

# Analysis of judo match for seniors

Ivan Segedi<sup>(A,B,C,D,E)</sup>, Hrvoje Sertić<sup>(A,C,D,E)</sup>, Dario Franjić<sup>(B,D)</sup>, Nenad Kuštro<sup>(B,D)</sup>,  
Davor Rožac<sup>(B,D)</sup>

Faculty of Kinesology University of Zagreb, Croatia

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## Summary

**Introduction.** In the last ten years judo sport is experiencing major changes. Coaches and athletes must follow the actualities and, to be successful, adapt training process to current rules and fight style. To bring training process closer to the competition conditions it is necessary to conduct judo match analyzes. That is why the main objective of this work is to analyze the structure of judo match on the Grand Prix level for seniors to help coaches and the athletes to improve their training process and fighting efficiency.

**Material and methods.** The paper analyses technical solutions in 125 matches of men's part of competition, and 68 matches of women's competition. All analyzed matches were part of elimination rounds of Grand Prix Tournament Rijeka 2013.

**Results.** Statistically significant number of matches ends in stand up position before the end of regular time in both, men and women, categories. Nage waza remain the most important techniques in judo match and the most used techniques in ground position are hold down techniques. Nevertheless, one can find a great deal of specificities through each weight category.

**Conclusions.** According to the results of performed analysis one can conclude that judo match requires a high level of technical efficiency and the physical ability. The differences in the analyzed variables, which occur between weight categories in the men's and women's competition, require an individualized approach in training process.

## Introduction

Each training process requires a careful analysis of the structures of that sport activity, as well as the respect of many external factors. To create efficient training process in judo one must be aware that this is a sport with a large number of technical elements that are performed in variable conditions [1,2]. These conditions are changing with each new change of the competition and fighting rules [3]. World Judo Federation, in its effort to promote and popularize judo sport, complements the rules of judo match. Constant improvement of rules allows Judo becomes easier to watch, closer to all spectators, adjusted to TV broadcasting and certainly all the more attractive to sponsors. Coaches should be able to adapt the technical, tactical and fitness goals of training depending on the factor of rules change.

To bring training process closer to the competition conditions it is necessary to conduct judo match analyzes [4]. Structure of modern judo match must be a model and training goal for all top level judokas.

That is why the main objective of this work is to analyze the structure of judo match on the Grand Prix Tournament for seniors in order to help coaches and the athletes to improve their training process and fighting efficiency.

## Material and methods

The sample of subjects (objective of research) was 125 matches in men's part of competition, and 68 matches in women's competition. All analyzed matches were part of elimination rounds of Grand Prix Tournament Rijeka (2013). Semifinal fights and fights for medals were not the part of analysis. In order to avoid the reduplication of results it was decided that one judoka can be analyzed in, not more than, three matches. Grand Prix tournament in judo is one of the highest level competitions in judo. All competitors on this tournament were members of their countries national teams.

Matches have been recorded by video camera, and has been analyzed by educated experts from Faculty of Kinesiology in Zagreb, associates on cathedra of Judo, each of them with minimum 10 years of experience in judo competition, and minimum black belt 1st DAN.

The data were processed in the statistical package Statistica for Windows version 10.0, using descriptive analysis and chi-square test under the significance level of  $p < 0.05$ .

## Results

According to the results in all, men's and women's, categories the number of matches resolved by Golden Score is significantly lower than the other two ways of ending the

match (Table 1). It can also be noticed that in men's categories the number of matches that last for the whole 5 minutes is statistically significantly lower in comparison with the number of matches ending before the 5 minute time limit has expired. This relationship has also been noticed in the women's categories but without any statistical significance.

Achieved scores show the technical excellence and, so to say, panache of judo fights in the men's and women's events. The piece of data that stands out is the fact that the majority of matches in both the men's and women's categories end with an ippon (64% in men's and 57% in women's events). Statistically speaking, a significant difference between the number of matches ending with an ippon and those ending with any other point has been determined in both the men's and women's categories. By analyzing every individual category an interesting fact crops up: in the men's super-heavy category (+ 100 kg) the match ends in only two ways; either

with an ippon before the time limit has expired or with a penalty. Similarly, in the women's super-heavy category (+ 78 kg) as many as 5 out of 6 matches end with an ippon before the time limit has expired.

