



E-ISSN: 2707-7020  
P-ISSN: 2707-7012  
[www.allsportsjournal.com](http://www.allsportsjournal.com)  
JSSN 2024; 5(1): 72-76  
Received: 05-01-2024  
Accepted: 12-02-2024

**Dr. G Radhakrishnan**  
Director of Physical  
Education, Sir Theagaraya  
College, Chennai, Affiliated to  
the University of Madras,  
Chennai, Tamil Nadu, India

## Influence of agility ladder training with lead-up activities on selected skill performance variables of volleyball players

**Dr. G Radhakrishnan**

DOI: <https://doi.org/10.33545/27077012.2024.v5.i1b.241>

### Abstract

The purpose of the study was to investigate the impact of intervention training programs, specifically ladder training combined with lead-up activities, on the skills of volleyball players. To achieve the purpose of this study, a total of 45 men volleyball players from the Chennai district were randomly selected as subjects. These players fell within the age range of 17 to 25 years. To form groups, they were divided into three equal sections using a random sample method. The first group, referred to as Intervention Group I, received agility ladder training combined with lead-up activities (ALTWLA), Intervention Group II (IVG-2), underwent Agility ladder training without lead up activities (ALTWOLA). And Non-intervention Group (NIVG), did not undergo any specific training and served as a comparison to the intervention groups. ANOVA (Analysis of Covariance) was used to analyse the data. Since all three groups were compared, the Scheffe's test was used as a post hoc test to identify any paired mean differences that may have existed whenever the acquired "F" ratio for the adjusted post-test was found to be significant. In every instance, a confidence level of 0.05 was set as the threshold for testing significance, which was deemed adequate. The results of the study proved that the intervention training programs significantly contributed to the improvement of volleyball players' skills, further there were significant differences between intervention groups and intervention group – 1 was better than intervention group – 2 and non-intervention group among volleyball players.

**Keywords:** Agility Lader Training, Lead up Activities, Intervention Group, Non-intervention groups, Dig Pass, Overhead pass, Service

### Introduction

In the present scenario participation in sports becomes a vital nutrient for human survival. In sports enormous modern technologies and training methods are used by the players and coaches to improve their sports performance. Participation in sports is a great way of staying active and offers wonderful rewards for mental health. The objective of training competitive sport is to prepare athletes for the achievement of outstanding athletic performance in competition. For this reason, the main tasks of athletic training are based mainly on the specific requirements of sports competitions but also on the amount of the training itself. Sports training are the total process of preparation of a sportsman, through different means and forms for better performance. The Sports performance is the result and expression of the total personality of the sportsman. The educational aspect of sports training is unfortunately overlooked by coaches and physical education teacher in India (Sinha, 2017) [7].

Volleyball is a highly dynamic sport that demands a combination of physical fitness, technical skills, and mental acuity from its players. Coaches and trainers are constantly exploring innovative training methods to enhance players' performance and gain a competitive edge. One such training technique that has gained popularity in recent years is ladder training. Ladder training involves performing footwork patterns and agility exercises using a ladder-shaped apparatus, with or without additional lead-up activities Brown, C. E. (2012) [1].

Lead-up activities in volleyball are essential components of training that help prepare players physically, mentally, and tactically for the sport. These activities bridge the gap between warm-up exercises and main skill practice or game scenarios, gradually increasing intensity and complexity. By replicating game-like situations and isolating specific skill components, lead-up activities enhance coordination, balance, reaction time, and cognitive engagement. They contribute to skill refinement, tactical understanding, and injury prevention.

**Corresponding Author:**  
**Dr. G Radhakrishnan**  
Director of Physical  
Education, Sir Theagaraya  
College, Chennai, Affiliated to  
the University of Madras,  
Chennai, Tamil Nadu, India

Incorporating footwork drills, passing and setting progressions, hitting exercises, defensive drills, and small-sided games, lead-up activities create a stimulating and enjoyable training environment that fosters skill development, teamwork, and motivation among volleyball players (Colyer, 2014) [2].

