A new approach to Special Judo Fitness Test index

Yazar Özkan Işık

A new approach to Special Judo Fitness Test index:
Relative index[1]

Ozkan Işık[2]

İlkay Doğan[3]

Halil İbrahim Cicioğlu[4]

İrfan Yıldırım[5]

Abstract

Although judo and wrestling have different rules, these branches are two different Olympic sports branches, partly based on similar basic techniques. For example; the technique called "Ippon-Seoi-Nage" (one shoulder throw) in judo is mechanically the same as the technique called "Arm Throw" in wrestling. The aim of this study was to gain relative special judo fitness test (SJFT) index with a new approach to the SJFT index used in the literature. The maximum number of "arm throw" is required from wrestlers during the tests. The test consists of 3 sets. The sets are 15 sec, 30 sec, and 30 sec, respectively, and rest between the sets is 10 seconds. The heart rate of the wrestlers has recorded at the end of each set of the test and 1 minute after. The wrestlers were classified as the elite and sub-elite group and also as weight classification. Statistical analyses were performed using Mann-Whitney U test and Kruskal Wallis test. There is no statistical difference between elite and sub-elite female wrestlers according to heart rate, the number of "arm throw", SJFT index, and relative SJFT index. On the other hand, there is a statistical difference in relative SJFT index according to weight classifications. Accordingly, lightweight wrestlers have highest relative SJFT index than the other groups. As a result of this study, there was no difference in the weight categories of the wrestlers according to the SJFT index, whereas there was a difference in the weight categories of the wrestlers according to the relative SJFT index. The use of the relative SJFT index to determine the difference between the weight categories will provide more accurate results for performance evaluation.

Keywords: Special judo fitness test; Wrestling; Performance; Arm throw; Ippon-Seoi-Nage

Introduction

In the last twenty years, athletes have become more powerful, and athletic performances have continued to improve in conjunction with improvements in exercise prescriptions. This has resulted in an increased interest in the measurement of anaerobic fitness (Karimi, 2016). For this

10 reason, accurate anaerobic fitness assessment is very important for athletes. Nowadays, anaerobic
11 fitness tests are applied in clinical and field settings. These tests assess an athlete's capability to
12 produce power and speed in a short period of time or over a relatively short distance (Isik et al.,
13 2014; Isik et al., 2015; Alpay, 2016; Sever et al., 2017).

14   Many different tests of physical fitness have been used in the evaluation of performance in
15 combat sports athletes in all over the world. In some sports (judo and wrestling, etc.), special fitness
16 tests have been used to evaluate athletic performance (Sterkowicz, 1995; Utter et al., 1997;
17 Franchini et al., 2005; Eyuboğlu, Aslan, & Koz, 2015). For example, in the judo, the special judo
18 fitness test (SJFT) is commonly used to evaluate judo-specific performance (Franchini, Vecchio, &
19 Sterkowicz, 2009; Casals et al., 2016; Eyuboğlu & Özkan, 2016; Garbouj et al., 2016). Although
20 judo and wrestling have different rules, these branches are two different Olympic sports branches,
21 partly based on similar basic techniques. For example; the technique called "lp-seoi-nage" (one
22 shoulder throw) in Judo is mechanically the same as the technique called "Arm Throw" in
23 Wrestling. Due to this similarity, Karimi (2016) was tested the reliability of the special judo fitness
24 test for wrestlers. Moreover, the average index values obtained by Karimi (2016) from wrestlers and
25 the average index values obtained from judokas in the literature are almost similar (Drid et al., 2009;
26 Jagiello, Beata, & Walery, 2009). This result shows that the special judo fitness test can be accepted
27 as criteria for evaluating the performance of the wrestlers.

28   Many studies have evaluated the performances of judokas using SJFT index results. In these
29 studies, usually, they have assessed either on the same weight category athletes (Drid et al., 2015) or
30 on studies including repeated measures of a sample (Franchini et al., 2015; Casals et al., 2017). Judo
31 and wrestling are a sport with weight classification. For this reason, when comparing the
32 performances of athletes in different weight category, the relative SJFT index results should be used
33 instead of the SJFT index results. Thus, performance changes of the athletes in the different weight
34 category are evaluated more accurately. Because the SJFT index values of athletes in different
35 weight category may vary according to their physical characteristics. For this reason, the SJFT index
36 values should be standardized as a value for per kilogram. For example; the SJFT index values of
37 athletes in the two different weight category are the same. In this case, when the athletes are
38 compared, we can not say that they are equal. But, when relative SJFT index values per kg are
39 calculated, we can compare these athletes. For this reason, standardizing the SJFT index values as a
40 value for per kg will provide us to obtain more accurate results in comparing athletic performance
41 between the athletes. In this context, the aim of this study was to gain relative index with a new
42 approach to the SJFT index used in the literature.

