

## EFFECT OF PLYOMETRIC TRAINING AND WEIGHT TRAINING ON LEG EXPLOSIVE POWER OF VOLLEYBALL PLAYERS

R. Sendhil

Director of Physical Education ,  
Perunthalaivar Kamarajar Arts College, Puducherry.

**Abstract:**-The purpose of this study is to assess the effect of plyometric training and weight training on leg explosive power of volleyball players. The subjects for this study were randomly selected from the P.K.Arts College, pondicherry. In total forty five boys were selected and their age ranged from 17 to 22 years as per the college records. The subjects were divided into 3 equal groups of 15 subjects each, one control group and two experimental groups. Experimental Group I doing plyometric training programme, Experimental group II underwent weight training programme experimental training for twelve weeks duration, Three days in a week. The control group was not allowed to participate in any training program. The data were collected on the criterion measures before (Pre-Test) and after (Post-Test) the training programme. The subjects were tested on selected variable were leg explosive power (Vertical jump). The data was analysed using Analysis of covariance (ANCOVA). The result of the study showed of plyometric training post test (F = 51.46) and adjusted post test mean (F = 51.06) weight training post test (F = 51.07) and adjusted post test mean (F = 49.88) showed significant ( $p < 0.05$ ) difference among plyometric training and weight training and control group on leg explosive power. It is concluded that plyometric training and weight training for 12 weeks is more effective in increasing leg explosive power of men volleyball players.

**Keywords:** Plyometric Training, Weight Training, Leg Explosive Power and Volleyball Players.

### INTRODUCTION

In the Modern volleyball requires for player good plyometric endurance, parallel it is very important to develop speed and explosive power and force endurance. Volleyball is also a social game, where next to the good coordination and cleverness comes up to the important place team players good rapprochement and cooperation (Järvekülg, 2002). Vertical jump ability is critical for success in volleyball. Jumping is utilized during the jump set, jump serve, blocking and spiking. A successful player must not only be able to jump high but must also be able to reach that height quickly. This requires an ability to generate power in a very short time (Powers, 1996). The use of strength during the play is determined by the fact that the usage of maximum strength lasts from 0.5 to 0.7 seconds; however, most of the explosive moments take substantially less time. For this reason the optimal usage and transformation of the gained maximum muscle strength into the "explosivity" of the main muscle group of the lower limbs, which take part in the takeoff, require special power training (Lehnert et al., 2009). Plyometric exercises have been shown to improve jump performance in many sports. These exercises combine strength with speed of movement to produce power. By using the myotatic stretch reflex of the muscle to produce an explosive reaction, plyometric is believed to be the link between speed and strength (Powers, 1996). The plyometric method is ranked

Please cite this Article as :R. Sendhil, "EFFECT OF PLYOMETRIC TRAINING AND WEIGHT TRAINING ON LEG EXPLOSIVE POWER OF VOLLEYBALL PLAYERS" : Academic Sports Scholar (Nov ; 2014)

among the most frequently used methods for conditioning in volleyball (Lehnert et al., 2009). Weight training program for the volleyball player, perhaps the most critical is improving the vertical leap. A well designed program which does this, and includes specific exercises for developing core strength while minimizing risk of injury. Core strength includes not only the legs and back, but the abs as well.

## METHODOLOGY

The purpose of this study is to assess the effect of plyometric training and weight training on leg explosive power of volleyball players. The subjects for this study were randomly selected from the P.K.Arts College, pondicherry. In total forty five boys were selected and their age ranged from 17 to 22 years as per the college records. The subjects were divided into 3 equal groups of 15 subjects each, one control group and two experimental groups. Experimental Group I doing plyometric training program, Experimental group II underwent weight training program experimental training for twelve weeks duration, Three days in a week. The control group was not allowed to participate in any training program. The data were collected on the criterion measures before (Pre-Test) and after (Post-Test) the training program. The subjects were tested on selected variable were leg explosive power (Vertical jump). The data was analysed using Analysis of co-variance (ANCOVA) Technique to find out the effect of plyometric training and weight training on leg explosive power of volleyball players. Then, the obtained 'f' ratio is tested at 0.05 level of significant.

**Table I**  
**Mean and Standard Deviation of Initial and Final Scores among Groups on Leg Explosive strength**

Group	Pre-Test Mean	Pre-Test S.D	Post-Test Mean	Post-Test S.D	Adjusted Post-Test Mean
Control Group	43.73	4.19977	44.26	5.29780	45.83
EXP I	45.73	4.26726	51.46	3.94365	51.07
EXP II	46.53	4.03320	51.06	4.60538	49.88

EXPI = Plyometric Training Group, EXP II = Weight Training Group

**Table II**  
**Analysis of Covariance for the Pre, Post and Adjusted Post-Test of Control and Experimental Groups on Leg Explosive strength**

Test	Source of Variance	Sum of Squares	df	Mean Squares	Obtained F' Ratio
Pre-Test	Between	62.400	2	31.200	1.796
	Within	729.600	42	17.371	
Post-Test	Between	491.200	2	245.600	11.365
	Within	907.600	42	21.610	
Adjusted Post-Test	Between	212.412	2	106.206	21.328
	Within	204.161	41	4.980	

The required table 'F' value (2) (42) = 3.21 at 0.05 level

The calculated F-value for pre-test (1.796) is lesser than the table value of 3.21 at 0.05 level and hence it is not significant. Therefore, there is no significant difference among pre-test scores of leg Explosive strength on control group and experimental groups before the training period.

