Effect Of Ladder Drills And Fartlek Training On Strength Endurance Among Volleyball Players

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ABSTRACT

The purpose of this study was to investigate the effect of ladder drills and Fartlek training on strength endurance among college men volleyball players. Sixty participants, aged 17–23 years, were randomly assigned to three groups: Ladder Drill Group (n=20), Fartlek Training Group (n=20), and Control Group (n=20). The experimental groups underwent 12 weeks of their respective training programs, while the control group continued regular activities without specific intervention. Pre-test and post-test measurements of strength endurance were conducted using the push-up test. The pre-test means were 14.25 (ladder drills), 15.10 (Fartlek), and 14.75 (control), with no significant difference ($F=1.38$, $p>0.05$). Post-test means improved to 16.90 (ladder drills), 17.10 (Fartlek), and 15.50 (control), showing a significant difference among groups ($F=4.64$, $p<0.05$). Adjusted post-test means confirmed significant improvements for ladder drills (17.22) and Fartlek training (16.82) over the control group (15.46), while no significant difference was observed between the two training methods. The findings indicate that both ladder drills and Fartlek training are effective in enhancing strength endurance in volleyball players, providing coaches with evidence-based options for conditioning programs.

Keywords: Volleyball, Strength Endurance, Ladder Drills and Fartlek Training.

INTRODUCTION

Volleyball is one of the most popular team sports that demands a high level of physical fitness, technical skills, and tactical awareness. Among the various physical attributes, strength endurance plays a vital role in sustaining repeated high-intensity efforts such as spiking, blocking, and defensive movements throughout the match. Strength endurance enables players to maintain power output without rapid fatigue, thereby contributing to overall performance efficiency (Gabbett, 2014). With the increasing competitiveness of modern volleyball, training methods that enhance both neuromuscular strength and cardiovascular endurance have gained significant attention.

Agility ladder drills are widely recognized as an effective training tool for improving lower limb coordination, speed, and muscular endurance. These drills require rapid foot movements, synchronization, and rhythm, which improve neuromuscular efficiency and promote strength endurance in game-like scenarios. Studies have shown that ladder drills enhance not only footwork but also muscular control, balance, and energy utilization, which are directly linked to prolonged high-intensity performance in volleyball (Singh & Sharma, 2015). Incorporating such drills into training programs can therefore contribute to both conditioning and skill-related fitness development.

Fartlek training, on the other hand, combines continuous running with intervals of varied speed and intensity. This training method enhances both aerobic and anaerobic capacity, making it particularly useful for sports like volleyball that demand frequent transitions between explosive and moderate-intensity actions (Buchheit & Laursen, 2015). Research indicates that Fartlek training significantly improves cardiovascular endurance, muscular stamina, and lactate tolerance, which collectively enhance strength endurance (Kumar, 2016). Thus, when applied systematically, Fartlek training can complement skill-based drills by conditioning players for repeated explosive efforts across the duration of a match.

The integration of ladder drills and Fartlek training in volleyball-specific conditioning has been highlighted in several studies. Both methods address different components of performance: ladder drills focus on neuromuscular coordination and explosive endurance, while Fartlek training emphasizes energy system efficiency and sustained stamina. Recent research has demonstrated that combining sport-specific drills with endurance-based training provides greater improvements in muscular endurance and game performance than isolated approaches (Patel & Mehta, 2016). This suggests that volleyball players may benefit more from a hybrid training approach rather than traditional conditioning methods.

Given the growing body of evidence, it is essential to investigate the combined effect of ladder drills and Fartlek training on strength endurance among volleyball players. Such research can provide valuable insights for coaches and physical educators to design more effective training regimens tailored to the specific physiological and performance demands of volleyball. The present study is an attempt to fill this gap by scientifically evaluating how these two training methods contribute to the development of strength endurance in volleyball athletes (Reddy et al., 2017).

