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Effect of Plyometric Training on Selected Motor Fitness Variables among College Volleyball Players

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Abstract

The purpose of the study was to investigate the effect of plyometric training on selected motor fitness components among college volleyball players. It was hypothesized that there would be significant differences on selected motor fitness components due to the effect of plyometric among college volleyball players. For the present study the 30 male college volleyball players from Pasumpon Muthuramalinga Thevar College, Usilampatti and Arul Anandar College, Karumathur, Tamilnadu, India were selected at random and their age ranged from 18 to 25 years. For the present study pre test – post test random group design which consists of control group and experimental group was used. The subjects were randomly assigned to two equal groups of fifteen each and named as Group 'A' and Group 'B'. Group 'A' underwent plyometric training and Group 'B' have not underwent any training. Speed was assessed by 50 metre dash, agility was assessed by shuttle run and explosive power was assessed by standing broad jump. The data was collected before and after twelve weeks of training. The data was analyzed by applying Analysis of Co-Variance (ANCOVA). The level of significance was set at 0.05. The experimental group showed better improvement on speed, agility and explosive power among college volleyball players than the control group.

Keywords: Plyometric Training, Motor, Speed, Agility, Explosive Power, Volleyball.

Introduction

Plyometric exercise is one such area that has been shown to increase strength and explosiveness in athletes. Most of the sports use this as a tool for physical training. Plyometric exercises consist of a rapid eccentric stretch immediately followed by a concentric contraction that stores elastic energy within the muscle and produces more force than a concentric contraction can offer alone. Plyometrics have been verified by research to improve strength, acceleration, power, joint awareness, proprioception and agility. Plyometrics by definition is, a type of exercise using explosive movements to develop muscular power, especially bounding, hopping and jumping. It is a term that describes exercises that help to bridge the gap between strength and speed, and refers to human movement that involves an eccentric muscle contraction immediately and rapidly followed by concentric contraction. When a muscle is lengthened, energy is released as heat, but some energy is stored in the muscles and tendons to be used in its subsequent contraction. The goal is to decrease the amount of time it takes for the muscle to contract in a movement. Again the focus is on time. If the muscle is stretched for too long, useable energy is lost as heat (Blair, 1990).

Volleyball is a worldwide popular game and ranks third as a recreational team sport. It is one of the few popular games that originated from the United States. The object of the game is to keep the ball in flight, going back and forth over the net without it touching the floor. At the higher skill levels, technical performance may be limited by physical characteristics as well as physical fitness, and performance characteristics. Volleyball is an Olympic team sport in which two teams of six active players, separated by a high net, each trying to score points by trying to ground the ball on the other team's court under organized rules. The complete rules of volleyball are extensive, but in general, play proceeds as follows: Points are scored by grounding the ball on the opponents' court, or when the opponent commits a fault. The first team to reach 25 points wins the set and the first team to win three sets wins the match. Teams can contact the ball no more than three times before the ball crosses the net and consecutive contacts must be made by different players. The ball is usually played with the hands or arms, but players can legally strike or push (short contact) the ball with any part of the body. Spiking the ball is easy to hit and has a fair advantage that the other team will not be able to hit back (Chen, 1989).

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Methodology

The purpose of the study was to investigate the effect of plyometric training on selected motor fitness components among college volleyball players. It was hypothesized that there would be significant differences on selected motor fitness components due to the effect of plyometric among college volleyball players. For the present study the 30 male college volleyball players from Pasumpon Muthuramalinga Thevar College, Usilampatti and Arul Anandar College, Karumathur, Tamilnadu, India were selected at random and their age ranged from 18 to 25 years. For the present study pre test – post test random group design which consists of control group and experimental group was used. The subjects were randomly assigned to two equal groups of fifteen each and named as Group 'A' and Group 'B'. Group 'A' underwent plyometric training and Group 'B' have not underwent any training. Speed was assessed by 50 metre dash, agility was assessed by shuttle run and explosive power was assessed by standing broad jump. The data was collected before and after twelve weeks of training. The data was analyzed by applying Analysis of Co-Variance (ANCOVA). The level of significance was set at 0.05.

Results

The findings pertaining to analysis of co-variance between experimental group and control group on selected motor components among college volleyball players for pre-post test respectively have been presented in table I to III.

Table I. ANCOVA between Experimental Group and Control Group on Speed of College volleyball players for Pre, Post and Adjusted Test

	Experimental Group	Control Group	Source of Variance	Sum of Squares	df	Mean Square	F
Pre Test Mean	8.47	8.55	BG	0.05	1	0.05	0.14
			WG	9.45	28	0.33	
Post Test Mean	7.99	8.48	BG	1.83	1	1.83	6.87*
			WG	7.45	28	0.26	
Adjusted Post Mean	7.99	8.47	BG	1.78	1	1.78	6.49*
			WG	7.41	27	0.27	

*** Significant at 0.05 level.** **df: 1/27= 4.21**

Table I revealed that the obtained 'F' value of 6.49 was found to be significant at 0.05 level with df 1, 27 as the tabulated value of 4.21 required to be significant at 0.05 level. The same table indicated that there was a significant difference in adjusted means of speed of college volleyball players between experimental group and control group. The graphical representation of data has been presented in figure I.

