

# Isolated and Combined Effect of Resistance Training and Plyometric Training on Explosive Power Performance Variables among Women Volleyball Players

Gummalla Haripriya<sup>1\*</sup> Dr. M. V. Srinivasan<sup>2</sup>

<sup>1</sup> Assistant Professor, Physical Education, College of Veterinary Science, YSR Kadapa, AP

<sup>2</sup> Assistant Professor, Department of Physical Education and Sports Sciences, Sri Krishnadevaraya University, AP

**Abstract** – The present study was undertaken to analyze the effect of isolated and combined effect of resistance training and plyometric training on explosive performance among women volleyball players. The investigator has selected N=80 women inter collegiate level/state level participated volleyball players at random from various college of the YSR Kadapa district of Andhra Pradesh, India and their age range from eighteen to twenty five years as per their college record. The volleyball players chosen for the study were divided into four equal groups n=20 and designated as experimental group 'A' experimental group 'B' experimental group 'C' and control group 'D'. polyometric exercises training were given to group 'A' resistance exercises training were given to group 'B', Combined training of plyometric exercises and resistance exercises training were given to group 'C' and the 'CG' control group 'D' were restricted to participate in any activities. The trainings were given for a period of twelve weeks. The data were collected before and after the training by conducting vertical jump. The obtained data's were analyzed by Analysis of Covariance (ANCOVA). The level of significant was fixed at 0.05 levels. The results of the study showed that plyometric exercises, resistance exercises and combined training significantly improved vertical jump performance of the volleyball players when comparative with control group. The Combined training group volleyball players shown better performance in vertical jump performance test when comparison with plyometric exercise training group and resistance exercises training group volleyball players.

**Keywords:** – Plyometric Exercises, Resistance Exercises, Explosive Power.

-----X-----

## INTRODUCTION

Resistance training is used by many athletes to get into top condition for a particular sports, it is an integral part of every athletes training program. A generally program of weight training for conditioning must include exercises that will develop muscular power and muscular endurance. The athlete tries progressively to exceed his limits in lifting and also stresses movements that must be done repeatedly with enough weights to make the muscle work. All lifting motions require timing, snap and explosive powers which are desirable in athletic training (Reddy 2009).

Plyometric exercises are also known as jump exercises with the goal of increasing explosive power. Plyometric exercises are primarily used by volleyball players to improve fitness level and explosive power (vertical jump) performance. Plyometric exercises were

squat jump, tuck jump, tuck squat jump, lateral jump, power skipping, alternative leg bounding, box jumps, vertical depth jump, plyo push up, scoop hooping, pike jump, straddle jump, lunge jump etc (Kamlesh 2018).

## STATEMENT OF THE PROBLEM:

The purpose of the study was to investigate the "effect of isolated and combined effect of resistance training and plyometric training on explosive performance among women volleyball players.

## OBJECTIVES OF THIS STUDY

1. To measure the influence of plyometric exercise training treatment on explosive power of volleyball players.

2. To evaluate the impact of resistance exercise training treatment on explosive power performance of volleyball players.
3. The examined the effect of combined training treatment on explosive power performance of volleyball players.
4. To understand the changes between plyometric exercises training, resistance exercises training and combined training on explosive power performance of volleyball players.

**HYPOTHESIS:**

- It was hypothesis that there will be a significant improvement in explosive power after the twelve weeks of training in plyometric exercises training group volleyball player, resistance exercises training group volleyball players and combined training group [plyometric training and resistance exercises] group volleyball players when compared with control group volley ball players.
- It was hypothesis that combined training group volleyball players will be superior to the plyometric training group and resistance exercises training program group volleyball player on explosive power.

**METHODOLOGY:**

The purpose of this study was to find out the effect of isolated and combined effect of resistance training and plyometric training on explosive performance among women volleyball players. To achieve the purpose of this study investigator has selected N=80 women inter collegiate level and state level participate volleyball players at random from various college of YSR Kadapa district of Andhra Pradesh, India and their age range from eighteen to twenty five years as per their college record.. The subjects chosen for study was divided into four groups each groups consisted of twelve volleyball players and designated as experimental group 'A' experimental group 'B' experimental group 'C' and control group 'D'. Plyometric training were given to group 'A' [PETG] resistance exercises training were given to group 'B' [RETG], Combined training of plyometric training and resistance exercises training were given to group 'C' [CPERETG] and the 'CONG' control group 'D' was restricted to participate in any of the training programme other than their regular activities.

