

COACHING & KINESIOLOGY

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Analysis of re-gripping behaviors, gripping numbers, and targets: A comparative study of gripping techniques preceding scored throws between the extra lightweight and half heavyweight categories in international judo competitions

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Abstract

Background. Judo competitors from various countries around the world have won medals at international competitions. We hypothesize that judo gripping techniques have evolved differently in each country as the practice of judo expands globally.

Problem and Aim: Few studies on gripping techniques preceding scored throws according to weight categories have been conducted. The purpose of this study is to elucidate whether there is a difference between the extra lightweight and half heavyweight categories in gripping techniques preceding scored throws.

Methods. 58 male and 50 female contests from the Judo Grand Slam Paris 2018 were analyzed using the DVDs recorded by the All Japan Judo Federation Science and Research Department. Throws resulting in scores were identified and the preceding gripping techniques were analyzed. Weight categories are the independent variables, while gripping techniques are dependant variables. Chi-squared tests were performed to determine variations in the frequency of scored throws between the extra lightweight and half heavyweight categories.

Results. In gripping targets preceding scored throws, the scoring rate of collar sleeve combination grips (CS-grip): collar grip, sleeve grip, collar and sleeve grip, collar and collar grip, sleeve and sleeve grip were significantly higher in the female extra lightweight category than the female half heavyweight category. In other words, the scoring rate of other grip (O-grip): the other grip, the other and collar grip, the other and sleeve grip, and the other and the other grip in the half heavyweight category was significantly higher than extra lightweight category.

Conclusions. A significant difference of gripping target preceding scored throw between the weight categories in female contest was found. This suggests that the types of effective throwing techniques, or applications in executing throwing techniques, are different between the extra lightweight and half heavyweight categories. In male contests, no significant differences were found between the two weight categories among any of the variables analyzed.

Introduction

Judo competitors from various countries around the world have won medals at international competitions. We hypothesize that judo gripping techniques have evolved differently in each country as the practice of judo expands

globally. There have been many previous studies on the importance of grip tactics in competitions. One of the most important actions in achieving winning or losing is the moment of the gripping, indeed, 59.3% of the effort sequences comprised either “trying gripping time” or “accomplished gripping time”[Soriano *et al.* 2019].

Gripping (*kumi kata*) constitutes a very important segment of judo competition, and well-executed gripping techniques may be a key factor in the competition outcomes [Kajimovic *et al.* 2014]. The average attacking frequency per one minute of competition in standing position was 1.86 times for the male 60 kg category and 1.71 times for the female 48 kg category in the 1997 world judo championship [Hirose *et al.* 2000]. These results suggest the remainder of the time was, to some extent, used in different activities related to gripping techniques, such as competitors considering how to approach and grab their opponent and attempting to gain an advantage over their opponent once gripping had commenced. Approach and handgrip phases make up a large part of the total competition time and have become extremely important for competitive performance [Barreto *et al.* 2019]. Two-thirds of competition time in the men's and women's finals of the 2016 Rio de Janeiro Olympics were spent on activities other than offense or defense maneuvers [Boguszewski 2016]. Furthermore, hand blocking was the most frequently used defensive technique [Boguszewski 2016]. The authors of this paper take the position that a competitor's gripping skills are vital to success in judo, as it is fundamental to setting up a throw.

In general, as competitors' weight increases, height also increases, and as the height increases, the arm length increases. Furthermore, taller competitors are generally slower. In terms of gender, physical strength and athletic abilities depend on differences in muscle mass ratio between males and females [Nakamura *et al.* 2014; Takami *et al.* 2018]. It can be inferred that such differences in physical characteristics and abilities result in changes in grip tactics based on competitors' speed and power. Elucidating these differences in grip tactics based on gender and weight categories for coaching professionals supports decision-making that takes into account competitors' gender and weight.