Figure I. Comparisons of Pre – Test Means Post – Test Means and Adjusted Post – Test Means for Control group and Experimental Group in relation to Speed

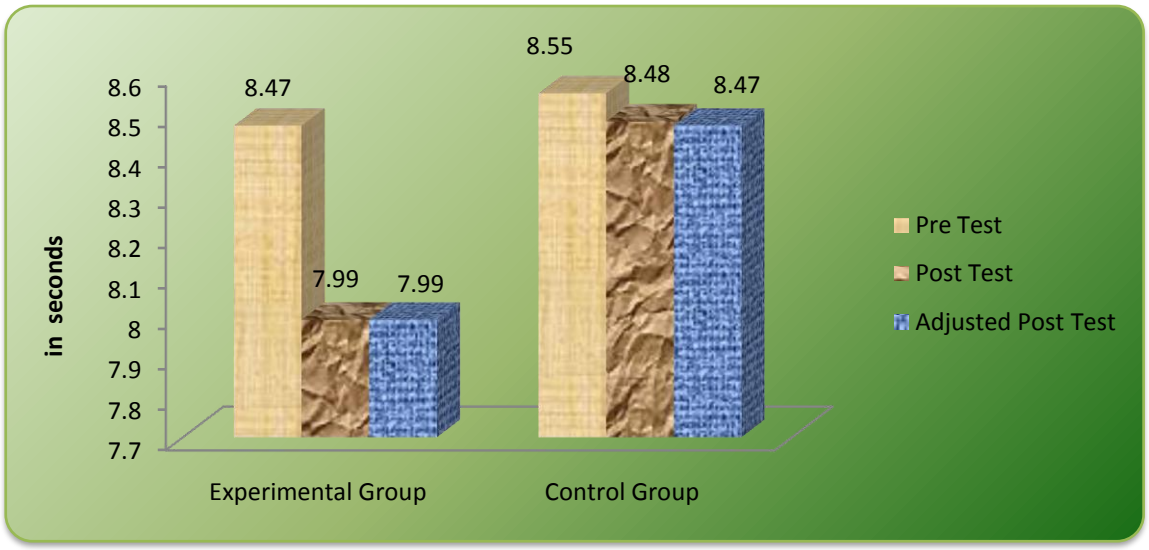


Table II. ANCOVA between Experimental Group and Control Group on Agility of College volleyball players for Pre, Post and Adjusted Test

	Experimental Group	Control Group	Source of Variance	Sum of Squares	df	Mean Square	F
Pre Test Mean	11.12	11.23	BG	0.38	1	0.38	0.94
			WG	11.47	28	0.41	
Post Test Mean	10.61	11.19	BG	5.46	1	5.46	12.20*
			WG	12.53	28	0.44	
Adjusted Post Mean	10.60	11.18	BG	4.76	1	4.76	10.61*
			WG	12.113	27	.449	

*** Significant at 0.05 level.** **df: 1/27= 4.21**

Table II revealed that the obtained 'F' value of 10.61 was found to be significant at 0.05 level with df 1, 27 as the tabulated value of 4.21 required to be significant at 0.05 level. The same table indicated that there was a significant difference in adjusted means of agility of college volleyball players between experimental group and control group. The graphical representation of data has been presented in figure II.

Figure II. Comparisons of Pre – Test Means Post – Test Means and Adjusted Post – Test Means for Control group and Experimental Group in relation to Agility

