SCIENTIFIC JOURNAL OF SPORT AND PERFORMANCE

ORIGINAL ARTICLE

The relationship between the special judo fitness test and field testing

Ryan Cedeno . *College of Health Professions & Medical Sciences. Department of Health Sciences and Clinical Practice. Barry University. Miami Shores, Florida, United States of America.*
Tal Amasay. *College of Health Professions & Medical Sciences. Department of Health Sciences and Clinical Practice. Barry University. Miami Shores, Florida, United States of America.*
Zacharias Papadakis. *College of Health Professions & Medical Sciences. Department of Health Sciences and Clinical Practice. Barry University. Miami Shores, Florida, United States of America.*
Claire Egret. *College of Health Professions & Medical Sciences. Department of Health Sciences and Clinical Practice. Barry University. Miami Shores, Florida, United States of America.*
Amariliss Owens. *College of Health Professions & Medical Sciences. Department of Health Sciences and Clinical Practice. Barry University. Miami Shores, Florida, United States of America.*

ABSTRACT

Judo, an Olympic sport, uses the Special Judo Fitness Test (SJFT) to predict an athlete's competition readiness. However, the SJFT's high anaerobic technical demands may increase pre-competition injury risk. Purpose: To identify field tests that could predict performance on the SJFT, providing alternative ways to evaluate an athlete's performance readiness. Methods: Ten judo athletes (age: 33.8±8.3 years; height: 171.5±3.7 cm; weight: 79.5±9.7 kg) performed eight field tests, including pro-agility, six-meter timed hop, modified handgrip strength, maximum push-ups, modified Gi flexed-arm hang, upper quarter Y-balance, maximum sit-ups, and 300-yard shuttle run tests. Pearson correlations and backward stepwise regression analyses were used to determine the relationship between the field tests and the SJFT score and index, p = .05. Results: The SJFT score was associated with the pro-agility (r = -.70) and the six-meter hop (r = -.73) and the SJFT index was associated with the pro-agility (r = .73) and the 300-yard shuttle run (r = .73), p < .05. A backward stepwise regression showed that the six-meter hop predicted the SJFT score, R^2 = .52, p = .018, while the 300-yard shuttle run predicted the SJFT index, R^2 = .53, p = .017. Conclusion: The six-meter hop and 300-yard shuttle tests can serve as measures for identifying an athlete's readiness for SJFT performance or, alternatively, their preparedness for competition.
Keywords: Performance analysis, Agility, Endurance, Anaerobic, Aerobic, Sport performance.

Cite this article as:
Cedeno, R., Amasay, T., Papadakis, Z., Egret, C., & Owens, A. (2026). The relationship between the special judo fitness test and field testing. *Scientific Journal of Sport and Performance*, *5*(3), 395-409. https://doi.org/10.55860/DBNQ2927

Corresponding author. *Department of Health Promotion & Clinical Practice. College of Health & Wellness Barry University Miami Shores, Florida, 33161 United States of America.*
E-mail: rycedeno@barry.edu
Submitted for publication January 14, 2026.
Accepted for publication February 25, 2026.
Published March 18, 2026.
Scientific Journal of Sport and Performance. ISSN 2794-0586.

doi: https://doi.org/10.55860/DBNQ2927

INTRODUCTION

Judo involves unique movement patterns that include various throwing and ground techniques in dynamic situations where athletes' grips and positions constantly change (Gardasevic & Stankovic, 2019; Sertić & Segedi, 2012). Success in judo competitions requires athletes to have advanced technical and tactical skills and a high level of physical fitness. Athletes optimize their techniques to conserve energy and exploit their opponent's weaknesses (Sterkowicz et al., 1997). A standard judo match is scheduled for four minutes, but if it's a draw, an unlimited golden score period begins (International Judo Federation, 2023). High-level matches typically last about three minutes, featuring short bursts of activity (20–30 seconds) with brief rest periods (5–10 seconds) (Castarlenas & Planas, 1997; Van Malderen et al., 2006). Judo depends mainly on anaerobic metabolism to provide the necessary strength, speed, and power for executing techniques, while aerobic metabolism supports intermittent efforts and recovery during pauses in the match (Franchini et al., 2009).

Coaches and sports science professionals routinely utilize numerous physical fitness evaluations to identify talented athletes across various age groups. However, many of these tests are conducted in laboratory settings, and some experts argue that they do not closely resemble the competitive performance and sport-specific movement patterns of judo athletes (Drid et al., 2012; Hesari et al., 2014). Therefore, Sterkowicz and Franchini (1995) introduced the special judo fitness test (SJFT) to mimic a judo match and monitor athletes for talent and progress.

