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## Effect of plyometric training on physical fitness variables of rural volleyball players

**S Senthil Kumar and Dr. PK Kavithashri**

### Abstract

This study was investigated the impact of plyometric training on physical fitness variables of volleyball players. To achieve the purpose of the study 40 male volleyball players were selected from Coimbatore district. The subjects was randomly assigned to two equal groups (n=20). Group- I underwent plyometric training (TST) 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. The physical parameters of Speed (50 meter dash test) Agility (4x10 meter shuttle run) before and after training period. The data collected from the subjects was statistically analysed with 't' test to find out significant improvement if any at 0.05 level of confidence. The result of the present plyometric training significantly improved speed and agility of rural volleyball players.

**Keywords:** Plyometric training, speed, agility and volleyball players

### Introduction

Volleyball is a team sport in which two teams of six players are separated by a net. Each team tries to score points by grounding a ball on the other team's court under organized rules. It has been a part of the official program of the Summer Olympic Games since 1964. The complete rules are extensive. But simply, play proceeds as follows: a player on one of the teams begins a 'rally' by serving the ball (tossing or releasing it and then hitting it with a hand or arm), from behind the back boundary line of the court, over the net, and into the receiving team's court. The receiving team must not let the ball be grounded within their court. The team may touch the ball up to 3 times but individual players may not touch the ball twice consecutively. Typically, the first two touches are used to set up for an attack, an attempt to direct the ball back over the net in such a way that the serving team is unable to prevent it from being grounded in their court. The rally continues, with each team allowed as many as three consecutive touches, until either (1): a team makes a kill, grounding the ball on the opponent's court and winning the rally; or (2): a team commits a fault and loses the rally. The team that wins the rally is awarded a point, and serves the ball to start the next rally. The team that wins the rally is awarded a point, and serves the ball to start the next rally. A few of the most common faults include: causing the ball to touch the ground or floor outside the opponents' court or without first passing over the net; catching and throwing the ball; double hit: two consecutive contacts with the ball made by the same player; four consecutive contacts with the ball made by the same team; net foul: touching the net during play; foot fault: the foot crosses over the boundary line when serving. The ball is usually played with the hands or arms, but players can legally strike or push (short contact) the ball with any part of the body Plyometric exercises are used to develop explosive power. In plyometric exercise, overload is applied to skeletal muscle in a manner that rapidly stretches the muscle (an eccentric or stretch phase) immediately prior to the concentric or shortening phase of action. It is this "pre stretch" that activates the muscles natural elastic recoil elements. Research has indicated that with plyometric training, greater power will be produced if the depth and rate of the movement is short and rapid rather than large and slow. This means that bounding/jumping should be done quickly and depth jump heights should not be too large.

With plyometric exercise similar rules to weight training apply. Generally, up to ten reps can be done per exercise with 2-4 sets of each. Rests should allow quality to be maintained and technique is very important. A sound base of strength is required to perform more difficult exercises safely. Plyometrics or jump training volleyball exercises should be done quickly with the purpose of training muscles to be more powerful. The purpose of jump training is to train the muscles to pre-stretch before jumping. During this pre-stretch, energy is stored in the muscle which can be used to jump higher. For example, when performing a counter movement prior to jumping, elastic energy is stored in the muscles of the legs. If the counter movement is performed quickly, the energy that's stored can be used to aid in jumping higher. If the counter movement is performed too slowly, the energy will be lost. The intensity of volleyball exercises or jumping drills refers to how much stress is placed on muscles, connective tissues, and joints.

**Methodology**

In this study the selected 40 rural volleyball players selected from Coimbatore district. The subjects were randomly assigned in to two equal groups namely, plyometric training (MSCST) (n=20) and Control group (CG) (n=20). 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. The evaluated physical variables were speed was assessed by 50 meter dash test and the unit of measurement was in seconds, agility was assessed by 4x10 meter test the unit of measurements was in seconds.

**Training Programme**

The training programme was lasted for 60 minutes for session in a day, 3 days in a week for a period of 12 weeks duration. These 60minutes included 10 minutes warm up, 40 minutes for plyometric training and 10 minutes and warm down. The equivalent in plyometric training is the length of the time each action in total 3 day per weeks (Monday, Wednesday and Friday).

