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Effect of Different Intensities of Resistance Training On Anaerobic Power and Elastic Power Among Judo Players

P. Rajapandi[1], Dr. P. Anandhan[2]

[1] Ph.D Research Scholar, Dept of Physical Education, Annamalai University.
[2] Physical Director, Government Arts College, Trichy

Abstract

The purpose of the study was to find out the impact of different intensities of resistance training on anaerobic power and elastic power among male judo players. Since the purpose of the study forty-five male judo players selected from Christian Educational Society, Ottanchathiram, Tamil Nadu, India and their age ranged between 17-25 years was selected as subjects. The selected subjects were divided into three equal groups, in which, group – I (n = 15) underwent medium intensity resistance training, group – II (n = 15) underwent high intensity resistance training, group – III (n = 15) acted as control which do not participate in any special training. The training programme was carried out for this study is three days per week for twelve weeks. The data collected from the three groups before and after the experimental training period were statistically examined to find out the significant improvement if any using the analysis of covariance (ANCOVA). The level of significance confidence was fixed at 0.05. Whenever, the obtained 'F' ratio value for adjusted post-test means was found to be significant, the Scheffe's post hoc test was applied to determine the paired mean differences. The results of the study showed that effects of the medium and high intensity resistance training on anaerobic power and elastic power has shown improvement for the medium and high intensity resistance training groups when compared with the control groups.

Keywords: Resistance Training, Anaerobic Power and Elastic Power.

1. Introduction

Training volume was commonly defined as sets × reps × load. That was, an individual moves a certain load for some number of repetitions, rests, and repeats this for some number of sets, and the volume was the product of these numbers. For non-weightlifting exercises, the load replaced with intensity, the amount of work required to achieve the activity. Training volume was one of the most critical variables in the effectiveness of strength training. There was a positive relationship between volume and hypertrophy. (Schoenfeld BJ et al, 2017)

The load or intensity is often normalized as the percentage of an individual's one-repetition maximum (1RM). Due to muscle failure, the intensity limits the maximum number of repetitions that

can be carried out in one set, and is correlated with the repetition ranges chosen. Depending on the goal, different loads and repetition amounts may be appropriate. (Schoenfeld BJ et al, 2021)

Strength training exercise was primarily anaerobic. Even while training at a lower intensity (training loads of ≈20-RM), anaerobic glycolysis was still the major source of power, although aerobic metabolism makes a small contribution (Kraemer WJ, 2003). Weight training was commonly perceived as anaerobic exercise, because one of the more common goals was to increase strength by lifting heavy weights. Other goals such as rehabilitation, weight loss, body shaping, and bodybuilding often use lower weights, adding aerobic character to the exercise. (Knuttgen HG, 2003)

Resistance training follows the fundamental principle that involves repeatedly overloading a muscle group. This is typically done by contracting the muscles against heavy resistance and then returning to the starting position. This process is repeated for several repetitions until the muscles reach the point of failure. (Schoenfeld BJ et al, 2017)

Resistance training typically follows the principle of progressive overload, in which muscles are subjected to gradually increasing resistance over time to stimulate adaptation and growth. They respond by growing larger and stronger. Beginning strength-trainers are in the process of training the neurological aspects of strength, the ability of the brain to generate a rate of neuronal action potentials that will produce a muscular contraction that is close to the maximum of the muscles potential. (Ida A, Sasaki K 2024)

The sport of judo entails throwing the opponents onto their backs using different techniques. This combat sport involves great neuromuscular demand, suggesting that a good level of physical fitness in strength and flexibility seems crucial to its competitors (Fukuda et al., 2011). For instance, competitors are matched by weight; hence, higher overall body strength is an important advantage.(Blais and Trilles, 2006)

METHODOLOGY:

The purpose of the study was to find out the impact of different intensities of resistance training on anaerobic power and elastic power among male judo players. Since the purpose of the study forty-five male judo players selected from Christian Educational Society, Ottanchathiram, Tamil Nadu, India and their age ranged between 17-25 years was selected as subjects. The selected subjects were divided into three equal groups, in which, group – I (n = 15) underwent medium intensity resistance training, group – II (n = 15) underwent high intensity resistance training, group – III (n = 15) acted as control which do not participate in any special training. The training programme was carried out for this study is three days per week for twelve weeks.