Both in the men's and women's events a statistically significant number of scores occur while standing up. This relationship, both in the men's and women's categories, is about 1:3 in favour of a score in tachi-waza. Observing each category individually one can notice a gradual change in the trend of scoring in different position as we climb the weight in the men's categories. The relationship between a score in tachi-waza and ne-waza gradually turns into 1:2 or even 1:1 as we reach higher weight men's categories. In the women's event the opposite applies: the relationship between a score in ne-waza and tachi-waza is almost identical in the lower weight divisions, and the difference increases with the judoka's weight. The greatest difference in this relationship can be noticed in

Table 1. Duration of matches in male and female weight categories

CATEGORY	END BEFORE REGULAR TIME	END IN REGULAR TIME	END IN GOLDEN SCORE	CATEGORY	END BEFORE REGULAR TIME	END IN REGULAR TIME	END IN GOLDEN SCORE
- 60 KG	10	5	0	- 48 KG	2	0	0
- 66 KG	11	11	1	- 52 KG	3	5	0
- 73 KG	7	8	2	- 57 KG	15	3	0
- 81 KG	19	4	1	- 63 KG	6	7	1
- 90 KG	10	7	0	- 70 KG	7	4	0
- 100 KG	10	4	0	- 78 KG	1	7	1
OVER 100 KG	12	3	0	OVER 78 KG	5	0	1
TOTAL (MALE)	79***	42*	4	TOTAL (FEMALE)	39**	26*	3

\*\*\*significant difference between the frequency of ending match before regular time and ending it in regular time or/and ending it in golden score time

\*\* significant difference between the frequency of ending match before regular time and ending it in golden score time

\* significant difference between the frequency of ending match in regular time and ending it in golden score time

Table 2. Frequency of the highest scores achieved during the matches in men weight categories

CATEGORY	END WITH IPPON	END WITH WAZA ARI	END WITH YUKO	END WITH PENALTY
- 60 KG	10	2	1	2
- 66 KG	11	6	4	1
- 73 KG	7	1	4	5
- 81 KG	19	3	1	1
- 90 KG	10	4	2	1
- 100 KG	10	0	1	3
OVER 100 KG	12	0	0	3
OVERALL	79*	16	13	16

\*significant difference between the frequency of Ippon and Waza ari, Yuko, Penalty

Table 3. Frequency of the highest scores achieved during the matches in women weight categories

CATEGORY	END WITH IPPON	END WITH WAZA ARI	END WITH YUKO	END WITH PENALTY
- 48 KG	2	0	0	0
- 52 KG	3	2	0	3
- 57 KG	15	2	1	0
- 63 KG	6	2	4	2
- 70 KG	7	1	1	2
- 78 KG	1	3	2	3
OVER 78 KG	5	1	0	0
OVERALL	39*	11	8	10

\*significant difference between the frequency of Ippon and Waza ari, Yuko, Penalty

Table 4. Difference in frequency of scores achieved in ground (ne waza) and in standing (tachi waza) position

CATEGORY	SCORE IN NE WAZA	SCORE IN TACHI WAZA	CATEGORY	SCORE IN NE WAZA	SCORE IN TACHI WAZA
- 60 KG	3	10	- 48 KG	1	1
- 66 KG	3	13	- 52 KG	3	2
- 73 KG	1	11	- 57 KG	5	13
- 81 KG	5	19	- 63 KG	1	10
- 90 KG	5	11	- 70 KG	2	7
- 100 KG	6	5	- 78 KG	0	6
OVER 100 KG	4	7	OVER 78 KG	1	5
OVERALL	27	81*	OVERALL	13	45*

\*significant difference between the frequency of ending match in ne waza and tachi waza position

Table 5. Frequency of successfully applied ground techniques in men competition

CATEGORY	SCORE WITH ARM LOCK (KANSETSU WAZA)	SCORE WITH STRANGULATION (SHIME WAZA)	SCORE WITH HOLD DOWN (OSAEKOMI WAZA)
- 60 KG	1	1	1
- 66 KG	1	0	2
- 73 KG	0	1	0
- 81 KG	1	1	3
- 90 KG	1	1	3
- 100 KG	1	0	5
OVER 100 KG	0	0	4
OVERALL	5	4	18*

\*significant difference between the frequency of osaekomi waza score and kansetsu waza, shime waza

Table 6. Frequency of successfully applied ground techniques in women competition

CATEGORY	SCORE WITH ARM LOCK (KANSETSU WAZA)	SCORE WITH STRANGULATION (SHIME WAZA)	SCORE WITH HOLD DOWN (OSAEKOMI WAZA)
- 48 KG	0	0	1
- 52 KG	1	1	1
- 57 KG	1	0	4
- 63 KG	0	1	0
- 70 KG	0	1	1
- 78 KG	0	0	0
OVER 78 KG	0	1	0
OVERALL	2	4	7

\*significant difference between the frequency of osaekomi waza score and kansetsu waza, shime waza

the medium weight division both in the women's (up to 63 kg) and men's (up to 81 kg) categories.

