

# Analysis of Plyometric Associated with Speed Training on Agility and Speed among Volleyball Players

Abraham Samson, D<sup>#1</sup>., Jim Reeves Silent Night, D.<sup>\*2</sup> & Arumugam, S.<sup>#3</sup>

<sup>1</sup>Ph.D Scholar, <sup>2</sup>Director of Physical Education (SG) & <sup>3</sup>Assistant Professor

<sup>1&3</sup>Dept. of Physical Education and Sports, Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli-627012

<sup>2</sup>Aditanar College of Arts and Science, Tiruchendur

[nelsguitar@gmail.com](mailto:nelsguitar@gmail.com), [drjimreeves67@gmail.com](mailto:drjimreeves67@gmail.com) & [draru1975@gmail.com](mailto:draru1975@gmail.com)

**Abstract-** The aim of the present study was to examine the investigation of plyometric training associated with speed training on agility and speed among volleyball players. To achieve the purpose of the study twenty four college level male volleyball players were selected randomly as subjects Thoothukudi District, Tamilnadu, India and their age were ranged from 18 to 25 years. The volleyball players were assigned at random into two groups of each twelve player (N=12). Group-I underwent plyometric training associated with speed training group and Group-II acted as control group who did not attended any special training other than their daily college schedule curriculum. The duration of the training period was restricted to eight week for three alternative days per week. The pre and post data were collected before and immediately after the training period. The selected variables such as agility and speed were measured by 4x10mts shuttle run and 50mts dash tests respectively. The collected data from the two groups prior to and after the experimental treatments on selected variables such as agility and speed were statistically analyzed by using the statistical technique of dependent-‘t’ test and analysis of covariance (ANCOVA). In all the cases 0.05 level of confidence was fixed as a level of confidence. The result of the study indicated that plyometric training associated with speed training group had shown significantly improved on agility and speed among volleyball players. However the control group had not shown any significant improvement on any of the selected variables such as agility and speed.

**Keywords-** Agility, Speed, Plyometric Training, Speed Training

## I. INTRODUCTION

Volleyball is a highly competitive game and it demands high motor abilities. The prime physical qualities essential area agility, balance, explosive power, flexibility, muscular endurance, muscular strength and speed. In Volleyball, the performance of skills during a jump as in spiking, blocking, jump-pass, or dive pass when the contact with the ground is lost, demands a high level of agility and accuracy in spatial movements. Such movements depend on the training of the body systems [1].

Plyometric exercise refers to those activities that enable a muscle to reach maximal force in the shortest possible time plyometric is a combination of Greek words that means to increase measurement (*plio* = more; *metric*=measure) [2]. The purpose of plyometric exercises is to increase the power of subsequent movements by using both natural elastic components of muscle and tendon and the stretch reflex. Plyometric exercises require a lot of energy, because they are highly intense [3].

Speed in training theory defines the capacity of moving a limb or part of the body’s lever system or the whole body with the greatest possible velocity. The maximum value of such movements would be without loading. Thus, the discus throwers arm will have the greatest velocity in the throwing phase if no discus is held and velocity would be reduced as the implement’s weight is increased relative to the athlete’s absolute strength [4].

Speed is the quickness of movement of a limb, whether it is the legs of a runner or the arm of the shot putter. Speed is an integral part of every sport and can be expressed as any one of, or combination of, the following: maximum speed, elastic strength (power) and speed endurance. Speed is influenced by the athlete's mobility, special strength, strength endurance, and technique [5].

Training is a systematic process of repetitive, progressive exercise or work involving learning process and acclimatization. The training load can be increased gradually or step by step is result in strong and faster adaptation process and more effective reaction from the organism [6].

Agility is the ability to change position and direction rapidly, with precision and without loss of balance. It depends on strength, speed, balance and coordination [7].

Speed may the most exciting ingredient in sport. It requires rapid acceleration, which involves the contraction of fast-twitch muscle fibers. Speed of movement includes reaction time and movement time (Brian, 2007).

The purpose of the present study was to examine the investigation of plyometric training associated with speed training on agility and speed among volleyball players.

## II. METHODOLOGY

### A. Participants

To achieve the purpose of the study twenty four college level male volleyball players were selected randomly as subjects from Thoothukudi District, Tamilnadu, India and their age were ranged from 18 to 25 years.

### B. Procedures

The volleyball players were assigned at random into two groups of each twelve player (N=12). Group-I underwent plyometric training associated with speed training group and Group-II acted as control group who did not attended any special training other than their daily college schedule curriculum. The duration of the training period was restricted to eight week for three alternative days per week.

### C. Variables and Measurement

The pre and post data were collected before and immediately after the training period. The selected variables such as agility and speed were measured by 4x10mts shuttle run test and 50mts dash test respectively.