Furthermore, lead-up activities contribute to the development of teamwork and communication skills. Many lead-up activities involve cooperative play, requiring players to collaborate, communicate, and coordinate their efforts effectively.

Building strong team cohesion and communication enhances the overall performance of the team, enabling them to work together seamlessly and make strategic plays that can lead to victory.

A well-conditioned team is better equipped to sustain their performance levels throughout the duration of a game, maintain focus, and execute skills effectively, thus increasing their chances of winning.

Lastly, lead-up activities provide opportunities for players to develop mental resilience and confidence. By engaging in challenging drills and game-like situations, players learn to handle pressure, overcome obstacles, and maintain composure in competitive environments. This mental toughness is invaluable when facing tough opponents or critical moments in games, ultimately influencing the outcome.

**Materials and Methods**

To achieve the purpose of this study, a total of 45 men volleyball players from the Chennai district were randomly selected as subjects. These players fell within the age range of 17 to 25 years.

To form groups, they were divided into three equal sections using a random sample method. The first group, referred to as Intervention Group I, underwent Agility ladder training. The second group, Intervention Group II, received ladder training combined with lead-up activities. Lastly, the third group, known as the Non-intervention Group, did not undergo any specific training and served as a comparison to the intervention groups.

**Training programme**

The intervention training program will be scheduled for three days in a week for six weeks (Mondays, Wednesdays and Fridays) per week in the evening 4.00 p.m. onwards.

The intervention training program consists of a warm-up and stretching for 10 minutes followed by specific training for both groups will be given and cool down for 5 – 10 minutes. The training will be given under the direct supervision of the investigator.

**Statistical procedure**

The collected data will be analyzed by using Analysis of Covariance (ANCOVA) as recommended by Clarke and Clarke (1972) and Best and Khan (1986). In all the cases 0.05 level was fixed as a level of significance which was considered as appropriate. Since four groups will be compared, whenever the obtained ‘F’ ratio for the adjusted post-test was found to be significant, the scheffe’s test will be applied as post hoc test to find out the paired mean differences if any. In all cases, 0.05 level was fixed as a level of confidence to test the significance which was considered as appropriate.

**Results on dig pass**

**Table 1:** Computation of analysis of covariance of pre-test post-test and adjusted post- test on dig pass among IVG’S and NIVG (Scores in Points)

Test	IVG-I	IVG – 2	NIVG	Source of variance	Sum of Square	DF	Mean Square	“F”
	ALTWLA	ALTWOLA						
Pre	14.950	14.650	14.750	BG	0.933	2	0.467	0.373
				WG	71.250	57	1.250	
Post	19.200	19.950	14.850	BG	303.300	2	151.650	152.452*
				WG	56.700	57	.995	
Adjusted	19.146	19.993	14.861	BG	302.810	2	151.405	172.293*
				WG	49.211	56	0.879	

\*Significant at 0.05 level of confidence. (Table value required for significant at 0.05 level of confidence with DF (2, 57) and DF (2, 56) was 3.16 correspondingly).

The ANCOVA results in Table 1 indicated that the pre-test means of ALTWLA, ALTWOLA, and NIVG had no significant changes among volleyball players, with F value of 0.373 being lower than the Table value of 3.16.

The post-test means of ALTWLA, ALTWOLA, and NIVG had noteworthy changes among volleyball players, with F value of 152.452 higher than the table value of 3.16.

The adjusted post-test means of ALTWLA, ALTWOLA, and NIVG had noteworthy changes among volleyball players, with F value of 172.293 higher than the table value of 3.16. The adjusted post-test means of volleyball players showed noteworthy changes.

The post hoc analysis using Scheffe's mean difference test is presented in Table 2.

