ISO 9001 - 2015

ISSN 2349 - 4891

Monthly

IJRRAS

IF
4.665

Volume 4,Issue 4, April 2017

International Journal of

# Recent Research and Applied Studies

SURRAGH PUBLICATIONS

ISSN: 2349 - 4891

International
Journal of Recent Research and Applied Studies
(Multidisciplinary Open Access Refereed e-Journal)

# Effect of High and Low Velocity Resistance Training on Speed Parameter of College Male Students

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Received 12th March 2017, Accepted 1st April 2017

**Abstract**

*The purpose of the study was to find out the effect of high and low velocity resistance training on speed parameter of college male students. To achieve the purpose of the study, forty five men students studying bachelor's of Engineering, Sri Sai-Ram Engineering College, Chennai, Tamil Nadu, India, were randomly selected and divided into three groups of fifteen each. The age of the subjects, ranged from 18 to 24 years. This study consisted of two experimental variables high velocity resistance training and low velocity resistance training. The allotment of groups was done at random, thus Group-I underwent high velocity resistance training, Group-II underwent low velocity resistance training for three days per week for twelve weeks, Group-III acted as control. All the subjects were tested prior to and after the experimentation period. The collected data were statistically treated by using ANCOVA, and 0.05 level of confidence was fixed to test the significance. When the obtained 'F' ratio was significant, Scheffe's post hoc test was used to find out the paired mean difference. The results of the study revealed that there was a significant difference among high velocity resistance training group, low velocity resistance training group as compared to control group on speed. And also it was found that there was a significant improvement on speed due to low velocity resistance training group as compared to high velocity resistance training group.*

**Keywords:** High velocity resistance training, Low velocity resistance training, Speed.



## Introduction

Resistance training, also known as strength or weight training is well established as an effective method of exercise for developing muscular fitness (i.e. the ability to generate muscle force). (Hass et al 2001, Fleck and Kraemer 2002) describes the primary goals of resistance training as improving muscular strength and endurance, while other health-related benefits derived from resistance training include, increase in bone mass, reduced blood pressure, increase muscle and connective tissue cross-sectional area (CSA), reduced body fat, and it may relieve low back pain. (Kraemer et al 2002) Although modern technology has reduced much of the need for high levels of force production during activities of daily living, it is recognized in both the scientific and medical communities that muscular strength is a fundamental physical trait necessary for health, functional ability, and enhanced quality of life. There are many sports which are specified and need to combine physical fitness components in order to access optimized performances. Despite development of needed biomotor abilities of each field is special and that's concerned with method training (Bompa, 1999). Velocity specificity is an important consideration when designing resistance training programs. It indicates that training adaptations increased strength and power are greatest at or near the training velocity Kanehish and Miyashita (1983). However, there exists a conflicting hypothesis that the intention to move a barbell, one's own body, or any other object explosively is more important than the actual movement velocity in determining velocity-specific responses of the neuromuscular system to resistance training Behm and Sale (1993). Thus the present study was undertaken to explore the effect of high and low velocity resistance training on speed.

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## Methodology

The purpose of the study was to explore the effect of high velocity and low velocity resistance training on speed. To achieve the purpose of the study, forty five men students studying bachelor's degree in the department of Engineering, Sri Sai-Ram Engineering College, Chennai, Tamil Nadu, India, were selected as subjects at random. The selected subjects were randomly divided in to three groups and each group consists of fifteen subjects. The group were randomly segregated as high velocity resistance training group, low velocity resistance training group and control group. The group-I underwent high velocity resistance training programme, group –II underwent low velocity resistance training programme for three days per week for twelve

weeks. Group-III acted as control and they did not participate in any special training programmes. The dependent variable selected was speed and was assessed by 50 meter dash. The subjects of all three groups were tested on selected dependent variables, prior to and immediately after the training programme.

**Training Protocol**

The experimental group-I underwent low velocity resistance training and group-II underwent high velocity resistance training regimen for a period of twelve weeks. The training regimen for high and low velocity resistance training consisted three set of eight exercises per day, three days per week. After selecting the exercise 1 RM was found for each exercise separately. 1RM is the maximum amount of weight a person can successfully lift one time only through the full range of motion. The low velocity resistance training group performed the selected resistance exercises with an effort of 75% load. They were asked to perform 5 repetitions with in 10 sec with 90 sec relief in between the exercises. Three sets were repeated with a complete rest of 5 minutes, one repetition was increased once in two weeks up to six weeks. Thereafter load was increased by 5% and they were asked to perform the overload 5 repetition within 10 sec. three sets were repeated with a complete rest of 5 minutes one repetition was increased once in two weeks up to 12weeks. The high velocity resistance training group performed the selected resistance exercises with an effort of 75%load. They were asked to perform 5 repetitions with in 8 sec with 90 sec relief in between the exercises. Three sets were repeated with complete rest of 5 minutes, one repetition was increased once in two weeks upto six weeks. Thereafter load was increased by 5% and they were asked to perform the overload 5 repetition within 8 sec,. three sets were repeated with a complete rest of 5 minutes, one repetition was increased once in two weeks up to 12 weeks.