Training was given three days in a week for twelve weeks to PETG, RETG and CPERETG volleyball players. The subject were tested on explosive power at the beginning (Pre-test) and at the end of the experimental period (Post-test). To measure the explosive power performance vertical jump test were used respectively because of their simplicity and

availability of necessary facilities, instrument and equipment's. The analysis of data on vertical jump test data have been examine by ANCOVA in order to determine the differences if any among the group at pre and posttest.

**Table – I**

**Analysis of Covariance of PETG, RETG, CPERETG and CONG volleyball players for explosive power performance [In centimeter]**

TEST	PETG	RETG	CPERETG	CLG	SOURCE OF VARIANCE	SUM SQUARES	df	MEAN SQUARES	OBTAINED F
Pre Test					Between	0.028	3	0.009	
Mean	2.31	2.26	2.30	2.29	Within	0.330	76	0.004	2.18
SD	.088	0.041	0.062	0.062	Between	0.183	3	0.061	
Post Test	2.35	2.29	2.38	2.26	Within	0.349	76	0.005	13.28*
Mean	0.081	0.043	0.054	0.083	Between	0.123	3	0.041	
SD					Within	0.118	75	0.002	26.25*
Adjusted Post Test	2.33	2.31	2.37	2.26	Mean				
Mean					Diff	0.02	0.03	0.07	0.03
Diff									

\*Significant at 0.05 level of confidence

Table value F-ratio at 0.05 level of confidence for 3 and 76 (df) =2.73, 3 and 75 (df) =2.73. \*Significant

The above table-I shows that there is a significant difference on explosive power among the four groups such as plyometric training group (PETG), resistance exercises training group (RETG), Combined training of plyometric training and resistance exercises training [CPERETG] and control group (CONG). Since the calculated 'F' value required being significant at 0.05 level for d/f 3, 76 and 3, 75 are 2.73 and 2.73, but the calculated values of explosive power post and adjusted posttest 'F' values are 13.28 and 26.25 respectively. Which are higher than the tabulated value. Since the obtained 'F' ratio is found significant.

**Table – II**

**Scheffes Post hoc test for mean difference between PETG, RETG, CPERETG and CONG volleyball players on explosive power [In centimeters]**

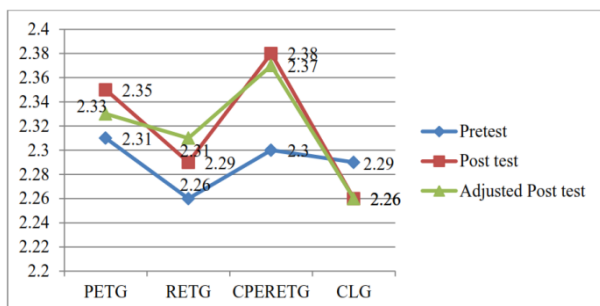
ADJUSTED POSTTEST MEANS VALUES					Required . C I
PETG	RETG	CPERETG	CLG	Mean Difference	
2.33	2.31	-	-	0.02*	0.01
2.33	-	2.37	-	0.04*	0.01
2.33	-	-	2.26	0.07*	0.01
-	2.31	2.37	-	0.06*	0.01
-	2.31	-	2.26	0.05*	0.01
-	-	2.37	2.26	0.11*	0.01

\*Significant at 0.05 level of confidence

The mean difference PETG volleyball players and RETG volleyball players, PETG volleyball players and CPERETG volleyball players, PETG volleyball players and CLG volleyball players, RETG

volleyball players and CPERETG volleyball players, RETG and CLG volleyball players and CPERETG and CLG were 0.02, 0.04, 0.07, 0.06, 0.05 and 0.11 which are higher than the CI value 0.01. Therefore study approved that there is significant differences exist between above groups on volleyball players.