43 **Material and Method**
44 *Participants*
45   The purposive sampling method was used in this study. A total of 18 senior female wrestlers
46 from Turkish national team participated in the study. All wrestlers were divided two groups as an
47 elite and sub-elite group in this research. In the elite group, consisted of 8 wrestlers, all competitors
48 won at least 1 medal in the European Wrestling Championship, World Wrestling Championship or
49 Olympic Games during the previous 3 years. The sub-elite group, consisted of other 10 wrestlers,
50 won at least 1 medal but only in national competitions (Turkey). Moreover, wrestlers were divided
51 into three groups according to their competition weight categories. The lightweight wrestlers was
52 consisted 48, 53, and 55 kg, the middleweight wrestlers was consisted 58, 60, and 63 kg, and
53 heavyweight wrestlers was consisted 69 and 75 kg.

54 *Experimental approach*
55   All measurements were performed immediately after the full rest day in the senior female
56 wrestling national team camp. The wrestlers have not participated SJFT before, therefore
57 information about SJFT was given by the researchers and all wrestlers gave written informed
58 consent to the researchers. Resting heart rates of the wrestlers were recorded and familiarization

was applied for SJFT at a low heart rate. SJFT was performed for each wrestler after the heart rate drops to the resting heart rate level.

Measurement of Body weight and height

Body weight and height were measured using a Seca column scale (model 769, Seca Corporation, Hamburg, Germany) to the nearest 0.1 kg.

Special Judo Fitness Test

SJFT was developed by Sterkowicz and reliability for SJFT was reported as 0.97 for judokas (Sterkowicz, 1995) and validity for wrestlers was reported as 0.867 (Karimi, 2016). Three wrestlers at similar body mass are needed to perform the SJFT. The SJFT is composed in three sets of 15, 30, and 30 s, with the 10-s rest interval between each set. During tests, evaluated wrestler (3 m away from other wrestlers) throws two other wrestlers (6 m away from each other) as many times as possible using the arm throw technique that is similar to the Ippon-seoi-nage (one shoulder throw) technique in judo.
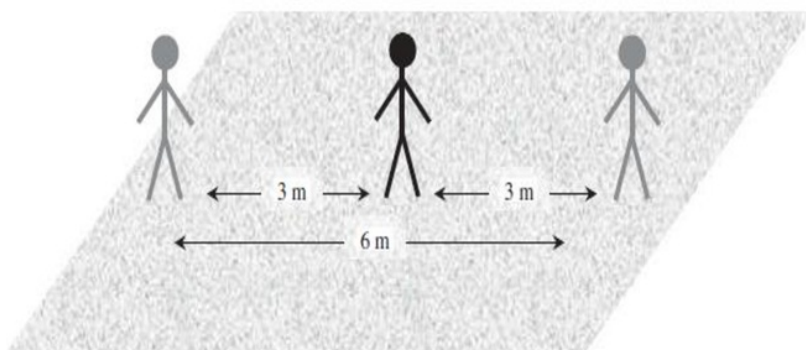
Figure 1. Representation of positions for wrestlers in SJFT (Karimi, 2016).

The total number of throws completed by the evaluated wrestler during each of the three sets was recorded; the evaluated wrestler's heart rate (HR) was measured immediately after and 1 min after the test (Polar Team², Polar, Finland). The SJFT index was calculated according to the following equation (Sterkowicz, 1995);

$$\text{SJFT Index} = \frac{\text{Immediately after HR (bpm.min}^{-1}) + \text{HR 1 min after (bpm.min}^{-1})}{\text{Total Throws (N)}}$$

In many studies have used SJFT index values to evaluate performance (Franchini et al., 2015; Casals et al., 2017). Relative SJFT index value was calculated using the following equation:

$$\text{Relative SJFT Index} = \frac{\text{SJFT Index}}{\text{Body Weight (kg)}}$$

Sterkowicz (1995) have reported that a lower SJFT index indicates a better performance. Similarly, a lower relative SJFT index indicates a better performance for athletes. For example, the length of time that a heavyweight wrestler performs a technique as biomechanically and the running time to the other wrestler may be different from lightweight and/or middleweight wrestlers. For this reason, it is more accurate to use relative SJFT index values to compare the wrestlers in the different weight category.