The SJFT consists of one 15-second bout and two 30-second bouts of throwing, separated by 10-second rest intervals. During the test, the athlete, positioned three meters away from two assistants spaced six meters apart, performs as many ippon seoi-nage (shoulder throw) techniques as possible. The total number of throws from each bout is recorded to determine the SJFT score. Heart rate measurements are taken immediately post-test and one minute later to calculate the SJFT index, which provides insight into cardiovascular recovery (Sterkowicz & Franchini, 1995). This test reflects judo's energy demands, with approximately 42% of energy derived from anaerobic sources (Franchini et al., 2011). Elite judo athletes typically execute more throws and achieve a lower SJFT index than novices, making the test a reliable performance indicator (Sterkowicz & Franchini, 2001).

According to Arazi et al. (2017), there has been limited focus on examining the correlation between a full range of required physical fitness assessments for a successful judo contest and an athlete's performance in the SJFT. Their study included 50 senior male judo athletes with at least two years of intermediate to advanced judo experience. The study aimed to clarify the relationship between anthropometric and physical fitness assessments and the SJFT index. Notably, there were negative correlations with hand grip strength ($r = -.39$), vertical jump ($r = -.34$), and 35-meter sprints with 10-second rest intervals ($r = -.38$). Positive correlations were found with 45-meter sprint speed ($r = .37$) and agility as measured by the 4 x 9-meter shuttle run ($r = .35$) with $p < .05$. Similarly, a study by Ceylan et al. (2022) found a relationship between physical fitness assessments and the SJFT index in a sample of 19 elite senior judo athletes (11 female). They found correlations between the SJFT index and 20-meter sprint speed ($r = .74$), agility T-test ($r = .77$), and vertical jump ($r = -.74$) with $p < .001$. However, there was no relationship between grip strength and the SJFT index. These findings highlight the complex relationship between various physical assessments and judo-specific fitness as assessed by the SJFT.

A limited number of studies have focused on examining the correlation between a dynamic and sport-specific set of physical fitness assessments required for a successful judo contest and performance in the SJFT.

Most of the studies primarily investigated the correlation between the SJFT and factors such as aerobic power and anaerobic capacity, emphasizing energy systems in laboratory settings (Hesari et al., 2014; Franchini et al., 2011; Franchini et al., 2005; Detanico et al., 2012) To the best of our knowledge, no studies involving senior judo athletes have correlated field testing with the SJFT score, and only two studies have correlated field testing with the SJFT index.

Therefore, given the limited evidence regarding the relationship between field tests and the SJFT score and index, as well as the potential to reduce the risk of injury associated with frequent use of the SJFT, this study aims to identify alternative judo-specific field tests that correlate with the SJFT score and index. It is hypothesized that these field tests will serve as significant predictors of both the SJFT score and index.

MATERIALS AND METHODS

Participants

Ten judo athletes (age: 33.8±8.3 years; height: 171.5±3.7 cm; weight: 79.5±9.7 kg; total years of practice: 13.3±9.0) participated in this study. Following the provision of informed consent, participants completed a questionnaire to assess their eligibility. The inclusion criteria for participants were as follows: individuals with no existing medical conditions and no reported injuries in the previous six months. Participants were required to hold a minimum rank of orange belt in judo and have at least two years of judo experience. Prior to the actual data collection session, the height, weight, and body fat percentage of participants were recorded. The study received approval from the Institutional Review Board Committee at Barry University. All procedures adhered to the ethical standards outlined in the Declaration of Helsinki.

Measures of judo testing

The SJFT was conducted as described by Sterkowicz and Franchini Sterkowicz and Franchini (1995) (Figure 1). Athletes performed one 15-second and two 30-second bouts of ippon seoi-nage throws, with 10-second breaks in between. Heart rates were measured immediately after testing and one-minute post-testing. The number of correct technical throws from the three bouts was summed to determine the SJFT score. This score was then used to calculate the SJFT index, using the following formula: [Final HR (bpm) + HR 1 minute after the test (bpm)] / [sum of total throws].

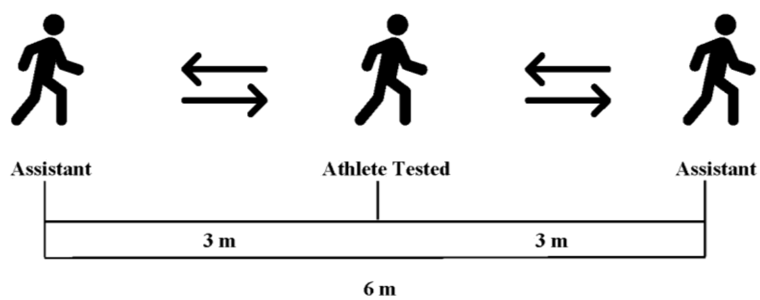

Figure 1. The special judo fitness test.