### D. Statistical Analyses

Data analysis were performed by using dependent 't' test and analysis of covariance (ANCOVA). In all the cases the level of confidence was fixed at 0.05 significant.

## III. ANALYSIS OF DATA

TABLE 1  
MEANS AND DEPENDENT 'T'-TEST FOR THE PRE AND POST TESTS ON AGILITY AND SPEED OF EXPERIMENTAL AND CONTROL GROUPS

Criterion variables	Mean	Experimental Group	Control Group
Agility	Pre test	10.68	10.69
	Post test	10.59	10.68
	't'-test	14.76*	0.99
Speed	Pre test	7.15	7.14
	Post test	7.09	7.13
	't'-test	8.11*	1.64

\*Significant at .05 level. (Table value required for significance at .05 level for 't'-test with df 11 is 2.20)

From the table 1 the dependent-'t'-test values of agility and speed between the pre and post tests means of experimental group were greater than the table value 2.20 with df 11 at 0.05 level of confidence, it was concluded that the experimental group had significant improvement in the agility and speed between while compared to control group.

### A. Computation of Analysis of Covariance

The descriptive measures and the results of analysis of covariance on the criterion measures were given in the following tables.

TABLE 2  
MEANS AND DEPENDENT 'T'-TEST FOR THE PRE AND POST TESTS ON AGILITY AND SPEED OF EXPERIMENTAL AND CONTROL GROUPS

	Experimental Group	Control Group	Source of Variance	Sum of Squares	Df	Mean Square	F-ratio
Agility (Adjusted Post Mean)	10.58	10.67	BG	2.32	1	2.32	<b>46.38*</b>
			WG	1.05	21	0.05	
Speed (Adjusted Post Mean)	7.08	7.13	BG	0.708	1	0.708	<b>19.14*</b>
			WG	0.777	21	0.037	

\* Significant at 0.05 level. Table value for df 1, 21 was 4.32.

The above table indicates the adjusted mean value on agility and speed of experimental group and control group were 10.58 & 10.67 and 7.08 & 7.13 respectively. The obtained F-ratio of 46.39 and 19.14 for adjusted mean was greater than the table value 4.32 for the degrees of freedom 1 and 21 required for significance at 0.05 level of confidence. The result of the study indicates that there was a significant difference among experimental group and control group on agility and speed.

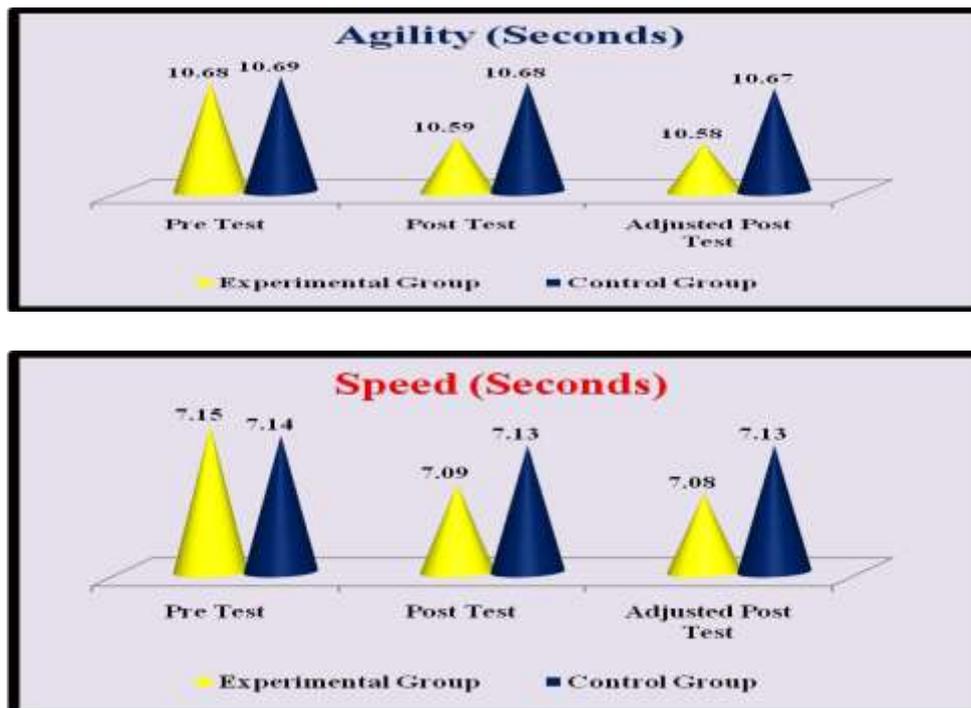


Fig. 1: Pre test, post test and adjusted post test mean values of experimental group and control group on agility and speed.

