

Periodic Research

Scientific Authenticity of J.M.G. Test and Judo Specific Fitness Test of Junior Indian Male Judo Players

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Abstract

The study was conducted to test the validity and reliability of Jose Manual Garcia (JMG) Test and Special Judo Fitness Test (SJFT). Forty six (N=46) juniormale beginners and advanced judo players (those who represented their states for national and international championships in last three years) were selected from different parts of NCT of Delhi. JMG Test and Special Judo Fitness Test were administered. The test retest reliability coefficient of JMG test was found to be 0.91. The test retest reliability coefficient of special judo fitness test was found to be 0.93. The concurrent validity coefficient between the JMG & SJFT was found to be 0.98; and criterion validity coefficient between the JMG & judo performance ranking was found to be 0.94 and criterion validity coefficient between the SJFT & judo performance ranking was found to be 0.93. It was concluded that the JMG Test and Special Judo Fitness Test are highly valid and extremely high reliable test for evaluation of judo performance.

Keywords: Reliability, Concurrent and Criterion Validity, JMG, Judo Specific Fitness Test

Introduction

There is great variation in the physical demands required to compete in different sports. There can be a large range in duration, from the explosive Singleaction of the shot put, to ultra endurance events lasting many days. The primary energy systems required can also vary, ranging from the highly aerobic marathon, to the anaerobic 100m sprints, and the multitude of team sports which require a combination of the energy systems. In line with the variations in the demands of the sports, the fitness tests that are implemented should reflect these differences. Also, when attempting to interpret fitness-testing results, it is important to have an idea of what is the relative importance of specific fitness components.

In preparing a Judo player for competition, many coaches believe that hours of hard, continuous randori alone will maximize abilities while others may agree that some type of supplementary training such as running or weight training might also be appropriate. Although these simplistic methods may at times produce good results, especially with natural athletes, it is imperative that coaches realize that higher levels of performance can be achieved if they are based on current research and information in sports medicine, exercise physiology and modern athletic training methods. Coaching Judo competitors, especially those of high national or international level, will entail much more than just grinding it out on the mat. Coaches must begin to see the larger picture of athletic training. While this article is not meant to discuss in any great depth any of the variables affecting performance, it is hoped that this presentation will give coaches a different perspective and may help them in developing more efficient and extensive training regimens.

Anybody who knows anything about judo knows how important gripping is these days. In any contest the judoka with a stronger grip and with more extensive knowledge of grips and grip fighting has the advantage. So, it would be a good idea for any judoka to ensure they have a strong grip.

Following correct and thorough testing, the presentation of results to the athlete or coach can be the most important step if any recommendations are implemented. A good way of illustrating the results is with a chart or plot, where initial and subsequent tests can be overlaid or compared side to side so that changes over time can be easily determined.

In combative sports very few skill tests are available and in judo there is not a single skill test available. A great number of general fitness, motor fitness, health related fitness, test batteries for general purpose as well as for different games of sports are available, very few test batteries are available for combative sports, there is no test battery is available for judo fitness (game specific) measurements. In the text books of test and measurement (Johnson, Gangwar, Srivastav, Safrit, Thani, Barrow, Bosco, Clarke, Collins, Gupta, Johnson, Kirkendall, Phillips, Kansal) in physical education not given any skill specific fitness fitted for any game. Only internet references revealing some sports specific/sports skill specific test, further, which are very rare for combative sports, only two (Special judo fitness test and J.M.G. Test) specific fitness test for judo. The scholar could discover from websites, those two tests were developed and standardized in reference to developed for countries, not India.

Hence, judo test need special attention with special reference to Indian context. The growth of any game depends on development base and strengthening the base, which starts from young age. Therefore, a study advocates with reference to its scientific authenticating and development norms for junior Indian male judo players.

Method

Total numbers of samples were forty-six (n=46), who were junior Indian male judo players. Some of them represented their states for national and international championships; some of them were beginner and some of them were advanced judo players, selected from different parts of NCT of Delhi. Proportional representation of four categories was considered to comprise the sample as a whole.

