

Sports are universal appeal has led to sport gaining recognition as a simple, low cost and effective medium for achieving key developmental goals-A review

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Abstract

The purpose of the present study was to find out the Effect of Ladder Training, Plyometric Training and Combined Training on Agility Performance of Inter Collegiate Male Athletes. For this study, sixty (N=60) athletes who participated in Anna University Erode Zone inter collegiate Athletic meet in the event of sprinting was randomly selected as subjects. Their age ranged from 18 to 21 years. The subjects were assigned at random into four groups of fifteen each (n=15). Group-I underwent Ladder training, Group-II underwent Plyometric training, Group-III underwent combined Ladder training and Plyometric training and Group-IV acted as Control. The age group of the subjects ranged from 18 to 21 years. The dependent variables selected for this study was Agility. Agility was assessed by 4x10 meter shuttle run test. All the subjects were tested prior to and immediately after the Experimental period on the selected dependent variables. The data obtained from the experimental groups before and after the experimental period were statistically analyzed with dependent 't'-test and Analysis of covariance (ANCOVA). Whenever the 'F' ratio for adjusted post-test means was found to be significant, the Scheffe's test was applied as post-hoc test to determine the paired mean differences. The level of confidence was fixed at 0.05 level for all the cases. The results of the study showed that the experimental groups namely, Ladder Training group, Plyometric Training group and Combined Ladder Training and Plyometric Training group had significantly improved in Agility.

Key words: 1.Ladder training, 2.Plyometric Training, 3.Combined Ladder Training and Plyometric Training, 4.Agility.

Introduction

Sports are universal appeal has led to sport gaining recognition as a simple, low cost and effective medium for achieving key developmental goals. Sport form is an inspirable part of the system of physical education. Physical education offers opportunities in competitive situations for physical, social, emotional and moral developments. Sports and Games are the best ways to earn social recognition and acquire a status in the modern society. Sports and games in the modern era occupy a very prominent and important place in the life of people and also in every sphere of life. Sport consists of physical activity carried out with a purpose for competition, for self-enjoyment, to attain excellence, for the development of a skill, or more often, some combination of these. Sports differ in their dependence upon a set of individuals or team skills, as well as in the ways in which they have their participants compete. As fitness and sports go hand in glove there is a need to develop the ability in an individual to play the game with good skill and perform consistently well (Baechle,1994).

Training is an educational process. People can learn new information, re-learn and reinforce existing knowledge and skills, and most importantly have time to think and consider what new options can help them improve their effectiveness at work. Effective training conveys relevant and useful information that inform participants and develop skills and behaviors that can be transferred back to the workplace.

Ladder drills are an important part of many team sport workouts. They require athletes to move their feet quickly in a precise and specified motion. Athletes must pay attention to perform the agility ladder drills accurately and quickly. Agility ladder drills benefit an athlete by teaching him to move in a swift yet deliberate fashion. This is important for athletes of every shape and size.

Ladder training is the multi-directional training, because the elements of strength, power, balance, agility, co-ordination, proprioception, core and joint stability, foot speed, hand eye coordination, reaction time and mobility. Each component should be integrated in to daily training session. Ladder skills are fun and functional ways to teach movement skills. By training, the mind and body to understand a verity of foot combinations (**Jamil et al., 2015**).

Plyometrics is a type of exercise training designed to produce fast, powerful movements, and improve the functions of the nervous system, generally for the purpose of improving performance in sports (**Holcomb, 1996**). Plyometrics are training techniques used by athletes in all types of sports to increase strength and Explosiveness (**Chu, 1998**). Performance of a number of individual and team sports that require jumping, kicking, and Sprinting rely heavily on explosive leg power. Consequently, during the past decades much effort from both coaches and researchers has been focused on determining the optimal training methods for the development of leg power and dynamic athletic performance. Currently, to enhance muscle power and dynamic performance athletes commonly use (a) heavy resistance training (80-90% of maximal load) and (b) explosive- type training in a form of either explosive (ballistic) resistance training (30-60% of maximal load) or plyometric training.

