

Relative Effects of Plyometric Training with and Without Hand Held Weights on Selected Power Related Parameters of Inter Collegiate Men Volleyball Players

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Abstract

Aim of the study was to find out the Relative Effects of Plyometric training with and without Hand Held weights on selected Power related Parameters of inter Collegiate Men Volleyball Players such as explosive power in vertical direction (EPVD) and explosive power in horizontal direction (EPHD). The study was conducted on forty five (N=45) inter collegiate volleyball players, studying various affiliated Colleges in Periyar University, Salem Tamilnadu, India during 2009-2010 were selected as subjects. The age of the subjects were ranged from 18 to 21 years. The subjects were assigned at random into three groups of fifteen each (n=15). Group-I underwent Plyometric Training with Hand held weights (PTWWT), Group-II underwent Plyometric Training without Hand held weights (PTWOWT) and Group-III acted as Control. All the experimental groups undergo their respective training for 8 weeks. Among the explosive power parameters explosive power in vertical direction (EPVD) and explosive power in horizontal direction (EPHD) were selected as dependent variables. Explosive power in vertical direction (EPVD) was assessed by Sargent Jump test and Explosive power in horizontal direction (EPHD) was assessed by standing long jump test. All the subjects were tested prior to and after the training for all the selected variables. The data collected from the three groups prior to and post experimentation was statistically analyzed by using Analysis of Covariance (ANCOVA). Scheffe's post hoc test was applied to determine the significant difference between the paired means. In all the cases .05 level of significance was fixed. The results of the study showed that there was a significant difference was found among the experimental groups. Plyometric Training with Hand held weights (PTWWT) groups is found to be better than other groups.

Keywords: Explosive power in vertical direction (EPVD), Explosive power in horizontal direction (EPHD)

Introduction

Today's sports and recreation activities have become more and more competitive, with this increased competitive nature comes an increase in the desire to improve performance. Many techniques have been used over the years in an attempt to enhance performance, and thus improve success. One of the most important aspects of performance enhancement, other than skill, is the ability to produce power (*Wilk & Arrigo, 1999*).

Sports science generally aims at identifying and developing performance variables essential for competitive excellence. In addition to other indices like muscle endurance and power, muscle strength plays a cardinal role in achiev-

ing athletic excellence. The final common denominator in athletic events is what the muscles can do for once - what strength they can give when it is needed, what power they can achieve in the performance of work and how long they can continue in their activity (*Guyton, 1991*).

Plyometric exercises have been used successfully over the years to elicit training responses from athletes. Plyometrics training is almost exclusively applied to extensor Muscle of the legs, and consists of a vigorous lengthening of the active extensor muscles (eccentric contraction) immediately followed by a maximal concentric contraction. They are most frequently used as a means of increasing speed and anaerobic power output in sprinters and jumpers, but the techniques may also be of

Plyometrics refers to human movement that involves an eccentric (lengthening) muscle contraction immediately and rapidly followed by a concentric (shortening) contraction. This is often referred to as the stretch-shortening cycle. The phase between these two contractions is referred to as the amortization phase. Energy stored during the eccentric phase is partially recovered during the concentric phase. In order to best use this stored energy the eccentric phase must be rapidly followed by the concentric.

Methodology

The purpose of the study was to find out the relative effects of Plyometric training with and without Hand Held weights on selected Power related parameters of inter Collegiate men Volleyball Players. To achieve the purpose forty five (N=45) male inter collegiate volleyball players were selected from various colleges affiliated to Periyar University, Salem, Tamilnadu, India were selected as subjects. The age of the subjects were ranged from 18 to 21 years. The purpose of the present study was explained to them clearly where by their consent to serve as samples were obtained. The present study is an experimental one and to test the effects of varied forms of intervening strategies, the care was taken in distributing the samples to each experimental group. For this, the selected samples (N=45) were divided into three equal groups. Group I was considered as Plyometric Training with Hand held weights (PTWWT), in which they underwent Plyometric Training with Hand held weights training, Group II was considered as Plyometric Training without Hand held weights (PTWOWT), in which they underwent Plyometric Training without Hand held weights Training and Group III was considered as control group they are doing the regular physical & skill practice The experimental group were given training for 3 days a week and for 8 weeks in total.

