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Single leg, double leg and combined plyometric training implications on skill performance among football players

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***Abstract*---**An addition of plyometrics within youth-based strength and conditioning programs is becoming prominent as a means to improve stretch-shortening cycle ability. The aim of this study was to investigate the effect of single leg, double leg and combined plyometric training on skill performance of football players. Forty male football players participated in this study as the subject. The subjects were randomly assigned to PT group (n=20, age: 18.5 ± 0.5 – 22.4 ± 0.5 years) and control group (n=20, age: 18.5 ± 0.5 – 22.4 ± 0.5 years). The PT group performed eight weeks' lower extremities tri-method PT besides the football team training. The control group performed only the game practice during the study. The results showed that the running with ball, feint and dribble, agility with ball improved after PT ($P<0.05$). For accuracy of shooting no significant change was observed after eight weeks on PT. It was concluded that the running with ball, feint and dribble, agility with ball improved after PT, but there was no significant difference found on accuracy of shooting football between control and tri-method plyometric training group.

***Keywords*---**single leg, double leg and combined plyometric training, football players and skill performance.

Introduction

Plyometric exercise is one of the most time-efficient training methods available, and has debatably the greatest transfer to sport application especially football.

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Plyometric techniques can be implemented for the whole body and also act out specific movements observed in competition. They can be done with little to no equipment and the surface of choice is often a level grass field. Plyometrics are often performed in various planes of movement (up/down, left/right, and forward/backward).

Plyometrics consists of a rapid stretching of a muscle (eccentric action) immediately followed by a concentric or shortening action of the same muscle and connective tissue (Baechle, T.R. and R.W. Earle, 2000). The stored elastic energy within the muscle is used to produce more force than can be provided by a concentric action alone (Miller M.G., et.al., 2002). A professional football player makes numerous explosive bursts, like kicking, tackling, jumping, turning, speed, and changing pace during a 90-minute football match, Plyometric workouts typically comprise of stopping, starting, and changing directions in an explosive manner. These actions are gears that can assist in developing skill performance in football players. Although PT has been shown to increase performance variables in sports, little scientific information is available to determine if PT actually enhances skill performance in football. Therefore, the purpose of this study was to determine the effects of an 8-week tri-method PT on skill performance in football players.

Hypotheses

- It was hypothesized that there would be significant difference on running with ball, feint and dribble, agility with ball among control group and experimental group due to plyometric training of male football players.
- It was hypothesized that there would be significant difference on accuracy of shooting among control group and experimental group due to plyometric training of male football players.

Delimitations

- Forty male intercollegiate level football players between the age group of 18.5 ± 0.5 – 22.4 ± 0.5 years from various engineering college in Andhra Pradesh were selected.
- Variables running with ball, feint and dribble, agility with ball and accuracy of shooting were selected as dependent variables.
- Selected unilateral, bilateral and combined plyometric training was given 3 days a week for a period of eight weeks.

Limitations

- The influence of certain factors like daily routine, food habits, life style and rest period, hereditary and environmental factors were not taken into consideration.
- No attempt was made to determine whether the subjects were having the same degree of motivation during the various stages of training and testing periods.

Methodology

To achieve the purpose of the study 40 male football players from various engineering college in Andhra Pradesh were selected. Selected subjects were equally divided into two group namely control and experimental group. The control group performed only the game practice during the study. Experimental group was given unilateral, bilateral and combined plyometric training for a duration of 60-70 minutes in the morning followed by warm up and end with proper warm down for eight weeks where muscles involved lower extremities.

Training schedule

Table 1

	Exercise	1-4 weeks		4-8 weeks	
Unilateral PT	Single leg speed hops	10 repetition	3 sets	10 repetition	5 sets
	Single leg bounding	15 meters	3 sets	15meters	5 sets
	Skater jump	1meter height, 10 repetition	3 sets	1m height, 10 repetition	5 sets
	Hurdle hop	6 repetition, 4 hurdles	3 sets	6 repetition, 4 hurdles	5 sets
Bilateral PT	Front Hurdle jump	10 repetition	3 sets	10repetition	5 sets
	Pike jump	10 meters	3 sets	10 meters	5 sets
	Ankle hops	10 repetition	3 sets	10 repetition	5 sets
	Side – side pogo jumps	10 repetition	3 sets	10 repetition	5 sets
Combined PT	Single leg plyo hurdles (Lateral)	10 repetition	3 sets	10repetition	5 sets
	Side to side pogo jumps	10 meters	3 sets	10 meters	5 sets
	Single leg Reverse Jumps	10 repetition	3 sets	10 repetition	5 sets
	Tuck Jumps	10 repetition	3 sets	10 repetition	5 sets

Pretest and post test data was collected on control group and experimental group before and after the eight weeks of experimental training by using following authenticated tests,

- Running with ball - 30M Dash test (Zagatto, A. (2009),
- Feint and dribble - Mor-Christian Soccer Skill Test (Collins & Hodges, 2001)
- Agility with ball - Slalom agility test (Milanovi Z (2011),
- Accuracy of Shooting - Soccer Accuracy test (Finnoff, J.T. et al. (2002).