93   ***Statistical Analysis***
94   In the analysis of the data; mean and standard deviation values are given as the descriptive
95   statistics. Moreover, Mann Whitney U test and Kruskal Wallis test applied for comparison of SJFT
96   index variables according to classifications. Dunn's post hoc test was used for multiple comparison
97   test after Kruskal Wallis test. The level of significance was set at 5%.

98   **Results**
99   The mean age of the elite group (n=8) was determined as 21.63±1.51 years, height 165.38±
100   5.40 cm, and the body weight 60.09± 6.65 kg, whereas the mean age of the sub-elite group (n=10)
101   was 21.30±1.95 years, height 162.50±4.70 cm, and the body weight 61.20±9.02 kg.

102   **Table 1:** Descriptive Statistics of SJFT index variables of female wrestlers

Variables	N	Mean±Std. Deviation
Throws set A (15 s)	18	5.44±0.62
Throws set B (30 s)	18	9.22±1.06
Throws set C (30 s)	18	9.39±0.78
Total throws	18	24.06±2.10
Heart rate after (bpm)	18	181.33±8.37
Heart rate 1 min after (bpm)	18	107.00±9.71
SJFT index	18	12.08±1.29
Relative SJFT index	18	0.21±0.03

103
104   Table 1 shows descriptive statistics of SJFT index variables. Total throws mean of female
105   wrestlers is 24.06±2.10; SJFT index means of female wrestlers is 12.08±1.29 and relative SJFT index
106   means of female wrestlers is 0.21±0.03.
107
108   **Table 2:** Comparison of SJFT index variables according to level of female wrestlers

Variables	Level of Wrestlers	N	Median	Z	p
Total throws	Elite	8	24.00	-0.764	0.445
	Sub-elite	10	24.50		
Heart rate after bpm)	Elite	8	177.00	-0.183	0.855
	Sub-elite	10	180.00		
Heart rate 1 min after (bpm)	Elite	8	111.00	-0.720	0.471
	Sub-elite	10	108.00		
SJFT index	Elite	8	12.41	-0.711	0.477
	Sub-elite	10	11.42		
Relative SJFT index	Elite	8	0.22	-1.510	0.131
	Sub-elite	10	0.20		

109
110   Table 2 shows Mann-Whitney U test results. No statistical difference was found in any
111   variables of the SJFT between elite and sub-elite female wrestlers (p>0.05).
112
113
114
115
116
117
118

119
120 **Table 3:** Comparison of SJFT index variables according to weight classification of female wrestlers

Variables	Weight Classification of Wrestlers	N	Median	χ^2	p
Total throws	Heavyweight	6	23.50		
	Middleweight	6	26.00	5.562	0.062
	Lightweight	6	23.00		
Heart rate after (bpm)	Heavyweight	6	186.00		
	Middleweight	6	180.00	5.988	0.051
	Lightweight	6	174.00		
Heart rate 1 min after (bpm)	Heavyweight	6	111.00		
	Middleweight	6	108.00	1.323	0.516
	Lightweight	6	108.00		
SJFT index	Heavyweight	6	12.89		
	Middleweight	6	11.20	5.158	0.076
	Lightweight	6	12.41		
Relative SJFT index	Heavyweight	6	0.19[a]		
	Middleweight	6	0.20[a]	12.316	**0.002**
	Lightweight	6	0.23[b]		

121 a,b: different letters show the difference between groups.
122
123   Table 3 shows Kruskal Wallis test results. No statistical difference was found in total throws,
124 heart rate after (bpm), heart rate 1 min after (bpm) and SJFT index variables according to weight
125 classification of female wrestlers (p>0.05). On the other hand, a statistical difference was found in
126 relative SJFT index according to weight classification of female wrestlers (p<0.05). Accordingly,
127 lightweight wrestlers have highest relative SJFT index median than the other groups.