Methodology

For this study, sixty (N=60) athletes who was participated in Anna University Erode Zone inter collegiate Athletic meet in the event of sprinting was randomly selected as subjects. Their age ranged from 18 to 21 years. The subjects were assigned at random into four groups of fifteen each (n=15). Group-I underwent Ladder training, Group-II underwent Plyometric training, Group-III underwent combined Ladder training and Plyometric training and Group-IV acted as Control. The age group of the subjects ranged from 18 to 21 years. The dependent variables selected for this study was Agility. Agility was assessed by 4x10 meter shuttle run test. All the subjects were tested prior to and immediately after the Experimental period on the selected dependent variables.

The data obtained from the experimental groups before and after the experimental period were statistically analyzed with dependent 't'-test and Analysis of covariance (ANCOVA). Whenever the 'F' ratio for adjusted post-test means was found to be significant, the Scheffe's test was applied as post-hoc test to determine the paired mean differences. The level of confidence was fixed at 0.05 level for all the cases.

Analysis of the Data

The influence of independent variables on each criterion variables has been analyzed and presented below.

The analysis of dependent 't'-test on the data obtained Agility of the subjects in the Pre-test and Post-test of Yogic Practices group, Plyometric Training group, Combined Yogic Practices and Plyometric Training group and Control group have been presented in Table-1.

Table - 1
The summary of mean and dependent 't' Test for the pre and post tests on agility of experimental groups and control group

Mean	Ladder Training Group	Plyometric Training Group	Combined Ladder Training and Plyometric Training Group	Control Group
Pre- test mean	10.57	10.63	10.65	10.63
Post-test mean	9.75	9.90	9.50	10.60
't'-test	2.23*	2.39*	3.04*	0.10

Table-1 shows that the pre-test mean on Agility of Ladder Training group, Plyometric Training group and Combined Ladder Training and Plyometric Training group and Control group are 10.57, 10.63, 10.65 and 10.63 respectively. The post-test mean are 9.75, 9.90, 9.50 and 10.60 respectively. The obtained dependent t-ratio values between the pre and post test means on Agility of Ladder Training group, Plyometric Training group and Combined Ladder Training and Plyometric Training group and Control group are 2.23, 2.39, 3.04 and 0.10 respectively.

The table value required for significant difference with df 14 at 0.05 level is 2.15. It was concluded that Experimental groups such as Ladder Training group, Plyometric Training group and Combined Ladder Training and Plyometric Training group and Control group had registered significant improvement in Agility.

The results of the Analysis of Covariance on Agility of the pre, post, and adjusted test scores of Ladder Training group, Plyometric Training group and Combined Ladder Training and Plyometric Training group and Control group are presented in Table - 2.

Table - 2
Analysis of covariance on agility of experimental groups and control group

Test	Ladder Training Group	Plyometric Training Group	Combined Ladder Training and Plyometric Training Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	F ratio
Pre Test Mean	10.57	10.63	10.65	10.63	Between	0.05	3	0.02	0.22
					Within	4.60	56	0.08	

Post Test Mean	9.75	9.90	9.50	10.60	Between	9.95	3	3.32	56.67*
					Within	3.28	56	0.06	
Adjusted Post Test Mean	9.76	9.90	9.49	10.59	Between	9.90	3	3.30	62.74*
					Within	2.89	55	0.05	

The table-2 shows that the pre-test mean values on Agility of Ladder Training group, Plyometric Training group and Combined Ladder Training and Plyometric Training group and Control group are 10.57, 10.63, 10.65 and 10.63 respectively. The obtained 'F' ratio of 0.22 for pre-test scores was lesser than the table value of 2.76 for degrees of freedom 3 and 56 required for significance at 0.05 level of confidence on Agility.

The post test mean values on Agility of Ladder Training group, Plyometric Training group and Combined Ladder Training and Plyometric Training group and Control group are 9.75, 9.90, 9.50 and 10.60 respectively. The obtained 'F' ratio of 56.67 for post-test scores was higher than the table value of 2.76 for degrees of freedom 3 and 56 required for significance at 0.05 level of confidence on Agility.

