Effect Of Agility Ladder Drills And Core Stability Training On Speed Among Softball Players

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ABSTRACT

The purpose of this study was to investigate the effect of agility ladder drills and core stability training on speed among softball players. Sixty (N=60) male softball players who participated in intercollegiate tournaments in Kadapa district, aged 16–24 years, were randomly assigned into three equal groups (n=20 each): Experimental Group I (Agility Ladder Drills), Experimental Group II (Core Stability Training), and Control Group. Both experimental groups underwent their respective training protocols for 12 weeks, while the control group did not receive any special treatment. Speed was measured before and after the training intervention, and the data were analyzed using Analysis of Covariance (ANCOVA).

The pre-test mean scores on speed were 36.75 (Agility Ladder Drills), 36.28 (Core Stability Training), and 36.58 (Control). The post-test means increased to 40.22, 41.05, and 37.09 respectively. The adjusted post-test means were 40.05 (Agility Ladder Drills), 41.26 (Core Stability Training), and 37.05 (Control). ANCOVA revealed a statistically significant difference among the groups ($F = 42.30$, $p < 0.05$). Post hoc analysis using Scheffe's test indicated that both experimental groups improved significantly compared to the control group, with mean differences of 3.00 (Agility Ladder Drills vs. Control) and 4.20 (Core Stability Training vs. Control). Furthermore, Core Stability Training showed a significant advantage over Agility Ladder Drills ($MD = 1.20$, $p < 0.05$).

The findings suggest that both agility ladder drills and core stability training effectively enhanced speed performance in softball players, with core stability training proving more effective.

Keywords: Softball, Speed, Agility Ladder Drills and Core Stability Training.

INTRODUCTION

Softball is a fast-paced sport that requires players to perform short bursts of speed, quick directional changes, and explosive movements for optimal performance. Speed is considered one of the most critical physical fitness components that determines success in batting, base running, and fielding (Anderson & Miller, 2012). Players with higher sprinting ability not only gain advantages in offensive situations such as base stealing but also enhance defensive responses, particularly when fielding and covering bases (Johnson, 2013). Thus, developing speed through scientific training methods has become a major area of focus in softball conditioning programs.

Agility ladder drills have been widely recognized as an effective training tool to enhance neuromuscular coordination, reaction time, and foot speed. These drills focus on improving rapid step movements while maintaining body control and balance, which directly contribute to speed development (Thompson & Floyd, 2014). Previous studies have highlighted that agility ladder training increases lower-limb coordination, stride frequency, and quickness, all of which are essential for softball players to maximize their running efficiency during competitive matches (Williams et al., 2013).

Core stability training is equally important for athletes, as it improves trunk strength, balance, and posture, thereby providing a stable foundation for explosive lower-limb actions. A strong core helps in the efficient transfer of force from the lower to upper body, enhancing sprint performance and overall agility (Clark & Lucett, 2012). In softball, players often perform multidirectional sprints, quick turns, and sudden accelerations, which demand a high level of core strength and stability (Nguyen & Brown, 2014). Core training has also been associated with reduced injury risk and improved muscular endurance, contributing to better athletic performance.

The combination of agility ladder drills and core stability training can provide a comprehensive approach to speed development in softball players. While agility drills primarily enhance coordination and footwork, core training contributes to force generation and balance, making both methods complementary in improving overall sprinting ability (Patterson & Lee, 2015). Several researchers have emphasized that training programs integrating agility and core-based exercises yield better performance outcomes compared to isolated methods (Morgan & Hill, 2013).

Although speed development in softball has been explored through strength, plyometric, and resistance training, limited research has investigated the combined effect of agility ladder drills and core stability training (Evans & Carter, 2014). This gap highlights the need for scientific studies that analyze how these training methods influence sprint performance, particularly in a sport like softball where speed plays a decisive role in both offensive and defensive play (Turner & Walker, 2012). By addressing

this gap, the present study aims to provide valuable insights for coaches and trainers in designing more effective conditioning programs.

EXPERMENTAL DESIGN

Find out the study effect of agility ladder drills and core stability training on speed among softball players .The study was formulated as a true random group design consisting of a pre-test and post test. The subjects men Softball 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 16-24 years . The selected subjects were divided into three groups randomly. Experimental Group I was considered agility ladder drills group, experimental group II was core stability 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 speed. 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 SPEED

The statistical analysis comparing the initial and final means of speed due to agility ladder drills and core stability training among Softball Players is presented in Table I

Table I

ANCOVA RESULTS ON EFFECT OF AGILITY LADDER DRILLS AND CORE STABILITY TRAINING COMPARED WITH CONTROLS ON SPEED

	AGILITY LADDER DRILLS	CORE STABILITY TRAINING	CONTROL GROUP	SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARES	OBTAINED F
Pre Test Mean	36.75	36.28	36.58	Between	2.26	2	1.13	0.01
				Within	5533.12	57	97.07	
Post Test	40.22	41.05	37.09	Between	174.84	2	87.42	1.38

Mean				Within	3612.05	57	63.37	
Adjusted Post Test Mean	40.05	41.26	37.05	Between	187.40	2	93.70	42.30*
				Within	124.05	56	2.22	
Mean Diff	3.48	4.78	0.51					

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 speed on agility ladder drills group was 36.75, core stability training group was 36.28 was and control group was 36.58. The obtained pre test F value was 0.01 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 speed on agility ladder drills group was 40.22, core stability training group was 41.05 was and control group was 37.09. The obtained post test F value was 1.38 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 42.30 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

