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PHYSICAL EDUCATION

EFFECT OF VARIED INTENSITIES OF RESISTANCE TRAINING ON MAXIMUM STRENGTH

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Abstract

The purpose of the present study was to find out the effect of varied intensities of resistance training on maximum strength. For this study, sixty Bachelor Degree in Physical Education male students of Annamalai University randomly selected as subjects. The age of the subjects ranged from 18 through 21and they were segregated into four groups each group consisting of 15 subjects. The first group underwent high intensity resistance training, the second group underwent medium intensity resistance training, the third group underwent low intensity resistance training and the fourth group acted as control and did not undergo any systematic training programme. All the subjects were tested on maximum strength before and after the commencement of the training programme. The varied intensities of resistance training were given 3 days a week for 10 weeks for the three experimental groups. The analysis of covariance (ANCOVA) was applied and the adjusted post-test means were tested for significance. If the 'F' ratio was significant Scheffe's post-hoc test was applied to find out the significant differences if any. The level of significance was set at 0.05 level. This study resulted that all experimental groups significantly improved maximum strength as compared to control group. The high intensity resistance group significantly improved maximum strength as compared to the other two training groups and the medium intensity group improved maximum strength better than the low intensity group.

Keywords: Resistance, Training, Intensity, High, Medium, Low and Maximum strength.

INTRODUCTION

Sports training is a basic preparation of the sportsmen for better performance through physical exercise. It is based on scientific principles of aiming at education and performance enhancement. Sports activities consist of motor movement and action and their success depends to a great extent on how correctly they are performed. Techniques of training and improvement of tactical efficiency play a vital role in the training process (Edward and Fox, 1984). There are various sports training activities in the fields of sports. They are strength (or) weight (or) resistance training, interval training, fartlek training, circuit training and so forth. These training are meant for the improvement of specific physical and motor fitness qualities. The main purpose of resistance training is the development of strength parameters. Resistance training consider as an exercise programme where free or stationary weights are used for the purpose of increasing muscular strength, muscular endurance and power and body composition through which skills can be improved. Specific training programmes can also lead to the development of cardio-respiratory endurance. (Moran and McGlynn, 1990). Strength is the key to success in sport and games. The value of strength in athletics is not a new idea. There is a vast need for everyone involved in sports for a better understanding of strength (Hooks, 1974). The purpose of study was to find out the effect of varied intensities of resistance training on maximum strength.

METHODOLOGY

SUBJECTS

For this study, sixty Bachelor Degree in Physical Education male students of Annamalai University randomly selected as subjects. The age of the subjects ranged from 18 through 21. Further they divided in to four groups and named as high, medium and low intensities training group and control group. The number of subjects in each group was confined to 15 which is adequate to draw meaningful conclusions.

VARIABLES

The varied intensities namely high, medium and low intensities of resistance training were selected as experimental variables. The maximum strength was selected as criterion variable.

TRAINING PROGRAMME

The resistance training programmes used in the present investigation for high, medium and low intensity groups are described below.

High intensity group: Started with 80% of intensity and 5% of intensity was increased progressively for over load during once in two weeks with 3 sets × 4 for ten weeks.

Medium intensity group: Started with 70% of intensity and 5% of intensity was increased progressively for over load during once in two weeks with 3 sets × 6 repetition for ten weeks.

Low intensity group: Started with 60% of intensity and

5% of intensity was increased progressively for over load during once in two weeks with 3 sets × 9 repetition for ten weeks. **Rest period:** One minute between sets and Two minutes between exercises.

SATISTICAL ANALYSES

Pre-test data were collected two days before the training programme and post-test data were collected two days after the training programme on maximum strength.To nullify the variation in the pre-test means collection of data, analysis of covariance was applied and the adjusted post-test means were tested for significance. If the F ratio was significant, Scheffe's post- hock test was applied to find out the significant differences if any, any of the paired means. The level of significance was set at 0.05 level.

RESULTS

MAXIMUM STRENGTH

The data collected during pre and post-tests among different intensity groups such as high, medium, low intensity groups and control group on maximum strength have been analysed statistically and the results are shown in table-1.