Measures of field testing

Athletes performed the pro agility test according to specific guidelines (Tomchuk, 2011). Two total trials were performed in opposite starting directions with a 2-minute rest between trials and the fastest trial was used for analysis. In the six-meter timed hop test, participants hopped forward as swiftly as possible using the same leg. Each leg underwent three trials, with the fastest overall time recorded for analysis (Tomchuk, 2011).

Handgrip strength was assessed according to Tomchuk, modifying the protocol with participants replicating the ippon seoi-nage (Shoulder Throw) technique while exerting pressure on the dynamometer. Three attempts were made with each hand, and the highest value for each hand was used for analysis. This method aims to measure handgrip strength in a more dynamic and sport-specific movement. The push-up test measured the maximum number of push-ups within one minute, maintaining a plank position, lowering their chest to touch a balance pad, and pushing back up (Tomchuk, 2011). The modified Gi flexed arm-hang test was conducted according to (Franchini et al., 2011), One trial was performed unless the participant opted for a second attempt, in which case a 2-minute break was given. In the sit-up test, the participants performed as many sit-ups as possible within one minute (Tomchuk, 2011). The upper quarter Y-balance test (UQYBT) was performed according to (Westrick et al., 2012) in a randomized sequence. The process was repeated two additional times with each arm. The composite reach score for each arm was used for analysis. Finally, athletes performed the 300-yard shuttle run test, and the final score used for analysis was the average of the two trials (Tomchuk, 2011).

Procedures

All athletes were assessed in a single session. The testing sequence adhered to the National Strength and Conditioning Association's (NSCA) Testing Guidelines, which recommend conducting non-fatiguing tests first, followed by agility tests, power and maximal strength assessments, muscular endurance evaluations, and concluding with anaerobic and aerobic capacity tests (McGuigan, 2016). A three-minute recovery time was allotted between each test to prevent fatigue. Testing was conducted at the judo athlete’s respective dojo.

Before testing, participants completed a judo-specific warm-up on the judo mat, incorporating various movements designed to prepare them for performance. The warm-up began with general movements to increase blood flow and flexibility, progressing to more judo-specific exercises. To conclude the warm-up and enhance their readiness for the SJFT, athletes practiced ukemi (break falls). Following this, they engaged in five minutes of partner-assisted moving uchikomi (repetition training), with a focus on the ippon seoi-nage technique. This progression ensured that the athletes were thoroughly prepared for the demands of the SJFT.

Analysis

A power analysis was conducted using G*Power (version 3.1.9.7) (Faul et al., 2020). We selected the F-test family with a linear multiple regression fixed model (R^2 deviation from zero) and specified an effect size of .35, an alpha level of .05, a power of .80, and eight predictors. This analysis indicated a requirement for a sample size of 52 participants to adequately power a regression model incorporating eight predictors.

In consideration of the exploratory nature of this study, Pearson product-moment correlation analyses were conducted to identify significant relationships between the independent and dependent variables. Independent variables that demonstrated significant correlations with the SJFT score or index were chosen for inclusion in separate regression models. Following this initial correlation analysis, a subsequent power analysis was performed using the aforementioned parameters. This analysis only included variables that significantly correlated with the SJFT score or index as predictors in the models, directly addressing the research question.

Descriptive statistics were presented as means (M) and standard deviations (SD) for data that were normally distributed, or as medians and interquartile ranges (IQR) for data that were not normally distributed. As previously mentioned, two distinct Pearson correlation analyses were conducted to examine the relationships between the independent variables and the SJFT score and index, respectively. Variables that demonstrated significant correlation with the SJFT score or index were included in two backward stepwise regression analyses; one aimed at predicting the SJFT score, and the other at predicting the SJFT index. All statistical analyses were performed with IBM SPSS Statistics, version 30.0 (IBM Corp., 2024), maintaining a significance level of $p < .05$.

RESULTS

As previously noted, the initial power analysis determined a required sample size of 52 participants. However, following a subsequent power analysis, this requirement was adjusted to 31 participants. Given the exploratory nature of the study, which required participants of similar height and weight, a convenience sample of 10 participants was employed. Descriptive statistics and the normal distribution of the data were verified, with the results presented in Table 1.

Table 1. Descriptive statistics of participants' field test data including CI, SD, and Shapiro-Wilk test results.