Numerous studies have been reported on differences in grip tactics between gender and weight class. The lightest and heaviest judo athletes displayed unique characteristics compared with athletes in the other weight categories, particularly in the attack, defense, groundwork, and pause phases [Sterkowicz-Prezybycien *et al.* 2017]. These results suggest grip tactics vary based on the competitors' weight category. Lighter athletes are the most differentiated because they spend more time in the approach phase of attacking, making handgrip attempts, and when performing handgrip attempts, they employ greater gripping diversity. Heavier weight categories spend a longer time in the handgrip phase and utilize more defensive grips [Barreto L.B.M *et al.* 2019]. Heavyweight *judokas* have a longer time to use actually gripping on their opponents than the lightweight and middleweight fighters [Soriano *et al.* 2019]. Re-gripping before throwing resulted in a significantly higher score rate in the male's 100 kg weight category while a significantly higher score rate was achieved by compet-

itors who did not attempt to re-grip their opponent prior to throwing them in the female 52 kg weight category after the 2013 rule revision [Ito *et al.* 2017]. In male competitions, competitors in lightweight classes spend more time in the approach, and extra lightweight spends less time with the *judogi* gripping; therefore, training focused on approach speed and gripping is recommended for the competitors in the lighter classes [Diaz-De-Durana *et al.* 2018]. Since the coordination ability and force expression in the gripping phase are significantly different depending on the weight differences [Fransinelli *et al.* 2019], it is expected that the grip tactics would also differ based on the competitor's weight category. Approach and gripping strategies are the main discriminant indicators of performance in half-middleweight male judo athletes [Miarka *et al.* 2016]. The men take a longer time to execute a grip than women, but the females spend a longer time with a real grip on their opponent than the males [Soriano *et al.* 2019]. Female athletes use higher frequencies of techniques with different biomechanical levers for the attack, while males use more variations of gripping and groundwork attacks [Bello *et al.* 2019]. Application of standing techniques is different by weight category and gender [Martins *et al.* 2019]; therefore, gripping techniques would differ accordingly.

Previous research has been conducted on the scoring efficacy of *kumi-kata* techniques, and much has been learned and documented. Attacking on the same side as *kumi-kata* increases the chance of scoring and winning the competition, independent of gender and weight category [Courel *et al.* 2014]. The most efficient throwing technique for males considering the same side grip is *ippon-seoi-nage*, while for females that is *harai-goshi*. In the opposite side grip, *uchi-mata* is the most efficient technique in both male and female competitors [Kajmovic *et al.* 2017]. *Ai-yotsu* (both competitors standing with closed stance) and *kenka-yotsu* (both competitors standing with open stance) configurations were more prevalent in the 2014 world championships than in 2011, while the central grip, cross grip and *tori* grips (only one competitor gripping) were more used in the 2011 world championships than in 2014 [Stankovic *et al.* 2019]. Mayo *et al.* [2019] reported there was an association between the lateral structure of fighting (symmetrical or asymmetrical) and the category of techniques. In addition to this, Mayo *et al.* [2019] clarified there was a preponderance of scoring actions that were the direct attack scores, occurring in the forward throw area, and in an asymmetrical lateral structure of fighting. Scoring rates significantly increased when competitors re-gripped their opponents in *ai-yotsu* and *kenka-yotsu* and the total of both stances [Ito *et al.* 2014; Ito *et al.* 2015] after the 2013 rule revision that prohibits competitors from attacking or defending below the belt using arms or hands, penalizing such actions with a *hansoku-make*, or disqualification [International Judo Federation 2013].

Grip approaches differ between beginner, intermediate and expert competitors. Expert-level *judokas* (judo competitors) spend more time in grip contests (trying to grip the opponent without being gripped) and less time engaged in grips. Additionally, experts spend less time between the grip and technique execution [Calmet *et al.* 2010]. In developing grip strength evaluation tables, a five-grade scale for maximal isometric handgrip strength was designed that can be used as a reference to guide judo athletes' training and can be relevant for goal setting concerning maximal strength performance, either peaking for a specific competition or rehabilitation process [Franchini *et al.* 2018].

