



ISSN: 2456-0057

IJPNPE 2018; 3(1): 703-706

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www.journalofsports.com

Received: 19-11-2017

Accepted: 20-12-2017

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Effect of plyometric training with and without weighted vest on physical variables among college men volleyball players

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Abstract

The purpose of this investigation was to find out the influence of plyometric training with and without weighted vest on speed and agility among college male volleyball players. Forty-five college male volleyball players ($N = 45$) were randomly selected as subjects and their age ranged between 18 and 22 years. The selected subjects were randomly assigned into three equal groups. Group I plyometric training with weighted vest (PTWWV), Group II plyometric training without weighted vest (PTWOWV), Group III control group (CG) and each group comprised of fifteen subjects ($N = 15$). Both the experimental groups underwent their respective experimental treatment for twelve weeks, 3 days per week and one session on respected days. Control group was not exposed to any specific training. Speed and agility were taken as variables for this study and was measured by 50m dash and shuttle run respectively. The collected data were analysed using analysis of covariance (ANCOVA) and Scheffe's post hoc test. The results revealed significant difference in all the selected physical variables ($p < 0.05$) among PTWWV and PTWOWV pointing towards the use of plyometric training for performance improvement.

Keywords: speed, agility

Introduction

Plyometric training is the key to develop maximal explosive power and speed of movement which in turn are the elements involved in sports too. By doing various exercises one can increase the performance level greatly (Yessis and Hatfield, 1986) [6].

Plyometric is used to indicate the greater tension expressed by a group of muscles when the working programme involve a quick a stretching phase followed by an equally quick contraction (Zanon, 1989) [7]. Plyometrics are training drills which are designed to develop that quality in the athlete which bridges the gap between sheer strength and power required to produce explosive reactive movements shown very clearly in activities like jumping, throwing and sprinting (Hazeldine, 1987) [1].

A weighted vest is a tool for a specific kind of fitness workout that focuses on burning a lot of calories and building body response. This is sometimes called a "power workout" in contrast to more slight physical workout routines aimed at increasing attributes like flexibility, balance or stamina.

Speed is the ability on capacity of an individual to perform successive movements of the same pattern at a faster rate (Barrow, 1971) [10]. Speed means the ability to execute motor action under given conditions for minimum possible time (Posion, 1979) [11].

Agility involves coordination quickly and accurately the muscles of the body in a particular activity. The rapid change in movement presents by the whole body or by some of its parts have been measured by such items as dodge run, ziz-zag run, shuttle run, side step and squat thrust, agility is more effective when it is combined with high level of strength endurance and speed while to a certain extent it depends on ones heritage (Wyne and Johnson, 1970) [8].

Materials and Methods

The purpose of this investigation was to find out the influence of plyometric training with and without weighted vest on speed and agility among college male volleyball players. Forty-five college male volleyball players ($N = 45$) were randomly selected as subjects and their age

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ranged between 18 and 22 years. The selected subjects were randomly assigned into three equal groups. Group I plyometric training with weighted vest (PTWWV), Group II plyometric training without weighted vest (PTWOWV), Group III control group (CG) and each group comprised of fifteen subjects (N = 15). Both experimental groups underwent their respective experimental treatment for twelve weeks, 3 days per week and one session on each respected day. Control group was not exposed to any specific training. Speed and agility were taken as variables for this study and was measured by 50m dash and shuttle run respectively. The subjects were instructed to wear a weight vest which was filled with 2 kg sand. The PTWWV and PTWOWV initially performed thorough warming up exercises. After that both the groups performed the following plyometric exercises, side to side leg bounding, jump to box, tuck jump, depth jump. These exercises were performed for 45 minutes each day. Observation was made for twelve weeks and then post test data were collected.

Data analysis

Mean and standard deviation were calculated for speed and

agility for each training group. And the data were analyzed by using analysis of covariance (ANCOVA). Wherever the ‘F’ value was found to be significant for adjusted post test mean, Scheffe’s test was applied as post hoc test to determine the significant difference between the paired mean. Statistical significance was set to priority at 0.05 levels.