Among the explosive power parameters explosive power in vertical direction (EPVD) and explosive power in horizontal direction (EPHD) were selected as dependent variables. Explosive power in vertical direction (EPVD) was assessed by Sargent Jump test (**Sargent, 1921**) and Explosive power in horizontal direction (EPHD) was assessed by standing long jump test.

Analysis of the Data

The data collected from the experimental groups and control group on prior and after experimentation on selected variables were statistically examined by analysis of covariance (ANCOVA) was used to determine differences, if any among the adjusted post test means on selected criterion variables separately. Whenever they obtained f-ratio value in the simple effect was significant the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases .05 level of significance was fixed.

The Analysis of covariance (ANCOVA) on Explosive power in vertical direction (EPVD) and Explosive power in horizontal direction (EPHD) of Experimental Groups and Control group, have been analyzed and presented in Table -I.

Table - I

**Analysis of Covariance for Experimental Groups and Control Group
on Dependent variables**

Certain Variable s	Adjusted Post test Means			Source of Variance	Sum of Squares	df	Mean Squares	'F' Ratio
	Plyometric Training with Hand held weights group- (I) (PTWWT)	Plyometric Training without Hand held weights group- (II) (PTWOWT)	Control Group (III)					
Explosive power in vertical direction (EPVD)	51.22	48.36	44.09	Between Within	384.32 108.11	2 41	192.16 2.64	72.87*
Explosive power in horizontal direction (EPHD)	2.21	2.08	1.96	Between Within	0.48 0.07	2 41	0.24 0.002	146.64*

* Significant at .05 level of confidence

(The table value required for Significance at 0.05 level with df 2 and 41 is 3.23)

Table 1 shows that the adjusted post test mean value of Explosive power in vertical direction (EPVD) and Explosive power in horizontal direction (EPHD) for Plyometric Training with Hand held weights (PTWWT) group, Plyometric Training without Hand held weights (PTWOWT) group and Control Group, were 51.22, 48.36, 44.09, 2.21, 2.08 and 1.96 respectively. The obtained F-ratio 72.87 and 146.64 for the adjusted post test mean was more than the table value 3.23 for df 2 and 41 required for significance at .05 level of confidence.

The results of the study indicate that there was a significant difference among the adjusted post test means of Experimental Groups and Control Group on the increase of Explosive power in vertical direction (EPVD) and Explosive power in horizontal direction (EPHD).

To determine which of the paired means had a significant differences, Scheffe's test was applied as Post hoc test and the results are presented in Table II.

Table - II

The Scheffe's Test for the differences between the Adjusted Post Tests Paired Means on Dependent Variables

Certain Variables	Adjusted Post test Means			Mean Difference	Confidence Interval
	Plyometric Training with Hand held weights group-(I) (PTWWT)	Plyometric Training without Hand held weights group-(II) (PTWOWT)	Control Group (III)		
Explosive power in vertical direction (EPVD)	51.22	48.36		2.86*	1.48
	51.22		44.09	7.13*	1.48
		48.36	44.09	4.29*	1.48
Explosive power in horizontal direction (EPHD)	2.21	2.08		0.13*	0.04
	2.21		1.96	0.25*	0.04
		2.08	1.96	0.12*	0.04

* Significant at .05 level of confidence

Table II shows that the adjusted post test mean for differences on Plyometric Training with Hand held weights group and Plyometric Training without Hand held weights group, Plyometric Training with Hand held weights group and Control group, Plyometric Training without Hand held weights group and Control group on Explosive power in vertical direction (EPVD) were 2.86, 7.13 and 4.29 respectively. The values were greater than the confidence interval value 1.48, which shows significant differences at .05 level of confidence.