Collected data was analysed by using ANCOVA. The level of significance was fixed as 0.05.

Results and Discussion

Table II showing the analysis of covariance on running with ball.

Table 2
Analysis of variance on running with ball of control and experimental group

Source	Sum of Squares	df	Mean Square	F
Between	0.17	1	0.17	11.29*
Within	0.56	38	0.02	
Total	0.73	39		

*Significant at 0.05 level

The obtained f-ratio value of 11.29 on running with ball was higher than the required table value of 4.098 at 38 df at 0.05 level. Hence, the null hypothesis was rejected. There was a significant difference on running with ball between control and experimental group's adjusted posttest means. Hence, the stated hypothesis was accepted. Figure 1 bar diagram showing the pretest and posttest mean values of control and experimental group on running with ball.

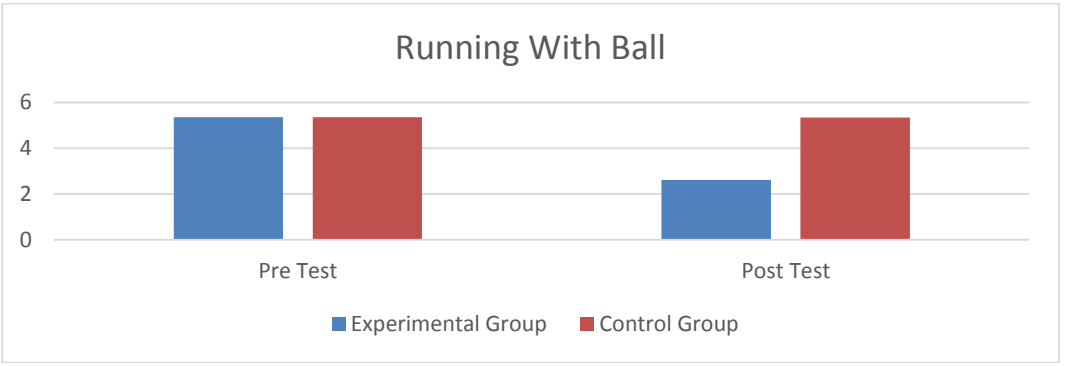

Fig 1. Showing running with ball mean values of pretest and posttest of control and experimental groups (mins.)

Table 3
Analysis of variance on feint and dribble of control and experimental group

Source	Sum of Squares	df	Mean Square	F
Between	17.33	1	17.33	**16.49***
Within	39.95	38	1.05	
Total	57.28	39		

*Significant at 0.05 level

The obtained f-ratio value of 16.49 on feint and dribble was higher than the required table value of 4.098 at 38 df at 0.05 level. Hence, the null hypothesis was rejected. There was a significant difference on feint and dribble between control and experimental group adjusted posttest means. Hence, the stated hypothesis was accepted. Figure 3 bar diagram showing the pretest and posttest mean values of control and experimental group on feint and dribble.

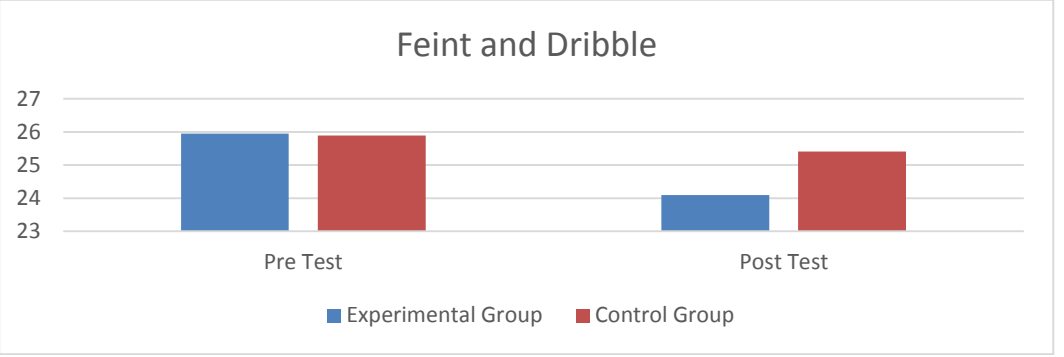

Fig 3. Showing feint and dribble mean values of pretest and posttest of control and experimental groups (seconds)

Table 4
Analysis of variance on agility with ball of control and experimental group

Source	Sum of Squares	df	Mean Square	F
Between	9.07	1	9.07	**6.26***
Within	55.10	38	1.45	
Total	64.17	39		

*Significant at 0.05 level

The obtained f-ratio value of 6.26 on agility with ball was higher than the required table value of 4.098 at 38 df at 0.05 level. Hence, the null hypothesis was rejected. There was a significant difference on agility with ball between control and experimental group's adjusted posttest means. Hence, the stated hypothesis was accepted. Figure 2 bar diagram showing the pretest and posttest mean values of control and experimental group on agility with ball.