Results and Discussion

1. Speed

It is clear from the Table I that there is no significant difference among plyometric training with weighted vest (PTWWV), plyometric training without weighted vest (PTWOWV) and control groups on speed at pre test as obtained F ratio value of 0.14 is lesser than the required table value of 3.222 at $\alpha = 0.05$ for the df of 2 and 42.

Table I also reveals that there is a significant difference among plyometric training with weighted vest (PTWWV), plyometric training without weighted vest (PTWOWV) and control groups on speed at post test. The obtained F ratio value of 35.45 is greater than the required table value of 3.222 at $\alpha = 0.05$ for the df of 2 and 42.

Table I: Analysis of covariance on speed of experimental groups and control group

TEST	PTWWV	PTWOWV	CONTROL	SOV	SS	DF	MS	F
Pre-test Mean SD(\pm)	8.15	8.22	8.20	BG	0.03	2	0.01	0.14
	0.15	0.29	0.51	WG	5.24	42	0.12	
Post-test Mean SD (\pm)	7.10	7.69	8.20	BG	8.93	2	4.46	35.43*
	0.12	0.34	0.49	WG	5.29	42	0.12	
Adjusted Post-test Mean	7.14	7.66	8.18	BG	8.08	2	4.04	345.09*
				WG	0.48	41	0.01	

*Significant at .05 level of confidence.

The findings however disclose that adjusted post test mean displayed significant difference on speed, since the obtained F ratio of 345.09 is greater than the required table value of

3.226 at $\alpha = 0.05$ for the df 2 and 41. Hence, the adjusted post test is significant Scheffe’s post hoc was applied and the results are given in Table II.

Table II: The scheffe’s test for the difference between paired means on speed

PTWWV	PTWOWV	Control	Mean difference	CI
7.14	7.66		0.52*	0.10
7.14		8.18	1.04*	0.10
	7.66	8.18	0.52*	0.10

*Significance at .05 level of confidence.

From the Table II it is imperative that there is a significant difference between plyometric training with weighted vest (PTWWV) - control group (CG) and plyometric training without weighted vest (PTWOWV) - control group (CG) on

speed. Therefore twelve weeks of plyometric training with weighted vest (PTWWV) showed greater improvement than Plyometric training without weighted vest (PTWOWV) on speed. The changes in speed are represented in Figure I.

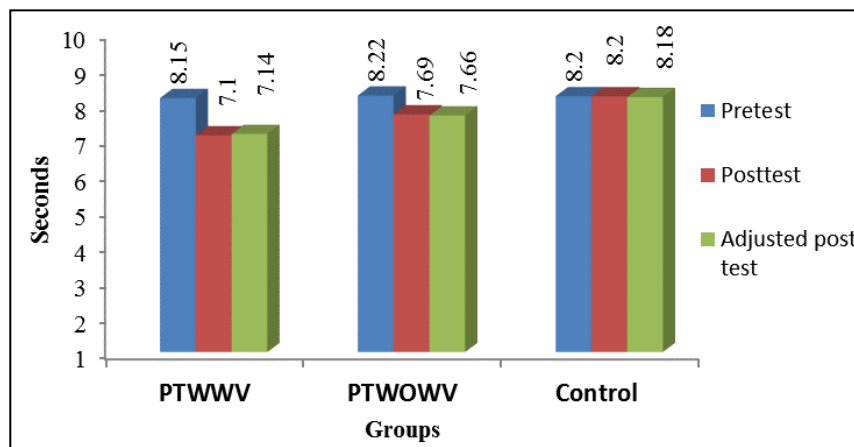


Fig 1: The pre, post and adjusted post test mean values of experimental groups and control group on speed.

2. Agility

It is clear from the Table III that there is no significant difference among plyometric training with weighted vest (PTWWV), plyometric training without weighted vest (PTWOWV) and control groups on agility at pre test as obtained F ratio value of 1.34 is lesser than the required table value of 3.222 at $\alpha = 0.05$ for the df of 2 and 42.

