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A COMPARATIVE STUDY ON ISOMETRIC STRENGTH BETWEEN JUDOKAS AND WEIGHTLIFTERS

Shashi Kumar. S [1]

[1] Guest Faculty University College of Physical Education. Bangalore University, Bengaluru, India

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ABSTRACT

This study focuses on comparing the isometric strength between Judokas and weightlifters. Isometric strength, which refers to the maximum force a muscle can produce without varying its length, is a key aspect in both sports, albeit manifested differently. Weightlifting emphasizes maximum strength and explosive power in control, whereas Judo requires a combination of strength, endurance, and dynamic control across unpredictable movements. To achieve the aim of the present study, 20 male weightlifters and 20 male Judokas, a total of 40 athletes, were selected randomly as subjects of Karnataka State. The researcher selected the hand grip dynamometer test to evaluate the isometric strength of the subjects, and descriptive statistics and two-sample t-tests were used to analyse the data. The findings revealed a significant difference between Judokas and weightlifters. It has been concluded that weightlifters have a stronger isometric strength than the Judokas in state of Karnataka.

Keywords: Isometric Strength, Judokas and Weightlifters

1. INTRODUCTION

Strength greatly influences athletic performance, and it is essential to comprehend how various training plans affect the development of strength to maximize performance in various sports. An essential element of total athletic performance is isometric strength. Isometric strength affects everything from performance in sports activities to stability and injury prevention. High levels of isometric strength benefit athletes in almost every activity because they enable them to control their bodies during static and dynamic movements. Understanding the function of isometric strength and how it is enhanced by focused training can provide players with a major edge in maximizing their performance in a variety of sports. Isometric strength is the most important among the various kinds of strength. Isometric strength refers to an athlete's ability to produce force without triggering a change in muscle length, which has been identified as an essential aspect in both dynamic and static sports endeavours. While the nature of training for players in different sports often varies, adapting their muscles to specific demands remains a focal point of study. Specifically, Judokas and weightlifters train differently, with each focusing on a different physical attribute, but both require high levels of strength to succeed in their respective sports.

Weightlifters concentrate on developing explosive strength and power through controlled exercises like Olympic lifts, deadlifts, and squats, which require quick bursts of maximal force. Due to the nature of the lifts performed, the

purpose of these movements is to increase both dynamic and isometric strength, particularly in the upper body, legs, and core. On the other hand, because they participate in combat settings where muscle endurance and controlled strength are essential, Judokas want to exhibit a balance of strength, endurance, flexibility, and agility. Their diversified training schedule includes strength training and judo-specific drills that call for prolonged isometric muscle contractions, particularly in grappling and holding positions.

Despite the differences in training and goals, there has not been sufficient study assessing the isometric strength of Judokas and weightlifters. By contrasting the isometric strength of these two sports groups, our study attempts to close this discrepancy. The results of this study could potentially influence training methods, allowing players and coaches to better adapt strength training plans to the particular demands of each sport.

The following previous studies have explored the relationship between handgrip strength (HGS) and handgrip endurance (HGE), as well as anthropometric variables. Also, previous studies were compared with those of other disciplines.

Reena Kaur Ruprai (2015) conducted a study on handgrip strength as a determinant of upper body strength/physical fitness, a comparative study of people using the gym and doing gymnastics. The purpose of the study is to compare the handgrip strength (HGS) and handgrip endurance (HGE) of the two physically active groups. The researcher employed a handgrip dynamometer test as the testing tool. Seventy-five participants in all took part in this study. Split into three groups of 25 each: gymnastics, gymnasium, and control. The researchers came to the conclusion that physical activity must be a major part of everyday life. The clinical application of handgrip dynamometers to evaluate relevant patients' muscle strength should also be considered.

Aswathy. (2019) conducted a study on the relationship between hand grip strength and anthropometric variables in inter-university level softball and hockey players. The study revealed that the grip strength of softball players showed the closest relationship with arm measurements compared to that of hockey players. It may be concluded that the grip strength of university-level women softball players had a significant relationship with most of their arm measurements.

Miss. Sowmyashree (2020) conducted a study on hand grip strength between wrestlers and weight lifters: a comparative investigation. a Researcher, concludes that there is no significant difference in hand grip strength level between wrestlers and powerlifters of Mangalore University. The study found that there is a positive relationship between body weight and handgrip strength.

However, there remains a gap in understanding the isometric strength between Judokas and weightlifters, and this research aims to fill the gap. This study investigates how weightlifters' and Judokas' training regimes contributed to differences in muscle strength and how these differences might influence their performance in tasks specific to their sport by comparing their isometric strength.