Clarifying the differences in gripping techniques by gender and weight category could contribute to improving the accuracy of the following throws. We have examined changes in gripping tactics as a result of rule modifications, but few studies have been conducted on the differences in gripping techniques between weight categories in both male and female contests. The present study, a comparative analysis of handgrip techniques, has been conducted to clarify whether there is a difference in the application of gripping techniques preceding scored throws between the extra lightweight and half heavyweight categories for each of the following three gripping-related factors: re-gripping behavior (re-grip or no re-grip), gripping number (one hand or both hands grip), and gripping target (collar and sleeve grip or the place other than collar and sleeve grip). These gripping techniques could be the most important determinants of scores gained through throws. This information will be useful for and practical information for improving gripping performance at international-level competitions.

Methods

Analysis data and Analysts

58 male (60 kg category: 25; 100 kg category: 33) and 50 female contestants (48 kg category: 25; 78 kg category: 25) from the Judo Grand Slam Paris 2018 were analyzed using the DVDs recorded by the All Japan Judo Federation Science and Research Department. The following functions were used for viewing the DVDs: reverse viewing, slow (0.5x, 0.75x) and high-speed viewing (2.0x), frame-by-frame playback viewing, 10 seconds fast forward and rewind, pause, repeated viewing for 5 seconds, and zoom up.

The extra-lightweight category for analyzing both male and female competitions was used; however, the heavyweight category was not used for comparing the gripping techniques because the heavyweight category does not have weight limits. Therefore, in order to clarify differences in grip techniques based on weight differences

in male and female high-level athletes, comparisons were made between the extra lightweight and half heavyweight categories.

Two analysts took part in this handgrip analysis for standing techniques. The two analysts were “6th *dan*” (male; practice frequency: 5 times a week /: male; practice frequency: 6 times a week). *Dan* is a ranking system indicating a 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. All data relating to competitors' use of gripping techniques were confirmed unanimously by the two analysts as part of the validation process. Each analyst is qualified as a judo instructor with an A-rating, the highest level in Japan, as specified by the All Japan Judo Federation, and the two analysts are currently active in judo instruction.

Ethical Issues

There were no ethical issues related to the analysis and interpretation of collected data. In the present research, contestants' individual identification is not reported, as only the gripping techniques in the competitions were collected.

Procedure

Videos of 84 scored (*waza-ari*, *ippon*) throws and the preceding gripping techniques were analyzed from the 108 contests (male: 58; female: 50). All gripping techniques data were coded using Microsoft Excel software.

The use of one or both hands in the gripping techniques preceding a scored throw was documented. Re-gripping attempts were then documented. Gripping techniques preceding a scored throw were 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, gripping techniques that included more than two instances of a competitor grabbing their opponent in a continuous sequence were categorized as a re-grip. Gripping techniques in which grasping occurred less than three times in a continuous motion were considered to be gripping techniques with no re-gripping. Finally, gripping targets of one hand or both hands were identified. Gripping targets are classified as follows: collar, sleeve, collar and sleeve, collar and collar, sleeve and sleeve, which are categorized as collar and sleeve grip (CS-grip) and the other, the other and collar, the other and sleeve, and the other and the other, which categorized as other grips (O-grip).

Analyzed factors

Score rates were categorized according to whether the competitor used one or both hands preceding scored

throws by weight category (the extra lightweight vs half heavyweight) in both male and female contests. Score rates were classified according to the re-gripping behavior (re-gripping or no re-gripping) preceding scored throws by weight category (the extra lightweight vs half heavyweight) in both male and female contests. Score rates of gripping targets (CS-grip or O-grip) preceding scored throws were categorized by weight category (the extra lightweight vs half heavyweight) in both male and female contests.