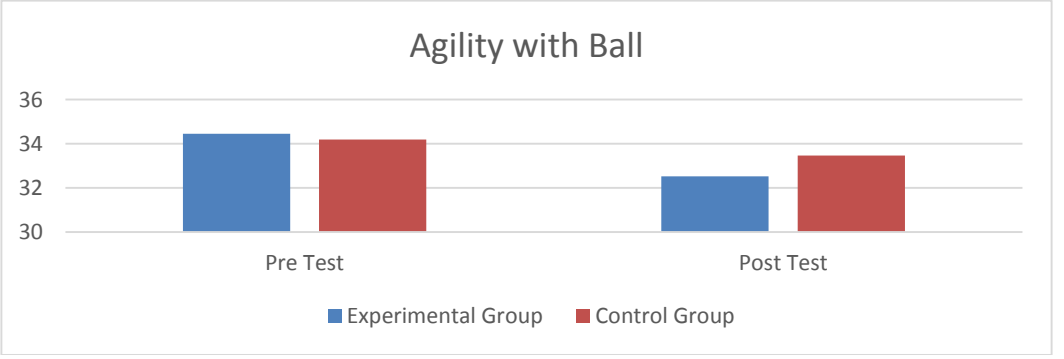

Fig 2. Showing agility with ball mean values of pretest and posttest of control and experimental groups (seconds)

Table 5
Analysis of variance on accuracy of shooting of control and experimental group

Source	Sum of Squares	df	Mean Square	F
Between	2.02	1	2.03	2.68
Within	28.75	38	0.76	
Total	30.77	39		

Not significant at 0.05 level

The obtained f-ratio value of 2.68 on accuracy of shooting was lower than the required table value 4.098 at 38 df at 0.05 level. Hence, the null hypothesis was accepted. There was no significant difference on accuracy of shooting between control and experimental group's adjusted posttest means. Hence, the stated hypothesis was accepted. Figure 4 bar diagram showing the pretest and posttest mean values of control and experimental group on accuracy of shooting.

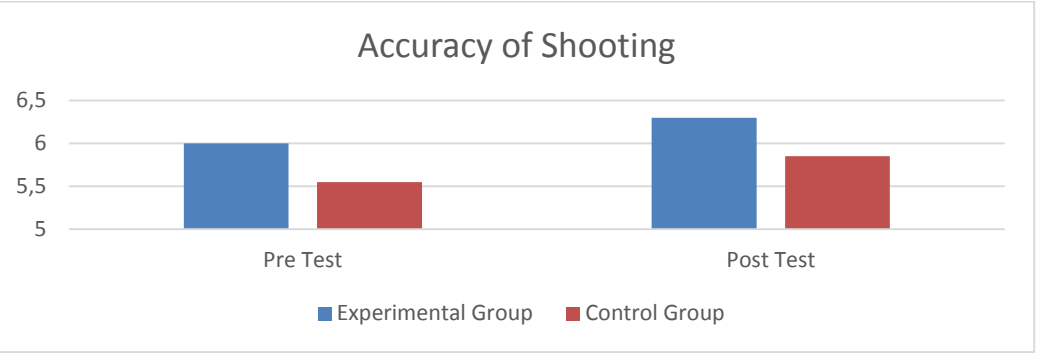

Fig 4. Showing accuracy of shooting mean values of pretest and posttest of control and experimental groups (counts)

Discussion

The primary finding of the present study was that all the selected dependent variables improved significantly over eight weeks of training. Except accuracy of shooting there was a significant increase in the values of running with ball, feint and dribble, agility with ball had been found in the comparison made before and after the training for the control and experimental group ($p<0.01$). Our results showed that although eight weeks tri-method PT increased accuracy of shooting, but did not achieve statistical significance. Haghighi et al. (2012) in an only available study reported PT had no significant effect on accuracy of shooting in young football players.

Conclusion

- It was concluded that eight weeks of unilateral, bilateral & combined plyometric training practices significantly improved running with ball, feint

and dribble, agility with ball of male football players of various engineering college in Andhra Pradesh.

- It was concluded that eight weeks of unilateral, bilateral & combined practices did not make any significant improvement on accuracy of shooting of male football players of various engineering college in Andhra Pradesh.

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