The calculated F-value for post test (11.365) is higher than the table value of 3.21 at 0.05 level and hence it is significant. Therefore, there is a significant difference among post-test scores of leg Explosive strength on control group and experimental groups after the training period.

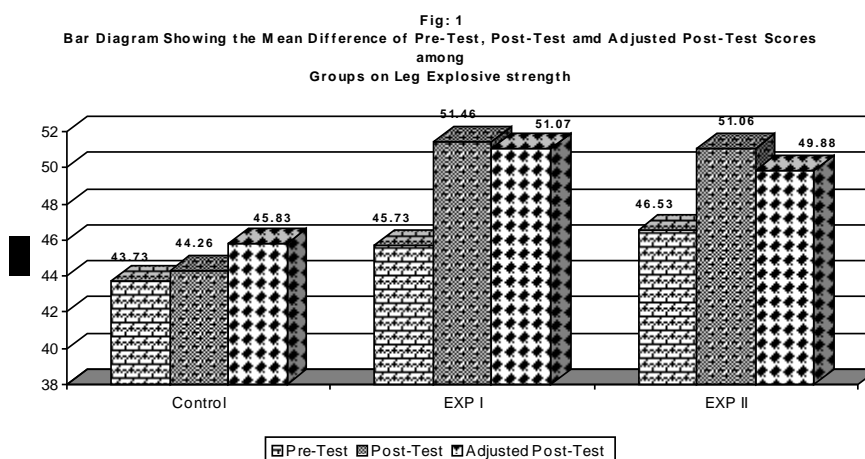
Results of ANACOVA are also presented on the above table for pre and post test scores of leg Explosive strength. From the table it can be seen that 'F' value of 21.328 for the post test among control, and experimental groups is higher than the table value of 3.23 at 0.05 level. Thus the significant 'F' value indicates that the training have a positive influence on leg Explosive strength among the subjects.

**Table III**  
**The Scheffe's Post Hoc Test for the Difference between the Adjusted Post-Test Paired Means on Leg Explosive strength**

Plyometric Training	Weight Training	Control	M. D	L. S
-----	49.88	45.83	4.05	0.01
51.07	49.88	-----	1.19	NS
51.07	-----	45.83	5.24	0.01

Scheffe's CI. Value at 0.05 level      2.034

Since, 'F' value for final test was significant, Scheffe's Post HOC was applied to see the significant mean difference between three groups at the results was presented in the above table.



**CONCLUSION**

It was observed from the pre test results, that there is no significant difference among control and experimental groups. While the post test results of control and experimental groups revealed that, there is a significant difference among the three groups. The training program has influenced the experimental groups where as there is no effect in the control group.

In the analysis of co-variance on leg Explosive strength among control and two experimental groups, a significant difference was revealed which throws light on the application for twelve weeks plyometric training and weight training. From the statistical analysis it is clear that both the training program had its own effects. But the plyometric training showed more effects in the physical variable on leg Explosive strength when compared to weight training group and control group.

**REFERENCES**

1.Adams, K., O'Shea, P., O'Shea K. L. & Climstein M. (1992). The effect of six weeks of squat, plyometric and squat-plyometric training on power production. Journal of Applied Sport Science Research 6, 1, 36-41.

- 2.Arthur, M. & Bailey, B. (1998). Conditioning for football. Champaign, IL: Human Kinetics.
- 3.Asmussen, E. & Bonde-Petersen, F. (1974). Storage of elastic energy in skeletal muscles in man. *Acta Physiologica Scandinavica*, 91, 385-392.
- 4.Blattner, S. E. & Noble, L. (1979). Relative effects of isokinetic and plyometric training on vertical training on vertical jumping performance. *Research Quarterly for Exercise and Sport*, 50 (4), 583-588.
- 5.Brown, M. E., Mayhew, J. L. & Boleach, L. (1986). Effect of plyometric training on vertical jump performance in high school basketball players. *Journal of Sports Medicine and Physical Fitness* 26(1), 1-4.
- 6.Chu, D., Faigenbaum, A., & Falkel, J. (2006). *Progressive plyometrics for kids*. Monterey: Healthy Learning, CA.
- 7.Diallo, O., Dore, E., Duche, P. & Van Praagh, E. (2001). Effects of plyometric training followed by a reduced training programme on physical performance in prepubescent soccer players. *Journal of Sports Medicine and Physical Fitness*, 41, 342-348.
- 8.Faigenbaum, D. A., McFarland, E. J., Keiper, B. F., Tevlin, W., Ratamess, A. N., Kang, J. & Hoffman, R. J. (2007). Effects of a short-term plyometric and resistance training programme on fitness performance in boys age 12-15 years. *Journal of Sports Science and Medicine*, 6, 519-525.
- 9.Lehnert M, lamrova I, Elfmark M. Changes in speed and strength in female volleyball players during and after a plyometric training program. *Acta Universitatis Palackianae Olomucensis Gymnica*. 2009; 39(1):59-66
- 10.Milic V, Ncjc D, Kostic R. The effect of plyometric training on the explosive strength of leg muscles of volleyball players on single foot and two-foot takeoff jumps. *Plyometric Education and Sport*. 2008; 6(2):169- 179
- 11.Shaji J, Isha S. Comparative analysis of plyometric training program and dynamic stretching on vertical jump and agility in male collegiate basketball player. *Al Ameen J Med Sci*. 2009; 2(1);36-46.
- 12.Stojanovic T, Kostic R. The effects of the plyometric sport training model on the development of the vertical jump of volleyball players. *Plyometric Education and Sport*. 2002; 1(9):11 -25.



**R. Sendhil**

Director of Physical Education ,Perunthalaivar Kamarajar Arts College, Puducherry.