128 **Discussion**
129   The SJFT index is often used to evaluate judo-specific performance in all over the world.
130 However, there are many variables that need to be considered when assessing judo-specific
131 performance. Casals et al. (2017) have reported that body mass and gender are significantly
132 associated with the SJFT index. This information should be taken into consideration when
133 evaluating athletes of different weight categories because heavyweight judokas obtain worse SJFT
134 results than lightweight judokas, although there is not a classificatory adjustment by weight.
135 Additionally, it has been reported that lightweight judokas have higher throwing speed (ippon-seoi-
136 nage technique), more power and better oxygen uptake than heavyweight judokas (Almansba et al.,
137 2010; Franchini et al., 2011). For this reasons, Casals et al. (2017) have reported that the judo
138 athlete's body mass should be considered before applying the SJFT results at an elite level.
139   Numerous studies have evaluated relative output results instead of absolute outputs for talent
140 identification and/or selection (Sánchez-Puccini et al., 2014; Isik et al., 2015). Because the use of
141 relative outputs plays a more important role in determining individual differences. For example, it
142 may think of it like the evaluation of Wingate anaerobic test performance results. A heavy person
143 may have achieved higher absolute power outputs than lighter. However, this situation may result
144 in opposite as the relative power output. In this context, the primary purpose of the study was to
145 gain relative SJFT index value with a new approach to the SJFT used in the literature. The
146 secondary purpose of the research was to compare senior female wrestlers according to their levels
147 and weight classification.
148   In the current study, the total number of throws of female senior wrestlers (n=18) was
149 determined as 24.06±2.10, heart rate immediately after SJFT 181.33±8.37, heart rate 1 minute after

150   SJFT 107.00±9.71, SJFT index values 12.08±1.29, and relative SJFT index 0.21±0.03. Heart rates
151   and total throws of female senior wrestlers are similar to many studies in the literature (Wolska et
152   al., 2009; Smulski et al., 2011).
153   Many studies have reported that there is a difference between SJFT variables between female
154   elite and sub-elite judokas (Franchini et al., 2005; Drid et al., 2008). For example, Franchini et al.
155   (2005) have reported that there was a difference between elite and sub-elite female judokas' total
156   throws and SJFT index results. In the study of Drid et al. (2008) was obtained similar results to
157   Franchini et al. (2005). However, in the current study, there was no statistically significant
158   difference any SJFT index variables according to the levels of female wrestlers. This result can be
159   attributed to the fact that all athletes are in the national team and may have the level to represent
160   the national team.
161   In the present study, it was determined that there was no significant difference when the
162   SJFT index variables were compared according to the weight classification of senior female
163   wrestlers. Despite that, Casal et al. (2017) have reported that lightweight athletes will have a better
164   SJFT index results than heavyweight athletes. In addition, it was determined that there is a
165   difference between the relative SJFT index obtained by a new approach. According to these results,
166   it was determined that the lightweight wrestlers was a worse relative SJFT index than the
167   middleweight and heavyweight senior female wrestlers. So, lightweight athletes need to be faster
168   than middleweight and heavyweight.

169   **Conclusion**
170   The relative SJFT index can be used instead of the SJFT index for comparison of athletes in
171   the different weight category. Because there are athletes in different weight category in a sports club
172   or in the national team. As has been previously mentioned, the judo athlete's body mass and/or
173   gender should be considered before applying the SJFT results at an elite level. For this reasons, the
174   use of the relative SJFT index is recommended to compare individual developments of athletes
175   with each other. Moreover, the relative SJFT index can be used as a criterion for talent
176   identification and/or selection of basic educated judokas and wrestlers. Also, more accurate results
177   can be obtained when comparing the athletes in the different weight category.

A new approach to Special Judo Fitness Test index

Yamato, Makoto Andou, Takeshi Shiba, Hideo Utsumi, and Kenji Sunagawa. "Effect of anaesthesia-induced alterations in haemodynamics on in vivo kinetics of nitroxyl probes in electron spin resonance spectroscopy", Free Radical Research, 2008.
Yayın

<%1

7	circheartfailure.ahajournals.org
	İnternet Kaynağı

<%1

Alıntıları çıkart   üzerinde   Eşleşmeleri çıkar   < 10 words
Bibliyografyayı Çıkart   üzerinde