Variable	Mean	95% CI Lower	95% CI Upper	SD	Shapiro-Wilk W	Shapiro-Wilk *p*
Age	33.8	27.9	39.7	8.27	.95	.64
Height (cm)	171.5	168.8	174.2	3.72	.95	.65
Weight (kg)	79.5	72.6	86.4	9.70	.99	1.00
Body Fat (%)	16.6	13.1	20.0	4.80	.86	.08
Training Years	13.3	6.9	19.7	8.98	.94	.53
SJFT Index	15.4	13.0	17.8	3.36	.85	.06
Pro-Agility (s)	5.7	5.2	6.1	0.67	.95	.64
6-meter Hop Test (s)	2.1	2.0	2.3	0.26	.98	.95
Hand Grip Strength	48.2	43.8	52.6	6.09	.95	.71
Push-ups (s)	47.4	37.3	57.5	14.20	.93	.48
GI Hang (s)	29.4	16.8	42.0	17.7	.93	.48
UQYBT Composite Score RH	1.02	0.9	1.1	0.11	.93	.48
UQYBT Composite Score LH	1.02	0.9	1.1	0.11	.93	.48
Sit-ups (s)	46.4	39.8	53.0	9.19	.94	.56
300-yard Shuttle (s)	76.3	71.7	80.8	6.36	.94	.56

Note. CI = Confidence Interval, UQYBT = Upper Quarter Y-Balance Test, SL = Superolateral, M = Medial, IF = Inferolateral, RH = Right Hand, LH = Left Hand.

Correlations

A Pearson product-moment correlation was employed to identify relationships between the SJFT score, SJFT index, and field testing. Positive correlations were observed between the SJFT score and the pro agility and six-meter hop tests, as shown in Table 2. Negative correlations were found between the SJFT index and the pro agility and 300-yard shuttle tests, as presented in Table 3. These correlated variables were subsequently utilized to predict the SJFT score and index.

Table 2. Correlation between field tests and the SJFT score.

Field test	r	*p*-Value
Pro-agility	-.70	.025*
6m Hop Test	-.73	.018*
Hand Grip Strength	-.06	.864
Maximum Push-ups	.07	.839
Maximum GI Hang	.22	.543
Maximum Sit-ups	.49	.154
300-Shuttle	-.50	.143
UQYBT Composite Score Right Hand	.36	.302
UQYBT Composite Score Left Hand	.14	.700

*Note. UQYBT = Upper Quarter Y-Balance Test. * p < .05, ** p < .01, *** p < .001.*

Table 3. Correlation between field tests and the SJFT Index.

Field test	r	*p*-Value
Pro-agility	.73	.017*
6m Hop Test	.63	.053
Hand Grip Strength	.25	.488
Maximum Push-ups	-.27	.444
Maximum GI Hang	.001	.998
Maximum Sit-ups	-.58	.078
300-Shuttle	.73	.017*
UQYBT Composite Score Right Hand	-.40	.249
UQYBT Composite Score Left Hand	-.36	.309

*Note. UQYBT = Upper Quarter Y-Balance Test. * p < .05, ** p < .01, *** p < .001.*

Backward stepwise regression - SJFT score

Negative correlations were identified between the SJFT score and both the pro agility and six-meter hop tests. The pro agility and six-meter hop tests also did not significantly correlate with each other (r = .63, *p* = .052) (Table 5). In the initial model, which encompassed both the pro agility and six-meter hop tests, the overall model was significant (*p* < .005) (Table 4). However, when assessing the individual contribution of the predictors, neither was significant in the overall model (Table 5). Further analysis showed that model two, which included only the six-meter hop test, as an individual predictor, was also significant (*p* < .005) (Table 5). Therefore, the SJFT score can be predicted using the six-meter hop test (R^2 = .52, *p* = .018). The regression equation is: SJFT score = 43.128 − 10.106 × (Six-meter Hop).

Table 4. The special judo fitness test score Anova.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	68.379	2	34.190	5.682	.034[a]
	Residual	42.121	7	6.017		
	Total	110.500	9			
2	Regression	57.606	1	57.606	8.713	.018[b]
	Residual	52.894	8	6.612		
	Total	110.500	9			

Note. a. Predictor: six-meter hop, pro-agility; b. Predictor: six-meter hop.

Table 5. The special judo fitness test score coefficients.

Model		Unstd. B	Coef. Std. Error	Std. Coef. Beta	t	Sig.	Coll Tolerance	Stats VIF
1	(Constant)	47.590	7.783		6.114	<.001		
	Pro-Agility	-2.129	1.591	-0.401	-1.338	.223	.606	1.651
	Six Meter Hop	-6.581	4.196	-0.470	-1.568	.161	.606	1.651
2	(Constant)	43.128	7.372		5.850	<.001		
	Six Meter Hop	-10.106	3.424	-0.722	-2.952	.018	1.000	1.000

Note. Unstd: Unstandardized; Coef: Coefficient; Std: Standard; Coll: Collinearity; Stats: Statistics.