**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 posttest. In all cases the criterion for statistical significance was set at 0.05 level of confidence. ( $p < 0.05$ )

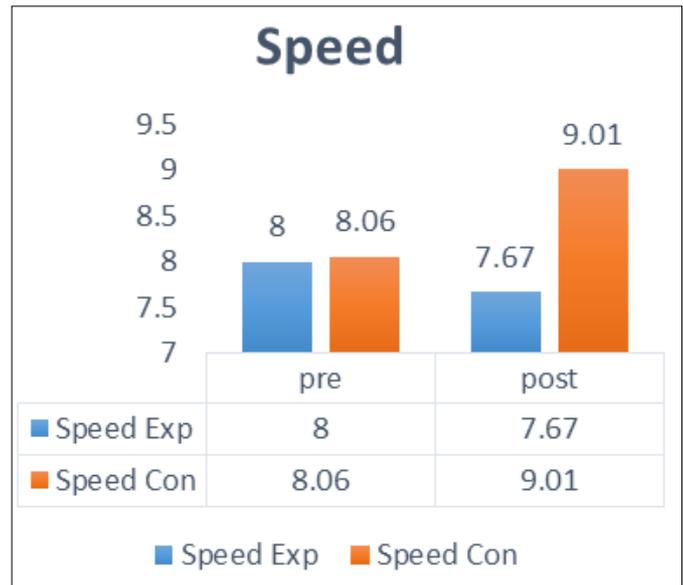
**Table 1:** Computation of 't' ratio on speed on experimental group and control group (Scores in numbers)

Groups	Pre-test mean	Pre-test S.D	Post-test mean	Post-test S.D	't' ratio
Plyometric training group	8.00	0.72	7.67	0.56	6.94*
Control group	8.06	0.68	9.01	0.69	0.74

\*significant level 0.05 level degree of freedom (2.09, 1 and 19)

Table shows that the 't' ratio's on speed of plyometric training group, and control group were 6.94 and 0.74 respectively. Since, these values were higher than the required table value 2.09, it was found to be statistically significant at 0.05 level of confidence for degrees of freedom 1 and 19. And the Obtained 't' ratio between pre and post-test of control group speed 0.74 was lesser than required table value of 2.09, found to be statistically significant.

From the result, it was inferred that, plyometric training group, produced a significant improvement in speed of male volleyball players.



**Fig 1:** Bar diagram showing the mean value on Speed of volleyball players on Experimental and Control group

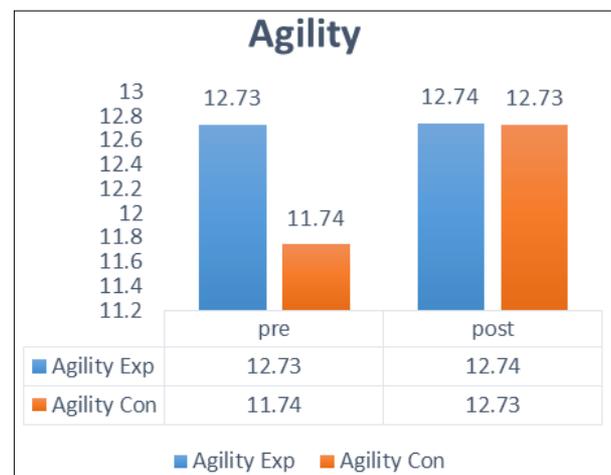
**Table 2:** Computation of 't' ratio on agility on experimental group and control group (Scores in numbers)

Groups	Pre-test mean	Pre-test S.D	Post-test mean	Post-test S.D	't' ratio
Plyometric training group	12.73	0.95	11.74	0.80	3.93*
Control group	12.74	0.95	12.73	0.95	1.00

\*significant level 0.05 level degree of freedom (2.09, 1 and 19)

Table shows that the 't' ratio's on agility of plyometric training group, and control group were 3.93 and 1.00 respectively. Since, these values were higher than the required table value 2.09, it was found to be statistically significant at 0.05 level of confidence for degrees of freedom 1 and 19. And the Obtained 't' ratio between pre and post-test of control group agility 1.00 was lesser than required table value of 2.09, found to be statistically significant.

From the result, it was inferred that, plyometric training group, produced a significant improvement in agility of male volleyball players.



**Fig 2:** Bar diagram showing the mean value on Agility of volleyball players on Experimental and Control group

## Discussion and Findings

The present study experimented the effect of plyometric training on physical fitness variables of male volleyball players. The result of the study shows that the plyometric training improved the speed and agility. The changes in the selected parameters were attributed the proper planning, preparation and execution of the training package given to the players. The findings of the present study had similarity with the findings of the investigations referred in this study. 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 and agility was significantly improved of subject in the group may be due to the in plyometric training. However the subjects participated in the control group did not improve their speed, and agility.

French *et al.*, (2006) <sup>[2]</sup> suggested that plyometrics are worthwhile training activities for improving power and agility in youth soccer players.

Chatzinikolaou *et al.*, (2010) revealed that plyometric exercises training sessions. Improving repeated sprint ability in young elite soccer players: repeated shuttle sprints vs. explosive strength training.

Chelly *et al.*, (2008) reported that biweekly plyometric training of junior soccer players (including adapted hurdle and depth jumps) improved important components of athletic performance relative to standard in-season training.

The discrepancy between the result and the result of previous studies might be attributed to several reasons, such as the training experience level of the subjects, the training programme, the intensity used and the duration of the training programme.

## Conclusions

It was concluded that eight weeks of plyometric training programme produced significant changes in speed, and agility of rural male volleyball players.

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