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Effect of Combination of Plyometric and Skill Training in the Development of Speed, Muscular Strength Endurance and Serving Ability among the Volleyball Players

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Abstract

The purpose of the study was to find out the effects of combination of plyometric and skill training in the development of the speed, muscular strength endurance and serving ability of the school level volleyball players. Sixty volleyball players from the various schools of Dakshina Kannada in Karnataka were selected as subjects and their age ranged from 14 to 17 years. The subjects were divided into three equal groups. The first group underwent plyometric with skill training (n=20), the second group underwent skill training alone (n=20) and the third group acted as the control group they did not practice any specific training. The selected variables were assessed by the speed (50 meter dash test), muscular strength endurance (sit-ups test)) and serving ability (Russell-Lange volleyball test) conducted before and after the 12 weeks of training regimen. The data was analyzed by co-variance. The plyometric with skill training group showed significantly greater improvement in the muscular strength endurance, speed and Serving ability better than the other two groups of the skill training group and the control group. During volleyball match the body moves in multiple plans of motions like jump, spike, block, dive and volley. This involves training multiple muscles through movements, as opposed to isolating muscles.

Keywords: Speed, Muscular strength endurance, Serving ability, Plyometric training, Skill training, Acceleration Runs, Pace Races.

Introduction

Plyometric is the term now applied to exercise's that have their roots in Europe, where they were first known simply as "jump training". Interest in this jump training increased during the early 1970s as East European athletes emerged as powers on the world sport scene. As the Eastern bloc countries began to produce superior athletes in such sports as track and field, gymnastics, and weightlifting, the mystique of their success began to center on their training methods. (Donald, 1992). The actual term plyometric was first coined in 1975 by Fred Wilt, one of America's more forward thinking track and field coaches. Based on Latin origins, plyo + metrics is interpreted to mean "measurable increases. "These seemingly exotic exercises were thought to be responsible for the rapid competitiveness and growing superiority of Eastern Europeans in track and field events. Plyometric rapidly became known to coaches and athletes as exercises or drills aimed at linking strength with speed of movement to produce power. Plyometric training became essential to athletes who jumped, lifted, or threw. The necessity for power development in sports needs no debate.

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Strength and conditioning specialists dedicate a great deal of time researching muscular power development techniques and implementing only those that produce significant results on athletes. Recent studies suggest that plyometric and/or resistance training exercises can increase vertical jump height, explosive power, and sprint speed by improving the production of peak muscle force and power.

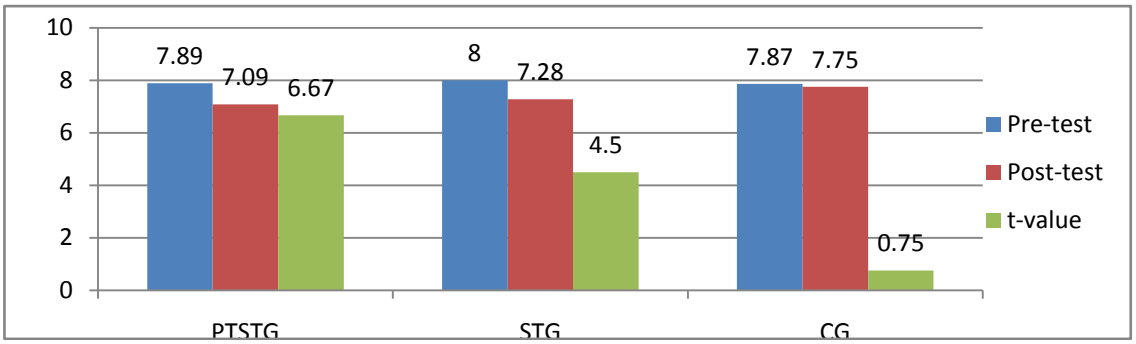
Methodology

The study was formulated as Pre and Post test random group design, in which sixty school boys volleyball players from various school representing inter school level tournaments were selected as the subjects for the study from Dakshina Kannada district, Karnataka. Sixty subjects were divided into the three equal groups. The subjects were assigned at random to one of the three groups, in which the first group (n=20, plyometric with skill training group) performed the plyometric with skill training, the second group (n=20, skill training group) performed the skill training alone, the third group (n=20, control group) did not perform any training. The variables such as the speed were measured by 50 meter dash test, the muscular strength endurance was measured by sit-ups test and the serving ability was measured by Russell-Lange volleyball test. The test was occurred before and after 12 weeks regimen.