Backward stepwise regression - SJFT index

Positive correlations were observed between the SJFT index and the pro agility and 300-yard shuttle tests. The pro agility and 300-yard shuttle tests were correlated with each other (r = .775, *p* = .008) (Table 7). In the first model, which included both tests, the overall model was significant (*p* < .042) (Table 6). However, neither the pro agility nor the 300-yard shuttle run tests were significant individual predictors when included together in the model (Table 7). Further examination revealed that model two, which included only the 300-yard shuttle run test, was a significant individual predictor (*p* < .017) (Table 7). Therefore, the SJFT index can be predicted using the 300-yard shuttle run test (R^2 = .53, *p* = .017). The regression equation is: SJFT index = -14.034 + 0.386 × (300-yard shuttle run).

Table 6. The special judo fitness test index Anova.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	61.13	2	30.565	5.156	.042[a]
	Residual	41.494	7	5.928		
	Total	102.624	9			
2	Regression	54.298	1	54.298	8.988	.017[b]
	Residual	48.326	8	6.041		
	Total	102.624	9			

Note. a. Predictor: 300-yard shuttle run, pro-agility; b. Predictor: 300-yard shuttle run.

Table 7. The special judo fitness test index coefficients.

Model		Unstand. B	Coef Std. Error	Stand Coef Beta	t	Sig.	Coll Tolerance	Statis VIF
1	(Constant)	-12.990	9.817		-1.323	.227		
	Pro-Agility	2.088	1.945	0.408	1.074	.319	.400	2.503
	300-Yard Shuttle Run	0.218	0.202	0.411	1.081	.316	.400	2.503
2	(Constant)	-14.034	9.862		-1.423	.193		
	300-Yard Shuttle Run	0.386	0.129	-0.727	2.998	.017	1.000	1.000

Note. Unstd: Unstandardized; Coef: Coefficient; Std: Standard; Coll: Collinearity; Stats: Statistics.

DISCUSSION

Previous studies examining the relationship between the SJFT and field tests have focused solely on the SJFT index rather than the SJFT score and SJFT index. The primary objective of this study was to identify the relationships between the SJFT score and SJFT index with various field tests used to assess athletic performance in judo athletes. Our hypothesis, which anticipated correlations between the SJFT score and index with specific field tests, was partially supported by our findings. The SJFT score exhibited moderate to high correlations with the pro-agility and six-meter hop tests. At the same time, the SJFT index demonstrated moderate to high correlations with the pro-agility and 300-yard shuttle run tests.

Looking at the relation between the SJFT score and the field test we identified significant correlations with the pro-agility test (r = -.70) and the six-meter hop test (r = -.73). To our knowledge, no other study investigated the relation between the SJFT score and field tests in senior judo athletes, the majority of studies used laboratory testing (Franchini et al., 2005; Detanico et al., 2012). Franchini et al. (2005), reported that elite athletes exhibited significantly greater peak and mean power ($p < .05$) during the upper-body Wingate test on a Monark cycle ergometer, alongside superior SJFT scores, in a controlled laboratory setting. Similarly, Detanico et al. (2012) identified correlations between the SJFT score and both peak velocity and anaerobic threshold velocity during a treadmill incremental test (r = .70 and r = .60, respectively; $p < .01$).

Our study performed a linear regression analysis to predict the SJFT score using correlated field test scores. The linear regression analysis showed that the combination of the pro agility and six-meter hop tests could predict the SJFT score ($R^2 = .62$ with the overall model to be statistically significant ($p = .034$). However, individually, the pro agility test ($p = .233$) and the six-meter hop test ($p = .161$) were not significant predictors when combined in the model. Further analysis using backward stepwise regression demonstrated that the six-meter hop test alone could predict the SJFT score with 52% accuracy ($p = .018$).

These findings suggest that the six-meter hop test may be an effective tool for predicting SJFT score, given its moderate to high correlation values relative to laboratory-based assessments. Since the six-meter hop test requires maximal effort (McArdle et al., 2016) and is considered a maximum test that emphasizes anaerobic metabolism and lower leg power (Tomchuk, 2011). Then, due to similar physiological metabolic pathways involved it is logically assumed that the six-meter hop test can be an alternative testing tool to estimate the SJFT score. Moreover, the ippon seoi-nage throw in the SJFT necessitates anaerobic power (Franchini et al., 2011), further underscoring the relevance of the six-meter hop test as a predictor of the SJFT score.

The SJFT index demonstrated significant correlations with the pro-agility test (r = .73) and the 300-yard shuttle run (r = .73). These findings align with those of Arazi et al. (2017), who reported a correlation between the SJFT index and the 4x9 m agility test (r = .35, p = .01), and (Ceylan et al., 2022) who observed a correlation between T-test agility times and the SJFT index (r = .77, p < .001). Together, these results reinforce the association between agility measures and SJFT performance.

