

Effect of plyometric training on selected physical and physiological variables among college level volleyball players

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Abstract

This study was designed to investigate the Effect of plyometric training on selected physical and physiological variables among college Volleyball players. To achieve the purpose of the study 30 inter-collegiate male Volleyball players were selected from affiliated colleges of Bharathiar University, Coimbatore. The subjects was randomly assigned to two equal groups (n=15). Group-I underwent plyometric training (PTG) and Group - II was acted as control group (CG). The plyometric training was given to the experimental group for 3 days per week (Monday, Wednesday and Friday) for the period of twelve weeks. The control group was not given any sort of training except their routine work. A pilot study was conducted to assess the initial capacity of the subjects in order to fix the load. The physical parameters of speed (50 mts dash), leg explosive power (vertical jump) and physiological parameters (Breath Holding Time, Resting Heart Rate) before and after training period. The data collected from the subjects was statistically analyzed with 't' test to find out significant improvement if any at 0.05 level of confidence. The result of the speed, leg explosive power and Breath Holding Time, Resting Heart Rate speculated significant improvement due to influence of plyometric training with the limitations of (diet, climate, life style) status and previous training. The result of the present study coincide findings of the investigation done by different experts in the field of sports sciences. Plyometric training group significantly improved speed, leg explosive power and Breath Holding Time, Resting Heart Rate college male Volleyball players.

Keywords: plyometric training, speed, leg explosive power, breath holding time, resting heart rate

Introduction: Plyometric Training

Plyometric (also known as "ploys") is a type of exercise training designed to produce fast, powerful movements, and improve the functions of the nervous system, generally for the purpose of improving performance in sports. Plyometric movements, in which a muscle is loaded and then contracted in rapid sequence, use the strength, elasticity and innervations of muscle and surrounding tissues to 23 jump higher, run faster, throw further, or hit harder, depending on the desired training goal. Plyometric is used to increase the speed or force of muscular contractions, providing explosiveness for a variety of sport-specific activities. Plyometric has been shown across the literature to be beneficial to a variety of athletes. Benefits range from injury prevention, power development and sprint performance amongst others. Plyometric can improve strength in both your upper and lower body. Examples of lower body plyometric are tuck jumps, squat jumps, box jumps and depth jumps. The goal of these jumps is to get higher, utilizing your leg strength to improve the height of your jump. Upper body plyometric include clapping push ups, medicine ball chest press throw and overhead throws. These help improve strength in your upper body. Plyometric exercises require a lot of energy, because they are highly intense. They utilize the whole body and activate most muscle groups, therefore burning many calories in a single session and aiding in weight loss. The repetitive landing causes your entire leg muscles to contract, helping to improve overall tone and definition. Plyometric combine strength training and

cardiovascular exercise, allowing you to "kill two birds with one stone."

Volleyball

Volleyball is a dynamic, fast-paced game. The purpose of strength training for volleyball is not to build big muscles, but to develop the physical attributes necessary to improve a player's performance. So strength training is very important to volleyball and should not be developed independently of other abilities such as agility, quickness and endurance. When watching a great volleyball player, the one word that comes to the mind is "quick". Everything the player does is short and quick. There are no long drawn out motions like sprinting in other sports. There is simply a succession of explosive bursts that keep the ball in play and control the flow of the game. The quickness that must be focused on, when training a volleyball player is not only quickness from side to side and front to back, but also quickness from up to down. Unique from other sports, volleyball players must be able to quickly change direction from the upward motion of a vertical jump to the downward motion of a point-saving dig (or vice versa). To play volleyball one has to be good at vertical jump, known as explosive power. A volleyball match can be played for five sets which means a match can last about 90 minutes, during which a player can perform 250 -300 actions dominated by the explosive type of strength of the leg muscles. The total number of actions as jumps takes up around 50-60% high speed movements and change of direction in space about 30% and as falls about 15%. The spike and block actions are

dominated by the corresponding explosive type of strength which is referred to as a player’s vertical jump which is usually the key to winning point.

Methods

Experimental Approach to the Problem In order to address the hypothesis presented herein, we selected 30 inter-collegiate men volleyball players from affiliated colleges of Bharathiar University, Coimbatore. The subjects were randomly assigned in to two equal groups namely, Plyometric training group (PTG) (n=15) and Control group (CG) (n=15). A pilot study was conducted to assess the initial capacity of the subjects in order to fix the load. The respective training was given to the experimental group the 3 days per weeks (alternate days) for the training period of twelve weeks. The control group was not given any sort of training except their routine.

