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EFFECT OF PLYOMETRIC TRAINING ON VARIOUS SURFACE ON SELECTED SKILL PERFORMANCE OF FEMALE SOCCER PLAYERS

P. Vasuki*¹ and Dr. R. L. Sudhan Paulraj²

¹Ph. D. Research Scholar, Department of Physical Education, Annamalai University

²Professor & Head (Retd) Department of Sports Sciences, Annamalai University

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*Corresponding author: P. Vasuki,

ABSTRACT

The purpose of the study was to examine the effect of plyometric training on various surface on selected skill performance of female soccer players. To achieve the purpose 36 inter-collegiate female soccer players were selected as subjects. Their age ranged between 18 and 24. The selected subjects were randomly divided into four groups of 9 each. Group-I underwent plyometric exercises on the sand surface, group-II underwent plyometric exercises on the soil surface, group-III underwent plyometric exercises on the grass surface and group-IV acted as control. Dribbling, passing and shooting were selected as skill performance of female soccer players. The experimental variable used in the present study was plyometric training in various surface (Sand, Soil and Grass). A 12-week plyometric training programme was developed using three training sessions per week. The results show that, 12 weeks of plyometric training on various surface improved the dribbling, passing and shooting performance of women soccer players significantly. As for as dribbling performance in concerned insignificant differences were observed between sand, soil and grass surface plyometric training groups. When comparing experimental groups of passing ability, sand surface group is better than grass surface group but insignificant differences were observed between sand, and soil surface groups and also between soil, and grass surface groups. As for as shooting performance of women soccer players, sand surface group is better than the grass surface group but insignificant differences were observed between sand, and soil surface groups and also between soil and grass surface groups.

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INTRODUCTION

Plyometric training has many advantages for the improvement of athlete's overall performance in various sport events including soccer. Plyometric training exercise improve explosive power, muscular strength, speed and quickness, agility, neuromuscular coordination, vertical jump performance, leg strength, muscular power, increase joint awareness and enhance soccer skill performances of the athletes. Plyometric training is widely used in conditioning, power training and in prevention and rehabilitation of injuries in some sports (Roopchand-Martin & LueChin, 2010). Plyometric training is a form of exercise that utilizes the body's stretch reflex and eccentric muscle contractions to enhance speed and power. Though explosive power contributes relatively little to aerobic performance, plyometric training helps develop general athletic ability, ballistic skills, kinaesthetic awareness, rhythm and coordination. Soccer players, especially, can benefit from the development of the power and overall athleticism provided by plyometric exercise.

Soccer players need to have the ability to respond quickly and powerfully on both offense and defence (Chimera et al. 2004). In soccer rapid movements such as acceleration and deceleration of the body, changes of direction, as well as jumps are often performed and high level of dynamic muscular performance is required at all levels of training status. In investigations mostly elite soccer players were recruited to demonstrate the effects of PT on muscular performance (Ronnestad et al., 2008; Sedano Campo et al., 2009).

METHODOLOGY

The purpose of the study was to examine the effect of plyometric training on various surface on selected skill performance of female soccer players. To achieve the purpose 36 inter-collegiate female soccer players were selected as subjects. Their age ranged between 18 and 24. The selected subjects were randomly divided into four groups of 9 each. Group-I underwent plyometric exercises on the sand surface, group-II underwent plyometric exercises on the soil surface,

group-III underwent plyometric exercises on the grass surface and group-IV acted as control. Dribbling, passing and shooting were selected as skill performance of female soccer players. The experimental variable used in the present study was plyometric training in various surface (Sand, Soil and Grass). Mor Christian General Soccer Ability Skill Test was used to assess the skill performance of female soccer players.

TRAINING PROGRAMME

The training programmes were scheduled for one session a day each session lasted for one hour to one and half hours approximately including warming up and warming down. During the training period, the experimental groups underwent their respective training programme three days a week on alternative days for twelve weeks in addition to their regular programme. The group-I performed plyometric training in sand surface, group-II did plyometric training in soil surface and group-III underwent plyometric training in grass surface. A 12-week plyometric training program was developed using three training sessions per week. The training programme was based on recommendations of intensity and volume by Piper and Erdmann (1998). Training volume ranged from 70 foot contacts to 120 foot contacts per session. The rest interval of 1:1 ratio between repetitions and 1:5 ratio between sets was provided. The pretest data were collected prior to the training programme and posttest data was collected immediately after the twelve weeks of plyometric training on various surface plyometric training groups and control group.

