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The Effect of Agility Ladder Drills on Agility Improvement in Tennis Players

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Abstract

This study examined whether agility ladder drill training could improve agility among tennis athletes at Club Ciamis Tennis Academy. An experimental approach with a One Group Pretest–Posttest Design was employed. The study involved 14 athletes in the club, while 8 athletes met the participation criteria and completed all stages of the program. Agility was assessed through the Spider Drill Test before and after six weeks of training, consisting of 18 sessions. The data were examined using descriptive statistics, the Shapiro–Wilk test, and the Wilcoxon Signed Rank Test. The mean test time decreased from 19.25 seconds at pretest to 18.06 seconds at posttest, an improvement of 1.19 seconds. The Wilcoxon test showed a significant difference between measurements (p = 0.012), and all eight athletes recorded faster completion times after training. This result suggests improved performance in the Spider Drill Test following the program. The improvement may be associated with repeated footwork patterns, rapid movements, changes of direction, balance, and coordination practiced through agility ladder drills. These skills are relevant to tennis, where athletes must move quickly and change direction efficiently to reach the ball. Therefore, agility ladder drill training may serve as an alternative method for developing agility in tennis athletes and may help coaches design structured, progressive physical-conditioning programs. However, because the study used a single group without a control group, the findings should be interpreted cautiously. Further studies with larger samples and control groups are needed to confirm the effectiveness of this training method.

Keywords: Ladder Drill*, Agility,* Spider Drill Test*, Tennis, Training*

INTRODUCTION

Tennis is a competitive sport played amidst rapid and constantly changing movement dynamics. Matches can be played in singles or doubles formats, with the objective of placing the ball in the opponent's court in a manner that prevents a valid return under the rules of play (International Tennis Federation, 2024). The evolution of tennis

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requires athletes to perform dynamic movements, respond to unpredictable ball trajectories, and execute rapid changes of direction during match play. These demands highlight the importance of physical fitness, particularly agility and movement coordination, alongside technical skills and tactical abilities to maintain effective performance throughout the match (Bompa & Buzzichelli, 2019; Giles et al., 2024)

Agility is a crucial component of physical fitness for meeting these demands. It involves the body's capacity to rapidly yet controllably change direction and position. In tennis, athletes must move forward, backward, laterally, and diagonally, then immediately return to a ready position for the next shot (Fernandez-Fernandez et al., 2019; Meffert et al., 2021). Good agility enhances the effectiveness of footwork, reactions to the ball, and body positioning. Conversely, limited agility can cause athletes to be late in reaching the ball and lose advantageous positioning (Jansen et al.,2021 : Guo et al., 2024)

Initial observations at the Club Ciamis Tennis Academy identified 14 athletes participating in training activities. The study subsequently involved eight athletes who were actively training, willing to participate, and completed the entire process through to the post-test. Field observations revealed several issues, including slow reactions to the ball's trajectory, delayed repositioning after a stroke, and inefficient footwork when changing direction. These factors can prevent athletes from quickly reaching an ideal position during a rally. One suspected contributing factor is the club's training program, which prioritizes technical skills over physical training specifically targeting agility (Ishihara, Sugasawa, Matsuda, & Mizuno, 2017; Sonal, 2018).

Agility ladder drills offer a viable option for addressing these requirements. These exercises utilize a coordination ladder and specific footwork patterns to train foot speed, coordination, balance, movement response, and the ability to change direction (Dahlia, Padli, Sari, & Purnomo, 2025; Sari, Padli, & Aprilianto, 2024). Consistent and progressive practice stimulates neuromuscular coordination, resulting in more purposeful and efficient movement. The nature of these drills aligns with the demands of tennis, which requires rapid and repetitive changes in position (Deng et al., 2023)

Several previous studies have yielded results supporting the use of ladder drills for agility training. Sari et al., (2024) reported improvements in the movement capabilities of tennis players following agility ladder training. Dahlia et al., (2025) also found that structured ladder drill training could help enhance the agility of tennis players.

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Meanwhile,Deng et al., (2023) explained that training combining footwork coordination with changes in direction can positively impact the physical performance of tennis players.