EXPERMENTAL DESIGN

Find out the study Effect of Ladder Drills and Fartlek Training on Strength endurance among Volleyball Players .The study was formulated as a true random group design consisting of a pre-test and post test. The subjects men volleyball Players who are participated inter collegiate tournaments in kadapa district (N=60) were randomly assigned to three equal groups of twenty and their age ranged between 17-23 years . The selected subjects were divided into three groups randomly. Experimental

Group I was considered ladder drills group, experimental group II was fartlek training group and control group was not involved in any special treatment. Pre test was conducted for experimental Groups I and II and the control group on Strength endurance . Experimental groups underwent the respective training for 12 weeks. Immediately after the completion of 12 weeks training, all the subjects were measured of their post test scores on the selected criterion variable. The difference between the initial and final scores was considered the effect of respective treatments. To find out statistical significance of the results obtained, the data were subjected to statistical treatment using ANCOVA. In all cases 0.05 level was fixed to test the significance of the study.

RESULTS ON STRENGTH ENDURANCE

The statistical analysis comparing the initial and final means of strength endurance due to ladder drills and fartlek Training among college men volleyball players is presented in Table I

Table I

ANCOVA RESULTS ON EFFECT OF LADDER DRILLS AND FARTLEK TRAINING COMPARED WITH CONTROL ON STRENGTH ENDURANCE

	LADDER DRILLS	FARTLEK TRAINING	CONTROL GROUP	SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARES	OBTAINED F
Pre Test Mean	14.25	15.10	14.75	Between	7.30	2	3.65	1.38
				Within	151.30	57	2.65	
Post Test Mean	16.90	17.10	15.50	Between	30.40	2	15.20	4.64*
				Within	186.60	57	3.27	
Adjusted Post Test Mean	17.22	16.82	15.46	Between	33.66	2	16.83	8.58*
				Within	109.79	56	1.96	
Mean Diff	2.65	2.00	0.75					

Table F-ratio at 0.05 level of confidence for 2 and 57 (df) =3.16, 2 and 56 (df) =3.16.

*Significant

As shown in Table I, the obtained pre test means on strength endurance on ladder drills group was 14.25, fartlek training group was 15.10 was and control group was 14.75. The obtained pre test F value was 1.38 and the required table F value was 3.16, which proved that there was no significant difference among initial scores of the subjects.

The obtained post test means on strength endurance on ladder drills group was 16.90, fartlek training group was 17.10 was and control group was 15.50. The obtained post test F value was 4.64 and the required table F value was 3.16, which proved that there was no significant difference among post test scores of the subjects.

Taking into consideration of the pre test means and post test means adjusted post test means were determined and analysis of covariance was done and the obtained F value 8.58 was greater than the required value of 3.16 and hence it was accepted that there was significant differences among the treated groups.

Since significant differences were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table II.

Table II

Post Hoc Analysis Multiple Paired Adjusted Mean Comparisons using Scheffe's Confidence Interval Test Scores on strength endurance

MEANS				Reqd. C I
ladder drills Group	fartlek training Group	Control Group	Mean Difference	
17.22	16.82		0.41	1.11
17.22		15.46	1.76*	1.11
	16.82	15.46	1.35*	1.11