Statistical analysis

Chi-square tests were used to determine differences in the ratio of scored throws between the weight categories with regards to variables selected for the study. When the expected frequency of less than 5 was confirmed at 20% or more, Fisher's exact probability test was used to calculate exact significance. Phi coefficient was calculated to evaluate effect size and interpreted using the criteria: low-effect size; 0.00 to 0.10, moderate-effect size; 0.11 to 0.50, high-effect size; 0.51-1.00. The statistical significance level was set at $p < 0.05$ for all analyses. Statistical Package for Social Science (SPSS) for Windows 26.0 was used to compute the statistics.

Results

The score rates in both the 48 kg and 78 kg categories in which the competitor used both hands were high, and no significant difference was found between the two weight categories (48 kg: 76.5%, 78 kg: 100.0%; table 1). The expected frequency of less than 5 was confirmed at 50%; therefore, Fisher's exact probability test was used to calculate the exact significance ($p=0.103$).

Table 1. Score rate categorized according to whether the competitors used one or both hands in female competitions

Weight category	N (%)		χ^2 (df = 1)	P
	One hand grip	Both hands grip		
Extra lightweight	4 (23.5)	13 (76.5)	1.533	0.033
Half heavyweight	0 (0.0)	17 (100.0)		

In cases where the competitors re-gripped their opponents, no significant difference was found between the two weight categories (48 kg: 41.2%, 78 kg: 58.8%; table 2).

In gripping target preceding scored throws, the scoring rate of the CS-grip in the 48 kg weight category was significantly higher than that of the 78 kg weight category. In other words, the score rate of the O-grip in 78 kg weight category was significantly higher than

that of the 48 kg weight category ($\chi^2 = 5.846$; $p = 0.016$; table 3). It could be considered that the level of correlation between the weight categories and the gripping target was moderate (phi coefficient = 0.415).

Table 2. Score rate classified according to re-gripping behaviour in female competitions

Weight category	N (%)		χ^2 (df = 1)	P
	No re-gripping	Re-gripping		
Extra lightweight	10 (58.8)	7 (41.2)	1.059	0.303
Half heavyweight	7 (41.2)	10 (58.8)		

Table 3. Score rate of gripping targets preceding scored throws in female competitions

Weight category	N (%)		χ^2 (df = 1)	P
	CS-grip	O-grip		
Extra lightweight	13 (76.5)	4 (23.5)	5.846*	0.016
Half heavyweight	6 (35.3)	11 (64.7)		

* $P < 0.05$; $\phi = 0.415$

Score rates in both 60 kg and 100 kg categories in which the competitor used both hands were high (60 kg: 100.0%, 100 kg: 93.3%; table 4), and no significant difference was found between the two weight categories. The expected frequency of less than 5 was confirmed at 50%; therefore, Fisher's exact probability test was used to calculate exact significance ($p=0.502$).

Table 4. Score rate categorized according to whether the competitors used one or both hands in male competitions

Weight category	N (%)		χ^2 (df = 1)	P
	One hand grip	Both hands grip		
Extra lightweight	0 (0.0)	22 (100.0)	1.525	0.217
Half heavyweight	2 (6.7)	28 (93.3)		

The score rates in both the 60 kg and 100 kg categories when the competitors re-gripped their opponents were almost the same, and no significant difference was found between the two weight categories (60 kg: 31.8%, 100 kg: 33.3%; table 5).

Table 5. Score rate classified according to re-gripping behaviour in male competitions

Weight category	N (%)		χ^2 (df = 1)	P
	No re-gripping	Re-gripping		
Extra lightweight	15 (68.2)	7 (31.8)	0.013	0.908
Half heavyweight	20 (66.7)	10 (33.3)		

In gripping targets preceding the scored throw, the score rates of gripping targets (CS-grip or O-grip) in both the 60 kg and 100 kg weight categories were almost the same, and no significant difference was found between the two weight categories (table 6).