#### IV. DISCUSSION ON FINDINGS

The findings of this study had clearly revealed that the effect of plyometric training associated with speed training shows positive changes on selected dependent variables such as agility and speed among volleyball players. When the exercises were done regularly during the plyometric training associated with speed training programme for 8 weeks, the subject should have improved all selected dependent variables such as agility and speed. The consistency in determining the significant contribution of plyometric training associated with speed training on developing the dependent variables in this study was similar to the findings of other following studies. Gururaj & Arumugam, (2018) evaluated the study on the effect of interval training in varied surfaces on agility and reaction time among kabaddi players. His study was concluded that the interval training in varied surfaces was given the positive changes among the agility and reaction time among kabaddi players. Selvakumar & Vigneshwaran, (2019) conducted the study on influence of game-specific field training on speed among cricket players. He also concluded that the speed was improved due to the effect of game-specific training among cricket players. Vigneshwaran, (2017) reported the study on impact of core training on speed among soccer players. The researcher concluded that core training was shown the positive changes on speed among soccer players. Nelson Durai, Jimreeves Silent Night & Arumugam, (2020) conducted the study on effect of high-intensity interval training on explosive power and speed among college volleyball players. The result of their study was that the explosive power and speed got an improvement due to the effect of high-intensity interval training among volleyball players. Kumar & Arumugam, (2019) analysed the change of direction with short quick sprint training on acceleration and agility among women soccer players. They concluded that the selected dependent variables were improved by the change of direction with short quick sprint training among soccer players. Arumugam, & Kumar, (2019) evaluated the influence of specific field training on speed and agility among soccer players. He concluded that the speed and agility was improved by the specific field training among soccer players. From above those supportive studies the researcher intended to conduct this study, the result of my study also indicates that there were significant changes on agility and speed due to the effect of plyometric training associated with speed training among volleyball players when compared to the control group.

#### V. CONCLUSIONS

1. There was significant improvement on agility due to the effect of plyometric training associated with speed training among volleyball players.
2. There was significant improvement on speed due to the effect of plyometric training associated with speed training among volleyball players.
3. There was a significant difference that exists between experimental and control groups on selected dependent variables such as agility and speed due to the effects of plyometric training associated with speed training among volleyball players.
4. However, the control group had not shown any significant improvement on any of the selected variables.

**REFERENCES**

- [1]. Nicholls, Keith. (1973). *Modern Volleyball; for Teacher, Coach and Player*. United Kingdom: Kimpton.
- [2]. Arumugam, S., Kumar., & Suriya, P., (2019). Effect of Plyometric Associated with Weight Training on Agility and Leg Explosive Power among Kabaddi Players, *Journal of Informational and Computational Science*, 9 (11), 740-744.
- [3]. Arumugam, S., Suriya,P., & Kumar., V., (2019). Effect of Skill Training Associated with Plyometric Training on Selected Performance Variables and Leg Explosive Power among Kabaddi Players, *The International journal of analytical and experimental modal analysis*, 11 (11), 1373-1377.
- [4]. Leatherman, Dick. (2006). *The Training Trilogy: Conducting Needs Assessments, Designing Programs, Training Skills*. United States:
- [5]. Arumugam, S., & Suriya, P. (2018). Effect of Sprint Training on Speed and Agility among Soccer Players. *Journal of Emerging Technologies and Innovative Research, An International Open Access Journal*, 5(7), 308-311.
- [6]. Arumugam, S. (2018). *Sports Training and System of Coaching*. First Edition, Shanlax publications
- [7]. Brian J. Sharkey and Steven E. Gaskill (2007), *Fitness and health* (6<sup>th</sup> Ed.). Human Kinetics, United States, pp: 145 - 147.
- [8]. Gururaj, S., & Arumugam, S. (2018). Effect of interval training in varied surfaces on agility and reaction time among kabaddi players, *journal of emerging technologies and innovative research*, 5 (6), 399-404, ISSN: 2349-5162.
- [9]. Selvakumar, R., & Vigneshwaran, G., (2019). Influence of game-specific field training on speed among cricket players. *The International journal of analytical and experimental modal analysis*, 11 (11), 3330-3334.
- [10]. Vigneshwaran, G., (2017). Impact of core training on speed among soccer players, *International Journal of Advance Research and Innovative Ideas in Education*, 3 (3), 4192-4194.
- [11]. Nelson Durai, A., Jimreeves Silent Night, D., & Arumugam, S., (2020). Effect of High-Intensity Interval Training on Explosive Power and Speed among College Volleyball Players. *Journal of Information and Computational Science*, 10 (3), 1409-1413.
- [12]. Kumar, V., & Arumugam, S. (2019). Change of direction with short quick sprint training on acceleration and agility among women soccer players. *Journal of Fitness Health, Physical Education & Iron Games*, 6(3), 88-93.
- [13]. Arumugam, S. & Kumar, V., (2019). Influence of Specific Field Training on Speed and Agility Among Soccer Players, 8 (2), 3682-3688.