TABLE-1
ANALYSIS OF COVARIENCE FOR PRE- AND POST-TEST DATA ON MAXIMUM STRENGTH AMONG HIGH, MEDIUM, LOW INTENSITY GROUPS AND CONTROL GROUP

	High intensity group	Medium intensity group	Low intensity group	Control group	SOV	Sum of squares	df	Mean square	'F' ratio
Pre-Test									
Mean	44.40	42.67	43.13	40.93	B:	92.58	3	30.86	1.59
SD	4.21	4.39	4.66	4.35	W:	1085.60	56	19.39	
Post-Test									
Mean	54.47	50.33	49.00	42.00	B:	1209.78	3	403.26	16.45*
SD	5.52	4.89	5.03	4.29	W:	1373.07	56	24.52	
Adjusted Post-Test									
Mean	52.72	50.46	48.62	44.00	B:	573.57	3	191.19	101.35*
					W:	103.76	55	1.89	

** Significant at 0.05 level of confidence.*
df-degrees of freedom; SD-Standard Deviation; S.O.V.-Source of Variance. B-Between; W-Within
The table value required for significance at 0.05 level with df 3 & 56, and 3 & 55 are 2.776 and 2.78 respectively.

Table-1 further shows that the adjusted post-test mean values for high intensity group is 52.72, medium intensity group is 50.46, low intensity group is 48.62 and control group is 44.00, which have an 'F' ratio of 101.35 and it is higher than the table value of 2.78 required for df 3 and 55 at 0.05 level of significance. It is found that significant differences exist among the four groups on maximum strength after adjusting the initial mean differences on the post-test means. In order to determine which of the paired means have significant differences, Scheffe's test was computed and it is presented in table-2.

TABLE-2
SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST-TEST PAIRED MEANS OF MAXIMUM STRENGTH

Adjusted Post-Test Means				Means Differences
High intensity group	**Medium intensity group**	**Low intensity group**	**Control group**	
52.72	50.46			2.26*
52.72		48.62		4.10*
52.72			44.00	8.72*
	50.46	48.62		1.84*
	50.46		44.00	6.46*
		48.62	44.00	4.62*

* Significant at 0.05 level.
The confidence interval required for significance at 0.05 level is 1.43.

An examination of the table-2 indicates that the adjusted post-test mean difference of maximum strength between control group and high intensity group, control group and medium intensity group and between control group and low intensity group are 8.72, 6.46 and 4.62 respectively which are higher than the confidence interval value of 1.43 at 0.05 level of significance. It is inferred that the ten weeks of different intensities of resistance training have significantly increased the maximum strength in three experimental groups as compared to the control group.

Table-2 also shows the mean difference between high intensity group and medium intensity group is 2.26, high intensity group and low intensity group is 4.10, and between medium and low intensity groups is 1.84 which are more than the confidence interval value 1.43 at 0.05 level of significance. The result reveals that the high intensity group shows significant differences on maximum strength as compared to the medium and low intensity groups. The result shows that the medium intensity group shows significant difference on maximum strength as compared to low intensity group, but the low intensity group shows significantly higher on maximum strength as compared to control group but less than the other intensity groups.

FINDINGS

The varied intensities of resistance training have significantly increased the maximum strength in three experimental groups as compared to the control group. The high intensity group significantly improved maximum strength as compared to medium and low intensity group. The medium intensity group resulted in a significant raise in maximum strength as compared to low intensity group. The maximum strength is the ability of the person to produce maximum effort in a single period of contraction (tension). Hence, only high resistance training programme which involves greater amount of load can develop maximum strength since the effort is greater and repetitions are less.

(Hass et al., 2000). Have conducted a study on single and multiple sets on muscular strength, muscular endurance and body composition (physical variables) in adult recreational weight lifters. The results shows that both the groups significantly improved the maximum strength. (Maxine Friedman, 2000) have conducted a study on the effects of increasing volume from one set to three sets on strength. It resulted that both the groups significantly improved their maximum strength. (Faigenbaum et al, 1999) conducted a study of comparing the effect of low repetitions heavy load resistance programme and high repetition moderate load resistance programme on the development of strength and muscular endurance. Both the groups showed significant improvement in muscular strength. The above findings support the result of the present study.

CONCLUSION

The study concluded that all experimental groups significantly improved maximum strength as compared to control group. The high intensity group significantly improved maximum strength as compared to the other two experimental groups and the medium intensity group improved maximum strength better than the low intensity group.

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