**Table 2:** Scheffe’s confidence interval test scores – dig pass (Scores in Points)

IVG-1	IVG – 2	NIVG	MD	CI
ALTWLA	ALTWOLA			
19.146	19.993	-	0.847*	0.74
19.146	-	14.861	4.285*	
-	19.993	14.861	5.132*	

\*Significant at 0.05 level of confidence

Table 2 presents Scheffe's Confidence Interval Test results for dig pass scores in IVG-1, IVG-2, and NIVG. The mean difference (MD) between IVG-1 and IVG-2 is 0.847, IVG-1 and NIVG is 4.285 and IVG-2 and NIVG is 5.132. There

were significant differences between IVG-1 vs IVG-2, IVG-1 vs NIVG and IVG-2 vs NIVG at level of significant 0.05. Figure 1 shows ordered adjusted means for dig pass scores in IVG-1, IVG-2, and NIVG before and after the intervention, corroborating Table 1 findings.

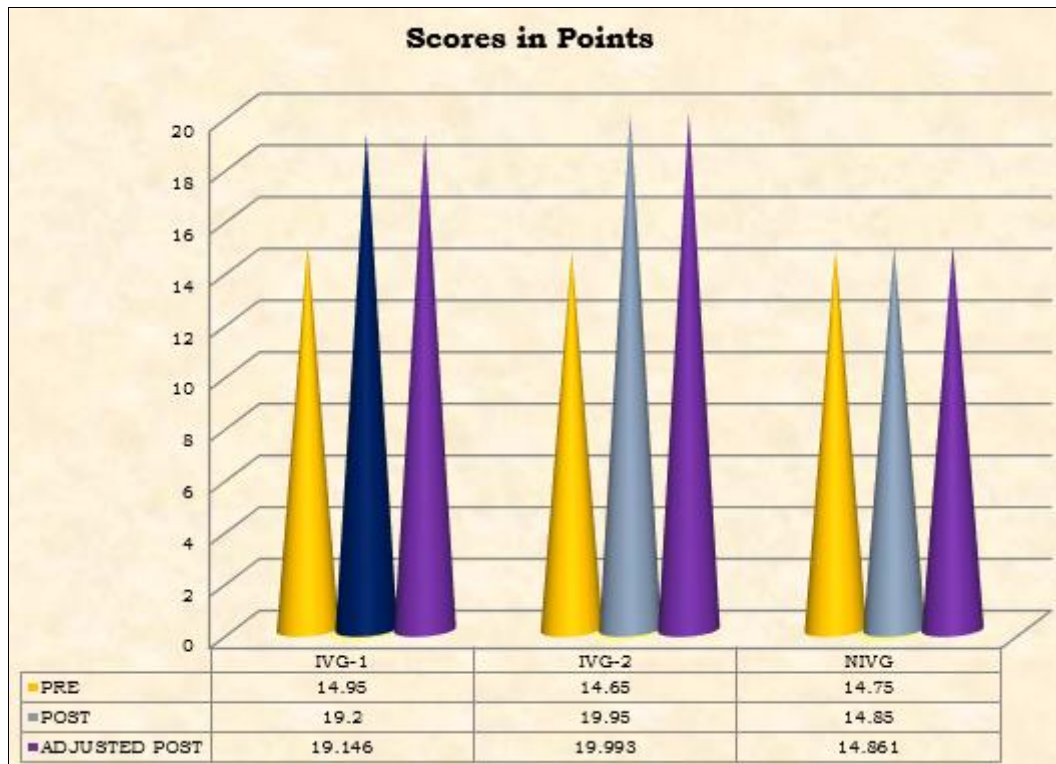


Fig 2: Bar diagram on pre-post and adjusted post-test differences of the AYPG, peg, CT and cg on dig pass

**Result on overhead pass**

Table 3: Computation of analysis of covariance of pre-test post-test and adjusted post- test on dig pass among IVG'S and NIVG (Scores in Points)

Test	IVG-1	IVG - 2	NIVG	Source of Variance	Sum of Square	DF	Mean Square	"F"
	ALTWLA	ALTWOLA						
Pre	17.950	17.55	17.750	BG	1.600	2	0.800	0.603
				WG	75.650	57	1.327	
Post	22.350	23.000	17.850	BG	314.633	2	157.317	137.743*
				WG	65.100	57	1.142	
Adjusted	22.282	23.068	17.850	BG	316.448	2	158.224	156.99*
				WG	56.437	56	1.008	

\*Significant at 0.05 level of confidence. (Table value required for significant at 0.05 level of confidence with DF (2, 57) and DF (2, 56) was 3.16 correspondingly).

