

# EFFECT OF DIFFERENT INTENSITY RESISTANCE TRAINING PROGRAMME ON BACK STRENGTH

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## ABSTRACT

The purpose of the study was intended to investigate the effect of different intensity resistance training programme on selected strength parameter of progressive resistance training with the three different intensity groups on selected strength parameter namely back strength. To achieve the purpose of the study the investigator adapted a series of systematic steps. sixty subjects were selected randomly. The sixty subjects were randomly assigned into four equal groups comprising fifteen each. The study groups were named based on the intensity of training (pertaining to this particular study), as high intensity group, medium intensity group, low intensity group and the fourth group acted as control group. All the subjects were tested on the above mentioned criterion variable before the commencement of the training programme. Thereafter three different intensities of resistance training were given 3 days a week for 10 weeks for the three experimental groups and the control group did not participate in any systematic programme. The collected data were analysed statistically by analysis of covariance (ANCOVA) and Scheffe's post-hoc test was used to test the paired mean differences. High, medium and low intensity training groups showed significant improvement in back strength as compared to control group. The high and medium intensity progressive resistance training programme significantly improved back strength as compared to the low intensity training programme. There was no significant difference between high and medium intensity training programmes in back strength.

**Key words:** Different intensity, Resistance training, Back strength, High Medium and Low intensity.

## INTRODUCTION

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. The main components which influence the physical performance of an athlete are strength endurance, power, speed and agility.

Every individual needs different levels of strength as per the nature of their activities and their physical demand **Patterson Lombardi (1989)**. The human body has the capacity to adjust itself to the demands placed upon it. It can adapt itself to many kinds of stress and even increasing its efficiency as a result of stressful stimuli. Research indicates that in physical stress or under intensive training will lead to the increase of functional capacity (strength and endurance). Resistance training is only beneficial as long as it causes the body to adapt to the physical efforts. If the stress is limited, adaptation will not occur. If there is too much stress then injury and deterioration will result. Vigorous physical activity is harmful for children under ten years of age **Ghosh (1992)**. Maximum strength of men and women is generally achieved between the ages of 20-25 and significantly higher strength levels can be maintained well into advanced age. Normally a progressive decline of muscle strength and muscle mass takes place with aging process and it is brought about primarily by inactivity. Physical training can however decrease the rate of strength decline with aging process **Grimby (1983)**.

## 2. Materials and methods

### 2.1 Statistical technique

The collected data were analysed statistically by using ANCOVA (analysis of covariance) to find out the effect of different intensity resistance training programme on selected strength (Back strength) parameter. Whenever, the obtained 'F' ratio for the adjusted post test mean was found to be significant, the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. The .05 level of confidence was fixed to test the level of significance which was considered as an appropriate.

### 2.2 Selection of subjects

Sixty subjects were selected at random. The sixty subjects were randomly assigned into four equal groups comprising fifteen each. The study groups were named based upon the intensity of training (pertaining to this particular study), as high intensity group, medium intensity group, low intensity group, and the fourth group acted as control group.

### 2.3 Selection of variable

In the present study, the investigator selected the Strength parameter namely Back strength. The selected criterion variable was measured by Back leg dynamometer.

## Analysis of the Data

### BACK STRENGTH

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

**TABLE -I**

**ANALYSIS OF COVARIENCE FOR PRE AND POST-TEST DATA ON BACK STRENGTH AMONG HIGH MEDIUM LOW INTENSITY GROUPS AND CONTROL GROUP**

	<b>High intensity group</b>	<b>Medium intensity group</b>	<b>Low intensity group</b>	<b>Control group</b>	<b>SOV</b>	<b>Sum of squares</b>	<b>df</b>	<b>Mean square</b>	<b>'F' ratio</b>
<b>Pre-Test</b>									
Mean	87.86	87.73	87.93	87.66	B:	0.66	3	0.22	0.02
SD	3.24	2.91	3.21	3.24	W:	558.93	56	9.98	
<b>Post-Test</b>									
Mean	95.40	94.06	91.66	88.06	B:	465.80	3	155.26	25.66*
SD	1.40	2.21	2.69	3.17	W:	338.80	56	6.05	
<b>Adjusted Post-Test</b>									
Mean	95.39	94.07	91.64	88.08	B:	663.42	3	154.47	25.82*
					W:	328.98	55	5.98	

\* 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.

It is clear from table I that the pre test mean scores secured by the high intensity group, medium intensity group, low intensity group and control group are, 87.86, 87.73, 87.93 and 87.66 respectively. The 'F' ratio of 0.02 arrived at by the statistical calculation is less than the table value of 2.776 required for df 3 and 56 at 0.05 level of significance on back strength. It is inferred that there is statistically no significant variation among different intensity groups and control group before the commencement of training programme.

The post test mean scores secured by the high intensity group, medium intensity group, low intensity group and control group are, 95.40, 94.06, 91.66 and 88.06 respectively. The 'F' ratio of 25.66 arrived at by the statistical calculation is greater than the table value of 2.776 required for df 3 and 56 at 0.05 level of significance. It reveals that all the four groups have demonstrated significant variations on back strength at the end of training programme.