Table III: Analysis of covariance on agility of experimental groups and control group

TEST	PTWWV	PTWOWV	CONTROL	SOV	SS	DF	MS	F
Pre-test Mean SD(\pm)	14.15	14.51	14.38	BG	0.99	2	0.49	1.34
	0.48	0.75	0.55	WG	15.56	42	0.37	
Post-test Mean SD (\pm)	12.86	13.97	14.40	BG	18.83	2	9.41	30.77*
	0.41	0.66	0.54	WG	12.85	42	0.30	
Adjusted Post-test Mean	13.01	13.85	14.37	BG	13.74	2	6.87	62.71*
				WG	4.49	41	0.11	

*Significant at .05 level of confidence.

The findings however disclose that adjusted post test mean displayed significant difference on speed, since the obtained F ratio of 62.71 is greater than the required table value of 3.226 at $\alpha = 0.05$ for the df 2 and 41. Hence, the adjusted post test is significant Scheffe's post hoc was applied and the results are presented in Table IV.

Table IV: The scheffe's test for the difference between paired means on agility

PTWWV	PTWOWV	Control	Mean difference	CI
13.01	13.85		0.84*	0.30
13.01		14.37	1.36*	0.30
	13.85	14.37	0.57*	0.30

*Significance at .05 level of confidence.

From the Table IV it is imperative that there is a significant difference between plyometric training with weighted vest (PTWWV) - control group (CG) and plyometric training without weighted vest (PTWOWV) - control group (CG) on agility. Therefore twelve weeks of plyometric training with weighted vest (PTWWV) showed greater improvement than Plyometric training without weighted vest (PTWOWV) on agility. The changes in speed are represented in Figure II.

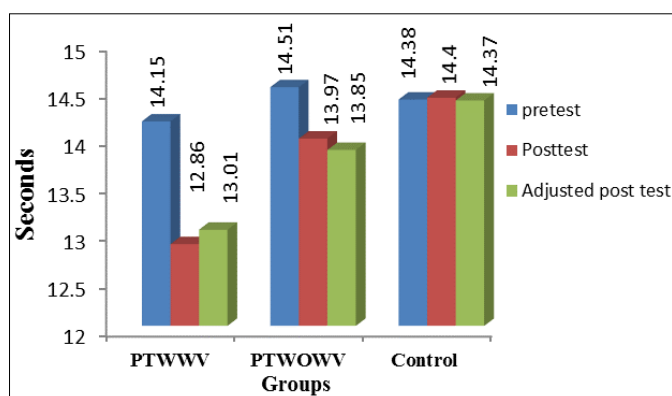


Fig II: The pre, post and adjusted post test mean values of experimental groups and control group on agility.

Discussion

The result of the present study pointed out that there was a significant difference in speed due to twelve weeks of plyometric training with weighted vest and plyometric training without weighted vest. The finding is in line with the findings of Rimmer and Sleivert (2000) [3], Lehnert, *et al.*, (2009) [2] as they reported that plyometric training increases

speed performance. The present study also showed significant difference in agility due to twelve weeks of plyometric training with weighted vest and plyometric training without weighted vest. The result are similar with the findings of the studies conducted by Sukumar (2010), Brown (1986) [9] and Sporis *et al.*, (2010) [4] as they revealed that plyometric exercise improves agility.

Conclusion

Plyometric training with weighted vest (PTWWV) and plyometric training without weighted vest (PTWOWV) used to increase factors associated with speed and agility. In summary, the speed and agility can be improved during the age between 18 and 22 years of college men volleyball players and favour the prescription of Plyometric training with weighted vest (PTWWV) and plyometric training without weighted vest (PTWOWV). The result of the study concluded that there was a significant difference between two experimental groups for speed and agility. Plyometric training with weighted vest (PTWWV) had significant improvement as compared to plyometric training without weighted vest (PTWOWV). It can be concluded from the results that Plyometric training with weighted vest (PTWWV) is best method to improve speed and agility among volleyball players.

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