The ANCOVA results in Table 3 indicated that the pre-test means of ALTWLA, ALTWOLA, and NIVG had no significant changes among volleyball players, with F value of 0.603 being lower than the Table value of 3.16.

The post-test means of ALTWLA, ALTWOLA, and NIVG had noteworthy changes among volleyball players, with F value of 137.743 higher than the table value of 3.16.

The adjusted post-test means of ALTWLA, ALTWOLA, and NIVG had noteworthy changes among volleyball players, with F value of 156.99 higher than the table value of 3.16. The adjusted post-test means of volleyball players showed noteworthy changes.

The post hoc analysis using Scheffe's mean difference test is presented in Table 4.

Table 4: Scheffe's confidence interval test scores – overhead pass (scores in points)

IVG-1	IVG - 2	NIVG	MD	CI
ALTWLA	ALTWLA			
22.282	23.068	-	0.786*	0.750
22.282	-	17.85	4.432*	
-	23.068	17.85	5.218*	

\*Significant at 0.05 level of confidence

Table 2 presents Scheffe's Confidence Interval Test results for dig pass scores in IVG-1, IVG-2, and NIVG. The mean difference (MD) between IVG-1 and IVG-2 is 0.786, IVG-1 and NIVG is 4.432 and IVG-2 and NIVG is 5.218. There

were significant differences between IVG-1 vs IVG-2, IVG-1 vs NIVG and IVG-2 vs NIVG at level of significant 0.05. Figure 1 shows ordered adjusted means for dig pass scores in IVG-1, IVG-2, and NIVG before and after the intervention, corroborating Table 3 findings.

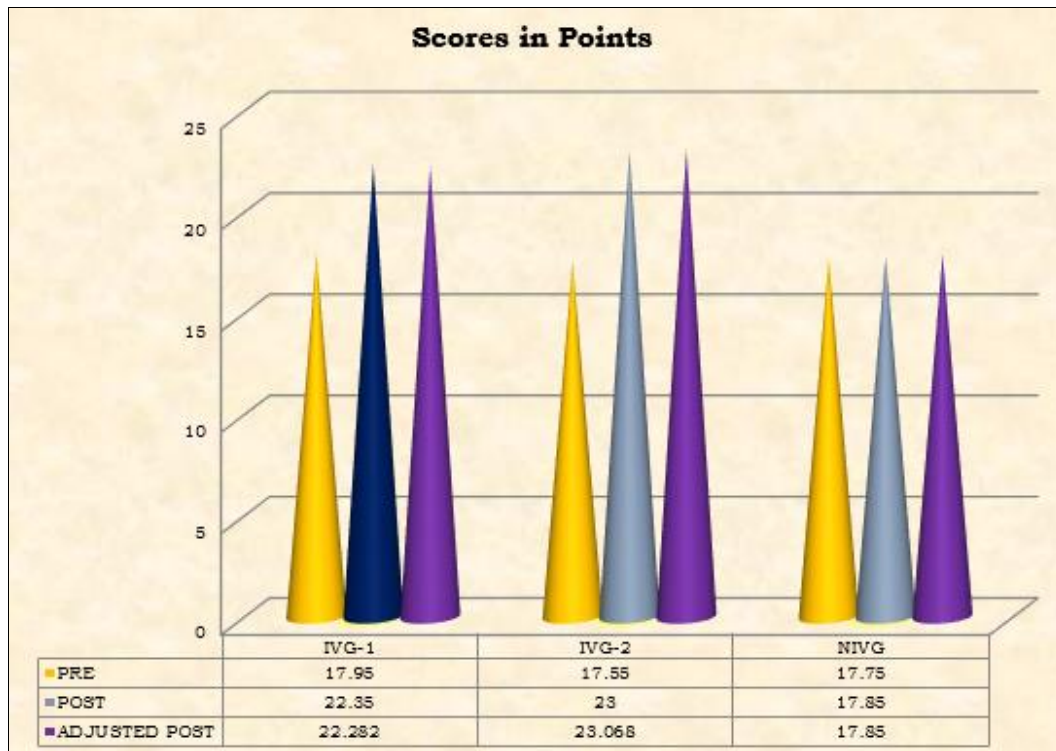


Fig 2: Bar diagram on pre post and adjusted post-test differences of the AYPG, peg, CT and cg on overhead pass