The adjusted post-test mean scores secured by the high intensity group, medium intensity group, low intensity group and control group are, 95.39, 94.07, 91.64 and 88.08 respectively. The 'F' ratio of 25.82 arrived at by the statistical calculation is greater 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 back strength after adjusting the initial mean differences on the post-test means.

The results of the study indicated that there was a significant difference between the adjusted post test means of high intensity resistance training group, medium intensity resistance training group, low intensity resistance training group and control group on back strength.

Since, the obtained 'F' ratio for the adjusted post test mean was found to be significant, the Scheffe's test was applied to find out the paired means differences, if any among the groups and the results are presented in Table -II.

**TABLE II****SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST-TEST PAIRED MEANS OF BACK STRENGTH**

Adjusted Post-Test Means				Means Differences
High intensity group	Medium intensity group	Low intensity group	Control group	
95.39	94.07			1.32
95.39		91.64		3.75*
95.39			88.08	7.31*
	94.07	91.64		2.43*
	94.07		88.08	5.99*
		91.64	88.08	3.56*

\* Significant at 0.05 level.

The confidence interval required for significance at 0.05 level is 2.53

The table II shows that the adjusted post-test mean difference of back strength between control group and high intensity group, control group and medium intensity group and between control group and low intensity group are 7.37, 5.99 and 3.56 respectively which are higher than the confidence interval value of 2.53 at 0.05 level of significance. It is inferred that the ten weeks of different intensities of resistance training have significantly increased the back strength in three experimental groups as compared to the control group.

The mean difference between high intensity group and medium intensity group is 1.32 high intensity group and low intensity group is 3.75 which are more than the confidence interval value 2.53 at 0.05 level of significance. The result reveals that the high intensity group shows significant differences on back strength compared to the low intensity groups. However there is no significant difference in back strength between high and medium intensity resistance training group.

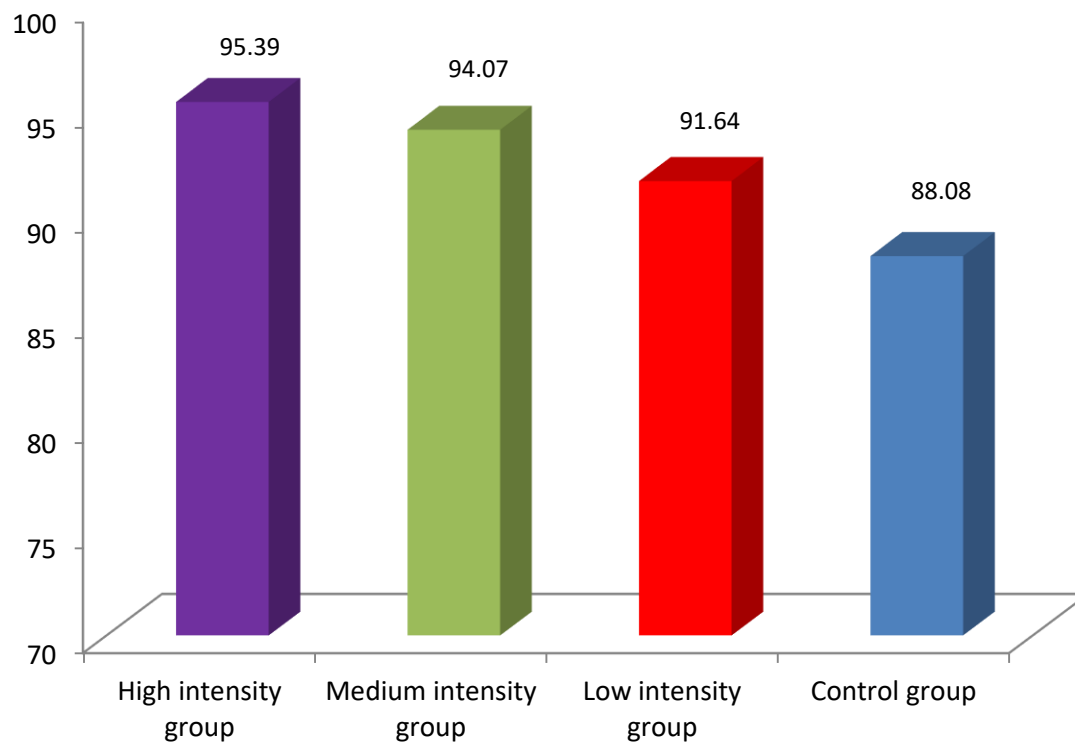
The mean difference between medium and low intensity groups is 2.43 and it is more than confidence interval value of 2.53 at 0.05 level of significance. The result shows that the medium intensity group shows significant difference on back strength as compared to low

intensity group, but the low intensity group shows significantly higher on back strength as compared to control group but less than the other intensity groups.

The details of back strength of three different intensity groups and control group are graphically illustrated in figures I.

**FIGURE I**

**THE ADJUSTED POST TEST MEAN VALUES OF DIFFERENT INTENSITIES OF RESISTANCE TRAINING GROUP AND CONTROL GROUP ON BACK STRENGTH**



## CONCLUSIONS

Based on the results of the study the following conclusions were drawn:

1. High, medium and low intensity training groups showed significant improvement in back strength as compared to control group.
2. The high and medium intensity progressive resistance training programme significantly improved back strength as compared to the low intensity training programme.
3. There was no significant difference between high and medium intensity training programmes in back strength.

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