Further the table 2 shows that the adjusted post test mean for differences on Plyometric Training with Hand held weights group and Plyometric Training without Hand held weights group, Plyometric Training with Hand held weights group and Control group, Plyometric Training without Hand held weights group and Control group on Explosive power in horizontal direction (EPHD) are 0.13, 0.25 and 0.12 respectively. The values were greater than the confidence interval value 0.04, which shows significant differences at .05 level of confidence.

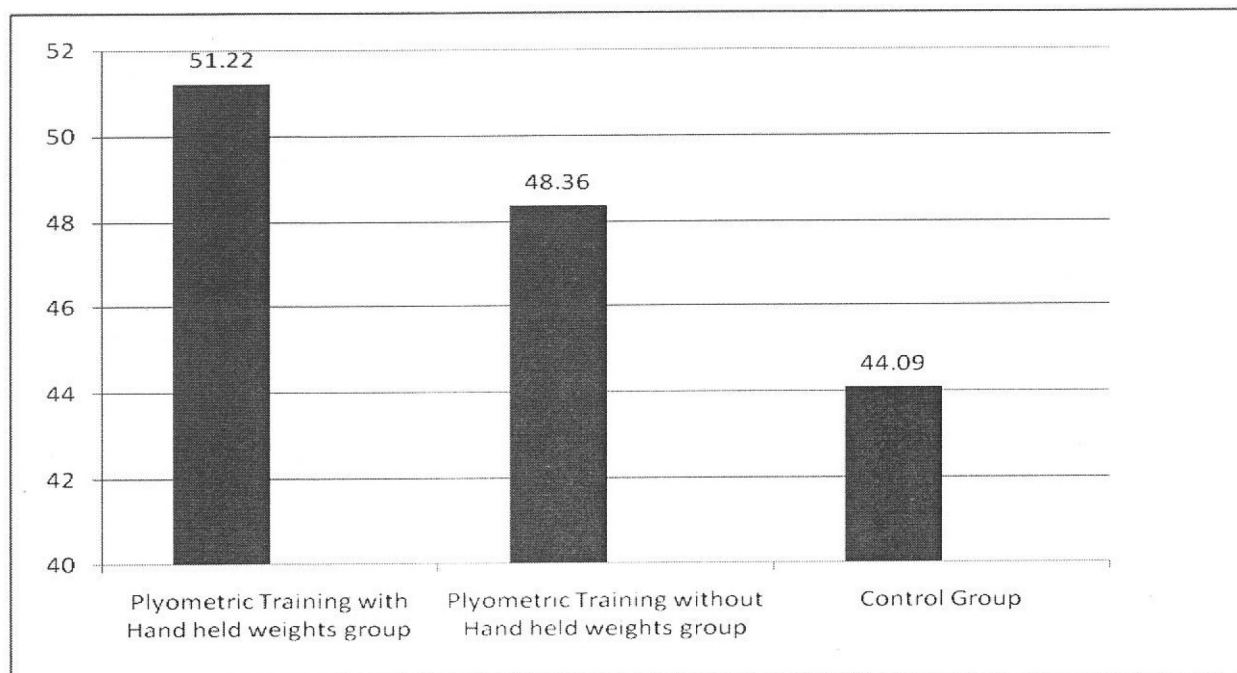
It was concluded from the results of the study that there was a significant difference in Explosive power in vertical direction (EPVD) and Explosive power in horizontal direction (EPHD) between the adjusted post test means of Plyometric Training with Hand held weights group and Plyometric Training without Hand held weights group, Plyometric Training with Hand held weights group and Control group, Plyometric Training without Hand held weights group and Control group. However, the improvement in Explosive power in vertical direction (EPVD) and Explosive power in horizontal direction (EPHD) was significantly increased for Plyometric Training with Hand held weights group than Plyometric Training without Hand held weights group and Control Group.

Therefore it may be concluded that the Plyometric Training with Hand held weights group was found to be better than the Plyometric Training without Hand held weights group and Control Group in improving Explosive power in vertical direction (EPVD) and Explosive power in horizontal direction (EPHD).