JMG Test: JMG Test comprised of three exercises viz. tunnel, sit ups and jumping from one side to the other of a 30 centimeter (cm) high bench, as explained under

- **Tunnel:** The helper stands with legs apart, trunk bent forward with the back at the height of subjects. The subject jumps on the helper, goes over through the back and comes back the way between helper's legs. This complete movement is one repetition (Note: for the test to be valid subject must complete at least 16 repetitions in one minute).
- **Sit ups:** Lying face up with the legs separated shoulder width apart and slightly flexed at the knee, with the hands behind the head. The subject without wasting time between the first and second exercises, start doing sit ups touching the elbow to the opposite knee. After touching the elbow to the opposite knee both elbows must touch the ground (mate) while going back.
- **Jumping from one side to the other of a 30 cm bench:** The subject jumps from one side to the other. The feet must leave and touch the ground at the same time but it is not essential for the feet to be together. Every time the floor touching is counted as one repetition.

At the command of 'now' the subject starts the tunnel exercise for one minute, at the end of one minute without any gap/ interval with command 'change' the subject starts the sit ups for one minute and immediately after second exercise without any gap/interval starts to execute the third exercise i.e. jumping from one side to the other of a bench. At the end of the test subject is stopped and recordings of immediate heart rate as P1, after one minute recovery heart rate as P2 and after two minutes recovery heart rate as P3 were recorded with the help of Polar Heart Rate Monitor.

Index of JMG was calculated by using the following formula.

$$A = [(P1 + P2) / 2] - [n^{\circ}rpt + kg / 2]$$

$$B = [K - (P1 - P2)] - [n^{\circ}rpt + kg / 2]$$

$$\text{Ratio JMG} = (A + B) / 2$$

Where, K= (220-age)

P1= Heart rate at the moment of termination of the test.

P2=Recovery heart rate after one minute of termination of the test.

n^orpt= Total number of complete repetitions executed (the total of the three exercises).

kg = Weight of the subject in kilograms.

age = Age of the subject in years.

Special Judo Fitness Test (SJFT): Two junior Indian male judo players (uke) were positioned six meters apart from each other, while the thrower (tori) positioned at the center of both uke i.e. three meters apart from both uke. To the command of 'go' the performer runs in the direction of one uke and accomplishes the Ipponseio-nage technique or their best favored technique, throwing the uke and soon after runs to other uke and accomplished the same movement and so on during 15 seconds. At the 15 seconds, the assessor command to stop for 10 seconds. After the 10 seconds, subject again start the same procedure for 30 second and again take the resting interval of 10 seconds. Thereafter, again tori start the same procedure for 30 seconds. At the end of the 30 seconds test is stopped and recordings of immediate heart rate as P1, after one minute recovery heart rate as P2 and after two minutes of recovery heart rate as P3 were taken with the help of Polar Heart Rate Monitor.

Index of SJFT was calculated by using the following formula:

$$\text{Index} = (P1 + P2) / \text{total number of throws}$$

Findings of the Study

The judo performance ranking was correlated with the JMG test score as well as SJFT score independently, using rank order correlation, where judo performance ranks served as criterion variable whereas the JMG test score and SJFT scores were served as two dependent variables in the process of criterion validation of above mentioned Judo specific tests; findings in this regards is presented in table number 2. The ranking of Judo specific tests namely JMG and SJFT were correlated using Pearson correlation to verify the concurrent validity, findings in this regard is presented in table number 3. The objective of the study was to verify the reliability of

JMG and SJFT with special reference to junior Indian male judo players. To study the test retest reliability of JMG test was conducted twice at an interval of one hour, the two sets of JMG test scores were correlated using rank order correlation similar method was adopted for SJFT the finding in regard to reliability testing of JMG and SJFT are presented in table number 4.

Table-1
Descriptive Statistics of Selected Judo Fitness Physical and Physiological Variables

S.N	Variables	Mean	S.D
1	Decimal Age (yr)	17.94	1.27
2	Weight(kg)	64.07	10.63
3	No. of Throws in 15s	5.99	1.00
4	No. of Throws in 30s	9.89	1.72
5	No. of Throws in 30s	9.30	1.81
6	Total No. of Throws	25.18	4.25
7	P1 Heart Rat	191.61	9.90
8	P2 Heart Rate	156.41	8.65
9	P3 Heart Rat	133.13	7.63
10	S.J.F.T. Index	14.27	2.85
11	Tunnel Exercise	20.52	2.66
12	Sit-Ups	35.46	9.31
13	Jumps	53.61	18.71
14	Total No. of Repetition	109.59	27.95
15	P1 Heart Rate	190.07	9.03
16	P2 Heart Rate	155.00	9.13
17	P3 Heart Rate	133.14	9.78
18	J.M.G Index	26.95	29.42

N=46

Table-2
Criterion Validity of Jose Manuel Garcia Test and Special Judo Fitness Test

S.No	Test	Compared With	Criterion Coefficient (rp)
1	J.M.G Test	Judo Performance Ranking	0.94*
2	S.J.F. Test	Judo Performance	0.95*

Significant at .05 level

The Coefficient of Correlation between JMG and Judo Performance Ranking found to be 0.94. Hence the finding suggests that the JMG Test is extremely high valid test for evaluation of judo performance of junior Indian male judo players.