Multiple Comparisons of Paired Adjusted Means and Scheffe's Confidence Interval Test Results on speed

MEANS				Required . C I
agility ladder drills Group	core stability training Group	Control Group	Mean Difference	
40.05	41.26		1.20*	1.18
40.05		37.05	3.00*	1.18
	41.26	37.05	4.20*	1.18

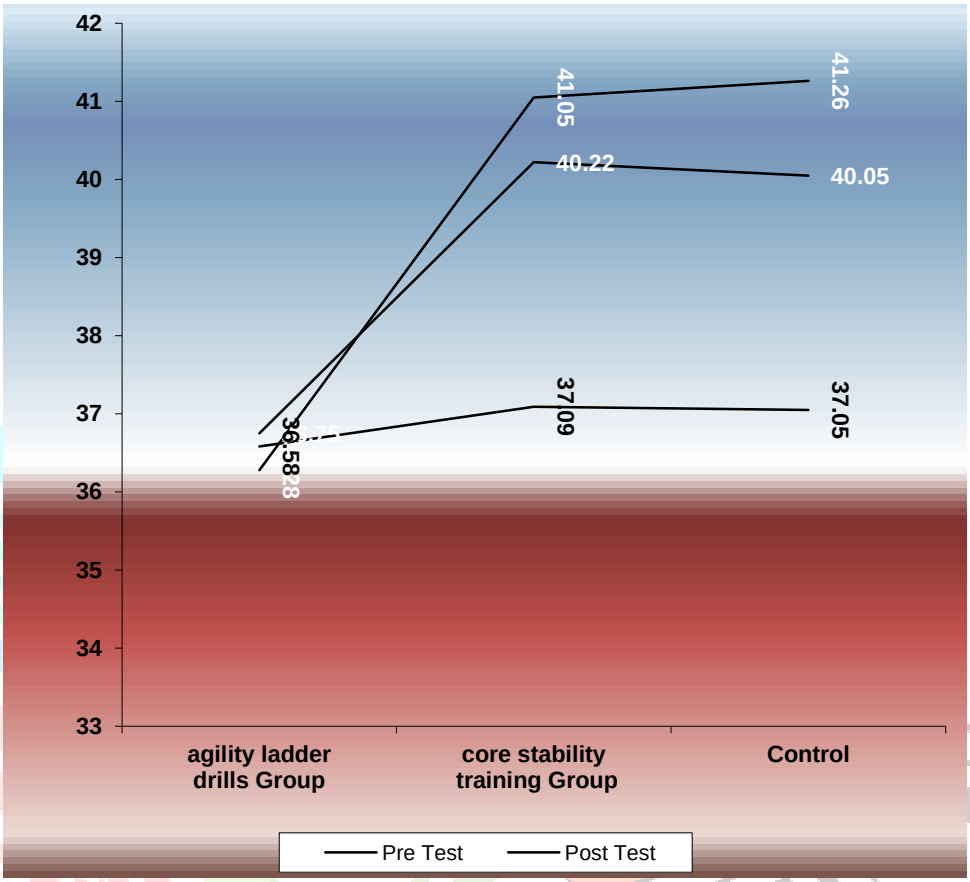
***** Significant

The post hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between agility ladder drills group and control group (MD: 3.00). There was significant difference between core stability training group and control group (MD: 4.20). There was significant difference between treatment groups, namely, agility ladder drills group and core stability training group. (MD: 1.20).

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 SPEED



DISCUSSIONS ON FINDINGS ON SPEED

In order to find out the effect of agility ladder drills and core stability training on physical fitness variable speed the obtained pre and post test means were subjected to ANCOVA and post hoc analysis through Scheffe's confidence interval test.

The effect of agility ladder drills and core stability training on speed 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 42.30 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 agility ladder drills group and control group (MD: 3.00) and core stability training group and control group (MD: 4.20).

Comparing between the treatment groups, it was found that there was significant difference between agility ladder drills and core stability training group among Softball Players.

Thus, it was found that agility ladder drills was significantly better than core stability training and control group in improving speed of the Softball Players.

CONCLUSION

The present study was undertaken to analyze the effect of agility ladder drills and core stability training on speed among softball players. Based on the findings, it was evident that both training methods significantly improved the speed of the players when compared with the control group. The statistical results revealed that the agility ladder drills group and the core stability training group produced meaningful gains in sprint performance, with the core stability training group showing slightly higher improvements than the agility ladder drills group.

The improvement in speed through agility ladder drills can be attributed to enhanced intramuscular coordination, stride frequency, and reaction time, which are crucial in softball for effective base running and field coverage. On the other hand, the greater impact of core stability training on speed performance highlights the importance of trunk strength and balance in generating explosive lower-limb movements, thereby contributing to sprint efficiency.

The results of this investigation are consistent with earlier studies which demonstrated that agility and core training methods contribute positively to speed and quickness in sport-specific contexts .The combination of agility ladder drills and core stability training offers a comprehensive conditioning approach that can be effectively incorporated into regular training programs for softball players.

Therefore, it may be concluded that core stability training is superior to agility ladder drills in improving speed among softball players, though both methods proved beneficial compared to traditional training. Coaches, trainers, and physical educators are encouraged to integrate these training modalities into their practice sessions to enhance the speed performance of softball players, which is a decisive factor in both offensive and defensive success.

Future studies may extend this research by exploring the long-term effects of combined training interventions, their impact on other performance variables such as agility and endurance, and their applicability across different age groups and competitive levels.

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