However, studies regarding the implementation of a six-week agility ladder training program for athletes at the Ciamis Tennis Academy Club were not found in the research serving as the basis for this article. Furthermore, the use of the Spider Drill Test to assess changes in the athletes' agility at the club has also rarely been reported. Therefore, this study highlights a progressively structured six-week training program and the use of the Spider Drill Test as its key features.

Based on these issues, this study aims to determine the effect of agility ladder drills on improving the agility of tennis players at the Ciamis Tennis Academy. The findings are expected to provide practical information for coaches in selecting and structuring physical conditioning exercises—particularly for agility development—and to contribute empirical evidence regarding the application of agility ladder drills for tennis players..

METHOD

This study employed an experimental method using a one-group pretest-posttest design. This design compares the subjects' abilities before and after the administration of the treatment within the same group (Sugiyono, 2019). The research was conducted at the outdoor tennis courts of the Ciamis Tennis Academy Club between May and June 2026.The study population consisted of 14 athletes affiliated with the Ciamis Tennis Academy Club. Ultimately, eight athletes met the research criteria and completed the entire program through to the posttest. The subjects analyzed comprised five male and three female athletes; consequently, the analysis utilized data from these eight athletes.

Initial measurements were taken using the Spider Drill Test to record completion times reflecting the ability to change direction; this instrument is used to measure tennis-specific agility (Huggins et al., 2017). Following the pre-test, subjects participated in an agility ladder drill program for six weeks, consisting of three sessions per week—totaling 18 sessions. The training regimen included one-foot drills, two-foot drills, in-in/out-out patterns, the icky shuffle, zig-zag drills, and front-and-back drills. Variations were introduced gradually, adhering to the principle of progression to allow the body to adapt to training demands (Bompa & Haff, 2009). Upon completion of the program, a post-test was conducted using the same equipment and procedures.

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The data consist of completion times for the Spider Drill Test, measured in seconds; shorter times indicate superior agility. Data were recorded on observation sheets and subsequently processed using IBM SPSS Statistics 24. Preliminary analysis involved descriptive statistics, including minimum and maximum values, the mean, and the standard deviation. As the number of subjects was fewer than 50, data distribution was assessed using the Shapiro–Wilk test (Ghozali, 2018)). The results indicated that the data did not fully meet the assumption of normality; therefore, differences between pretest and posttest scores were analyzed using the Wilcoxon Signed-Rank Test at a significance level of 0.05. An effect was considered significant if the Sig. value was less than 0.05.

RESULT

An analysis was conducted to examine changes in agility before and after an agility ladder drill program. Data were obtained from eight athletes using the Spider Drill Test and analyzed using descriptive statistics, the Shapiro–Wilk test, and the Wilcoxon Signed-Rank Test..

Table 1. Descriptive Statistics

	N	*Minimum*	*Maximum*	*Mean*	*Std. Deviation*
Pretest	8	17,73	20,20	19,2513	,99020
Posttest	8	15,20	19,18	18,0625	1,42001
Valid N (Listwise)	8				

Descriptive results indicate that the average pretest time was 19.2513 seconds, whereas the average posttest time was 18.0625 seconds. The minimum and maximum values for the pretest were 17.73 and 20.20 seconds, respectively, while for the posttest, they were 15.20 and 19.18 seconds. The lower average time following the intervention indicates an improvement in agility within the study group.

Table 2. Shapiro–Wilk Normality Test Results

	Shapiro-wilk		
	Statistic	df	Sig
Pretest	,857	8	,111
Posttest	,820	8	,047

The Sig. value for the pretest (0.111) is greater than 0.05; thus, the pretest data meet the assumption of normality. For the posttest, the Sig. value (0.047) is below 0.05,

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indicating that the data are not normally distributed. Since one of the datasets fails to meet the normality assumption, the subsequent analysis employs the Wilcoxon Signed-Rank Test to ensure the analysis aligns with the characteristics of the research data (Ghozali 2018)

Table 3. Wilcoxon Signed-Rank Test Results

		N	Mean Rank	Sum of Ranks
Posttest- Pretest	Negative Ranks	8[a]	4,50	36,00
	Positive Ranks	0	,00	,00
	Ties total	0		
	Total	8		

All eight subjects fell into the "negative ranks" category when comparing post-test results to pre-test results; no positive ranks or ties were observed. Since a lower Spider Drill Test time indicates better agility, these results mean that all athletes achieved faster post-test times compared to the initial measurements.