Analysis of the data and results of the study

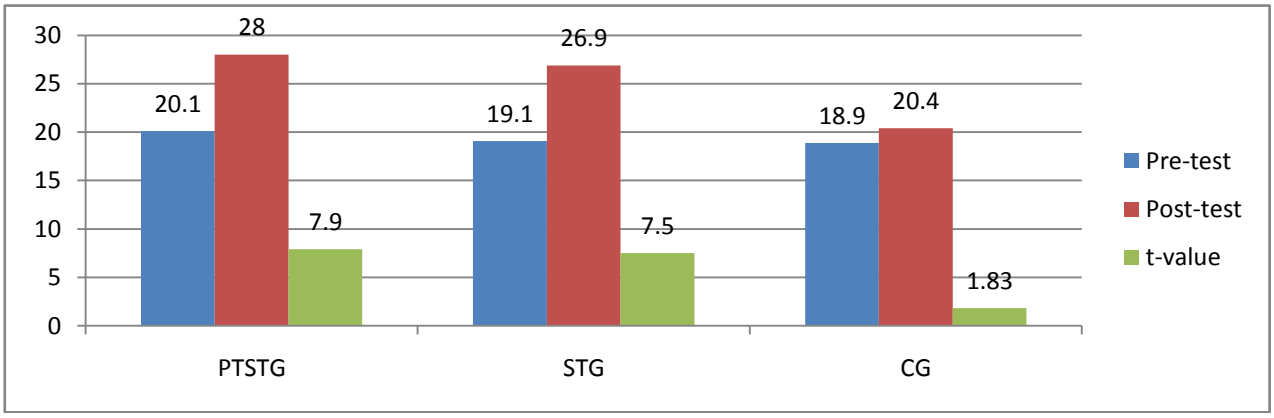
A paired sample of student's t-test was used to determine the significance of the mean differences between the Pre-test and Post-test values of a variable in the same group. Analysis of variance (ANOVA) was used to know the significant differences among the group. Statistical significance was accepted as $p \leq 0.05$ level of confidence. Diagrammatical representation of Pre-test, Post-test means and t-value of PSTG, STG and CG on the selected fitness and skill performance variables was presented in figure I to III.

Figure I. Bar diagram showing Pre-test and Post-test means and t-value of PSTG, STG and CG on Speed scores



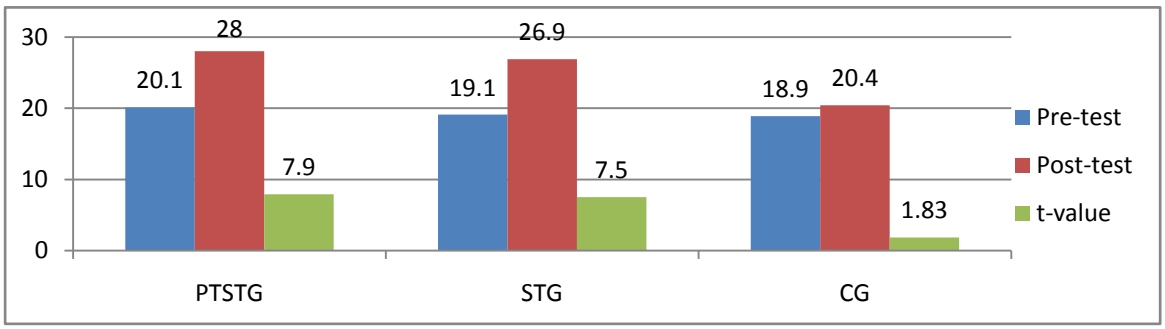
From the above figure-I (1.PSTG, 2.STG, 3.CG) it was observed that the 't' value for the plyometric with skill training group and skill training alone on speed were 6.67*, 4.5* and the required table value was 2.093 at 95% level. Since, the obtained't' value was higher than the table value and it was significant. But the control group on speed scores were ($t=0.75$, $p \leq 0.05$) lesser than table value 2.093 at 95% level and it was not significant.

Figure II. Bar diagram showing Pre-test and Post-test means and t-value of PSTG, STG and CG on Muscular strength endurance



From the above figure-II (1.PSTG, 2.STG, 3.CG) it can be observed that the't' value for the plyometric with skill training group and skill training alone on muscular strength endurance scores ($t=7.98$*, 7.50*, $p \leq 0.05$) were greater than table value 2.093 at 95% level and it was significant. But the control group on muscular strength endurance scores were ($t=1.83$, $p \leq 0.05$) lesser than the table value 2.093 at 95% level and it was not significant.

Figure III. Bar diagram showing Pre-test and Post-test means and t-value of PSTG, STG and CG on Serving ability scores



From the above figure III (1.PSTG, 2.STG, 3.CG) it was observed that the't' value for the plyometric with skill training group and skill training alone on Serving ability scores (t=7.90*, 7.50*, p ≤ 0.05) were greater than table value 2.093 at 95% level and it was significant. But the control group on Serving ability scores were (t=1.83, p ≤ 0.05) lesser than table value 2.093 at 95% level and it was not significant.

