Effect of 8 Weeks Plyometric Training on Selected Motor Abilities of the Male Jumpers

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Abstract

The purpose of thestudy was to determine the effect of 8 weeks plyometric training on the selected motor abilities namely speed, explosive strength and agility of the male jumpers. For the purpose of the study 50 male long jumpers in the age range of 17-30 years wereselected from different coaching centers of Delhi who were further randomly divided into two equal groups (25 each in experimental group and control group). The experimental group underwent plyometric training twice a week for 8 weeks with each session consisting of 30-45 minutes duration with additional warm up time. A week schedule was repeated to the proceeding week and the load was adjusted progressively by 10%. The control group was not allowed to take part in the specific experimental training except their daily general warming up and normal activities. The 40m sprint test, standing broad jumpand shuttle run test (10× 4) were the criterion measure for speed, explosive strength and agility of the male jumpers which were employed before and after the training (Pre Test and Post Test). Analysis of Covariance was employed as the statistical tool for the study. The findings of the study showed a significant difference in the speed and explosive strengthof the experimental group (6.90 sec and 2.61 m) and control group(7.06 sec and 2.51 m) as the adjusted posttest means obtained were 4.305 and 8.22 $p \leq 0.05$.

KEYWORDS: Speed, Explosive Strength, Agility, Standing Broad Jump, Shuttle Run.

Introduction

Plyometrics are the training techniques used to improve the explosiveness and strength of athletes in all types of sports (Chu, 1998). This training technique consists of rapid stretching of muscle (eccentric action) immediately followed by shortening (concentric action) of the same muscle (Baechle and Earle, 2000). Researchers have shown that different plyometric training programmes contributes to the improvements in vertical jump performance, acceleration, leg strength, muscular power, increased joint awareness, and overall proprioception (Anderst et al., 1994; Brown et al., 1986 and Clutch et al., 1983). The usual plyometric drills involve stopping, starting, and changing directions in an explosive manner. These movements are components that can assist in developing fitness variables and improving muscular speed and power. Some plyometric training programmes also improves the agility, flexibility and controls body position while quickly changing direction during a series of movements. The term plyometric involves the muscles working both concentrically and eccentrically. Plyometric is based upon the belief that a rapid lengthening of muscles just prior to the contraction will result in much stronger contraction. The added contractile strength is believed to be due to a stretch of muscle spindles

involving the myotaric reflex and resulting in an increased frequency of motor unit discharge. Plyometric training is one of the best methods to develop explosive power for sports. Basically plyometric's provide a method to train for the optimum relationship between strength and speed which will ultimately manifest itself as explosive power. Today plyometric movements are performed in almost all sports.Therefore, this study was conducted to determine the effect of 8 weeks plyometric training on the selected motor abilities namely speed, explosive strength and agility of the male jumpers of Delhi.

Methodology

For the purpose of the study 50 male long jumpers in the age range of 17-30 years were selected from different coaching centers of Delhi who were further randomly divided into two equal groups (25 each in experimental group and control group). The experimental group underwent plyometric training twice a week for 8 weeks with each session consisting of 30-45 minutes duration with additional warm up time. The training session was as follows:

Day I	Day II
➢ Depth jumps - 3 sets x 8-10 reps ➢ Over the Back Toss - 3 sets x 8-10 reps ➢ Lateral High Hops - 3 sets x 8-10 reps ➢ Squat Throws from Chest - 3 sets x 8-10 reps	➢ Single Arm Throws - 3 sets x 8-10 reps ➢ Hurdle Jumps - 3 sets x 8-10 reps ➢ Wall Throws - 3 sets x 8-10 reps ➢ Lateral Barrier Jumps - 3 sets x 8-10 reps

A week schedule was repeated to the proceeding week and the load was adjusted progressively by 10%. The control group was not allowed to take part in the specific experimental training except their daily general warming up and normal activities. The 40m sprint test, standing broad jump and shuttle run test (10× 4) were the criterion measure for speed, explosive strength and agility of the male jumpers which were employed before and after the training (Pre Test and Post Test). Analysis of Covariance was employed as the statistical tool for the study.

Findings

Table – I: Effect of 8 Weeks Plyometric Training on Selected Motor Abilities of the Male Jumpers