**Result on service**

Table 5: Computation of analysis of covariance of pre-test post-test and adjusted post- test on service among IVG’S and NIVG (Scores in Points)

Test	IVG-I	IVG - 2	NIVG	Source of Variance	Sum of Square	DF	Mean Square	“F”
	ALTWLA	ALTWOLA						
Pre	34.200	33.100	32.400	BG	32.933	2	16.467	2.105
				WG	445.800	57	7.821	
Post	38.950	39.650	32.850	BG	559.600	2	279.800	81.350*
				WG	196.050	57	3.439	
Adjusted	38.546	39.706	33.198	BG	466.548	2	233.274	110.368*
				WG	118.362	56	2.114	

\*Significant at 0.05 level of confidence. (Table value required for significant at 0.05 level of confidence with df (2, 57) and df (2, 56) was 3.16 correspondingly).

The ANCOVA results in Table 5 indicated that the pre-test means of ALTWLA, ALTWOLA, and NIVG had no significant changes among volleyball players, with F value of 2.105 being lower than the Table value of 3.16.

The post-test means of ALTWLA, ALTWOLA, and NIVG had noteworthy changes among volleyball players, with F value of 81.350 higher than the table value of 3.16.

The adjusted post-test means of ALTWLA, ALTWOLA, and NIVG had noteworthy changes among volleyball players, with F value of 110.368 higher than the table value of 3.16. The adjusted post-test means of volleyball players showed noteworthy changes.

The post hoc analysis using Scheffe's mean difference test is presented in Table 6.

Table 6: Scheffe’s confidence interval test scores – overhead pass (scores in points)

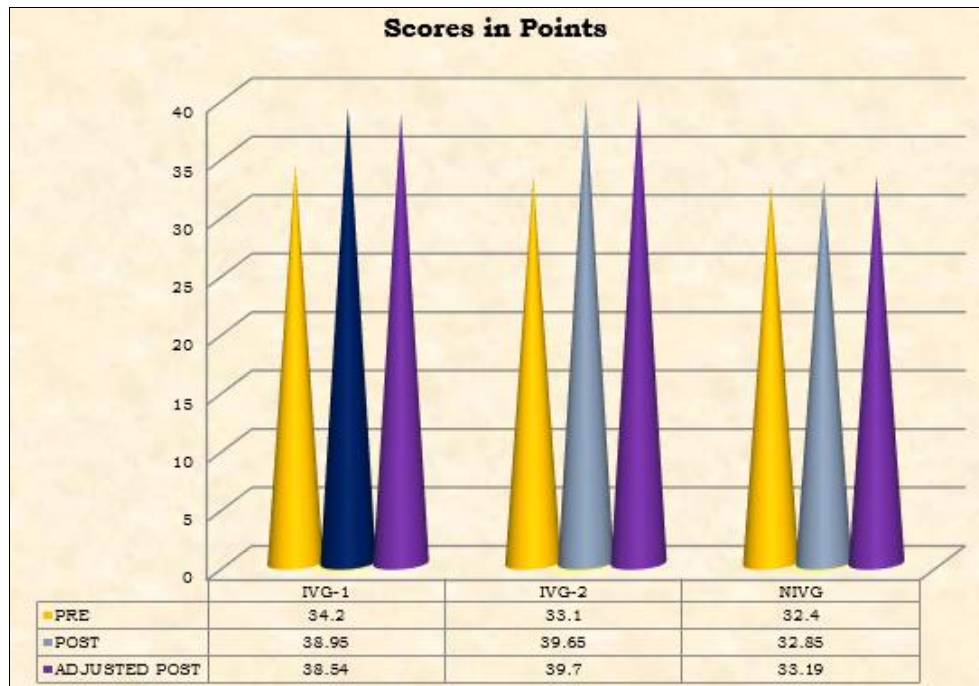
IVG-1	IVG - 2	NIVG	MD	CI
ALTWLA	ALTWLA			
38.546	39.706	-	1.160*	1.15
38.546	-	33.198	5.348*	
-	39.706	33.198	6.508*	