**Statistical Technique**

The data collected from the three groups prior to and post experimentation were statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). Since three groups were involved, whenever the obtained F ratio was found to be significant for adjusted post test means, the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases statistical significance was fixed at .05 levels.

**Result of the study**

Table 1
*ANACOVA for before training and after training on speed of experimental and control groups*

| | **LVRTG** | **HVRTG** | **CG** | **SOV** | **SS** | **df** | **MS** | **'F' ratio** |
|---|---|---|---|---|---|---|---|---|
| Before Training Mean | 7.32 | 7.35 | 7.31 | B | 0.015 | 2 | 0.008 | 1.29 |
| SD | 0.07 | 0.09 | 0.06 | W | 0.248 | 42 | 0.006 | |
| After training Mean | 6.91 | 6.87 | 7.30 | B | 1.67 | 2 | 0.836 | 15.15* |
| SD | 0.29 | 0.27 | 0.05 | W | 2.31 | 42 | 0.055 | |
| Adjusted Posttest Mean | 6.91 | 6.90 | 7.28 | B | 1.33 | 2 | 0.666 | 13.74* |
| | | | | W | 1.98 | 41 | 0.048 | |

*Significant F = (df 2,42 ) (0.05 ) = 3.22 ; (P ≤ 0.05 ) and F = (df 2,41 ) (0.05 ) = 3.23 ; (P ≤ 0.05 )

The adjusted post test mean values on speed of LVRTG, HVRTG and CG were 6.91, 6.90 and 7.28 respectively. The obtained 'F' ratio of 13.74 for adjusted post test scores was greater than the table value of 3.23 for df 2 and 41 required for significance at 0.05 level of confidence on speed. The results of the study indicated that there was significant difference between the adjusted post test means of LVRTG, HVRTG and CG on Speed.

Table 2
*Scheffe's post hoc test for the adjusted post-test paired mean differences on speed*

| ADJUSTED POST TEST MEANS | | | | Confidence Interval |
|---|---|---|---|---|
| **LVRTG** | **HVRTG** | **CG** | **Mean Difference** | |
| 6.91 | 6.90 | | 0.01 | 0.20 |
| 6.91 | | 7.28 | 0.37* | 0.20 |
| | 6.90 | 7.28 | 0.38* | 0.20 |

*Significant, ($p \leq 0.05$)

The table 2 shows that the adjusted post-test mean differences in speed between control and LVRTG and between control and HVRTG are 0.37 and 0.38 respectively, which are higher than the confidence interval value of 0.20. It is found that the all velocity groups improved in speed as compared to CG as a result of different velocities resistance training. Between LVRTG and HVRTG, the mean difference 0.01 is lower than the confidence interval value of 0.20. It may be concluded that no significant difference exists in speed among these two groups.

**Discussion on finding**

The result of present investigation showed significant increase in speed for both HVRTG and LVRTG as compared to CG. There was no significant difference between HVRTG and LVRTG in speed. There are many studies to support of finding of the present study. Tsimahidis et al (2010) have found that 10 week heavy resistance combined with a running training have significantly improved running speed. Maio Alves et al (2010) have concluded CCT induced the performance increase in 5 and 15m sprint and in squat jump it was suggested that the CCT is an adequate training strategy to develop soccer player muscle power and speed. Delecluse et al (1995) have found that high resistance and high velocity training significantly improved the sprint performance. Sole et al (2013) have found that significant effect as well as individual's results. It is possible that HRW protocols could be used as an acute method to improve agility performance in some court sport athletes. Mathisen and Petterson (2015) have found that short burst high intensity training increased speed and agility performance in junior soccer player.

**Conclusion**

1. There was a significant increase in speed for both low velocity resistance training group and high velocity resistance training group as compared to control group.
2. There was no significant difference between low velocity resistance training group and high velocity resistance training group in speed.

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