



Comparative effects of Plyometric and Resistance Training on Motor Components among College Football Players

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Abstract

The purpose of the study was to find out the plyometric training and resistance training on motor components namely speed, muscular endurance, agility and explosive power college level football players. To achieve the purpose of the present study, forty five football players from Madurai, Tamilnadu were selected as subjects at random and their ages ranged from 18 to 25 years. The subjects were divided into three equal groups of fifteen football players each. The study was formulated as a true random group design, consisting of a pre-test and post-test. The subjects (N=45) were randomly assigned to three equal groups of fifteen football players each. The groups were assigned as plyometric training, resistance training and control group in an equivalent manner. The group I underwent plyometric training, group II underwent resistance training and group III acted as a control group. The two experimental groups were participated the training for a period of twelve weeks to find out the outcome of the training packages and the control group did not participated in any training programme. The variable to be used in the present study was collected from all subjects before they have to treat with the respective treatments. It was assumed as pre-test. After completion of treatment they were tested again as it was in the pre-test on all variables used in the present study. This test was assumed as post-test. Analysis of covariance (ANCOVA) was applied because the subjects were selected random, but the groups were not equated in relation to the factors to be examined. Hence the difference between means of the four groups in the pre-test had to be taken into account during the analysis of the post-test differences between the means. This was achieved by the application of the analysis of covariance, where the final means were adjusted for differences in the initial means, and the adjusted means were tested for significance. When ever the adjusted post-test means were found significant, the scheffe's post-hoc test was administer to find out the paired means difference. To test the obtained results on variables, level of significance 0.05 was chosen and considered as sufficient for the study. The plyometric training and resistance training produced significant improvement in motor components.

Keywords: Plyometric, Resistance, Speed, Muscular Endurance, Football.

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Introduction

Plyometrics is the term given to exercises designed to increase the power of an athlete. It is defined as the equivalent of explosive strength (Brukner & Khan, 2001) and referred to by others as "speed-strength". In layman's terms, the aim of plyometrics is to increase the explosiveness of the muscle allowing an athlete to run faster, jump further, or generate force at a greater rate. Plyometric training is a form of training that is used to help develop and enhance explosive power, which is a vital component in a number of athletic performances. This training method is meant to be used with other power development methods in a complete training program to improve the relationship between maximum strength and explosive power. The modern history of Plyometrics is somewhat brief but not relatively new.

This technique was originated in Russia and Eastern Europe in the middle of 1960. The Soviets were very successful in the use of Plyometrics in their training programmes, especially in track and field. (Farentinos & Radcliffe, 1985).

Strength training is an inclusive term that describes all exercises devoted toward increasing physical strength. Weight training is a type of strength training that uses weights rather than elastic Eccentric Training or muscular resistance to increase strength. Weight training is often used as a synonym for strength training, but is actually a specific type within the more inclusive category. In addition to the basic principles of strength training, a further consideration added by weight training is the equipment used. Types of equipment include barbells, dumbbells, pulleys and stacks in the form of weight machines, and the body's own weight in the case of chin-ups and push-ups. (Baechle, 1994). Football is played as well as enjoyed by multitude of people all over the globe. This is one of the most

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recognized sports football has acquired popularity among the Indian masses with in a sport period of time and is the popular as well as widely played Indian sport. Although the modern game of football had emerged in England in its primitive form, it had undoubtedly been played for centuries in other countries. Play also claim that the game had been played in their countries from very ancient time. Soccer, the game evokes an out pouring passion and emotion unparalleled within the realm of sport. Soccer is a common language among people of diverse backgrounds and heritages, a bridge that spans economic political cultural and religious barriers. (Moris, 1981).