1.1. STATEMENT OF THE PROBLEM

- The present study compares isometric strength between Judokas and weightlifters.

1.2. OBJECTIVES OF THE STUDY

Keeping in view the statement of the problem, the following objectives were framed.

- To measure and compare the isometric strength between Judokas and weightlifters.
- To provide recommendations for enhancing isometric strength between Judokas and weightlifters based on identified differences in specific fitness components.

1.3. HYPOTHESIS OF THE STUDY

In accordance with the objectives, the below hypothesis was formulated.

- It was hypothesized that Judokas and weightlifters have a significant difference in isometric strength. Further, it was hypothesized that the weightlifter has significantly more isometric strength than the Judokas.

1.4. DELIMITATIONS OF THE STUDY

The following are more input delimitations of the study.

- The study was delimited to Judokas and weightlifters from Karnataka state only.
- The study was delimited to male Judokas and weightlifters of Karnataka only.
- The present study was delimited to a sample size of 20 weightlifters and 20 Judokas aged ranging between 18-23 years.
- The study was delimited to the assessment of isometric strength of the hand and forearm muscles only.
- We have delimited our study to measurements and assessments performed in controlled indoor environments to ensure standardisation of testing conditions.

1.5. LIMITATIONS OF THE STUDY

We state the limitations of the study below.

- The study was limited to primary and secondary data, potentially excluding other perspectives or historical fitness data.
- The study did not account for participants' previous training intensity or duration, which might contribute to differences in physical fitness levels.
- Environmental factors, such as the testing setting and timing, were standardised but could still introduce minor variations affecting participant performance.

1.6. SIGNIFICANCE OF THE STUDY

The following are most significant inputs for the study.

- The study helps understand the isometric strength component of Judokas and weightlifters of Karnataka state and provides insights into their particular strengths and areas for improvement.
- The results of the study are intended to encourage Karnataka state athletes to focus more on developing their athletic abilities.
- This study gives coaches and physical education trainers helpful data to develop customised training regimens that suit the particular physical demands of both athletes.
- Regarding hand grip strength performance rate, the study might give essential data about how Judokas and weightlifters pick their talent.

1.7. DEFINITION OF THE TERMS

Terms and some of the definitions are:

- **Isometric strength:** The ability of a muscle or group of muscles to produce force while keeping their length constant, that is, without moving or changing their joint angle, is known as isometric strength.
- **Weightlifters:** Weightlifters are athletes who take part in the sport of weightlifting, which involves lifting heavy weights in two main lifts: the snatch and the clean and jerk
- **Judokas:** Judokas are athletes who regularly practise and participate in the sport of Judo.

2. METHODOLOGY

This comparative study examines and contrasts the isometric strength of Judokas and weightlifters. In order to achieve the objective of the current study, the researcher used a comparative design. For this study, the investigator randomly selected 20 male judokas and 20 male weightlifters from Karnataka state. The investigator used the Handgrip

Dynamometer test to measure the isometric strength of the subjects. The researcher used the mentioned test protocol to gather data from both groups.

Statistical Technique: The following statistical procedures were used to evaluate the isometric strength between Judokas and weightlifters. The researchers used both descriptive and comparative methods for statistical analysis. The investigator used the mean and standard deviation for descriptive analysis and the t-test for comparative analysis.

3. DATA ANALYSIS AND INTERPRETATION

The statistical analysis results are as follows.

Table 1.1 Descriptive Statistics of Isometric Strength Between Judokas and Weightlifters