The prior test mean value, post test mean values and adjusted post test mean values of PETG, RETG, CPERETG and CONG volleyball players of explosive power displayed in line graph



**Figure –I display the line graph of pre test, post test and adjusted post test mean values for explosive power of PETG, RETG, CPERETG and CLG volleyball players.**

#### DISCUSSION ON HYPOTHESIS:

- In the first hypothesis it was stated that there will be a significant improvement in explosive power after the twelve weeks of training in plyometric exercises group volleyball player, resistance exercise training group volleyball players and combined training group [plyometric training and resistance exercises] group volleyball players when compared with control group volleyball players. The result of the study found that experimental group's volleyball players explosive power performance level improved when compared with control group. Hence the research hypothesis is accepted.
- In second hypothesis mention that combined training group volleyball players will be superior to the plyometric exercises training group and resistance exercises training group volleyball player. The study found that combined training group volleyball players given best performance when comparison with PETG and RETG training group volleyball players. Hence research hypothesis accepted.

#### DISCUSSION AND FINDINGS:

The study result proved that vertical jump of the volleyball players increased with isolated and combined exercises of plyometric and resistance training. Ramin et al., (2014) research observed that amount of improvement is more in plyometric exercises group volleyball players than resistance

exercise group volleyball players. Kumaran and Javaid (2018) suggested that plyometric exercises method is one of the best to improve vertical jumping ability of volleyball players. Nikola et al., (2012) proved that plyometric exercises training method program were more effective for developing jumping agility of volleyball players. Ozkan et al., (2016) study observed that 8-weeks plyometric exercises on wood and synthetic exercises were positively increase the vertical jump capacity of volleyball players. Srihari et al., (2018) plyometric exercises with skill training were better to improve leg explosive power of volleyball players. Arumugam et al., (2017) plyometric exercises with association of resistance exercises improved vertical jump and agility of kabaddi players.

#### CONCLUSIONS:

It was concluded that comparing between the plyometric exercises group volleyball players [PETG]. Resistance exercises training group volleyball players [RETG], combined plyometric exercises and resistance exercises training group volleyball players [CPERETG] and control group volleyball players [CLG] found significant changes between groups on vertical jump performance test. Combined plyometric exercises and resistance exercises training group volleyball players [CPERETG] was significantly better than the isolated training groups volleyball players and plyometric training group volleyball players [PETG] was significantly better than the resistance exercises training group volleyball players [RETG] on vertical jump performance test for explosive power of legs.

#### REFERENCES

**Aditya Kumar Das (2017)** Core Exercises, Laxmi Book Publication.

**Aditya Kumar Das (2018)** Physical Exercises Technique, Laxmi Book Publication.

**Arumugam. S, Suriya P and Kumar V. (2017)** Effect of Plyometric Associated with Weight Training on Agility and Leg Explosive Power among Kabaddi Players, Journal of Information and Computational Science, 9(11): pp. 74-745.

**Kamlesh M.L (2018)** UGC NET Digest Physical Education in three volumes, Khel Sathitya Kendra, New Delhi.

**Kumaran. G and Javaid Ahmad Sheikh (2018)** Effect of plyometric training on vertical jumping ability among college men volleyball players, International Journal of Advanced Research and Development, 3(1), pp. 675-676.

**Nikola Stojanovic, Nikodije Jovanovic and Toplica Stojanovic (2012)** The effects of plyometric training on the development of the jumping agility in volleyball player, Facta Universitatis Series: Physical Education and Sport, 10(1), pp. 59-73.

**Ozkan Cdmend, Hurmuz Koc, Fatma Cdmend and Celil Kacoglu (2016)** Effect of eight-week plyometric training on different surfaces on the jumping performance of male volleyball players Journal of Physical Education and Sport (JPES), 16(1), 26, pp. 162–169.

**Ramin Aghajani, Zahra Hojjati and Alireza Elmiyeh (2014)** The Effects of Plyometric and Resistance Training on Explosive Power and Strength of Young Male Volleyball Players, Annals of applied sports science, 2(1): pp. 45-52.

**Reddy P.S.A (2009)** Sports officiating and coaching, Sports Publication, New Delhi.

**Srihari. K, Suthakar. S and Sundarraj (2018)** Effects of Skill Based Plyometric Training on Explosive Power of School Level Volleyball Players, International Journal of Recent Research and Applied Studies, 5(11).

---

**Corresponding Author**

**Gummalla Haripriya\***

Assistant Professor, Physical Education, College of Veterinary Science, YSR Kadapa, AP