STATISTICAL TECHNIQUE

Analysis of covariance (ANCOVA) was used as a statistical technique to find out the significant difference if any. Whenever the obtained '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 (Broota, 1989). In all the cases level of confidence was fixed at 0.05 for significance.

dribbling of sand, soil and grass surface plyometric training group's differ significantly, as the paired 't' values (16.44, 14.34 & 3.15) of sand, soil and grass surface plyometric training group's are more than the table value 2.31 required for significance. The obtained paired 't' test results proved that, the mean difference found between pre and post data on passing ability of sand, soil and grass surface plyometric training group's differ significantly, as the paired 't' values (15.20, 13.00 & 9.44) of sand, soil and grass surface plyometric training group's are more than the table value 3.21 required for significance. The obtained paired 't' test results proved that, the mean difference found between pre and post data on shooting ability of sand, soil and grass surface plyometric training group's differ significantly, as the paired 't' values (23.56, 16.23 & 9.22) of sand, soil and grass surface plyometric training group's are more than the table value 2.31 required for significance. The obtained ANCOVA statistics and scheffe's post-hoc test results on dribbling, passing and shooting performance of different surface plyometric training group and control group are presented in table - 2 and table -3 reactively. The obtained 'F' ratio values of dribbling, passing and shooting are 5.36, 36.57 and 149.84 through ANCOVA statistics proved that, the adjusted post test mean values 32.73, 40.02, 41.64 and 64.16 on dribbling, the adjusted post test mean values 12.05, 11.50, 10.63 and 6.49 on passing and the adjusted post test mean values 138.3, 123.1, 116.0 and 68.62 on shooting of different surface plyometric training and control groups differ from one another. Because the obtained 'F' value of dribbling, passing and shooting respectively 5.36, 36.57 and 149.84 are better than table value 2.91 required for significant for degrees of freedom 3 and 31.

It proved that as a result of sand, soil and grass surface plyometric training the dribbling ability was improved significantly, because the means differences 31.43, 24.14 and 22.52 are more than confidence interval value 17.59. When comparing experimental groups, insignificant differences were observed between sand, soil and grass surface plyometric training groups in improving the dribbling ability. It proved that as a result of sand, soil and grass surface plyometric training the passing ability was improved significantly, because the mean difference of 5.56, 5.01 and 4.14 are more than the confidence

Table 1. Descriptive Statistics on Dribbling, Passing and Shooting of Different Surface Plyometric Training and Control Groups

Variables	Group	Test	N	Mean	SD	DM	't' - ratio
Dribbling	Sand Surface Plyometric Training	Pre	9	76.11	5.22	40.18	16.44*
		Post		35.93	5.01		
	Soil Surface Plyometric Training	Pre	9	90.01	9.39	43.87	14.34*
		Post		46.14	7.90		
	Grass Surface Plyometric Training	Pre	9	43.04	7.82	5.16	1.93
		Post		37.89	1.61		
	Control (CG)	Pre	9	34.48	2.08	24.12	3.15*
		Post		58.61	23.15		
Passing	Sand Surface Plyometric Training	Pre	9	7.78	0.83	4.22	15.20*
		Post		12.00	0.00		
	Soil Surface Plyometric Training	Pre	9	7.00	0.71	4.33	13.00*
		Post		11.33	0.50		
	Grass Surface Plyometric Training	Pre	9	6.89	0.78	3.56	9.44*
		Post		10.44	0.53		
	Control (CG)	Pre	9	10.56	0.73	3.67	12.70*
		Post		6.89	1.27		
Shooting	Sand Surface Plyometric Training	Pre	9	70.67	8.78	67.77	23.56*
		Post		13.84	4.33		
	Soil Surface Plyometric Training	Pre	9	62.67	9.33	60.00	16.23*
		Post		122.67	6.63		
	Grass Surface Plyometric Training	Pre	9	64.89	16.00	50.88	9.22*
		Post		115.78	7.10		
	Control (CG)	Pre	9	75.33	7.00	6.22	1.65
		Post		69.11	9.17		

Table value required for df 8 is 2.31 (*significant at 0.05 level)

RESULTS OF THE STUDY

The Pre & post test data collected on Dribbling, passing & shooting were analysed and descriptive statistics on dribbling, passing and shooting were presented in level-1. The obtained paired 't' test results proved that, the mean difference found between pre and post data on

interval value 1.02. When comparing experimental groups sand surface is better than grass surfaces but insignificant differences were observed between sand and soil surfaces and also between soil and grass surfaces. It proved that as a result of sand, soil and grass surface plyometric training the shooting ability was improved significantly, because the means differences 69.68, 54.48 and 47.38 are more than confidence interval value 9.88.