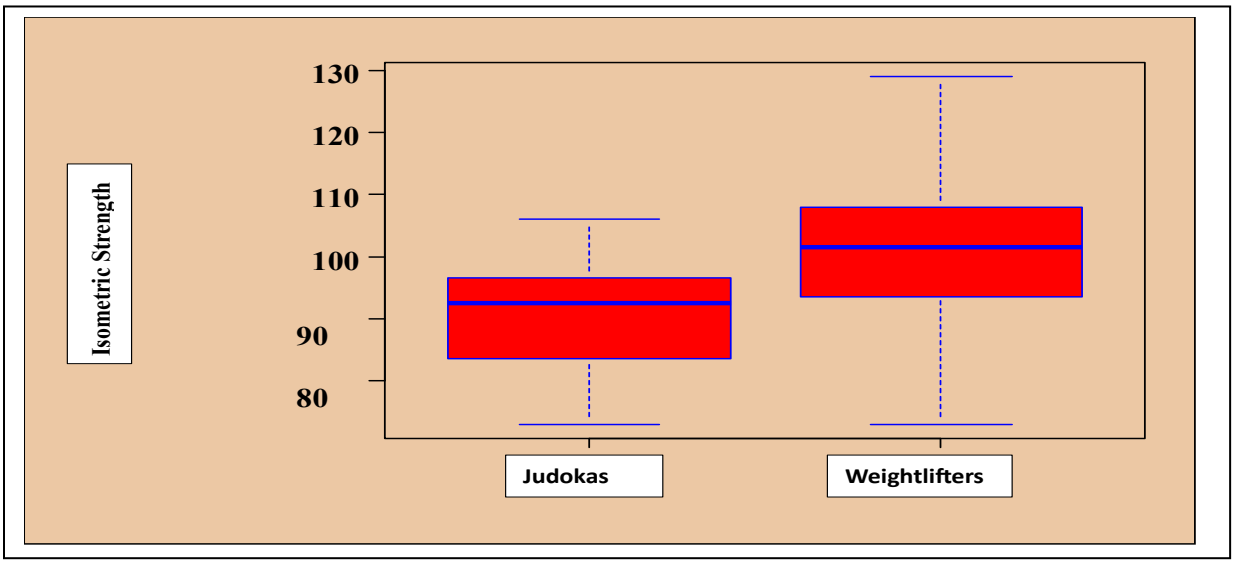
Group	N	Minimum	Maximum	Mean	Std. Error	Std. Deviation
Judokas	20	73	106	91.2	2.08	9.32
Weightlifters	20	73	129	100.5	3.09	13.83

Interpretation: The above table presents the descriptive statistics of the isometric strength scores for the Judokas and weightlifters.

Table 1.1 provides the minimum and maximum scores of isometric strength of judokas 73 and 106, respectively. The mean value is 91.2, the standard error is 2.08, and the standard deviation is 9.32 for the 20 subjects. Further, the weightlifters' minimum and maximum scores of isometric strength are 73 and 129, respectively. The mean value is 100.5, the standard error is 3.09, and the standard deviation is 13.83 for the 20 subjects.

Figure 1.1 Boxplot of Isometric Strength Between Judokas and Weightlifters

For comparison, we have plotted bar plots of the two groups one beside the other in figure 1.1



Interpretation: It is evident from the above boxplot that there exists a difference in the isometric strength between the two groups. Further, the graphs show that the isometric strength of the weightlifter is more than that of the Judokas.

3.1. VERIFICATION OF ASSUMPTION OF T-TEST

The normality assumption test found that the two groups' data are normally distributed (Shapiro-Wilk normality test- judokas p-value= 0.7748 and weightlifter p-value= 0.5665 respectively) and that the variance of the two groups is

equal (two variances test - p-value = 0.09367 and ratio of variances 0.4542566); hence, F test to compare two variances both assumptions are satisfied to apply the t-test to investigate the significant difference between the two groups. The result of the t-test is presented in Table 1.2

Table 1.2 Independent Samples T-test

t - value	df	p-value
-2.3728	38	0.02

Inference: Since the p-value <0.05, at a 5 % significance level, the null hypothesis is rejected and hence concludes that there is a significant difference in isometric strength between judokas and Weightlifters. Further, it clearly indicates that Weightlifters have more isometric strength than the Judokas.

4. DISCUSSION ON FINDINGS

This study's main objective was to compare the isometric strength of weightlifters and judokas., These are two different kinds of athletes with varying training schedules and demands that are particular to their sports. According to its findings, Weightlifters have significantly higher isometric strength than judokas.

Weightlifters' training is specially designed to produce maximal strength, isometric strength, through heavy resistance training. In contrast, judokas give priority to dynamic strength and agility. Their focus on developing maximal isometric strength is very less. Therefore, weightlifters have more isometric strength than judokas. These results emphasize the significance of sport-specific training and the role that muscle activation and strength development play in maximizing performance for each athlete.

5. CONCLUSION AND RECOMMENDATIONS

5.1. CONCLUSION

Finally, the study came to the conclusion that weightlifters have significantly higher isometric strength than judokas.

5.2. RECOMMENDATIONS

The following recommendations were made based on the conclusions:

- Judokas should place a significant focus on building core and grip strength, as these are essential for keeping influence in grappling situations and throwing techniques.
- The judo coaches and trainers should concentrate on designing a suitable training program to develop judokas isometric strength.
- The study may be conducted on more subjects, such as female players, and the study may be conducted in other disciplines.

CONFLICT OF INTERESTS

None.

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None.

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