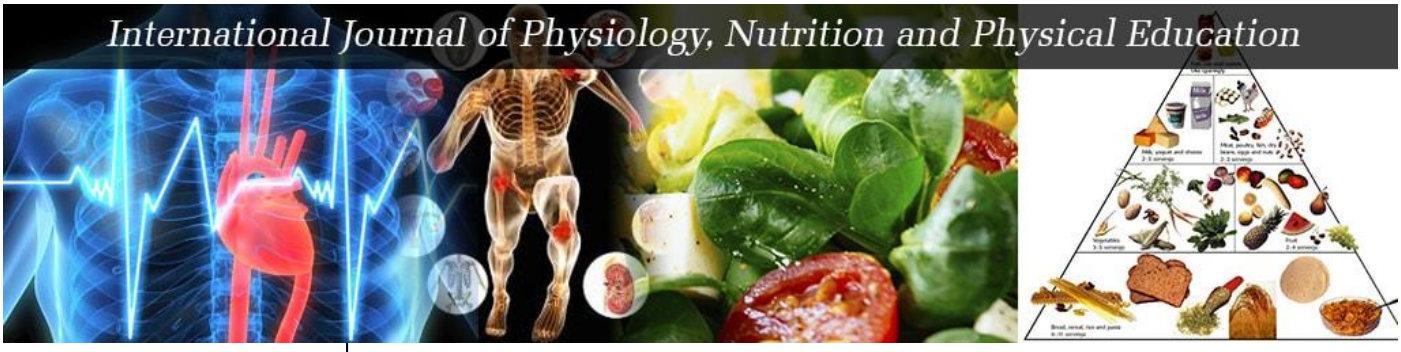

ISSN: 2456-0057
IJPNPE 2019; 4(1): 1388-1390

www.journalofsports.com
Received: 28-11-2018
Accepted: 30-12-2018

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Effect of high and low velocity resistance training on agility of college male students

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Abstract
The purpose of the study was to find out the effect of high and low velocity resistance training on agility 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 agility. And also it was found that there was a significant improvement on agility due to low velocity resistance training group as compared to high velocity resistance training group.

Keywords: High velocity resistance training, low velocity resistance training, agility

Introduction
Resistance training is an effective method to induce changes in muscular strength, hypertrophy, and power Gonzalez & Sanchez (2010) [5]. In order to optimize resistance training programs, specifically designed to increase the athletic performance of different sports disciplines, coaches can manipulate many variables such as load, the number of sets and repetitions, types of exercise, order and velocity of movement which all induce different physiological and neuromuscular adaptations Jovanovic & Flanagan (2014) [6]. Normally training intensity and volume have been the most studied topics while movement velocity has been often overlooked Gonzalez *et al* (2015). However, enhancing the rate of force development (RFD), a measure of how fast an individual can develop force is essential in most Olympic sports. RFD has been shown to increase after explosive strength training and is, therefore, used as a measure of the effectiveness of a training program Maffiuletti *et al* (2016) [8]. Until recently exercise intensity and degree of effort have been prescribed as the percentage of the one repetition maximum (1RM) in different exercises, allowing the estimation of the relative load of different numbers of repetitions and sets. An alternative method gaining more attention especially when the improvement of sport related performance is the main goal is normalizing intensity based on the measure of velocity during the concentric portion of the repetition cycle of the major strength exercises together with the creation of the velocity/load profile.

More recently, the movement velocity of repetitions has been extensively studied as a way of monitoring exercise intensity Gonzalez *et al* (2011) [3]. This method, known as velocity based training (VBT) allows to estimate the % 1RM from the actual velocity of each repetition, without performing demanding maximal tests to adjust training loads. This method allows estimating the daily readiness (or daily 1RM) and monitors the decrease in velocity within each set to manage the accumulation of fatigue. Previous studies with strength and top-level athletes have related the velocity of the bar and load lifted, proving the validity of the

estimation of 1RM percentage based on movement velocity Loturco *et al* (2016) [7]. 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) [1]. Thus the present study was undertaken to explore the effect of high and low velocity resistance training on agility.

Methodology

The purpose of the study was to explore the effect of high velocity and low velocity resistance training on agility. 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 agility 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 12 weeks. 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 Agility of Experimental and Control Groups

	LVRTG	HVRTG	CG	SOV	SS	df	MS	'F' ratio
Before Training Mean	11.92	11.89	11.90	B	0.005	2	0.002	0.003
SD	0.84	0.90	0.85	W	31.69	42	0.75	
After training Mean	10.55	10.42	11.92	B	20.56	2	10.28	26.08*
SD	0.63	0.57	0.66	W	16.55	42	0.39	
Adjusted Posttest Mean	10.55	10.43	11.92	B	20.55	2	10.27	111.43*
				W	3.78	41	0.092	

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

Table - 1 shows that the before experimental intervention mean in agility of LVRTG, HVRTG and CG are 11.92, 11.89 and 11.92 respectively. The 'F' ratio of 0.003 for the three groups obtained for the pre-test is lower than table value of 3.22 at 0.05 level. It shows that there is no significant difference among the three groups before the commencement of training. After experimental intervention the mean of LVRTG is 10.55, HVRTG is 10.42 and CG is 11.92. The 'F' ratio of 26.08 indicates that there is statistically significant difference among the three groups in the post-test, since the table value required for significance at 0.05 level with df 2 and 42 is 3.22. Further, the adjusted post-test means of LVRTG, HVRTG and CG are 10.55, 10.43 and 11.92 respectively and its 'F' ratio of 111.43 is more than the table value 3.23 at 0.05 level with df 2 and 41 required for significance at 0.05 level. The result of the study reveals that there is significant variation in agility between the three groups after the training period. Scheffe' S test was applied to determine which of the paired means had significant difference. The result of the follow up test is presented in table 2.

