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# Effects of High and Low Intensity Resistance Training on Anaerobic Power

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**Abstract**

*The purpose of the present study was to find the effect of high and low intensity resistance training on anaerobic power. For this purpose, forty five subjects studying forBachelordegree in the age group of 19-21 years were selected. They were divided into three equal groups andeach group consisted of fifteen subjects, in which group-I underwent high intensity resistance training, group- II underwent low intensity resistance training and group –III acted as control, who did not participate in any special training. The training period for this study was three days in a week for twelve weeks. Prior to and after the training period, the subjects were tested for anaerobic power. The analysis of covariance (ANCOVA) was used to find out the significant difference if any among anaerobic power separately. In all the cases, .05 level of confidence was fixed to test the significance. Since there was three groups were involved in this study, the scheffe's test was used as post hoe test. From the result it was concluded, after the high intensity and low intensity resistance training the improvement of anaerobic powersignificantly increased.*

**Keywords:** High intensity, low intensity, resistance training and anaerobic power.



## Introduction

Resistance training programme has gained great popularity in recent years. It acts as an integral part of a total strength and conditioning programme for the enhancement of athletic performance and also prescribed by many major health organization, recreational and clinical communities for improving health, fitness and also in rehabilitation. (Pearson *et al.,* 2000; ACSM, 2002; Chetlin, 2002). Resistance training programme for preadolescents and adolescents age groups, are generally similar (Fleck and Kraemer, 2004). Strength gains have been reported using adult and child sized weight machines, free weights, hydraulic machines, isometric exercises, wrestling drills, modified pull ups and calisthenics (Weltman et al., 1986, Faigenbaum, 1993, Ozmum *et al.,* 1994, Faigenbaum *et al.,* 1996). Furthermore, the latest research indicates that both children and adolescents can increase muscular strength as a consequence of strength training. This increase is strength is largely related to the intensity and volume of loading and appears to be the results of an increased neuromuscular activation of coordination, rather than muscle hypertrophy (Guy and Micheli, 2001).Reports indicated that resistance training may improve motor performance; strength of the muscles, ligaments and bones in youth (Faigenbaum, 2000]. In addition, resistance training helps to prevent or reduce injuries in sports and recreational activities and may favourably alter selected anatomic and psychosocial variables (Faigebaum et al., 1999). Resistance training has become popular among prepubescent and adolescents over the last decade and has received attention as an important component of youth fitness programme (Picosky *et al.,* 2002).

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## Methodology

The purpose of the study was to find out the effect of high and low intensity of resistance training on anaerobic power. To achieve this purpose of the study, forty-five men students studying in the Department of physical Education and sports sciences, Annamalai University, were selected as subjects at random. The selected subjects were divided into three groups of fifteen subjects each, such as high intensity resistance training group, low intensity resistance training group and control group. The group I underwent high intensity resistance training programme and group II underwent low intensity resistance training programme for three days per week for twelve weeks. Group III acted as control who did not participate in any special training programmes apart from their regular physical education activities as per their curriculum. Among the power parameter, the following variable namely anaerobic power was selected as criterion variable. All the subjects of three groups were tested on selected dependent variable at prior to and immediately after the training programme. The analysis of covariance was used to analyze the significant different, if any among the

groups. The 0.05 level of confidence was fixed as the level of significance to test the "F"ratio obtained by the analysis of covariance, which was considered as an appropriate. The Scheeff's test was used as post hoc test. The subjects participated in high intensity resistance training at 70 to 95% 1 RM and low intensity resistance training at 40 to 65% 1RM of each subjects has determined following protocol of Fleck and Kremer (2004). The training was given 45 to 60 min / day for three days/week for twelve weeks. The load was increase 5% once in two weeks.

**Results of the Study**

The data collected from all the three groups were statistically analyzed with Analysis of covariance (ANCOVA) as three groups were involved. Whenever the 'F' ratio was found to be significant, scheffe's test was used as post hoe test to determine which of the paired means differed significantly. In all cases the criterion for statistical significance was set at 0.05 level of confidence.

**Table I.** Analysis of covariance on anaerobic power of high and low intensity resistance –training and control groups

| | Group I | Group II | Group III | Source of variance | Sum of Squares | df | Mean squares | 'F' ratio |
|---|---|---|---|---|---|---|---|---|
| Pretest Mean | 99.30 | 98.79 | 98.54 | Between | 4.48 | 2 | 2.24 | 0.14 |
| SD | 4.29 | 3.61 | 4.21 | Within | 689.42 | 42 | 16.41 | |
| Posttest Mean | 104.47 | 110.35 | 98.88 | Between | 987.59 | 2 | 493.79 | 26.84* |
| SD | 4.55 | 4.71 | 3.50 | Within | 771.65 | 42 | 18.39 | |
| Adjusted Posttest Mean | 104.51 | 110.35 | 98.85 | Between | 990.27 | 2 | 495.13 | 26.42* |
| | | | | Within | 768.29 | 41 | 18.74 | |

*Significant at .05 level of confidence.
(The table values required for significance at .05 level of confidence for degree of freedom 2 and 41 is 3.23 and degree of freedom 2 and 42 is 3.22.)

The adjusted post test means on anaerobic power of high intensity resistance training, low intensity resistanc training and control group were 104.51, 110.35 and 98.85 respectively. The obtained 'F' ratio 26.42 was greater than the required table value of 3.23 for significance at 0.05 level of confidence with degrees of freedom 2 and 41. The result of the study shows that significant differences existed among the adjusted post test means of the high intensity resistance training, low intensity resistance training and control groups in anaerobic power.

**Table II.** Scheffe's post hoe test for the difference betweenthe adjusted post test mean of anaerobic power

| ADJUSTED POST TEST MEANS | | | | Confidence Interval |
|---|---|---|---|---|
| High Intensityresistance Training Group | Low Intensity resistance Training Group | Control Group | Mean Difference | |
| 110.35 | 104.51 | | 5.83* | 3.96 |
| 110.25 | | 98.85 | 11.49* | 3.96 |
| | 104.51 | 98.85 | 5.66* | 3.96 |

***Significant at .05 level of confidence**

Table-II indicates that the adjusted post test mean differences on anaerobic power between high intensity resistance training and low intensity resistance training groups, high intensity resistance training and control groups, and low intensity resistance training and control groups were 5.83,11.49 and 5.66 respectively, which were higher than the confidence interval value of 3.96 at 0.05 level of confidence.

**Discussions**

The result of the present study showed significant increase in anaerobic power for high and low intensity resistance training as compared to control group. Where as the increase was significantly higher intensity resistance training. Peak anaerobic power reflects short term anaerobic performance (Maliha et al., 2004). Factor determining the anaerobic performance include morphological (muscle architecture and fibre type). (Hetzeter et al., 1997) also observed that a 12 week resistance training programme with free weight and machines (3 times a week) did not improve the relative anaerobic power in adolescent male athletes. [Chromiak et al., 2004] showed that the relative anaerobic power of physically active adults increased significantly following a 10 weeks of periodised strength training programme consisting of 4 days of training a week.

**Conclusions**

1. There was a significant improved in anaerobic power for both high and low intensity resistance training as compared to control group**.**
2. There was a significant difference in anaerobic power for low intensity resistance training as compared to high intensity resistance training.

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