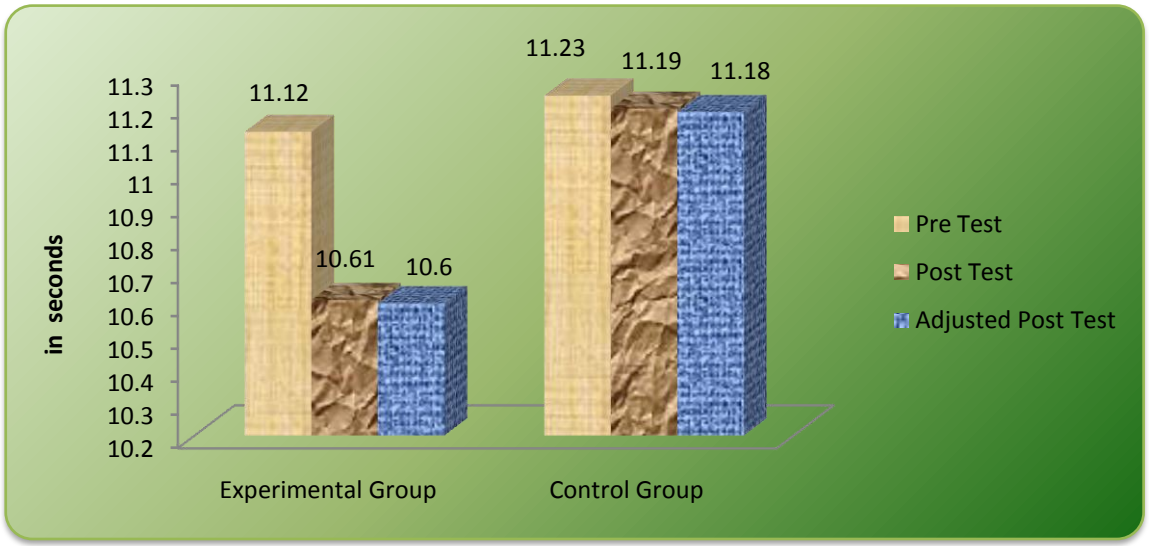


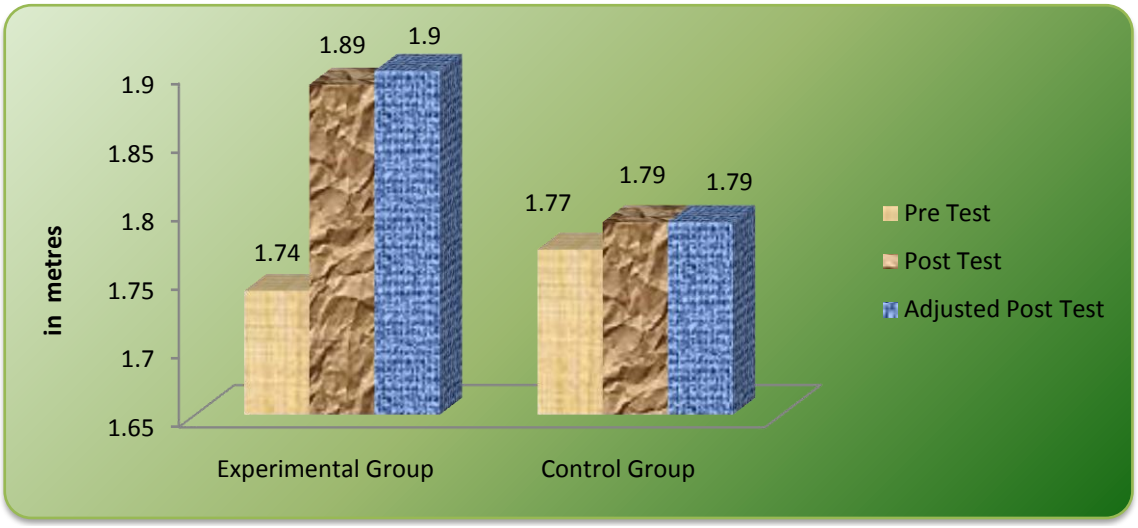
Table III. ANCOVA between Experimental Group and Control Group on Explosive Power of College volleyball players for Pre, Post and Adjusted Test

	Experimental Group	Control Group	Source of Variance	Sum of Squares	df	Mean Square	F
Pre Test Mean	1.74	1.77	BG	0.008	1	0.008	1.17
			WG	0.198	28	0.007	
Post Test Mean	1.89	1.79	BG	0.148	1	0.148	19.72*
			WG	0.211	28	0.008	
Adjusted Post Mean	1.90	1.79	BG	0.163	1	0.163	22.65*
			WG	0.194	27	0.007	

*** Significant at 0.05 level.** **df: 1/27= 4.21**

Table II revealed that the obtained 'F' value of 22.65 was found to be significant at 0.05 level with df 1, 27 as the tabulated value of 4.21 required to be significant at 0.05 level. The same table indicated that there was a significant difference in adjusted means of explosive power of college volleyball players between experimental group and control group. The graphical representation of data has been presented in figure II.

Figure III. Comparisons of Pre – Test Means Post – Test Means and Adjusted Post – Test Means for Control group and Experimental Group in relation to Explosive Power



Discussions on Findings

In case of motor components i.e. speed, agility and explosive powerthe results between pre and post (12 weeks) test has been found significantly higher in experimental group in comparison to control group. This is possible because due to regular plyometric training which may also bring sudden spurt in motor fitness components in college volleyball players. The findings of the present study have strongly indicates that plyometric training of twelve weeks have significant effect on selected motor components i.e., speed, agility and explosive power of college volleyball players. Hence the hypothesis earlier set that plyometric training programme would have been significant effect on selected motor fitness components in light of the same the hypothesis was accepted.

Conclusions

On the basis of findings and within the limitations of the study the following conclusions were drawn:

1. The plyometric training had positive impact on speed, agility and explosive power among college volleyball players.
2. The experimental group showed better improvement on speed, agility and explosive power among college volleyball players than the control group.

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