The 300-yard shuttle run, an established test for anaerobic power and capacity (Tomchuck, 2011), which demonstrated a strong correlation with the SJFT index (r = .73, p = .017). This finding is consistent with the work of (Arazi et al., 2017) who reported a relationship between the SJFT index and the 6x35 meter sprints anaerobic power (r = -.38). Additionally, Ceylan et al. (2022) observed correlations between SJFT index scores and various anaerobic power measures, including mean power output on a cycle ergometer in a laboratory setting (r = -.72, p < .00). However, they did not identify similar correlations with field tests.

Following, the regression analysis results indicated that the combination of the pro-agility and 300-yard shuttle run tests demonstrated a strong predictive capability for the SJFT index (R^2 = .60). The overall regression model was statistically significant (p = .042). However, neither the pro-agility (p = .319) nor the 300-yard shuttle run tests (p = .316) were significant predictors when included together in the model. Further analysis using backward stepwise regression revealed that the 300-yard shuttle run test alone could predict the SJFT index with 53% accuracy and was individually statistically significant (p = .017), indicating better predictive capability.

The short-term energy system (glycolysis) is activated during maximal efforts lasting up to three minutes (McArdle et al., 2016) The Special Judo Fitness Test (SJFT) primarily targets this energy pathway, with 42% of the energy derived from anaerobic sources (Franchini et al., 2011) The SJFT, which lasts one minute and 15 seconds, requires athletes to perform at maximum effort, thereby assessing their anaerobic capacity. Comparatively, in the 300-yard shuttle run test, another anaerobic capacity assessment (Tomchuk, 2011), athletes had an average completion time of one minute and 16 seconds, respectively, in the study. This similarity in duration between the SJFT and the 300-yard shuttle run test suggests a comparable anaerobic demand. Our study found a stronger correlation than that reported by Arazi et al. (2017). This finding implies that the 300-yard shuttle run test may be a more suitable field test for evaluating anaerobic capacity in judo athletes. This alignment in test durations and energy system engagement underscores the relevance of the 300-yard shuttle run as a possible reliable measure for this specific athletic population.

Practical applications

The findings indicate that the six-meter hop test scores enable the prediction of the SJFT score with 52% accuracy. Similarly, the 300-yard shuttle run test scores allow coaches to predict approximately 53% of an athlete's SJFT index. Our study suggests that instead of frequently administering the SJFT, potentially exposing athletes to unnecessary injury risk, coaches can rely on field tests such as the six-meter hop tests to predict the SJFT score or the 300-yard shuttle run to estimate the SJFT index. These tests may provide an effective means of establishing baselines and monitoring sport-specific performance due to their simplified protocols. This practical approach helps coaches and athletes better understand and track the physical demands and performance capabilities relevant to judo, ensuring that athletes are optimally prepared for the SJFT and competition.

Limitations

The sample size included only 10 participants, which is below the 52 recommended by the power analysis. This small sample probably reduced the generalizability of the findings and increased the risk of Type II errors. Smaller sample sizes have an increase of 14% to 21% of type II errors and partial correlations have a 43% to 85% increase in type II errors (Knudson & Lindsey, 2014). All participants were adult judo athletes, so the findings may not be applicable to younger athletes, recreational practitioners, or those from other martial arts disciplines. Potentially affecting the external validity of the study (Furler et al., 2012). Due to the lack of a control or comparison group and the fact that it is difficult to attribute observed effects solely to the interventions or conditions of the study, we may have an increase in bias (Hannan, 2008).

In addition, fatigue is a state of physical exhaustion caused by exertion, characterized by an inability to maintain the same level of exercise intensity, leading to a decline in performance (Evans & Lambert, 2007). Testing within a single session may introduce fatigue, thereby impacting performance across different tests. However, based on the NSCA guidelines, non-fatiguing tests should be done first, followed by agility, power, strength, endurance, and aerobic and anaerobic capacity tests (McGuigan, 2016). Thus, using this sequence fatigue was likely not an issue.

Furthermore, due to the pilot-in-nature correlation study design, results from this effort cannot establish causality between the examined variables (Altman & Krzywinski, 2015). But the strength of this endeavour is that we presented concepts (e.g., field tests) that can be further examined to analyse cause and effects between different field tests and their predictive power to substitute the standard SFJT test.

Future research

In general, using larger sample sizes is likely to enhance the accuracy and reliability of exercise science research results (Knudson & Lindsey, 2014). As such, future research should investigate the same research questions by utilizing larger sample sizes, probably more than 31, and adjust for attrition as well. Additionally, incorporating control groups and experimental designs can help establish causal relationships between training methods and performance outcomes. This approach distributes participants' unique characteristics across testing, preventing selective bias. In addition, random assignment provides an unbiased estimate of error effects and ensures these effects are statistically independent (Kirk, 2009).