Design

The evaluated physical parameters were physical parameters of speed (50 mts dash), leg explosive power (vertical jump)

and the unit of measurement was in counts, and Breath Holding Time, Resting Heart Rate the unit of were measured at baseline and after 12 weeks of yogic practices were examined.

Training Programme

The training Programme was lasted for 45 minutes for session in a day, 3 days in a week for a period of 12 weeks duration. These 45 minutes included 10 minutes warm up, Plyometric training for 25 minutes and 10 minutes warm down. Every three weeks of training 5% of intensity of load was increased from 65% to 80% of work load. The volume of aerobic dance training is prescribed based on the number of sets and repetitions. The equivalent in Plyometric training is the length of the time each action in total 3 day per weeks (Monday, Wednesday and Friday). The intensity of exercise for 10 weeks before tapering off during 11th and 12th weeks as removal by Piper and Erdman (1998). The intensity of training was tapered, so that fatigue would not be a factor during post testing.

Table 1: Plyometric training schedule for impact per session

Training week	Name of the aerobic dance exercises	Sets & Repetition	Intensity
I & II	Side to side ankle hops	2x5	55%
	Double leg hops	2X5	
	Split jumps	2x5	
	Lateral cone hops	2x5	
	Single leg bounding	2x5	
III & IV	Side to side ankle hops	3x7	60%
	Double leg hops	3x7	
	Split jumps	3x7	
	Lateral cone hops	3x7	
	Single leg bounding	3x7	
V & VI	Side to side ankle hops	2x7	65%
	Double leg hops	2x7	
	Split jumps	2x7	
	Lateral cone hops	2x7	
	Single leg bounding	2x7	
VII & VIII	Side to side ankle hops	3x8	70%
	Double leg hops	3X8	
	Split jumps	3x8	
	Lateral cone hops	3x8	
	Single leg bounding	3x8	
IX & X	Side to side ankle hops	4x7	75%
	Double leg hops	4X7	
	Split jumps	4x7	
	Lateral cone hops	4x7	
	Single leg bounding	4x7	
XI & XII	Side to side ankle hops	3x8	70%
	Double leg hops	3X8	
	Split jumps	3x8	
	Lateral cone hops	3x8	
	Single leg bounding	3x8	

Statistical Analysis

The collected data before and after training period of 12

weeks on the above said variables due to the effect of Plyometric training was statistically analyzed with ‘t’ test to

find out the significant improvement between pre and post-test. In all cases the criterion for statistical significance was set

at 0.05 level of confidence.

Table 2: Computation of ‘T’ ratio on selected plyometric training variables of college men volleyball players. on experimental group and control group.

Group	Variables		Mean	N	Std. Deviation	Std. Error	t ratio
Experimental group	Speed	Pre test	7.81	15	0.04	0.003	13.43*
		Post test	7.77	15	0.43		
	leg explosive power	Pre test	28.60	15	2.16	0.62	8.46*
		Post test	33.93	15	2.68		
	Breath Holding Time	Pre test	30.26	15	4.12	0.26	4.34*
		Post test	31.37	15	3.53		
	Resting Heart Rate		76.53	15	2.45	0.22	8.67*
			74.67	15	2.09		
Control group	Speed	Pre test	7.81	15	0.41	0.02	0.48
		Post test	7.82	15	0.43		
	leg explosive power	Pre test	26.73	15	3.01	0.80	1.07
		Post test	27.60	15	3.06		
	Breath Holding Time	Pre test	29.14	15	4.28	0.67	1.01
		Post test	29.84	15	4.60		
	Resting Heart Rate	Pre test	77.33	15	4.15	0.44	1.50
		Post test	76.67	15	3.83		

*Significant level 0.05 level degree of freedom (2.14, 1 and 14)

Table 2 reveals the computation of mean, standard deviation and ‘t’ ratio on selected physical and physiological parameters namely speed, explosive power, Breath Holding Time, Resting Heart Rate experimental group. The obtained ‘t’ ratio on speed, explosive power, Breath Holding Time, Resting Heart Rate were 13.43, 8.46 and 4.34, 8.67 respectively. The required table value was 2.14 for the degrees of freedom 1 and 14 at the 0.05 level of significance. Since the obtained ‘t’ values were greater than the table value it was found to be statistically significant.

Further the computation of mean, standard deviation and ‘t’ ratio on selected physical and physiological parameters namely speed, explosive power, Breath Holding Time, Resting Heart Rate control group. The obtained ‘t’ ratio on speed, explosive power, Breath Holding Time, Resting Heart Rate were 0.48, 1.07 and 1.01, 1.50 respectively. The required table value was 2.14 for the degrees of freedom 1 and 14 at the 0.05 level of significance. Since the obtained ‘t’ values were lesser than the table value it was found to be statistically not significant.