Table I. Results of the test of the three groups (plyometric with skill training group, skill training group and control group) of the school level volleyball male players on Speed

	PSTG	**STG**	**CG**	**SOV**	**Df**	**SOS**	**MS**	**F value**
Pre-test Mean	7.89	8.00	7.87	BG	2	0.20	0.10	0.42
SD	0.36	0.53	0.52	WG	57	13.73	0.24	
Post-test Mean	7.09	7.28	7.75	BG	2	4.61	2.31	10.50*
SD	0.42	0.47	0.48	WG	57	12.60	0.22	
S_{Ed}	0.12	0.16	0.16					
MD	0.8	0.72	0.12					
t-value	6.67*	4.50*	0.75					

Table F ratio at 0.05 level of confidence for 2 and 57(df) =3.15 significant.

The obtained 'F' value by the Pre test scores 0.42 was lesser than the required 'F' value of 3.15 was significant at 0.05 level. It was proved that there was no significant difference between the groups at the Pre-test and Post-test and the randomization at the Pre-test was equal. The Post-test scores analysis was proved that there was significant difference between the groups and the obtained 'F' value 10.50 was greater than the required 'F' value of 3.15.It was proved that the differences between the Post- test means of the subjects were significant.

Table II. Results of the test of the three groups (plyometric with skill training group, skill training group and control group) of the school level volleyball male players on Muscular strength endurance

	PSTG	**STG**	**CG**	**SOV**	**Df**	**SOS**	**MS**	**F value**
Pre-test Mean	20.10	19.10	18.90	BG	2	16.34	8.17	
SD	3.22	3.49	2.74	WG	57	601.12	10.55	0.77
Post-test Mean	28.00	26.90	20.40	BG	2	674.80	337.40	
SD	3.04	3.05	2.47	WG	57	492.90	8.65	39.01*
S_{Ed}	0.99	1.04	0.82					
MD	7.90	7.80	1.50					
t-value	7.98*	7.50*	1.83					

Table F ratio at 0.05 level of confidence for 2 and 57(df) =3.15 significant.

The obtained F value by the Pre-test score 0.77 was lesser than the required F value of 3.15 and it was significant at 0.05 level. It was proved that there was no significant difference between the groups at the Pre-test and Post-test and the randomization at the Pre-test was equal. The Post- test scores analysis was proved that

there was significant difference between the groups and the obtained 'F' value 39.01was greater than the required F value of 3.15. It was proved that the differences between the Post- test means of the subjects were significant.

Table III. Results of the test of the three groups (plyometric with skill training group, skill training group and control group) of the school level volleyball male players on Serving ability.

	PSTG	**STG**	**CG**	**SOV**	**Df**	**SOS**	**MS**	**F- value**
Pre-test Mean	31.70	32.40	32.00	BG	2	4.94	2.47	0.11
SD	4.88	4.09	4.63	WG	57	1239.52	21.75	
Post-test Mean	41.50	40.50	33.95	BG	2	661.30	330.65	29.42*
SD	2.75	2.60	4.21	WG	57	640.90	11.24	
S_{Ed}	1.25	1.08	1.96					
MD	9.80	8.10	1.95					
t-value	7.84*	7.50*	0.99					

Table F ratio at 0.05 level of confidence for 2 and 57(df) =3.15 significant.

The obtained 'F' value by the Pre- test scores 0.11 was lesser than the required 'F' value of 3.15 was significant at 0.05 level. It was proved that there was no significant difference between the groups at the Pre-test and Post-test and the randomization at the Pre-test was equal. The Post test scores analysis was proved that there was significant difference between the groups and the obtained 'F' value 29.42 was greater than the required 'F' value of 3.15. It was proved that the differences between the Post- test means of the subjects were significant.

Discussion

The results of the study were proved that Speed, Muscular strength endurance of the volleyball players was significantly improved within 12 weeks of the plyometric training with skill training group and skill training group. The study of the results showed significant improvement of the serving ability due to the plyometric training with skill training group and skill training group. The comparison between the treatment groups proved that the plyometric training with skill training group was better than the Skill training group respectively in improving speed, muscular strength endurance and serving ability of the volleyball players.

Conclusion

1. The plyometric training with skill training group and Skill training group improved significantly on speed, muscular strength endurance and serving ability of volleyball players.
2. The plyometric training with skill training group and Skill training group improved significantly better than the Skill training group and control group on speed, muscular strength endurance and serving ability of volleyball players.
3. The Skill training group improved significantly better than the control group on speed, muscular strength endurance and serving ability of volleyball players.

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