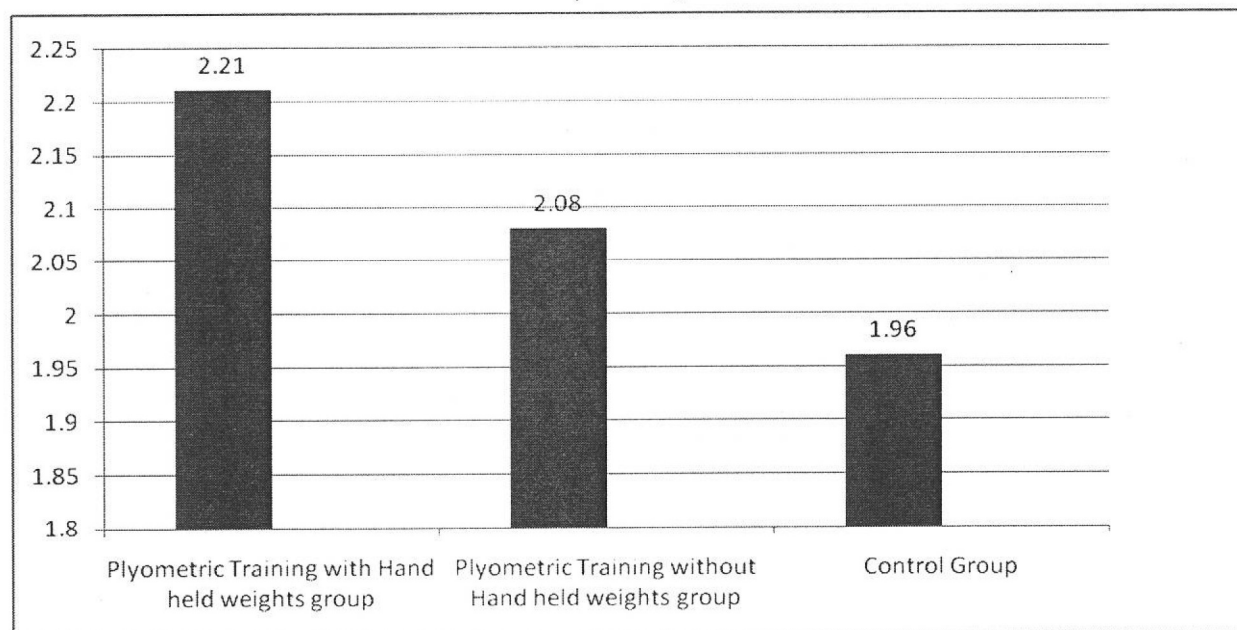
The adjusted post test means values of experimental groups and the control group on Explosive power in vertical direction (EPVD) and Explosive power in horizontal direction (EPHD) are graphically represented in the Figure -1 and Figure-2.

Figure-1

Bar Diagram on Ordered Adjusted Means of Explosive Power in Vertical Direction EPVD in Centimeters

**Figure-2**

Bar Diagram on Ordered Adjusted Means of Explosive Power in Horizontal Direction (EPHD) in Meters



Results and Discussion

The results of the study indicate that the experimental groups namely Plyometric Training with Hand held weights (PTWWT) group and Plyometric Training without Hand held weights (PTWOWT) group had significantly improved the selected dependent Explosive parameters namely Explosive power in vertical direction (EPVD) and Explosive power in horizontal direction (EPHD). It was also found that the improvement achieved by the Plyometric Training with Hand held weights

(PTWWT) group was greater when compared to Plyometric Training without Hand held weights (PTWOWT) group and Control group. These results were in conformity with the findings of the following studies undertaken by Ismail et al, (2010), MacDonald et al, (2012), Lloyd, et al, (2011) and (Villarreal et al, 2010).

Conclusion

From the results of the comparative effect among the plyometric training with and without hand held weights and control group on selected Power related Parameters of inter Collegiate Men Volleyball Players were made. It has been proven experimentally that an eight-week of training model using the plyometric training with hand held weights method can have an effect on the statistically relevant increase in the Power related Parameters (explosive type strength) of the leg muscles, which in turn leads to an increase in the block jump and spike jump. Due to this, the individual use of the plyometric method with handheld weights is recommended as more effective in the development of the vertical jump.

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