Furthermore, since fatigue can be a factor to influence both performance and injury (Meeusen, 2013), studies also need to consider, the athlete's training cycle. According to Jones et al. (2017), intensified training periods, such as the preseason, times of heightened competition, and the return of injured players to full training, have been found to both affect performance and elevate the risk of injury. Therefore, a comprehensive analysis of an athlete’s performance and injury risk must account for the variations in training loads and the timing within the training cycle. This approach ensures that the findings are reflective of real-world conditions.

On top of that, expanding the demographic diversity of participants, including variations in age, gender, and skill level, can provide a more comprehensive understanding of judo performance. Along this line, Krstulović et al. (2006) and Thomas et al. (1989) have emphasized the importance of creating physiological profiles for judo athletes. Including a broader range of tests that address tactical and psychological aspects of judo could offer a more holistic view of an athlete's performance. Furthermore, integrating qualitative assessments, such as athlete interviews, might provide insights into factors influencing performance that quantitative measures alone might miss (Poizat et al., 2013). These subjective indicators can potentially lead to a decline in performance. However, in other instances, these indicators can be relevant and sufficient for making decisions in dynamic, uncertain situations with significant time constraints (Poizat et al., 2013).

CONCLUSION

This study aimed to identify alternative judo-specific field tests that show a relationship with the SJFT. We found that the SJFT score correlated with pro agility and six-meter hop tests, whereas the SJFT index was associated with the pro-agility and the 300-yard shuttle run tests. Moreover, our study suggests that the pro-agility test can predict the SJFT score and the 300-yard shuttle run test can predict the SJFT index, reducing the need to perform the SJFT and thus minimizing the risk to athletes from being thrown and injured. These findings align with previous research, reinforcing the use of specific field tests to improve athletes' performance in the SJFT, which can be implemented in any dojo.

AUTHOR CONTRIBUTIONS

The authors stated that all contributors participated equally in the preparation of this document.

SUPPORTING AGENCIES

No funding agencies were reported by the authors.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

REFERENCES

Altman, N., & Krzywinski, M. (2015). Points of significance: Association, correlation and causation. Nat. Methods, 12(10), 885-887. https://doi.org/10.1038/nmeth.3587

Arazi, H., Noori, M., & Izadi, M. (2017). Correlation of anthropometric and bio-motor attributes with Special Judo Fitness Test in senior male judokas. Ido Mov. Cult. J. Martial Arts Anthropol., 17(4), 19-24.

Castarlenas, J. L., & Planas, A. (1997). Study of the temporal structure of judo combat. J. Phys. Educ. Sports, 47, 32-39.

Ceylan, B., Šimenko, J., & Balcı, Ş. S. (2022). Which performance tests best define the Special Judo Fitness Test classification in elite judo athletes? J. Funct. Morphol. Kinesiol., 7(4), 101. https://doi.org/10.3390/jfmk7040101

Detanico, D., Dal Pupo, J., Franchini, E., & dos Santos, S. G. (2012). Relationship of aerobic and neuromuscular indexes with specific actions in judo. Sci. Sports, 27(1), 16-22. https://doi.org/10.1016/j.scispo.2011.06.001

Drid, P., Trivić, T., & Tabakov, S. (2012). Special judo fitness test-a review. Serb. J. Sports Sci., 6(4), 185-190.

Evans, W. J., & Lambert, C. P. (2007). Physiological basis of fatigue. Am. J. Phys. Med. Rehabil, 86(1), S29-S46. https://doi.org/10.1097/PHM.0b013e31802ba53c

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2020). GPower for Windows (Version 3.1.9.7) [Computer software].

Furler, J., Magin, P., Pirotta, M., & van Driel, M. (2012). Participant demographics reported in "Table 1" of randomised controlled trials: A case of "inverse evidence"? Int. J. Equity Health, 11, 1-4. https://doi.org/10.1186/1475-9276-11-1

Franchini, E., de Moraes Bertuzzi, R. C., Takito, M. Y., & Kiss, M. A. P. D. (2009). Effects of recovery type after a judo match on blood lactate and performance in specific and non-specific judo tasks. Eur. J. Appl. Physiol, 107(4), 377-383. https://doi.org/10.1007/s00421-009-1134-2

Franchini, E., Miarka, B., Matheus, L., & Del Vecchio, F. (2011). Endurance in judogi grip strength tests: Comparison between elite and non-elite judo players. Arch. Budo, 7(1), 1-4.

Franchini, E., Sterkowicz, S., Szmatlan-Gabrys, U., Gabrys, T., & Garnys, M. (2011). Energy system contributions to the Special Judo Fitness Test. Int. J. Sports Physiol. Perform., 6(3), 334-343. https://doi.org/10.1123/ijspp.6.3.334

Franchini, E., Takito, M. Y., Kiss, M. A. P. D., & Sterkowicz, S. (2005). Physical fitness and anthropometrical differences between elite and non-elite judo players. Biol. Sport, 22(4), 315-328.