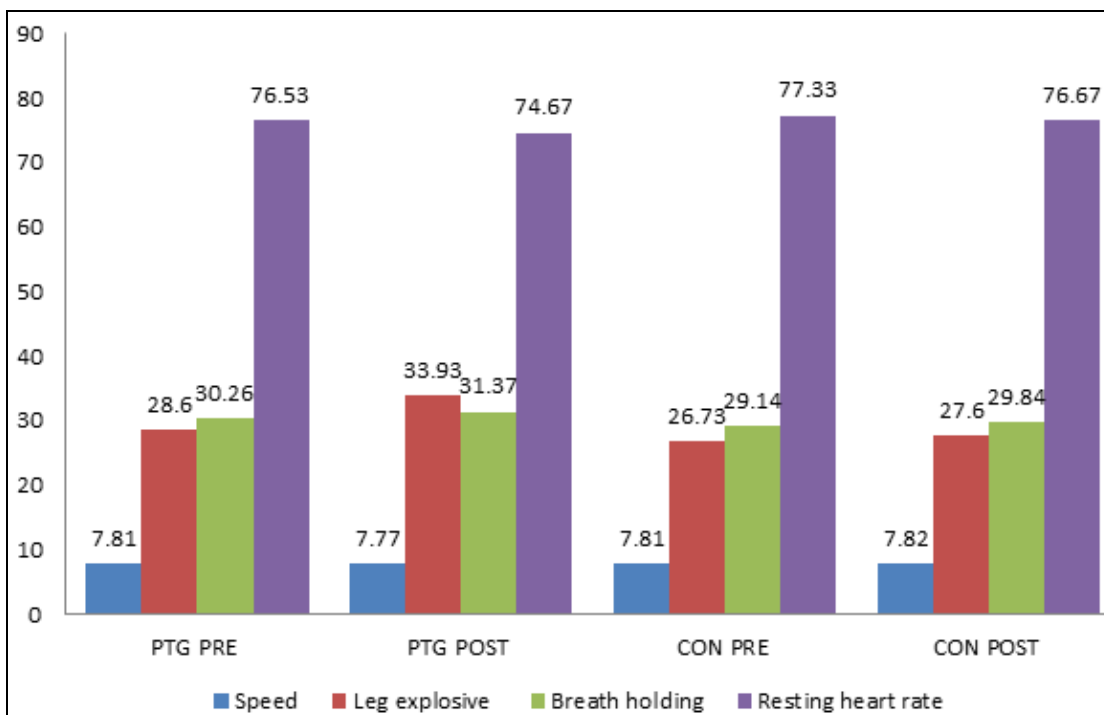


Fig 1: Bar diagram showing the mean value on physical and physiological. Parameters of inter Collegiate male volleyball players on experimental and control group

Conclusions Discussion Findings

The present study experimented the impact of Plyometric training on physical and physiological parameters of volleyball players. The result of the study indicated that the Plyometric training improved the physical parameters such as speed, explosive power, Breath Holding Time, Resting Heart Rate the findings of the present study had similarity with the findings of the investigations referred in this study. However, there was a significantly changes of subjects in the present study the speed, explosive power, Breath Holding Time, Resting Heart Rate was significantly improved of subject in the group may be due to the in Plyometric training. Ahilan, Singh Harman deep, (2015) reported that the Vertical Jumping for Plyometric training program on effective for volleyball players. Vladan Milić *et al.*, (2008) reported that the plyometric training on statistically significant deferens in explosive strength of cadet volleyball players. Shaikmannan (2015) suggestion that the volleyball specific plyometric training can improve arm and leg explosive power of male volleyball players. Annadurai (2014)^[2] revealed that the selected dependent variables such as speed, explosive power, serving Ability and passing ability have significant improvement due to the Swiss ball and plyometric training Programme. From of result of the present study, it is speculated that the observed changes in speed, explosive power, Breath Holding Time, Resting Heart Rate may properly designed Plyometric training which are suitable for men Volleyball players at college level.

Conclusions

1. It was concluded that 12 weeks twelve weeks Plyometric training significantly improved the speed, explosive power, Breath Holding Time, Resting Heart Rate of the inter collegiate male Volleyball players.
2. Plyometric training is one among the most appropriate means to bring about the desirable changes over physical and physiological variables of Volleyball players. Hence, suggested that coaches and the experts deal with Volleyball players to incorporate. Plyometric training as a component in their training Programme.

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