The adjusted post-test means on Agility of Ladder Training group, Plyometric Training group and Combined Ladder Training and Plyometric Training group and Control group are 9.76, 9.90, 9.49 and 10.59 respectively. The obtained 'F' ratio of 62.74 for adjusted post-test scores was higher than the table value of 2.78 for degrees of freedom 3 and 55 required for significance at 0.05 level of confidence on Agility.

The results of the study indicate that there are significant differences among the adjusted post test means of Ladder Training group, Plyometric Training group and Combined Ladder Training and Plyometric Training group and Control group in Agility performance.

To determine which of the paired means have a significant difference, the Scheffe's test is applied as Post hoc test and the results are presented in Table - 3.

Table - 3
The scheffe's test for the differences between
The adjusted post test paired means on agility

Adjusted Post-test Means				Mean Difference	Confidence Interval
Ladder Training Group	Plyometric Training Group	Combined Ladder Training and Plyometric Training Group	Control Group		
9.76	9.90			0.14	0.24
9.76		9.49		0.27*	0.24
9.76			10.59	0.83*	0.24
	9.90	9.49		0.41*	0.24
	9.90		10.59	0.69*	0.24
		9.49	10.59	1.10*	0.24

Table-3 shows that the adjusted post test mean differences on Agility between Ladder Training group and Combined Ladder Training and Plyometric Training group, Ladder Training group and Control group, Plyometric Training group and Combined Ladder Training and Plyometric Training group, Plyometric Training group and Control group, Combined Ladder Training and Plyometric Training group and Control group are 0.27, 0.83, 0.41, 0.69 and 1.10 respectively, which are greater than the confidence interval value of 0.24 on Agility at 0.05 level of confidence.

Further the table-4.6 shows that the adjusted post test mean differences on Agility between Ladder Training group and Plyometric Training group is 0.14, which is than the confidence interval value of 0.24 on Agility at 0.05 level of confidence.

The results of the study showed that there was a significant difference between Ladder Training group and Combined Ladder Training and Plyometric Training group, Ladder Training group and Control group, Plyometric Training group and Combined Ladder Training and Plyometric Training group, Plyometric Training group and Control group, Combined Ladder Training and Plyometric Training group and Control group on Agility.

Further the results of the study showed that there was no significant difference between Ladder Training group and Plyometric Training group on Agility.

The above data also reveal that Combined Ladder Training and Plyometric Training group had shown better performance than Ladder Training group, Plyometric Training group and Control group in Agility.

The pre and post mean values of Ladder Training group, Plyometric Training group and Combined Ladder Training and Plyometric Training group and Control group on Agility are graphically represented in the Figure -1.

The adjusted post mean values of Ladder Training group, Plyometric Training group and Combined Ladder Training and Plyometric Training group on Agility are graphically represented in the Figure -2.