Table 2. ANCOVA Results on Dribbling, Passing and Shooting of Different Surface Plyometric Training and Control Groups

Variables	Mean	Sand Surface Plyometric Training	Soil Surface Plyometric Training	Grass Surface Plyometric Training	Control	S o v	SS	df	MS	'F' ratio
Dribbling	Adjusted post test	32.73	40.02	41.64	64.16	B	2565.78	3	855.26	5.36*
						W	4945.44	31	159.53	
Passing	Adjusted post test	12.05	11.50	10.63	6.49	B	58.85	3	19.62	36.57*
						W	16.63	31	0.54	
Shooting	Adjusted post test	138.3	123.1	116.0	68.62	B	22619.20	3	7539.73	149.84*
						W	1559.84	31	50.32	

(Table value required for significant for df 3 & 31 is 2.91) *Significant (.05 level)

Table 3. Scheffe's Test on Dribbling, Passing and Shooting of Different Surface Plyometric Training and Control Groups

Variables	Sand Surface Plyometric Training	Soil Surface Plyometric Training	Grass Surface Plyometric Training	Control	MD	CI
Dribbling	32.73	40.02			7.29	17.59
	32.73		41.64		8.91	17.59
	32.73			64.16	31.43*	17.59
		40.02	41.64		1.62	17.59
		40.02		64.16	24.14*	17.59
Passing			41.64	64.16	22.52*	17.59
	12.05	11.50			0.55	1.02
	12.05		10.63		1.42*	1.02
	12.05			6.49	5.56*	1.02
		11.50	10.63		0.87	1.02
Shooting		11.50		6.49	5.01*	1.02
			10.63	6.49	4.14*	1.02
	138.3	123.1			15.2	9.88
	138.3		116.0		22.3*	9.88
	138.3			68.62	69.68*	9.88
	123.1	116.0		7.10	9.88	
	123.1		68.62	54.48*	9.88	
		116.0	68.62	47.38*	9.88	

*Significant at .05 level

When comparing experimental groups sand surface is better than grass surfaces but insignificant differences were observed between sand and soil surfaces and also between soil and grass surfaces.

DISCUSSION

The results show that, 12 weeks of plyometric training on various surface the dribbling, passing and shooting performance of female soccer players were improved significantly. As for as dribbling performance is concern the insignificant differences were observed between sand, soil and grass surface plyometric training groups. When comparing experimental groups passing ability, sand surface is better than grass surfaces but insignificant differences were observed between sand and soil surfaces and also between soil and grass surfaces. Considering shooting performance of female soccer players, sand surface group is better than grass surfaces group but insignificant differences were observed between sand and soil surfaces groups and also between soil and grass surfaces groups. For above findings, some of the supportive studies are given below. Min-Young Lee et.al. (2019) investigated the effects of 8-week plyometrics training on fitness and soccer-specific performance in female middle school soccer players and they concluded that 8-week plyometrics training increased anaerobic muscle peak power and this increase may contribute to the increased shooting ball velocity in the female middle school soccer players.

Mesfin Mengesh et. al. (2015) conducted a study to find out the effects of plyometric training on soccer related physical fitness variables of Haramaya University intercollegiate female soccer players. They concluded that, participant's dribbling soccer skill, kicking right foot for distance and kicking left foot for distance were significantly improved through plyometric training. Rubley Mack D et.al. (2011) were to measure the effects of low-frequency, low-impact plyometric training on vertical jump (VJ) and kicking distance in female adolescent soccer players. Based on their findings, to increase lower-body power resulting in increased VJ and kicking distance, strength coaches should implement once-weekly, low-impact plyometric training programmes with their adolescent athletes.

CONCLUSION

Based on the results, the following conclusions were drawn:

Dribbling: Due to 12 weeks of plyometric training on various surface the dribbling performance of female soccer players improved significantly. Further, the insignificant differences were observed between sand, soil and grass surface plyometric training groups.

Passing: As a result of plyometric training the passing performance of female soccer players improved significantly in sand, soil and grass surfaces. When comparing experimental groups the sand surface is

better than grass surfaces but insignificant differences were observed between sand and soil surfaces and also between soil and grass surfaces.

Shooting: Shooting ability of female soccer players significantly improved due to the effect of plyometric training in various surface. When comparing the various surface training groups, the sand surface group is better than grass surface group but insignificant differences were observed between sand and soil surfaces groups and also between soil and grass surfaces groups.

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