Methodology

The purpose of the study was to find out the plyometric training and resistance training on motor components namely speed, muscular endurance, agility and explosive power college level football players. To achieve the purpose of the present study, forty five football players from Madurai, Tamilnadu were selected as subjects at random and their ages ranged from 18 to 25 years. The subjects were divided into three equal groups of fifteen football players each. The study was formulated as a true random group design, consisting of a pre-test and post-test. The subjects (N=45) were randomly assigned to three equal groups of fifteen football players each. The groups were assigned as plyometric training, resistance training and control group

in an equivalent manner. The group I underwent plyometric training, group II underwent resistance training and group III acted as a control group. The two experimental groups were participated the training for a period of twelve weeks to find out the outcome of the training packages and the control group did not participated in any training programme. The variable to be used in the present study was collected from all subjects before they have to treat with the respective treatments. It was assumed as pre-test. After completion of treatment they were tested again as it was in the pre-test on all variables used in the present study. This test was assumed as post-test. Analysis of covariance (ANCOVA) was applied because the subjects were selected random, but the groups were not equated in relation to the factors to be examined. Hence the difference between means of the four groups in the pre-test had to be taken into account during the analysis of the post-test differences between the means. This was achieved by the application of the analysis of covariance, where the final means were adjusted for differences in the initial means, and the adjusted means were tested for significance. When ever the adjusted post-test means were found significant, the scheffe's post-hoc test was administer to find out the paired means difference. To test the obtained results on variables, level of significance 0.05 was chosen and considered as sufficient for the study.

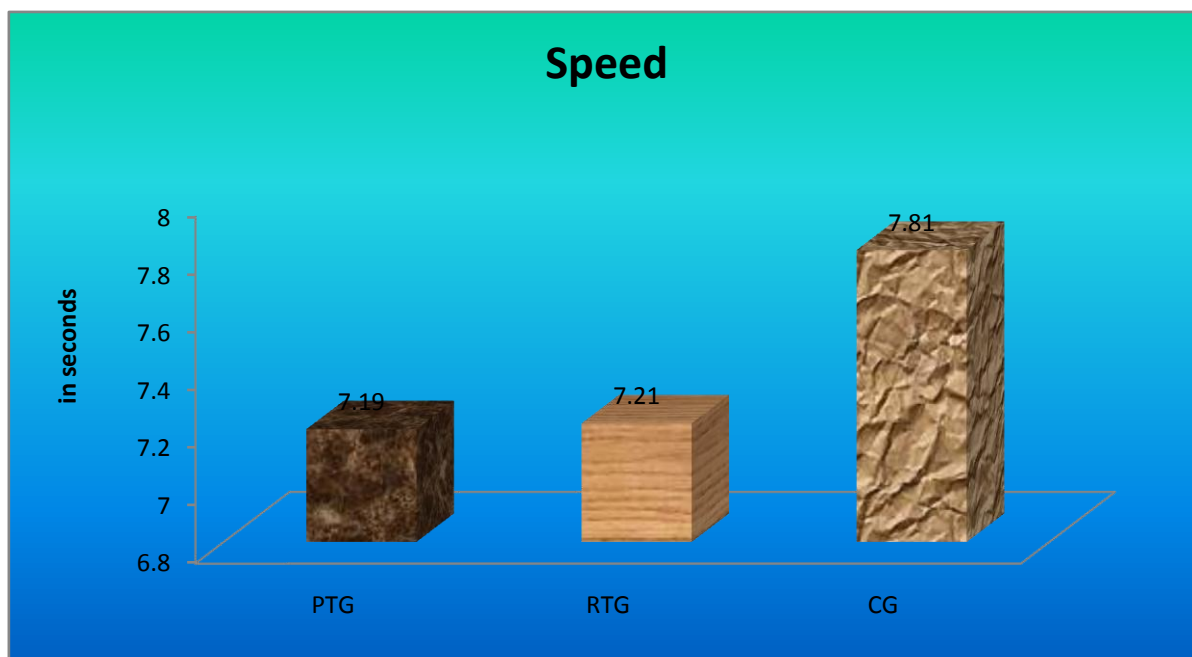
Results

Table I. Computation of Analysis of Covariance of Mean of Plyometric Training, Resistance Training and Control Groups on Speed (PTG, RTG & CG)