This improvement demonstrates that agility ladder drills are effective in helping athletes move faster when shifting positions or changing direction. Consistent training also enhances footwork coordination, maintains body balance, and improves neuromuscular response, resulting in more effective movement when chasing the ball. These findings align with Deng et al., (2023), who stated that programmed change-of-direction training can enhance the footwork capabilities and physical performance of tennis players.

Table 4. Statistical Test Results

	Posttest –Pretest
Z	-2,521[b]
Asymp. Sig. (2-tailed)	,012

The Wilcoxon test results show a Z-value of -2.521 and an Asymp. Sig. (2-tailed) value of 0.012. Since the significance value is less than 0.05, the null hypothesis is rejected. Thus, there is a significant difference between the measurement results taken before and after the agility ladder drill training. Consequently, it can be concluded that agility ladder drill training has a significant effect on improving the agility of tennis players at the Ciamis Tennis Academy Club.

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DISCUSSIONS

The research results indicate that the agility ladder drill program is associated with improved agility among tennis athletes at the Ciamis Tennis Academy. The average time for the Spider Drill Test decreased from 19.25 seconds in the pre-test to 18.06 seconds in the post-test. The Wilcoxon test yielded a significance value of 0.012, indicating that the change was statistically significant. The program was implemented over a six-week period, consisting of three training sessions per week.

These changes can be explained by the nature of agility ladder drills, which prioritize step patterns, coordination, balance, and the speed of foot transitions. The progressive repetition of movements allows the neuromuscular system to adapt. Such adaptation enables athletes to accelerate, decelerate, and change direction more rapidly and with greater coordination (Anderson, 2021; Budi et al., 2020). Furthermore, training principles characterized by planning, systematic structure, and continuity facilitate adaptations that align with specific training objectives (Bompa & Buzzichelli, 2019)

The relevance of training becomes increasingly apparent when considered in the context of the nature of tennis. Athletes must chase balls moving in various directions and then quickly recover their position. Good footwork enables athletes to maintain balance and position their bodies optimally for executing shots (Jansen et al., 2021). Consequently, training that emphasizes step speed and changes of direction is strongly linked to the movement demands of tennis (Federation, 2024; Kovacs, 2007).

The findings of this study align with those of Sari et al. (2024), who reported improved agility among tennis athletes following agility ladder training. Dahlia et al., (2025) also demonstrated that ladder drills can facilitate improvements in change-of-direction ability and dynamic balance. Furthermore, Aulia & al., (2024) explained that agility ladder training can enhance coordination and movement speed in athletes who require rapid positional changes. These consistent findings reinforce the premise that ladder training is a relevant method for developing agility.

From a practical standpoint, the study's findings suggest that coaches should incorporate agility ladder drills into the physical conditioning programs of tennis athletes. The six-week program employed in this study resulted in improved test times. However, these results should be interpreted with the study's limitations in mind: the small sample size (eight athletes from a single club) and the absence of a control group in the research

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design. Future studies could utilize larger samples and comparison groups, as well as compare agility ladder drills with other forms of agility training.

CONCLUSION

A structured and progressive six-week agility ladder drill program demonstrated a significant impact on improving the agility of tennis players at the Ciamis Tennis Academy. This change was evidenced by a reduction in the average Spider Drill Test time from 19.25 seconds to 18.06 seconds, with the Wilcoxon test yielding a significance value of 0.012. These results indicate that the training effectively supported the athletes' abilities regarding change of direction, footwork speed, coordination, and balance. Coaches might consider agility ladder drills as a form of physical conditioning to improve agility. Future research should involve a larger number of subjects, a control or comparison group, and a variety of training methods to allow for a more comprehensive assessment of the program's effectiveness.

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