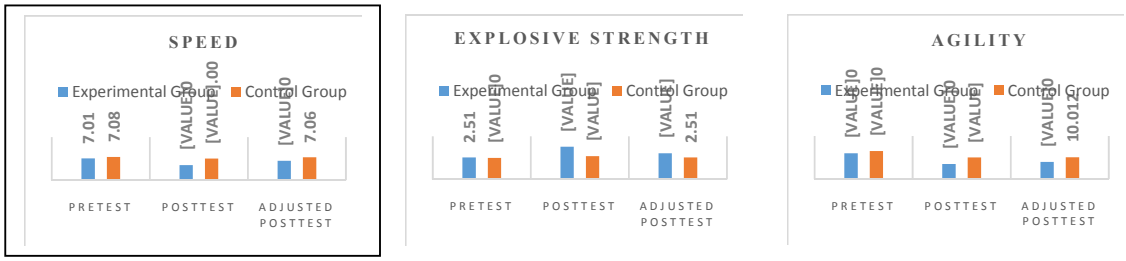
Motor Abilities	Group	Pre-test	F-ratio	Post-test	F-ratio	Adjusted Post-test	F-ratio
Speed	**Experimental**	7.01	0.647	6.70	1.668	6.90	4.305*
	Control	7.08		7.00		7.06	
Explosive Strength	**Experimental**	2.51	0.265	2.76	8.22*	2.61	7.623*
	Control	2.50		2.54		2.51	
Agility	**Experimental**	10.20	0.556	9.70	0.789	9.800	0.789
	Control	10.30		10.01		10.012	

***Significant at 0.05 level**

Table- I clearly shows that before the 8 weeks plyometric trainingtheexperimental group and control groupwere not significantly different in all the three selected motor

abilities. But after undergoing 8 weeks plyometric training, analysis of covariance showed significant differences between the experimental group and control groupin the adjusted posttest of speed and explosive strength. While no significant difference was obtained for agility.

The mean values of the selected motor abilities of the male long jumpers of Delhi before and after the 8 weeks plyometric training has been graphically represented in



the figure 1.

FIG. 1: Effect of 8 Weeks Plyometric Training on Selected Motor Abilities of the Male Jumpers

Discussion on the Findings

The study clearly showed that 8 weeks plyometric training has positive effects on the speed, explosive strength and agility of the male jumpers of Delhi. The speed of the male jumpers in the experimental group has improved from 7.01 sec (pre-test) to 6.70 sec (post-test) and 6.90 sec (adjusted post-test) while the speed of the control group had varied from 7.08 sec (pre-test) to 7.00 sec (post-test) and 7.06 sec (adjusted post-test). When compared using analysis of covariance, the experimental group and control group were not found significantly different in the pre-test and posttest as the 'f' values obtained were 0.647 and 1.668 $p>0.05$ while both the groups were found significant different for adjusted posttest as the 'f' value obtained was 4.305 at $p\leq0.05$. Similarly the explosive strength of the male jumpers in the experimental group has improved from 2.51 m (pre-test) to 2.76 m (post-test) and 2.61 m (adjusted post-test) while the explosive strength of the control group had varied from 2.50 m (pre-test) to 2.54 m (post-test) and 2.51 m (adjusted post-test). When compared using analysis of covariance, the experimental group and control group were not found significantly different in the pre-test as the 'f' value obtained was 0.265 $p>0.05$ while both the groups were found significantly different for posttest and adjusted posttest as the 'f' values obtained were 8.220 and 7.623 at $p\leq0.05$. The agility of the male jumpers in the experimental group has improved from 10.20 sec (pre-test) to 9.70 sec (post-test) and 9.80 sec (adjusted post-test) while the agility of the control group had varied from 10.30 sec (pre-test) to 10.01 sec (post-test) and 10.012 sec (adjusted post-test). When compared using analysis of covariance, no significant difference was found between the experimental group and control group for the pre-test, posttest and adjusted posttest as the 'f' values obtained were 0.556, 0.789 and 0.789 respectively at $p>0.05$.The results of this study indicating improvement in the motor abilities variables namely speed, explosive strength and agility are in agreement with the similar findings reported by *Karimian, (1993); Arabi, (1994) Matavulj et al (2001); Toumiet al (2004); Wisloff et al (2004);*.The plyometric exercises lead to the increased power and potency in the legs and speed in the runners. The activation of the motor blocks to induce an extreme and powerful contraction and the fast rocker movement in the involved muscles, and also increased movement speed is due to the

plyometric exercises. Summoning more motor blocks and muscle strands related to them and reduced reaction time are also because of such exercises (*Fox and Mathews, 2003*).

Speed is the ability to produce muscular forces very rapidly and is therefore very important in jumping performance. Plyometric exercises are specialized exercises that enable a muscle to reach maximal strength in the shortest space of time. This works by stretching a muscle and then relying on its elastic properties to produce greater forces than are normally possible in the reflex contraction (as the muscle returns to it's resting length). In order to achieve this greater muscular force, the muscle must contract with in the shortest possible time following lengthening *(www.playtheball.com).* It can be speculated that improvements were a result of enhancedmotor unit recruitment patterns as suggested by *Potteiger et al (1999).*Another possible reason can be neural adaptation which can occur when athletes respond or react as a result of improved co-ordination between the CNS signal and proprioceptive feedback as mentioned by *Craig (2004).*

Conclusion

Results of the study show that 8 weeks Plyometric training has significant effect on the selected motor abilities namely speed, explosive strength and agility of the male jumpers. Thus there is need to undergo Plyometric training if one wants to get the improvement in jumping performance for competitions.

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