	PTG	RTG	CG	Source of Variance	Sum of Squares	Df	Means Squares	F-ratio
Pre-Test Means	7.79	7.82	7.83	BG	0.01	2	0.006	1.26
				WG	0.20	42	0.005	
Post-Test Means	7.18	7.21	7.82	BG	3.87	2	1.93	136.08*
				WG	0.59	42	0.01	
Adjusted Post-Test Means	7.19	7.21	7.81	BG	3.53	2	1.76	131.86*
				WG	0.55	41	0.01	

Table I reveals that the indicated that the obtained 'F'-ratio for the pre-test means among the groups on speed were 7.79 for experimental group – I, 7.82 for experimental group – II and 7.83 for control group. The obtained 'F'-ratio 1.26 was lesser than the table 'F'-ratio 3.21. Hence the pre-test mean 'F'-ratio was insignificant at 0.05 level of confidence for the degree of freedom 2 and 42. The post-test means were 7.18 for experimental group – I, 7.21 for experimental group – II and 7.82 for control group. The obtained 'F'-ratio 136.08 was higher than the table 'F'-ratio 3.21. Hence the post-test mean 'F'-ratio was significant at 0.05

level of confidence for the degree of freedom 2 and 42. The adjusted post-test means were 7.19 for experimental group – I, 7.21 experimental group – II and 7.81 for control group. The obtained 'F'-ratio 131.86 was higher than the table 'F'-ratio 3.22. Hence the adjusted post-test mean 'F'-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 41. It was concluded that there was a significant mean difference among plyometric training group, resistance training group and control group, in developing speed of the football players.

Figure I. Adjusted Post Test Differences of the Plyometric Training, Resistance Training and Control Groups on Speed (PTG, RTG & CG)**Table II.** The Scheffe's Test for the Differences between the Adjusted Post Test Means on Speed

Adjusted Post-test means			Mean Difference	Required CI
Plyometric Training	Resistance Training	Control Group		
7.19	7.21	---	0.02	0.09
7.19	---	7.81	0.62*	
---	7.21	7.81	0.60*	

* Significant at 0.05 level of confidence

Table II shows the post hoc analysis obtained on adjusted post test means. The mean difference required for the confidential interval to be significant was 0.09. It was observed that the plyometric training

group significantly improved speed better than the control group. The resistance training group significantly improved speed better than the control group.

Table III. Computation of Analysis of Covariance of Mean of Plyometric Training, Resistance Training and Control Groups on Muscular Endurance (PTG, RTG & CG)

	PTG	RTG	CG	Source of Variance	Sum of Squares	Df	Means Squares	F-ratio
Pre-Test Means	35.33	35.26	34.60	BG	4.93	2	2.46	1.20
				WG	85.86	42	2.04	
Post-Test Means	41.26	42.33	34.80	BG	498.53	2	249.26	45.38*
				WG	230.66	42	5.49	
Adjusted Post-Test Means	41.25	42.32	34.82	BG	467.20	2	233.60	41.57*
				WG	230.36	41	5.61	

Table III reveals that the indicated that the obtained 'F'-ratio for the pre-test means among the groups on muscular endurance were 35.33 for experimental group – I, 35.26 for experimental group – II and 34.60 for control group. The obtained 'F'-ratio 1.20 was lesser than the table 'F'-ratio 3.21. Hence the pre-test mean 'F'-ratio was insignificant at 0.05 level of confidence for the degree of freedom 2 and 42. The post-test means were 41.26 for experimental group – I, 42.33 for experimental group – II and 34.80 for control group. The obtained 'F'-ratio 45.38 was higher than the table 'F'-ratio 3.21. Hence the post-test mean 'F'-ratio was

significant at 0.05 level of confidence for the degree of freedom 2 and 42. The adjusted post-test means were 41.25 for experimental group – I, 42.32 experimental group – II and 34.82 for control group. The obtained 'F'-ratio 41.57 was higher than the table 'F'-ratio 3.22. Hence the adjusted post-test mean 'F'-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 41. It was concluded that there was a significant mean difference among plyometric training group, resistance training group and control group, in developing muscular endurance of the football players.