The study was formulated as a random group design consisting of pre and post-tests. Pre-test was conducted for all the subjects on selected criterion variables. Post-test was conducted after the experimental treatment of twelve weeks and the scores were recorded. The analysis of covariance (ANCOVA) was applied to find out the significant difference in each criterion variables among the groups. Whenever, the obtained 'F' ratio value for adjusted post-test means was found to be significant, the Scheffe's post hoc test was applied to determine the paired mean differences

STATISTICAL ANALYSES:

The mean values of anaerobic power of medium, high resistance training group and control group at different stages of tests have been analyzed and submitted in table -1.

Table –1

Test	MRT Group	HRT Group	Control Group	SOV	SS	df	MS	'F'
Pre-test mean	108.497	115.33	114.48	**B**	416.002	2	208.001	1.93
S.D	9.78	10.6	10.75	**W**	4531.601	42	107.895	
Post-test mean	123.76	119.76	114.05	**B**	973.11	2	486.55	4.62*
S.D	7.11	12.46	10.49	**W**	4421.790	42	105.28	
Adj. Post- Test mean	124.65	118.23	113.69	**B**	1149.41	2	574.71	5.58*
				W	4226.41	41	103.08	

* Significant at 0.05 level of confidence.

The table value required for significance at 0.05 level of significance with df 2 and 42 and 2 and 41 were 3.22 and 3.23 respectively.

The post test scores analysis proves that there was significant difference among the groups, as obtained 'F' value 4.62 was greater than the required 'F' value of 3.22. This proves that there was significant difference among the post-test means of the subjects. That proves there was significant difference existed among the adjusted means due to twelve weeks of medium and high resistance training on anaerobic power. Since the significant improvements are recorded, the results are subjected to post hoc analysis using Scheffe's Confidence interval test. The results are presented in table -2.

Table-2

Adjusted Post-Test Means			Mean Difference	Confidence Interval Value
MRT Group	**HRT Group**	**Control Group**		
124.65	118.23		6.42*	1.72
124.65		113.69	10.96*	
	118.23	113.69	4.54*	

As the confidence interval required being significant at 0.05 levels was 1.72 and the obtained values are greater than the required value. It was observed that the significant difference was found to be existed. The mean values Elastic power of medium, high resistance training group and control group at different stages of tests have been analyzed and submitted in table – 3.

Table –3

Test	MRT Group	HRT Group	Control Group	SOV	SS	df	MS	'F'
Pre-test mean	9.397	9.77	9.41	**B**	1.35	2	0.68	1.51
S.D	0.74	0.62	0.65	**W**	18.83	42	0.45	
Post-test mean	9.65	10.51	9.48	**B**	7.06	2	3.53	5.67*
S.D	0.76	0.901	0.69	**W**	26.12	42	0.62	
Adj. Post- Test mean	9.67	10.48	9.46	**B**	6.06	2	3.03	4.79*
				W	25.96	41	0.63	

Table-3 shows that the post test scores analysis proves elastic power that there was significant difference among the groups, as obtained 'F' value 5.67 was greater than the required 'F' value of 3.22. That proves that there was significant difference among the post-test means of the subjects. Elastic power proves that there is significant difference existed among the adjusted means due to twelve weeks of medium and high resistance training on elastic power. Since the significant improvements are recorded, the results are subjected to post hoc analysis using Scheffe's Confidence interval test. The results are presented in table -4.

Table-4

Adjusted Post-Test Means			MeanDifference	Confidence Interval Value
MRT Group	**HRT Group**	**Control Group**		
9.67	10.48		0.82*	0.134
9.67		9.46	0.21*	
	10.48	9.46	1.02*	

As the confidence interval required being significant at 0.05 level was 0.134 and the obtained values were greater than the required value. It was observed that the significant difference was found to be existed.