Table 6. Score rate of gripping targets preceding scored throws in male competitions

Weight category	N (%)		χ^2 (df = 1)	P
	CS-grip	O-grip		
Extra lightweight	12 (54.5)	10 (45.5)	0.105	0.746
Half heavyweight	15 (50.0)	15 (50.0)		

Discussion

In both the female 48 kg and 78 kg categories, the scoring rate when competitors used both hands was high, 76.5% for the 48 kg category, 100% for the 78kg category, respectively. Of note is the 100% figure for the 78 kg category, showing that all the subsequent attacks were made using both hands. And also, the score rates in both male 60 kg and 100 kg categories when the competitors used both hands were high (100%, 93.3%, respectively). Comparing the results of the previous research [Ito *et al.* 2015] reporting the frequency of both gripping techniques before initiating scored throws in Grand Slam Paris 2013 with this study's results, the scoring rate of both gripping techniques in total for all 7 male categories in previous research was 91.7%, and in this study, 100% for the 60 kg category, 93.3% for the 100 kg category. Using both hands before initiating scored throws is most effective, in other words, one hand gripping techniques are not effective for scoring regardless of gender differences or weight category. These observations show that using both grips is considered to be the mainstream of gripping techniques regardless of gender differences and weight category. However, from a different perspective, if competitors are familiar with each other's unique skills, a throwing technique using one-handed gripping might be effective if they surprise their opponent, especially in close or golden score matches.

We could not confirm a significant difference between the weight categories in both male and female competitors regarding the frequency of the re-gripping techniques preceding scored throws. Therefore, coaches do not need to consider this factor when advising competitors in different weight categories about re-gripping techniques. Comparing previous research [Ito *et al.* 2017] which reported the frequency of re-gripping techniques preceding scored throws in the Grand Slam Paris 2013 and the Grand Slam Tokyo 2013 with the current study, the score rate of re-gripping techniques in the female 52 kg category was 11% in the previous research. In this study, although the weight category is one class lighter

than that of the previous study, the scoring rate of re-gripping techniques in the 48 kg category was 41.2%. The score rate of re-gripping techniques in the female 78 kg category was 26.9% in previous research, while in this study, 58.8% in the 78 kg category. This increase of the scoring rate of re-gripping techniques in the 48 kg category, while one weight class lower than the category it was compared to, and the 78 kg category means that the re-gripping technique has become widely-used techniques in these weight categories. This is why we strongly recommend that the re-gripping techniques be included in coaching manuals for female athletes.

The score rates in both the male 60 kg and 100 kg categories when the competitors re-gripped their opponents were almost the same, around 32% in each category; therefore, we do not need to change teaching methods between the classes when coaching re-gripping techniques. Results from previous research [Ito *et al.* 2017] reporting the frequency of re-gripping techniques preceding scored throws in the Grand Slam Paris 2013 and the Grand Slam Tokyo 2013 revealed the scoring rate of re-gripping techniques in the male 66 kg category to be 28.3%. In this study, the weight category is one class lighter than that of the previous study, the scoring rate of re-gripping techniques in the 60 kg category was 31.3%. The same previous research revealed the score rate of re-gripping techniques in the male 100 kg category was 53.0%, while in this study, it was 33.3% in the 100 kg category. The score rate in the 100 kg weight category decreased by 19.7% compared to 5 years ago. These results show the opposite trends compared to the female 48 kg and 78 kg classes. Coaches should consider gender differences in long-term trends with regards to re-gripping techniques. We recommend for female competitors using re-gripping techniques with searching the most advantageous gripping targets for winning *ippon*.

The current research revealed that the scoring rate of O-grip in the 78 kg category was significantly higher than that of the 48 kg category. This indicated that the effective gripping target used preceding scored throws varies depending on weight classes. Franssinelli *et al.* [2019] revealed a correlation of motor abilities (force expression and coordination capabilities) with athletes' weight in fighting gripping technique (*kumi-kata*) stages in quantitative analysis. It could be speculated that weight differences could make a difference in grip tactics. Martins *et al.* [2019] used a new classification of throwing techniques created by Dopico *et al.* [2014] instead of the *kodokan* manual [Daigo 2005] and reported that female extra lightweight or 48 kg category, scored more frequently using techniques without turning maneuvers, forward or backward throws, and standing on both feet: *ura-nage*, *ushiro-goshi*, *yoko-otoshi*, *sumi-otoshi*, and *daki-wakare* than those of the heavyweight or over 78 kg category. This indicates that effective techniques might be different between the