The Coefficient of Correlation between Special Judo Fitness Test and Judo Performance Ranking found to be 0.95. Hence the finding suggests that the Special Judo Fitness Test is extremely high valid test for evaluation of judo performance of junior Indian male judo players.

Criterion validity evidence involves the correlation between the test and a criterion variable (or variables) taken as representative of the construct. In other words, it compares the test with other measures or outcomes (the criteria) already held to be valid.

Table-3
Concurrent Validity Of Jose Manuel Garcia Test and Special Judo Fitness Test Coefficient

Variable Correlated	Correlation Coefficient
J.M.G.Test and S.J.F. Test	0.98*

Significant at .05 level

N=46

The coefficient of correlation between JMG Test and Special Judo Fitness Test is found to be 0.98. Hence the finding suggests that the JMG Test and Special Judo Fitness Test are extremely high valid and extremely high correlating with each other. Hence either or both the test can be used for judo fitness evaluation of junior Indian male judo players.

Concurrent validity is demonstrated where a test correlates well with a measure that has previously been validated. The two measures may be for the same construct, or for different, but presumably related, constructs. The two measures are taken at the same time. This is in contrast to predictive validity, where one measure occurs earlier and is meant to predict some later measure. Concurrent validity applies to validation studies in which the two measures are administered at approximately the same time (McIntire and Miller, 2005). The concurrent validity is often quantified by the correlation coefficient between the two sets of measurements obtained for the same target population, the measurements performed by the evaluating instrument and by the standard instrument (Safrit and Wood, 1989).

Table-4
Test Re-Test Reliability of Jose Manuel Garcia Test and Special Judo Fitness Test

S.No	Test	Reliability Coefficient
1	JMG Test	0.91
2	Special Judo Fitness Test	0.93

N=46

The Coefficient of correlation between JMG and Judo Performance Ranking found to be 0.91. Hence the finding suggests that the JMG Test is extremely high reliable test for evaluation of judo performance of junior Indian male judo players.

The Coefficient of correlation between Special Judo Fitness Test and Judo Performance Ranking found to be 0.93. Hence the finding suggests that the Special Judo Fitness Test is extremely high reliable test for evaluation of judo performance of junior Indian male judo players.

The finding in table number 3 demonstrates that ratio between the mean and standard deviation of all selected variables were non-poisoned hence the research scholar was confident for parametric applications in term of planned objective.

Subjective rating of performance result to descriptive data. So performance ranking by using round robin of judo bout along with the cross verification with their achievements and percentage of performance level at the time of testing enable the research scholar an authentic judo performance ranking using above mentioned hybrid method.

Judo performance being ranked for appropriate application of statistic (rank order correlation) further

more JMG index generates bi-polar ranking that is positive score as well as negative score to overcome such problem ranking of JMG score and SJF score was unavoidable. The data regarding the same presented in table number 5.

The finding in reference to table number 6 suggest the criterion validity of JMG test is extremely high according to Kirkendall.et.al.(1987) criterion, identical finding repeated in regard to judo specific fitness test. Hence, it is recommendable for the population which is tested, Tests deserved cross validation as form of concurrent validation the finding table number 7 reveals that the relationship between JMG and SJF test possessed extremely high concurrent validity coefficient ($r = 0.98$) which is much superior of then that of criterion validity hence, using either of one become scientifically authenticated.

In process of analysis the test retest coefficient found to be high ($r = 0.91$) and ($r = 0.93$) for JMG test, SJF test respectively. A highly valid test likely to be a highly reliable test, which is well advocated in the finding of the study in regard (table number 8)

Conclusions

1. The findings suggest that JMG test is extremely high reliable test for evaluation of judo performance of junior Indian male judo players.
2. The findings suggest that special judo fitness test is extremely high reliable test for evaluation of judo performance of junior Indian male judo players.
3. The findings suggest that the JMG and special judo fitness test are highly valid and highly correlating with each other. Hence, either or both the tests can be used for judo specific fitness evaluation of junior Indian male judo players.

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