Results

The results of the study showed that effects of the medium and high intensity resistance training on anaerobic power and elastic power has shown improvement for the medium and high intensity resistance training groups when compared with the control groups. In addition, the result of the tests shows that High intensity resistance training group was better in anaerobic power and elastic power compared with medium intensity resistance training

Discussion

Based on the result of the study the following findings were drawn: It was found from the effects of the medium and high intensity resistance training on anaerobic power and elastic power in the terms of horizontal and vertical distances has shown improvement for the medium and high intensity resistance training groups when compared with the control groups. **Orange et al., (2022)** estimated the effectiveness of using velocity feedback to regulate resistance training load on changes in muscle strength, power, and linear sprint speed in apparently healthy participants. **Dowse, McGuigan and Harrison (2020)** idea was to decide whether a nine-week resistance training program could have significant effect maximum lower-body strength and power, dynamic balance and dance performance in adolescent dancers.

Both medium and high intensity resistance training groups have improved their leg strength, back strength and elastic power when compared with the control groups**.** In addition, the result of the tests shows that there was a significant difference between experimental groups. High intensity resistance training group was better in leg strength, back strength and elastic power compared with medium intensity resistance training and control groups. **Sabag et al., (2018)** inspected the result of concurrent high intensity interval training and resistance training on strength and hypertrophy it recommends concurrent high intensity interval training and resistance training doesn't contrarily affect hypertrophy or upper body strength.

Medium and high intensity resistance training groups have improved their abdominal strength, strength endurance, anaerobic power and explosive power in the terms of horizontal and vertical distances when compared with the control group**.** In addition, the results of the tests show that there was a significant difference between experimental groups. Medium intensity resistance training group was better in abdominal strength, strength endurance, anaerobic power and explosive power in the terms of horizontal and vertical distances compared with high intensity resistance training and control groups. **Fernandez-Lezaun (2017)** investigated the effects of resistance training performed with different frequencies, including a follow-up period, on cardio respiratory fitness in healthy older individuals.

Conclusions

Hence, it was concluded from the results that both medium and high intensity resistance training practice were improved anaerobic power and elastic power. Among the experimental groups, the increase was higher for high intensity resistance training than medium intensity resistance training.

References

1. Blais L, Trilles F. (2006) “The progress achieved by judokas after strength training with a judo-specific machine”. Journal of Sports Science Medicine; 5: 132-135.
2. Dowse RA, McGuigan MR, Harrison C (2020) “Effects of a Resistance Training Intervention on Strength, Power, and Performance in Adolescent Dancers” Journal of Strength Condition Research;34 (12):3446-3453.

3. Fernandez-Lezaun, E., Schumann, M., Makinen, T., Kyrolainen, H., & Walker, S. (2017) “Effects of resistance training frequency on cardio respiratory fitness in older men and women during intervention and follow-up” Experimental Gerontology, 95, 44-53.
4. Ida A, Sasaki K (2024) "Distinct adaptations of muscle endurance but not strength or hypertrophy to low-load resistance training with and without blood flow restriction", Experimental Physiology; 109 (6): 926–938.
5. Knuttgen HG (2003) "What is exercise? A primer for practitioners", The Physician and Sports medicine; 31 (3): 31–49.
6. Kraemer WJ (2003) "Strength training basics: designing workouts to meet patients' goals", The Physician and Sports medicine; 31 (8): 39–45.
7. Orange, S. T., Hritz, A., Pearson, L., Jeffries, O., Jones, T. W., & Steele, J. (2022) “Comparison of the effects of velocity-based vs. traditional resistance training methods on adaptations in strength, power, and sprint speed: A systematic review, meta-analysis, and quality of evidence appraisal” Journal of Sports Sciences; 40(11).
8. Sabag, A. et al., (2018) “The compatibility of concurrent high intensity interval training and resistance training for muscular strength and hypertrophy: a systematic review and meta-analysis” Journal Sports Science; 36(21): 2472-2483.
9. Schoenfeld BJ, Grgic J, Ogborn D, et al. (2017), "Strength and Hypertrophy Adaptations between Low- vs. High-Load Resistance Training", Journal of Strength and Conditioning Research;. 31 (12): 3508–23.
10. Schoenfeld BJ, Grgic J, Van Every DW. (2021) "Loading Recommendations for Muscle Strength, Hypertrophy, and Local Endurance: A Re-Examination of the Repetition Continuum" Sports; 9 (2): 3[2]