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Effects of Plyometric Training With Core Exercises Program on Vo2 Max among Men Volley Ball Players

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Abstract – The present study was undertaken to analyze the effects of Plyometric training with core exercises on VO2 max among men volley ball players. The investigator has selected N=60 men inter collegiate level/state level participated volley ball players at random from various college of Rajiv Gandhi University of Knowledge Technologies Nuzvid, Krishna district, of Andhra Pradesh and their age range from eighteen to twenty five years as per their college record. The volley ball players chosen for the study were divided into four equal groups n=15 and designated as experimental group 'A' experimental group 'B' experimental group 'C' and control group 'D'. plyometric exercises training were given to group 'A' core training were given to group 'B', Combined training of plyometric exercises and core 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 Copper's Test – VO2 max. 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, core training and combined training significantly improved VO2 max of the volley ball players when comparative with control group volley ball players.

Keywords: – Plyometric Exercises, Core Exercises, Jump, Service.

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INTRODUCTION

Jumping training also known as plyometrics. "Plyos" are physical exercises in which muscles produce maximum force in short interval of time, with the aim of increasing speed and strength (Chu, 1988). Explosive strength exercises used by the coaches to train their athlete's muscles to activate the quick response and elastic properties of the major muscles in the body (Starks 2013).The research studies found that major reason for back pain whether its upper back pain or lower back pain in many people's caused by weak abdominal muscles. High incidence of back injury correlated with weak abdominal muscles (Rainville et al., 2004). Low back pain is a reason to cause of disability. Weak abdominal muscles linked to inactivity which contributes to decrease trunk strength, poor muscular endurance, flexibility, cardio vascular fitness, bone density and increase spinal segment stiffness (Sasidharan et al., 2011).

Cardio respiratory system of human body is to supply a continuous flow of oxygen and nutrients to the working skeletal muscles and to remove metabolic waste product of cellular respiration during exercises (Mayer 2001). Maximal oxygen uptake (VO_2 max) provides information on the capacity of the long-term human energy system, to attain high VO2max of volleyball players requires a high level of cardiovascular, respiratory, and neuromuscular functions. Therefore, VO2 max is an important components to asses fitness level of volleyball players and coaches, VO2 max changes with changes in training (Hickson et al., 1981 & Madsen et al., 1993) ventilator threshold and running economy are used in conjunction with VO2 max to increase the prediction of endurance performance in athletes (Bassett and Howley 2000).

Researcher stated that VO2 max, often in combination with other physiologic markers, is a good indicator of performance of endurance sports such as cyclists and runner (Perez-Landaluce et al., 2002 & Sjodin et al., 1982).

STATEMENT OF THE PROBLEM:

The purpose of the study was to investigate the "effects of plyometric training with core exercises on VO_2 max performance among men volley ball players".

OBJECTIVES OF THIS STUDY

1. To measure the influence of plyometric training treatment VO2 max performance of volley ball players.
2. To evaluate the impact of core training treatment on VO2 max performance of volley ball players.
3. The examined the effect of combined training treatment on VO2 max performance ability of volley ball players.
4. To understand the changes between plyometric training, core training, and combined training on VO2 max performance of Volley ball players.

HYPOTHESES:

- It was hypothesis that there will be a significant improvement on VO2 max performance after the twelve weeks of training in plyometric group, core training group volley ball players and combined training group [plyometric and core training] group volley ball players when compared with control group volley ball players.
- It was hypothesis that combined training group volley ball players will be superior to the plyometric training group and core training group volley ball player on VO2 max performance.

METHODOLOGY:

The purpose of this study was to find out the effects of Plyometric training with core exercises on VO_2 max performance among men volley ball players. To achieve the purpose of this study investigator has selected N=60 men inter collegiate level and state level participate volley ball players at random from various college of various college of Rajiv Gandhi University of Knowledge Technologies Nuzvid, Krishna district, of Andhra Pradesh and their age range from eighteen to twenty five years as per their college record.. The volley ball players chosen for study was divided into four groups each groups consisted of twelve volley ball players and designated as experimental group 'A' experimental group 'B' experimental group 'C' and control group 'D'. Plyometic training were given to group 'A' [PTG] core training were given to group 'B' [CTG], Combined training of plyometric and core training were given to group 'C' [CPCTG] and the 'CG' 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 PTG, CTG and CPCTG volley ball players. The subject were tested on VO_2 max performacne at the beginning (Pre-test) and at the end of the experimental period (Post-test). To measure the VO_2 max performance Russell–Cooper Test were used respectively because of their simplicity and availability of necessary facilities, instrument and equipment's. The analysis of data on VO_2 max 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 PTG, CTG, CPCTG and CG Volley ball players for Jump service ability performance [In number]

TEST	PT GROUP	CT GROUP	CPCT GROUP	C GROUP	SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARES	OBTAINED F
Pre Test Mean SD	53.65 9.62	54.34 4.52	52.42 8.43	55.17 8.17	Between	61.03	3	20.34	0.32
					Within	3514.90	56	62.76	
Post Test Mean SD	56.45 10.18	58.29 3.52	60.27 3.08	51.51 8.55	Between	635.92	3	211.97	4.32*
					Within	2743.83	56	48.99	
Adjusted Post Test Mean	56.62	57.99	61.27	50.62	Between	897.30	3	299.10	18.50*
					Within	889.24	55	16.16	
Mean Diff	2.8	3.95	7.85	4.55	-	-	-	-	-

PTG: Plyometric training group Volleyball players; CTG: Core training group Volleyball players; CPCTG: Combined plyometric and core training group Volleyball players; CG: Control group Volleyball players

Required table F-ratio at 0.05 level of confidence for 3 and 56 (df) = 2.77, 3 and 55 (df) = 2.77.

