Blach, 2014). That was to be expected when we take into consideration that heavyweight judokas have a lower aerobic and anaerobic capacity (Franchini, Del Vecchio, Matsushigue & Artioli, 2011).

Te waza (35.87%) along with ashi waza (34.82) were used most frequently. If we compare our results with the results of Boguszewski (2010), we can notice a visible decrease in the total usage of te waza (44% to 35.87%). This result is mostly due to the results obtained in categories -100kg and +100kg (19.29%). Kruszewski, Jagiello & Adamiec (2008) reported that Koshi waza is the most effective group of techniques; however, in their research, as well as ours, judokas rarely used them (7.36%).

Having the control of the opponent via kumikata is one of the most important aspects in judo (Calmet, Miarka, Franchini, 2010). Kenka yotsu (37.94%) followed by ai yotsu (24.11%) were used most frequently. These are standard gripping configurations where fighters are in strong connection. Since grouped kenka yotsu and ai yotsu followed by a same-side attack increased the chance of winning the combat (Courel, Franchini, Femia, Stankovic & Escobar-Molina, 2014) we can say that world class judokas prefer close contact fighting. In difference, only in lightweight categories do we have significant percentage (19.11%) of situations when the attack occurred in a moment when only the tori had kumikata.

Our study had some limitations that need to be considered when interpreting the data in further studies. The first limitation was that we only analyzed combats from one competition. Data would be better if we had analyzed fights from different competition levels (national, regional). In further investigations, the performance analysis of judo fight competitions before and after competition rule changes could be compared.

## CONCLUSION

Every sports performance during competition is unique and irreproducible. By analyzing a sufficient number of matches, the course of the average judo fight could be established. Based on the results, we can conclude that judokas need to conduct a great number of attack attempts in order to score. They prefer te and ashi waza techniques from the kenka and ai yotsu gripping stance. The practical application of the study lies in the explained structure of the judo fight. As coaching advice, the number of training situations that favor attacking from the kenka and ai yotsu stance should be significantly increased. Practicing offensive and defensive actions in all other kumikata stances should be reduced, except for lightweight categories where other kumikata stances have a large share in combat structure. Additionally, coaches should pay attention to attacking and defending with ashi waza and te waza, because this group of techniques were dominantly used in the competition.

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## **TOK DŽUDO MEČEVA NA SVETSKOM PRVENSTVU ODRŽANOM 2011.**

*Cilj ovog istraživanja bio je da se ispita tok džudo mečeva u različitim težinskim kategorijama tokom seniorskog Svetskog Prvenstva održanog 2011. u Parizu. Uzorak je činilo 140 džudo mečeva u muškoj konkurenciji. Iz svake od sedam težinskih kategorija, analizirano je dvadeset najvažnijih mečeva. U ispitivane kategorije spadale su laka (-60kg and -66kg), srednja (-73kg, -81kg and -90kg) i teška (-100kg and +100kg). Ukupno je analizirano 959 situacija. Analizirane su i sledeće varijable: akcija, grupa nage vaze i položaj kumikate. Statistički značajne razlike ( $p < 0.05$ ) uočene su između različitih težinskih kategorija u svim analiziranim parametrima. Rezultati pokazuju da bi trebalo da izvedu veći broj napada kako bi osvojili poen (65.38% svih akcija činili su neuspeli pokušaji bacanja). Češće su primenjivane te vaza (35.87%) i aši vaza (34.82) tehnike iz kenka jotsu (37.94%) i jotsu (24.11%) hvata. Kao savet za trenere, broj situacija tokom treninga u kojima se koristi kenka i ai jotsu položaj, kao i odbrana od napada te vazom i aši vazom trebalo bi povećati.*

**Ključne reči:** *analiza performansi, borilački sport, pravila suđenja*