In both, men's and women's, competition judoka achieve more scores with hold down techniques. However, the difference in achieving score with hold down techniques in the men's competition was also and statistically significant higher than achieving score with other techniques. Arm locks and choking techniques are applied almost equally and between them were no significant differences.

## Discussion

The introduction of new rules which, on the one hand, encourage offensive judo and, on the other, impose harsher penalties for passivity has led to an increase in the intensity of the fight. As confirmed by the results, a significantly higher number of matches ended before the time limit has expired

(Table 1). Training-wise this means that competitors have to prepare for a more active opponent and, most likely, for maintaining a high intensity throughout the match. A higher degree of tolerance regarding all of the harmful physiological by-products of activity at such a level should be sustained, even more because judo fight was already known as very physically demanding activity [5,6]. There is no more room for tactical brake (false attacks, leg catches when defending against an attack, adjusting the belt and a longer time frame between mate and hajime, etc.), which competitors could use to get their body into the best physiological state possible (lowering the heart frequency, discarding the harmful metabolites from their muscles, etc.).

High number of positive scores (especially ippon) in judo match is in contradiction with some researches [7,8] which showed an increase in the number of penalties and matches resolved by Golden Score in tournaments between 2005. and

2010. It seems that the modifications of the rules in January 2013., specifically the swifter penalties for passive fighting, have significantly affected the dynamics of the fight.

These results point to the growing prominence of judo and present it in the best light. The general public is becoming more and more interested in TV broadcasts of judo, which brings about a greater interest from sponsors. Observing these results from the point of view of training one can reach the conclusion that there is a stronger need for a technical training of higher quality. Without the proper acquisition of the correct structure of technical elements, the competitor's chances of achieving top results will diminish significantly.

Bearing in mind the fact that for top results a judoka should use various throwing techniques [9,10,11] one can reach the conclusion that the future development of judo will be of a more technical – tactical nature.

The frequency of application of throwing techniques indicates the need for modification of tactical training with respect to the weight category. Earlier research has shown a similar effectiveness of nage-waza techniques as opposed to katame-waza [12,13,14,15]. The new rules certainly encourage the fight in a standing position, but the presence of differences between tachi waza and ne waza by particular categories indicates the need of individual tactical approach to the match. Looking at the results in the men's competition can be concluded that they are definitely associated with the anthropological characteristics [16] and their differences through weight classes. Frequency of application of throwing techniques in light weight categories is higher and thereby one increases the possibility of achieving score. If, however score does not happen they are able to avoid attacks in the ne-waza position because of their exceptional speed and coordination. Therefore, because of this reason, in the men's competition there are fewer score in ground position.

Comparing the results of frequency of successfully applied ground techniques (Table 5 and 6) with previous studies one may notice the resemblance. In some studies [14,15,17] it is also observed a higher efficiency of hold down techniques

compared to other groups of ground techniques. Also, some previous findings confirm that the dominance in the use of hold down techniques is more pronounced in men than in women weight categories [12,13]. Reason why the hold down techniques are more successfully applied is their simplicity of execution. On the other hand arm locks and strangulations demand more precise movement and greater ne-waza knowledge [18,19]. It is easier to defend one part of body (elbow or neck) than the whole body. It is enough to learn some quality defense and the probability of application of arm locks and strangulations will be diminished.

## Conclusion

The aim of this study was to determine the structural characteristics of judo match at the elite judo competition level – Grand Prix Tournament Rijeka 2013. The results have enabled the creation of the conclusions of physiological, technical and tactical demands of modern senior judo match:

1. Significant number of judo matches end before the expiry of the normal time. Modern judokas start a fight in a fast rhythm and they must be able to maintain that pace until the end of the match to increase their chances to achieve results. Also, in judo match, attacking tactics is encouraged and more ippons are achieved. This fact suggests that judo match requires of judoka also a high level of technical efficiency.
2. Domination of standup fight versus ground fight directly affects the creation of tactical patterns during judo match.
3. The differences in the analyzed variables, which occur between weight categories in the men's and women's competition, require an individualized approach in training process.

Analyzed competition was held in the period before the Olympic qualification begun and it will be interesting to follow the further appearances in this tournament and to analyze the differences in performance in this competition during the Olympic qualification cycle.

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**Address for correspondence:**

Ivan Segedi

Horvaćanski zavoj 15, 10 000 Zagreb, Croatia

00385 1 3658 754, e-mail: ivan.segedi@kif.hr

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