two female weight categories. We assume that if the effective techniques were different between the weight categories, the gripping targets could change depending on the category. In the present study, competitors might use techniques that do not inhibit the effectiveness of using O-grip in the 78 kg weight category, while the competitors might use the techniques that reduce the effectiveness unless they use CS-grip in the 48 kg category. In addition, it was assumed that gripping targets could be different even if a competitor in the 48 kg category and a competitor in the 78 kg category use the same throwing techniques. For example, when performing *uchi-mata* in the 48 kg category, a competitor might primarily use the CS-grip, while in the 78 kg category, a competitor might use the O-grip extensively because their longer arm(s) enabled them to. And also when performing *harai-maki-komi* and *soto-maki-komi*, a competitor in the 78 kg category might use an O-grip, especially gripping the back with one hand in order to bring the opponent closer before initiating these techniques by using their longer arms. Future research should investigate the relationship between scored throws and the gripping targets before initiating scored throws across all weight categories.

The scoring rates using O-grip in both the male 60 kg and 100 kg categories were almost the same, 45% for the 60kg, and 50% for the 100 kg, respectively; this shows that CS-grips are recognized as standard gripping targets in Japan, the country where judo was founded but [Matsumoto 1985] are no longer the standard globally. Miarka *et al.* [2017] reported that male athletes displayed one-handed gripping of the back and sleeve, whereas female athletes executed a greater number of groundwork techniques. This previous study supports our assertion that male competitors often grab places other than collars, and sleeves (O-grip) whereas, the previous research [Bello *et al.* 2019] using data from competitions held under the 2010-2012 IJF rule, male athletes showed a higher frequency of gripping the left collar and sleeve, on the right sleeve, on the left sleeve and on both sleeves. This might be due to the differences in competition rules. Comparing the results of the previous research [Ito *et al.* 2015] which reported the frequency of the O-grip before initiating scored throws in Grand Slam Paris 2013 with this study's results, the score rate of O-grip techniques in total for all 7 male's categories in the previous research was 63.2%, in the current study, it was 45.5% for the 60 kg category, and 50% for the 100 kg category. The results indicate that about half of scored throws were preceded by an O-grip and that the application for throwing techniques has been transforming or throwing techniques have improved.

It is thought that re-gripping techniques were made in order to grasp the parts other than the collar and sleeve which are considered as standard gripping targets in Japan. In other words, the more competitors try to vary

gripping targets, categorized as O-grips, the more re-gripping techniques will be used. Previous research [Ito *et al.* 2019] reported that in male's contests from the Judo Grand Slam Paris 2016, re-gripping techniques resulted in significantly higher score rates than no re-gripping techniques when competitors grabbed the competition number area and places other than the collar and sleeve except the place of the competition number (e.g. shoulder and armpit) with at least one hand. Perhaps these competitors used CS-grips in the initiation of gripping because the opponent's collar and sleeves are closest and easy to hold in the first step of gripping. Then, they would try to re-grip their opponents using an O-grip to close the space between themselves and their competitor, getting into the most ideal position for scoring. Thus, combining re-gripping techniques with selecting effective gripping targets could be an important maneuver in scoring in international-level competitions. Geesink [2000] also recommended gripping the shoulder near the armpit over a single-handed collar grip. He stated that grabbing at exactly the shoulder (at the sleeve set-in) of the competitor allows one to hold onto the competitor with minimal strength, stopping them from freeing themselves. Confirmation of these observations requires further handgrip analysis with a larger sample size to verify the relationship between re-gripping techniques and gripping targets preceding scored throws in all weight categories.