Figure II. Adjusted Post Test Differences of the Plyometric Training, Resistance Training and Control Groups on Muscular Endurance (PTG, RTG & CG)

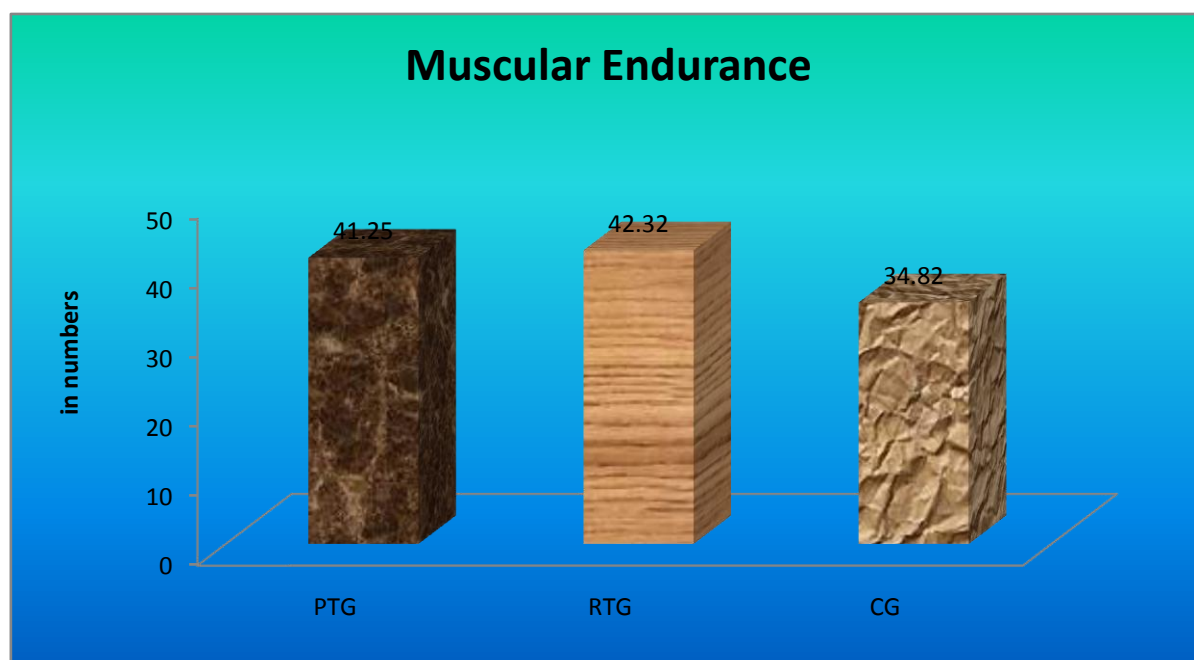


Table IV. The Scheffe's Test for the Differences between the Adjusted Post Test Means on Muscular Endurance

Adjusted Post-test means			Mean Difference	Required CI
Plyometric Training	Resistance Training	Control Group		
41.25	42.32	---	1.07	2.19
41.25	---	34.82	6.43*	
---	42.32	34.82	7.50*	

* Significant at 0.05 level of confidence

Table IV shows the post hoc analysis obtained on adjusted post test means. The mean difference required for the confidential interval to be significant was 2.19. It was observed that the plyometric training group significantly improved muscular endurance better than the control group. The resistance training group significantly improved muscular endurance better than the control group.

Results

1. The plyometric training group produced significant improvement in motor components.

The 't' values of the selected variables have reached the significant level.

2. The resistance training group produced significant improvement in motor components. The 't' values of the selected variables have reached the significant level.
3. In the control group the obtained 't' value on all the variables were failed to reach the significant level.

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