

Effect of Ballistic Resistance Training on Selected Physical Fitness Variables

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Abstract

The purpose of the study was to find out the effect of ballistic resistance training on selected physical fitness variables. To achieve this purpose of the study 30 men students studying Physical Education and Sports Science, Annamalai University, Annamalai Nagar, were selected as subjects at random. The selected subjects were randomly divided into two groups and each group consists of fifteen subjects each, such as ballistic resistance training and control group. The group-I underwent ballistic resistance training programme for three days per week for twelve weeks, group-II acted as control, they did not participate any special training programmes apart from their regular physical education activities as per their curriculum. Among the physical fitness variables the following variables namely speed and leg strength was selected as criterion variables. All the subjects of two groups were tested on selected dependent variables at prior to and immediately after the training programme. The analysis of covariance was used to analysis the significant difference, 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 results of the study revealed that there was a significant difference among ballistic resistance training group and control group on speed and leg strength. And also it was found that there was a significant improvement on speed and leg strength due to ballistic resistance training.

Key words: Ballistic resistance training, speed, leg strength.

Introduction

Physical fitness is one of the fundamental importance of all human beings, a man cannot move even an inch without proper amount of physical fitness. Many prominent people in the field of medicine and in other fields have spoken and written about the need for exercise to maintain an organically sound body from birth to old age. Functioning of this body requires energy, which depends on the ability of the heart, lungs and blood vessels to process oxygen and deliver it to the muscles where it becomes the fuel for energy.

The ballistic training is the nearly a modern way which join between plyometric training with weights but includes nearly light weights with high speed. The ballistic training is one of the methods used to over come the lack of speed in the traditional training through the full domain of motion. We see that ballistic movement is defined as the movement which is performed by the muscles but it continues by the quantity of movement in parties.

Speed plays a vital role in most of the sports and games. Speed, mostly in the form of acceleration speed is an important factor. It can make the difference as to whether a performer is able to gain an advantage over his opponent in most of the competitions or not. It determines how quickly a performer can respond completely and correctly to a given situation.

Strength is defined as the ability of the muscle to work. Maximum strength is sometimes defined as the greatest possible weight that a muscle or a group of muscles can lift for maximum repetitions. It is also reported that maximum strength is fixed as the biggest possible strength that the neuromuscular system can develop with maximum constriction (Mc Ardle Katch and Katch, 2000).

Methodology

The purpose of the study was to find out the effect of ballistic resistance training on selected physical fitness variables. To achieve this purpose of the study 30 men students studying Physical Education and Sports Sciences, Annamalai University, Annamalai Nagar were selected as subjects at random. The selected subjects were randomly divided into two groups and each group consists of fifteen subjects each, such as ballistic resistance training and control group. The group-I underwent ballistic resistance training programme, for three days per week for twelve weeks. Group-II acted as control group, they did not participate any special training programmes apart from their curriculum. Among the physical fitness variables the following variables namely, speed and leg strength was selected as criterion variables. All the subjects of two groups were tested on selected dependent variables at prior to and immediately after the training programme. The ballistic resistance training was given with a load of 30 – 50% of their 1 RM (Fleus and Kraremer). Throughout the muscles are made to exert force with high velocity the ballistic resistance training group underwent the following exercise, jump squat, split squat jump, high knee action jogging with weight, leg curl and bench press 4% load increase for every alternative week. Each exercise was performed 3 to 5 repetitions and 5 sets, station recovery 90 sec and 180 sec set recovery. The analysis of covariance was used to analyse the significant difference if any among the groups. The 0.05 level of confidence was fixed as the significance 'F' ratio and was considered as appropriate.

Result of Study

Analysis of covariance on speed and leg strength of pre and post test for ballistic resistance training and control group was analysed and presented in table-1.

The adjusted post-test mean on speed of ballistic resistance training is 6.60 and control group is 7.10. The obtained 'F' ratio of 23.87 for adjusted post-test mean is more than the table value of 4.21 required for significance at 0.05 level of df 1 and 27. The results of the study showed that there was a significant difference among two groups on speed. The adjusted post-test mean on leg strength of ballistic resistance training is 90.67 and control group is 80.32. The obtained 'F' ratio of 44.69 for adjusted post-test mean is more than the table value of 4.21 required for significance at 0.05 level of df 1 and 27. The results of the study showed that there was a significant difference among two groups on leg strength.

Table-1
Analysis of covariance for pre and post test data on speed and leg strength of ballistic resistance training and control group

	Test	Ballistic Resistance Training	Control Group	Source of Variance	Sum of Square	df	Mean Square	F Ratio
Speed	Pre-test							
	Mean	7.22	7.25	Between	0.0083	1	0.0083	0.0
	S.D	0.39	0.29	Within	3.40	28	0.12	6
	Post-test							
	Mean	6.59	7.12	Between	2.07	1	2.07	15.
	S.D	0.40	0.31	Within	3.69	28	0.13	68*
	Adjusted Post-test							
	Mean	6.60	7.10	Between	1.89	1	1.89	23.
			Within	2.14	27	0.079	87*	
Leg Strength	Pre-test							
	Mean	79.66	79.80	Between	0.13	1	0.13	0.0
	S.D	3.88	3.44	Within	377.73	28	13.49	1
	Post-test							
	Mean	90.66	80.33	Between	800.83	1	800.83	44.
	S.D	5.06	3.15	Within	498.66	28	17.81	96*
	Adjusted Post-test							
	Mean	90.67	80.32	Between	804.34	1	804.34	44.
			Within	485.94	27	17.99	69*	

Required table value for significance at 0.05 level of confidence for df 1 and 27 & df 1 and 27 is 4.21.
 *Significant at 0.05 level. df – degree of freedom, S.D – Standard Deviation

Discussion

Cormie, P. *et al.* (2010) reveal ballistic power training improve the maximal strength. Winchester, J.B. *et al.* (2008) ballistic resistance exercise improve the maximum strength. Dinn, N.A., Behm, D.G. (2007) dynamic training improve punching speed. Olsen, P.D., Hopkins, W.G. (2003) ballistic training and resistance training improve speed. Due to ballistic resistance training in the present investigation also improve speed and leg strength. The finding of this study showed that the speed and leg strength has improve due to the ballistic resistance training compared to the control group. Ballistic can place considerable eccentric force on joints, ligament and tendons fat twitch motor unit. Ballistic lifts force the muscles to produce the greatest amount of force in the shortest amount of time. In accordance with muscle fibers are recruited from a low to a high threshold as force requirements increase. All these has positively influence the athlete and improve the speed and leg strength the subject of this research.

Conclusion

The results of study reveal that there was a significant improvement after the 12 weeks of ballistic resistance training in improve the speed and leg strength as compare to the control group.

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