*Significant.

The above table-I shows that there is a significant difference on VO_2 max perofrmance among the four groups such as plyometric training group [PTG], core training group (CTG), combined training of plyometric and core training [CPCTG] and control group (CG). Since the calculated 'F' value required being significant at 0.05 level for d/f 3, 56 and 3, 55 are 2.77 and 2.77, but the calculated values of VO_2 max performance post and adjusted posttest 'F' values are 4.32 and 18.50 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 PTG, CTG, CPCTG and CG Volley ball players for VO_2 max performance [In number]

ADJUSTED POSTTEST MEANS VALUES					Required . C I
PT GROUP	CT GROUP	CPCT GROUP	C GROUP	Mean Difference	
56.62	57.99	-	-	1.37	4.22
56.62	-	61.27	-	4.65*	4.22
56.62	-	-	50.62	6.00*	4.22
-	57.99	61.27	-	3.28	4.22
-	57.99	-	50.62	7.37*	4.22
-	-	61.27	50.62	10.65*	4.22

Significant at 0.05 level of confidence

The mean difference PTG volley ball players and CPCTG volley ball players, PTG volley ball players and CG volley ball players, CTG volley ball players and CG volley ball players, CPCTG and CG volley ball players were 4.65, 6.00, 7.37 and 10.65 which are higher than the CI value 4.22. Therefore study approved that there is significant differences exist between above groups on volley ball players. Further the study proved that there is no significant difference between PTG and CTG volley ball players and CTG and CPCTG volley ball players lesser than CI Value.

The prior test mean value, post test mean values and adjusted post test mean values of PTG, CTG, CPCTG and CG volley ball players for VO_2 max performance displayed in bar graph

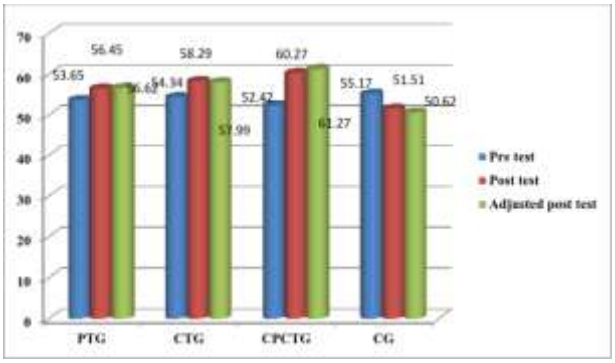

Figure –I display the line graph of pre test, post test and adjusted post test mean values for VO_2 max of PTG, CTG, CPCTG and CG volley ball players.

DISCUSSION ON HYPOTHESIS:

- In the first hypothesis it was stated that there will be a significant improvement on VO2 max after the twelve weeks of training in plyometric group, core training group volley ball player, and combined training group [plyometric exercises and core training] group volley ball players when compared with control group badminton players. The result of the study found that experimental group's volley ball players VO2 max performance level improved when compared with control group. Hence the research hypothesis is accepted.

- In second hypothesis mention that combined training group volley ball players will be superior to the plyometric training group and core training group volleyball player. The study found no significant difference between core training groups and combined training group volley ball players. Hence research second hypothesis rejected.

DISCUSSION AND FINDINGS:

The impact of explosive strength exercises [Plyometric], core exercises, combined explosive strength exercises [plyometric] and core exercises resulted significant increase in VO_2 max in liters. The experimental studies effect on VO_2 max were Indranil et. al., (2010) found soccer training is an effective to significant increase VO_2 max of soccer players. Sinilkumar et. al., (2017) found progressive plyometric training and resistance training programme resulted in a significant increase in cardiovascular endurance among teenage boys. Rodrigo et al., (2014) study declared that significant reduction in 2.4-km endurance run time of training group with plyometric exercises. Senthil Kumar (2016) found that eight weeks of land plyometric exercises and sand plyometric exercises resulted significant increase in cardio vascular endurance of hockey players.

CONCLUSIONS

The statistical result on VO_2 max concluded that plyometric training group volley ball players [PTG], core training group volley ball players [CTG], combined plyometric and core training group volley ball players [CPCTG] covered greater distance in cooper test and had maximum oxygen consumption capacity comparison to control volley ball players group [CG]. The study further proved that there are no significant changes between plyometric training group volley ball players [PTG] and core training group volley ball players [CTG]. Whereas combined plyometric and core training group volley ball players [CPCTG] significantly had more oxygen consumption capacity than plyometric training group volley ball players [PTG]. Finally there are no significant changes between Core training group volley ball players [CTG] and combined plyometric and core training group volley ball players [CPCTG] on VO_2 max.

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