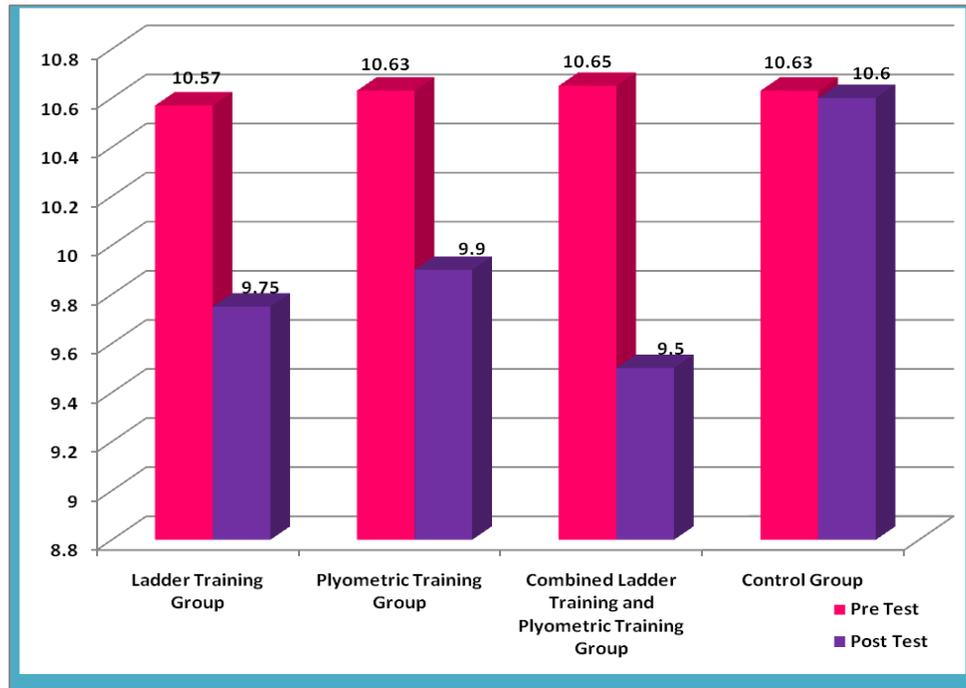


Figure: 1 The Pre and Post test Mean values of Ladder Training group, Plyometric Training group and Combined Ladder Training and Plyometric Training group and Control group on Agility (In Seconds)

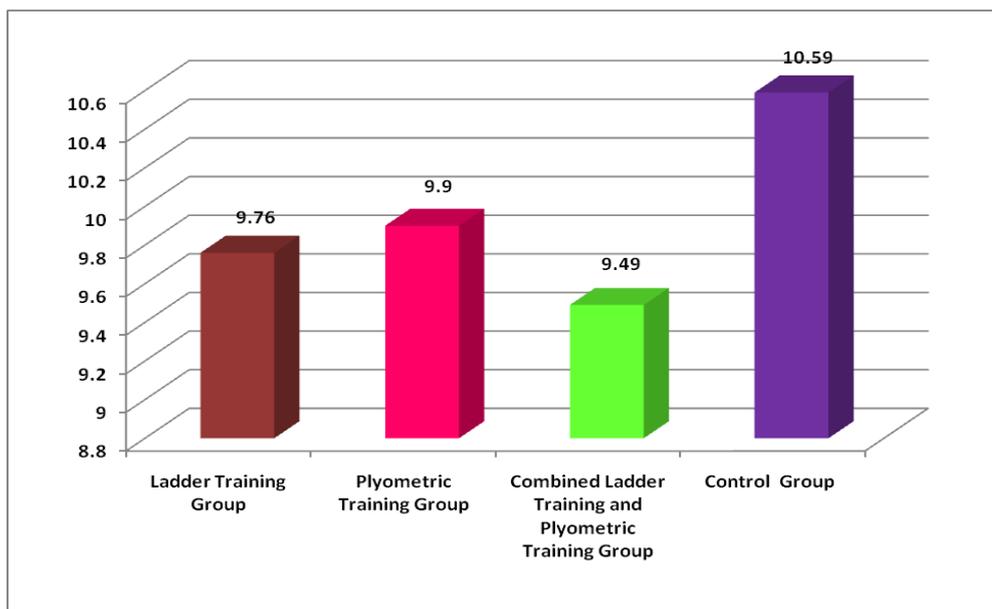


Figure: 2 The Adjusted Post Mean Values of Ladder Training group, Plyometric Training group and Combined Ladder Training and Plyometric Training group and Control group on Agility (In Seconds)

Conclusion

From the analysis of the data, the following conclusions were drawn.

- 1) The Experimental groups namely, Ladder Training group, Plyometric Training group and Combined Ladder Training and Plyometric Training group had significantly improved in Agility.
- 2) Significant differences in achievements were found between Ladder Training group, Plyometric Training group, Combined Ladder Training, Plyometric Training group, and Control group in Agility.
- 3) The Combined Ladder Training and Plyometric Training group was found to have greater impact on the group concerned than the Ladder Training group, Plyometric Training group and Control group in enhancing the performance of Agility.

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