Table 2: Scheffe' s Post Hoc Test for the adjusted post-test paired mean differences on Agility

adjusted post test MEANS				Confidence Interval
LVRTG	HVRTG	CG	Mean Difference	
10.55	10. 43		0.12	0.28
10.55		11.92	1.37*	0.28
	10..43	11.92	1.49*	0.28

*Significant, ($P \leq 0.05$)

The table 2 shows that the adjusted post-test mean differences in agility between CG and LVRTG and between CG and HVRTG are 1.37 and 1.49 respectively, which are higher than the confidence interval value of 0.28. It is found that the both the velocity groups improved in agility as compared to CG. Between LVRTG and HVRTG the mean difference is 0.12 and it is lower than the confidence interval value of 0.28. It may be concluded that no significant difference in agility among these two experimental groups. The findings of the study reveal that regular training of different velocities resistance programme has resulted in a significant increase on agility for LVRTG and HVRTG as compared to CG. But there is no significant difference in agility between LVRTG and HVRTG.

Discussion on Finding

The result of present investigation showed significant increase in agility for both HVRTG and LVRTG as compared to CG. There was no significant difference between HVRTG and LVRTG in agility. There are many studies to support of finding of the present study. Tsimahidis *et al*. (2010) [13] have found that 10 week heavy resistance combined with a running training have significantly improved running agility. Maio Alves *et al*. (2010) [9] 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 agility. Delecluse *et al*. (1995) [2] have found that high resistance and high velocity training significantly improved the sprint performance. Sole *et al*. (2013) [12] 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) [10] have found that short burst high intensity training increased agility and agility performance in junior soccer player. Negra *et al*. (2016) [11] have found in-season low-to-moderate load HVRT conducted in combination with regular soccer training is a safe and feasible intervention that has positive effects on maximal strength, vertical and horizontal jump and sprint performance as compared with soccer training only.

Conclusion

1. There was a significant increase in agility 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 agility.

Reference

1. Behm DG, Sale DG. Intended Rather than Actual Movement Velocity Determine Velocity-Specific Training Response. J Appl Physiol. 1993; 74:359-368.
2. Delecluse C, Van Coppenolle H, Willems E, Van Leemputte M, Diels R, Goris M. Influence of High-Resistance and High-Velocity Training on Sprint Performance. Med Sci Sports Exerc. 1995; 27(8):1203-9.
3. Gonzalez-Badillo JJ, Marques MC, Sanchez-Medina L. The importance of movement velocity as a measure to control resistance training intensity. J Hum. Kinet. 2011; 29:15-19.
4. González-Badillo JJ, Pareja-Blanco F, Rodríguez-Rosell D, Abad-Herencia JL, Del Ojo-Lopez JJ, Sanchez-Medina L. Effects of velocity- based resistance training on young soccer players of different ages. J. Strength Cond. Res. 2015; 29:1329-1338.
5. González-Badillo JJ, Sánchez-Medina L. Movement velocity as a measure of loading intensity in resistance training. Int. J. Sport Med. 2010; 31:347-352.
6. Jovanovic M, Flanagan E. Researched applications of velocity based strength training. J Aust. Strength Cond. 2014; 22:58-68.
7. Loturco I, Kobal R, Moraes EJ, Kitamura K, Abad CCC, Pereira AL *et al*. Predicting the maximum dynamic strength in bench press: The high precision of the bar velocity approach. J Strength Cond. Res. 2016; 31:1127-1131.
8. Maffiuletti NA, Aagaard P, Blazevich AJ, Folland J, Tillins N, Duchateau J. Rate of force development: Physiological and methodological considerations. Eur. J Appl. Physiol. 2016; 116:1091-1116.
9. Maio Alves JM, Rebelo AN, Abrantes C, Sampaio J. Short-term Effects of Complex and Contrast Training in Soccer Players' Vertical Jump, Sprint, and Agility Abilities. J Strength Cond Res. 2010; 24(4):936-41.
10. Mathisen G, Pettersen SA. Effect of High-Intensity Training on Speed and agility Performance in 10-year-Old Soccer Players. J Sports Med Phys Fitness. 2015; 55(1, 2):25-9.
11. Negra Y, Chaabene H, Hammami M, Hachana Y, Granacher U. Effects of high-velocity resistance training on athletic performance in prepuberal male soccer athletes. J Strength Cond Res. 2016; 30(12):3290-3297.
12. Sole CJ, Moir GL, Davis SE, Witmer CA. Mechanical Analysis of the Acute Effects of a Heavy Resistance Exercise Warm-up on Agility Performance in Court-Sport Athletes. J Hum Kinet. 2013; 39:147-56.
13. Tsimahidis K, Galazoulas C, Skoufas D, Papaiakovou G, Bassa E, Patikas D *et al*. The Effect of Sprinting after Each Set of Heavy Resistance Training on the Running Speed and Jumping Performance of Young Basketball Players. J Strength Cond Res. 2010; 24(8):2102-8.