Gardasevic, N., & Stankovic, N. (2019). The most frequently used judo techniques in accordance with current sport rules. Acta Kinesiol., 13(1), 87-92.

Hannan, E. L. (2008). Randomized clinical trials and observational studies: Guidelines for assessing respective strengths and limitations. JACC Cardiovasc. Interv., 1(3), 211-217. https://doi.org/10.1016/j.jcin.2008.02.002

Hesari, A. F., Mirzaei, B., Ortakand, S. M., Rabienejad, A., & Nikolaïdis, P. T. (2014). Relationship between aerobic and anaerobic power, and Special Judo Fitness Test (SJFT) in elite Iranian male judokas. Apunts Med. Esport, 49(181), 25-29. https://doi.org/10.1016/j.apunts.2013.07.005

IBM Corp. (2024). IBM SPSS Statistics for Windows (Version 30.0) [Computer software].

Jones, C. M., Griffiths, P. C., & Mellalieu, S. D. (2017). Training load and fatigue marker associations with injury and illness: A systematic review of longitudinal studies. Sports Med., 47, 943-974. https://doi.org/10.1007/s40279-016-0619-5

International Judo Federation. (2023). Rules. Retrieved from [Accessed 2026, 06 March]: https://78884ca60822a34fb0e6-082b8fd5551e97bc65e327988b444396.ssl.cf3.rackcdn.com/up/2024/04/IJF_Sport_and_Organisation_Rul-1712049108.pdf

Kirk, R. E. (2009). Experimental design. In Sage Handbook of Quantitative Methods in Psychology (pp. 23-45). Sage. https://doi.org/10.4135/9780857020994.n2

Knudson, D. V., & Lindsey, C. (2014). Type I and Type II errors in correlations of various sample sizes. Compr. Psychol, 3, 03-CP. https://doi.org/10.2466/03.CP.3.1

Krstulović, S., Žuvela, F., & Katić, R. (2006). Biomotor systems in elite junior judoists. Coll. Antropol., 30(4), 845-851.

McArdle, W. D., Katch, F. I., & Katch, V. L. (2016). Essentials of exercise physiology (5th ed.). Wolters Kluwer.

McGuigan, M. (2016). Principles of test selection and administration. In G. G. Haff & N. T. Triplett (Eds.), Essentials of strength training and conditioning (4th ed., pp. 249-258). Human Kinetics.

Meeusen, R., Duclos, M., Foster, C., Fry, A., Gleeson, M., Nieman, D., Raglin, J., Rietjens, G., Steinacker, J., & Urhausen, A. (2013). Prevention, diagnosis, and treatment of the overtraining syndrome: Joint consensus statement of the European College of Sport Science (ECSS) and the American College of Sports Medicine (ACSM). Eur. J. Sport Sci., 13(1), 1-24. https://doi.org/10.1080/17461391.2012.730061

Poizat, G., Sève, C., & Saury, J. (2013). Qualitative aspects in performance analysis. In J. L. Seifert, J. Komar, & P. Robineau (Eds.), Routledge handbook of sports performance analysis (pp. 309-320). Routledge.

Sertić, H., & Segedi, I. (2012). Structure of importance of techniques of throws in different age groups in men judo. J. Combat Sports Martial Arts, 3(1), 59-62. https://doi.org/10.5604/20815735.1047649

Sterkowicz, S., & Franchini, E. (1995). The Special Judo Fitness Test. Antropomotoryka, 12(13), 29-44.

Sterkowicz, S., & Franchini, E. (2001). Specific fitness of elite and novice judoists. J. Hum. Kinet., 6(1), 81-98.

Sterkowicz, S., Kiejda, I., & Błach, W. (1997). Characteristics of judo fighting methods in the Olympic Games 1988-1996. Training, 1(33), 27-43.

Thomas, S. G., Cox, M. H., LeGal, Y. M., Verde, T. J., & Smith, H. K. (1989). Physiological profiles of the Canadian National Judo Team. Can. J. Sport Sci., 14(3), 142-147.

Tomchuk, D. (2011). Companion guide to measurement and evaluation for kinesiology. Jones & Bartlett Learning.

Van Malderen, K., Jacobs, C., Ramon, K., Zinzen, E., Deriemaeker, P., & Clarys, P. (2006). Time and technique analysis of a judo fight: A comparison between males and females. In Book of Abstracts of the 11th Annual Congress of the European College of Sport Science (p. 101). Lausanne, Switzerland.

Westrick, R. B., Miller, J. M., Carow, S. D., & Gerber, J. P. (2012). Exploration of the Y-balance test for assessment of upper quarter closed kinetic chain performance. Int. J. Sports Phys. Ther.,7(2), 139-147.