\*Significant at 0.05 level of confidence



Table 2 presents Scheffe's Confidence Interval Test results for digpass scores in IVG-1, IVG-2, and NIVG. The mean difference (MD) between IVG-1 and IVG-2 is 1.160, IVG-1 and NIVG is 5.348 and IVG-2 and NIVG is 6.508. There

were significant differences between IVG-1 vs IVG-2, IVG-1 vs NIVG and IVG-2 vs NIVG at level of significant 0.05. Figure 1 shows ordered adjusted means for dig pass scores in IVG-1, IVG-2, and NIVG before and after the intervention, corroborating Table 5 findings.



**Fig 3:** Bar diagram on pre post and adjusted post-test differences of the AYPG, peg, CT and cg on service

### Discussion on findings

The study found that IVGs had a noteworthy progress in dig pas, overhead pas and service ( $p < 0.05$ ). Post hoc results showed that there were noteworthy differences between IVGs, and IVG – II (ALTWLA) was better than IVG – I (ALTWOLA) and NIVG among volleyball players ( $p < 0.05$ ). The analysis's findings are consistent with prior research findings. Mala (2022) [3] disclosed this as a result of game-specific training using Pilate's programme. According to Raja and Kumar (2020) [6], there is a substantial improvement in serving skill among volleyball players. Specific training programmes developed by Siva and Rajan (2018) significantly improve the passing, service, attacking, and blocking abilities of high school male volleyball players. Power and strength training greatly improves volleyball players' skill performance, according to Kitamura *et al.* (2020). Parasuraman (2020) [5] revealed that volleyball players performance improved due to circuit training using Kettlebell. Parasuraman & Mahadevan (2018) [4] found that systematic practice of 6 weeks kettlebell and battle rope training significance differences on muscular strength better than the control group among inter collegiate volleyball players.

### Conclusions

Based on the comprehensive analysis conducted in this study, it can be concluded that the intervention training programs, particularly the combination of ladder training with lead-up activities, have significantly contributed to the improvement of various skills among volleyball players. The findings demonstrate noteworthy progress in agility, dig pass, overhead pass, and service skills among the intervention groups compared to the non-intervention group.

The post hoc analysis further supports these findings, indicating significant differences between the intervention groups and the non-intervention group. Additionally, within the intervention groups, the group undergoing ladder training combined with lead-up activities demonstrated superior performance compared to the group undergoing only ladder training and the non-intervention group.

### Reference

1. Brown CE. Volleyball: Steps to Success. 3rd ed. Champaign, IL: Human Kinetics; c2012.
2. Colyer R. Volleyball: The Complete Illustrated Guide to the Game. Champaign, IL: Human Kinetics; c2014.
3. Mala R. Effect of specific skill training with Pilates training on skill performance variables of school level volleyball players. *Int. J Phys. Educ. Sports Health.* 2022;9(3):76-78.
4. Parasuraman T, Mahadevan V. Effect of 6-week Kettlebell training on core strength and muscular endurance in volleyball players. *Int. J Physiol. Nutr. Phys. Educ.*; c2018.
5. Parasuraman T. Effect of circuit training with Kettlebell on performance-related variables among volleyball players. *Int. J Physiol. Nutr. Phys. Educ.* 2020;5(1):24-26.
6. Raja K, Kumar RA. Effects of pre-season strength training and plyometric training on selected physical fitness variables, physiological variables, and skill performance variables of male inter-collegiate volleyball players. *Int. J Physiol. Nutr. Phys. Educ.* 2020;5(1):09-12.
7. Sinha BK. Sports Training: Principles and Practices. PHI Learning Private Limited; c2017.