***** Significant

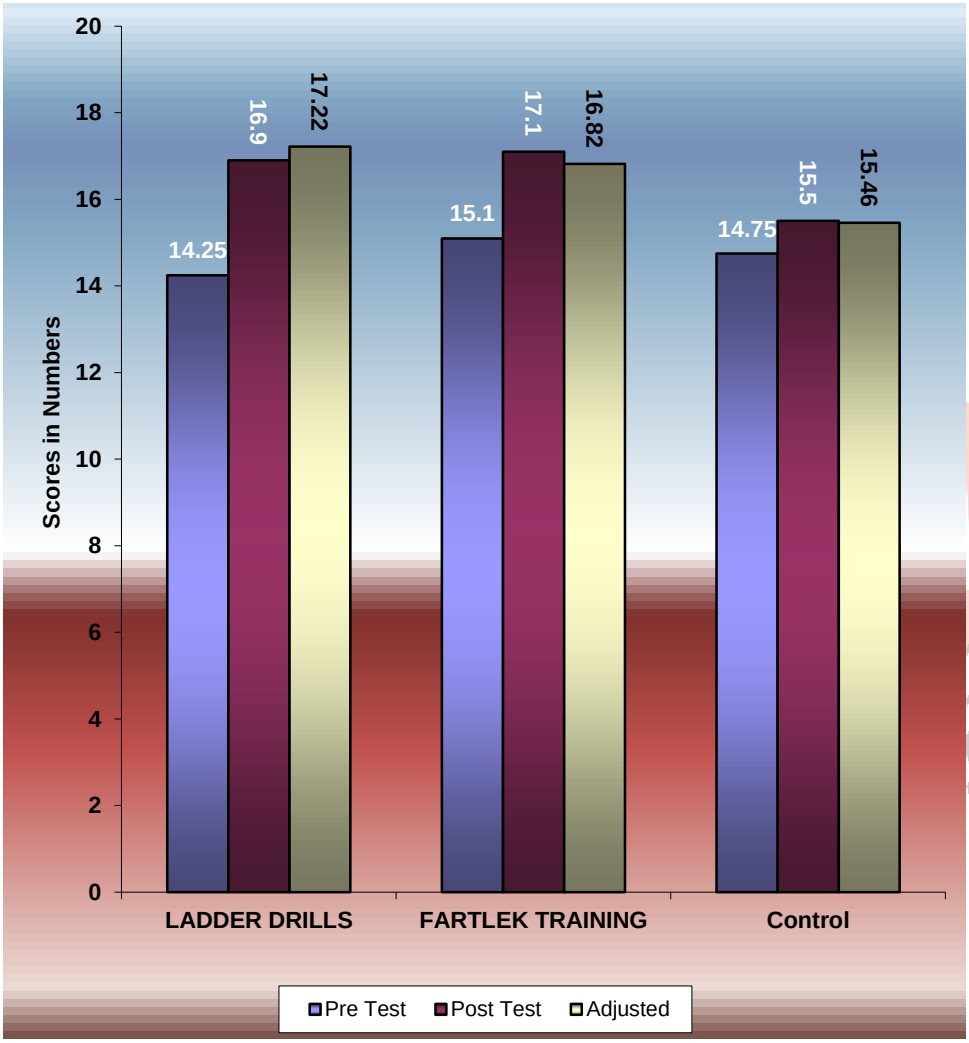
The post hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between ladder drills group and control group (MD: 1.76). There was significant difference between fartlek training group and control group (MD: 1.35). There was no significant

difference between treatment groups, namely, ladder drills group and fartlek training group. (MD: 0.41).

The ordered adjusted means were presented through bar diagram for better understanding of the results of this study in Figure I.

Figure I

BAR DIAGRAM SHOWING PRE TEST, POST TEST AND ORDERED ADJUSTED MEANS ON STRENGTH ENDURANCE



DISCUSSIONS ON FINDINGS ON STRENGTH ENDURANCE

The effect of ladder drills and fartlek training on strength endurance is presented in Table I. The analysis of covariance proved that there was significant difference between the experimental group and control group as the obtained F value 8.58 was greater than the required table F value to be significant at 0.05 level.

Since significant F value was obtained, the results were further subjected to post hoc analysis and the results presented in Table II proved that there was significant difference between ladder drills

group and control group (MD: 1.76) and fartlek training group and control group (MD: 1.35). Comparing between the treatment groups, it was found that there was no significant difference between ladder drills and fartlek training group among volleyball players.

Thus, it was found that ladder drills and fartlek training were significantly better than control group in improving strength endurance as measured through push ups test among college men volleyball players.

CONCLUSION

The findings of the study revealed that both ladder drills and Fartlek training significantly improved strength endurance among college men volleyball players compared to the control group. Post-test and adjusted mean scores demonstrated that the experimental groups exhibited superior performance in strength endurance, as measured by the push-up test, whereas the control group showed minimal improvement. No significant difference was observed between the ladder drills and Fartlek training groups, indicating that both training methods are equally effective in enhancing strength endurance. These results suggest that volleyball coaches and physical educators can incorporate either ladder drills or Fartlek training into their conditioning programs to improve muscular stamina and overall performance during matches.

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