Conclusions

This research confirmed that using both hands before initiating scored throws is the most predominant gripping technique category. In other words, one hand gripping techniques are not effective for scoring regardless of gender differences or weight category. However, there was no significant difference between weight classes in the re-gripping technique for both male and female athletes. This is compared to previous research data from five years ago, where the higher score rate following re-gripping techniques was found to be an important factor for scoring in the female 48 kg and 78 kg weight categories. Differences in gripping targets preceding scored throws between the weight classes in female contests were found. In the extra lightweight or the 48 kg category, the CS-grip is effective for scoring, while in the half heavyweight or 78 kg category, O-grip is effective. This difference suggests that the type of effective throwing techniques, or practical use with hands for throwing techniques is changing between the 48 kg and the 78 kg weight categories.

The findings should be considered by coaches who participate in international-level competitions for creating new practice methods that are focused on combination maneuvers, re-gripping behavior and gripping targets preceding scored throws. Finally, our findings

indicate that male and female competitors are practicing similar, well-orchestrated judo maneuvers in international-level competitions.

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Analiza zachowań podczas ponownego chwytania, liczby chwytów i celów: Studium porównawcze technik chwytów poprzedzających punktowane rzuty pomiędzy kategoriami wagi extra lekkiej i półciężkiej w międzynarodowych zawodach judo

Słowa kluczowe: coaching, sporty walki, sztuki walki, analiza zawodów, techniki rzutów, kategorie wagowe

Streszczenie

Wprowadzenie. Zawodnicy judo z różnych krajów świata zdobywają medale na zawodach międzynarodowych. Autorzy postawili hipotezę, że techniki chwytu w judo ewoluowały w różny sposób w poszczególnych krajach, w miarę jak praktyka judo rozszerza się globalnie.

Problem i cel: Przeprowadzono niewiele badań nad technikami chwytów poprzedzających rzuty punktowane w zależności od kategorii wagowych. Celem niniejszej pracy było wyjaśnienie, czy istnieje różnica pomiędzy kategoriami wagi extra lekkiej i półciężkiej w technikach chwytów poprzedzających punktowane rzuty.

Metody. Przy użyciu płyt DVD nagranych przez Dział Nauki i Badań All Japan Judo Federation przeanalizowano 58 walk z udziałem mężczyzn i 50 walk z udziałem kobiet w Judo Grand Slam Paris 2018. Zidentyfikowano rzuty skutkujące punktami i przeanalizowano poprzedzające je techniki chwytów. Kategorie wagowe były zmiennymi niezależnymi, podczas gdy techniki chwytów były zmiennymi zależnymi. Testy Chi-kwadrat zostały przeprowadzone w celu określenia różnic w częstotliwości punktowanych rzutów pomiędzy kategoriami wagi półciężkiej i półciężkiej.

Wyniki. W chwytach poprzedzających rzuty punktowane, wskaźnik punktacji kombinacji chwytów kołnierz-rękaw (CS-grip): chwyt za kołnierz, chwyt za rękaw, chwyt za kołnierz-rękaw, chwyt za kołnierz-kołnierz, chwyt za rękaw-rękaw był istotnie wyższy u zawodniczek kategorii extra lekkiej niż u zawodniczek kategorii półciężkiej. Innymi słowy, wskaźnik punktacji pozostałych chwytów (O-grip): inny chwyt, inny i kołnierzowy chwyt, inny i za rękaw oraz inny-inny chwyt w kategorii półciężkiej był istotnie wyższy niż w kategorii extra lekkiej. Wnioski. Stwierdzono istotną różnicę w sposobie wykonania chwytu poprzedzającego punktowany rzut pomiędzy kategoriami wagowymi w konkurencji kobiet. Sugeruje to, że rodzaje skutecznych technik rzutowych, czy też zastosowania w wykonywaniu technik rzutowych, różnią się pomiędzy kategoriami wagi extra lekkiej i półciężkiej. W zawodach z udziałem mężczyzn nie stwierdzono istotnych różnic pomiędzy obiema kategoriami wagowymi w zakresie żadnej z analizowanych zmiennych.