



The Effect Of Ladder Drills Training On Dribbling Ability In Futsal Games

Andi Arman^{1A-E*}, Nukhrawi Nawir^{2B-D}, Muslim^{3B-D}

^{1,2,3} Universitas Negeri Makassar, Sulawesi Selatan, Indonesia

andiramang23@gmail.com^{1*}, nukhrawi.nawir@unm.ac.id², muslim@unm.ac.id³

AUTHORS' CONTRIBUTION

A. Conception and design of the study; B. Acquisition of data;

C. Analysis and interpretation of data; D. Manuscript preparation; E. Obtaining funding

ARTICLE HISTORY

Reviewed: 2026/04/26

Accepted: 2026/05/14

Published: 2026/06/21

KEYWORDS

Ladder Drills;

Dribbling;

Futsal;

Agility;

Sports Students.

ABSTRACT

This research is motivated by the importance of dribbling skills in futsal, especially because players are required to be able to control the ball, change direction of movement, and overcome opponent pressure in a limited playing space. Based on initial observations of FIKK UNM students, errors were still found in dribbling, such as unstable ball control, slow foot movements, and easily losing the ball when facing an opponent. Therefore, a targeted training method is needed to improve agility, coordination, foot speed, and movement efficiency. This study aims to determine the effect of ladder drills on dribbling skills in futsal games for FIKK UNM students. The research method used was an experiment involving 20 students as a sample, which was divided into a ladder drill training group and a control group, each consisting of 10 people. The research instrument used a futsal dribbling ability test conducted at the initial test and the final test. Data were analyzed descriptively and inferentially through normality tests, homogeneity tests, paired sample t-tests, and unpaired sample t-tests. The results showed that the ladder drills group experienced an average improvement from 17.9840 seconds in the initial test to 14.7830 seconds in the final test, with an average difference of 3.20100 seconds. The t-test results showed a calculated t-value of 6.618 > t-table 1.833 and a significance value of 0.000 < 0.05. The post-test comparison between the ladder drills group and the control group also showed a significant difference with a calculated t-value of 3.101 and a significance value of 0.006 < 0.05. Thus, ladder drills proved to be significantly and more effective in improving the futsal dribbling skills of FIKK UNM students.

Cites this Article : Arman, A.; Nawir, N.; Muslim, M. (2026). The Effect Of Ladder Drills Training On Dribbling Ability In Futsal Games. *Journal of Sport Praxis and Human Performance*. 1(2), P.10-19

INTRODUCTION

Futsal is a fast, dynamic, and high-intensity invasion game that requires players to perform technical actions under limited space, high defensive pressure, and rapid transition situations. Unlike conventional football, futsal provides less time for decision-making; therefore, players must combine technical mastery with agility, balance, coordination, acceleration, and change-of-direction ability. One of the most frequently used technical skills in futsal is dribbling, because it allows players to maintain ball possession, penetrate defensive lines, escape opponent pressure, and create goal-scoring opportunities. Dribbling is not only a movement of running while pushing the ball, but also a complex motor skill involving footwork rhythm, body orientation, visual control, ball contact precision, and tactical decision-making (Febrian & Perwira, 2021; Naser et al., 2017; Spyrou et al., 2020).



In futsal learning and training contexts, poor dribbling ability often results in repeated ball loss, reduced attacking effectiveness, and weak individual contribution during game situations. Previous studies have shown that dribbling performance is strongly associated with agility, speed, coordination, balance, and lower-limb movement efficiency (Akmal & Lesmana, 2019; Abidin et al., 2020; Asmara et al., 2023; Sekulic et al., 2019). This issue was also found among students of the Faculty of Sports and Health Sciences, Universitas Negeri Makassar (FIKK UNM). Based on preliminary observation and informal interviews conducted in September, many students who participated in futsal games still made frequent dribbling errors, especially when facing opponent pressure, changing direction, or attempting to control the ball at speed. These errors made them lose possession easily and reduced their effectiveness in game play.

Preliminary dribbling tests on two FIKK UNM students further indicated that their dribbling ability had not yet reached the expected performance standard. Irwan recorded 29.37 seconds, categorized as “very poor”, while Aqsyah recorded 23.32 seconds, categorized as “poor” based on the assessment norm used in the study. Although these two cases cannot represent the whole population, they provide an early diagnostic signal that students’ dribbling performance needs to be improved through a more systematic, measurable, and sport-specific training program. Therefore, an appropriate training model is needed to improve foot speed, agility, coordination, and movement control in futsal dribbling.

Recent sports training literature emphasizes that futsal performance depends on the integration of technical skill and physical conditioning. Match-play studies show that futsal players repeatedly perform accelerations, decelerations, short sprints, abrupt stops, and multidirectional movements throughout the game (Ribeiro et al., 2025; Spyrou et al., 2020). Change-of-direction speed and reactive agility are considered essential qualities in futsal because players must respond quickly to opponent movement, ball position, and tactical space (Sekulic et al., 2019; Serrano et al., 2020; Zeljko et al., 2020). Therefore, dribbling training should not only focus on ball contact, but also on neuromuscular coordination, body control, and quick foot adjustment.

Ladder drills have become one of the most widely used training methods to develop agility, footwork rhythm, coordination, speed of movement, and lower-limb control. Ladder drill exercises require athletes to perform repeated stepping patterns through ladder grids with various directions, rhythms, and movement combinations. This training stimulates rapid neuromuscular activation, improves coordination between the lower limbs and visual-motor control, and strengthens the ability to change body position efficiently (Pramono et al., 2023; Fauzan et al., 2024; Khanina et al., 2025). In futsal, ladder drills are relevant because dribbling demands quick steps, close ball control, sudden direction changes, and stable body posture while moving in narrow spaces (Febrian & Perwira, 2021; Misbahul et al., 2024).

Empirical evidence also supports the effectiveness of agility-based training for dribbling development. Studies on futsal and football have reported that agility training, zig-zag movement, shuttle run, ladder drill, and small-sided game interventions can improve dribbling ability, movement speed, and technical execution (Rista et al., 2019; Suryadi et al., 2023; Chafidz et al., 2023; Widodo et al., 2024). Misbahul et al. (2024) found that ladder drill training significantly improved futsal dribbling agility, while Widodo et al. (2024) reported that ladder drill combined with ball feeling exercises contributed positively to dribbling performance. Similarly, Syah (2025) indicated that ladder drill training improved speed among futsal players, and Adi et al. (2025) emphasized in a systematic review that agility training provides practical benefits for futsal performance. These findings indicate that ladder drills can be considered a relevant intervention for improving the movement components that support futsal dribbling.

Although many studies have examined agility and dribbling in futsal, several gaps remain. First, most previous studies were conducted on school students, youth athletes, extracurricular participants, or club-level players, while research involving university students, especially students of sports science and health faculties, is still limited. This population is important because FIKK UNM students are expected to have better motor competence and may later become teachers, coaches, or sports practitioners. Therefore, improving their futsal technical competence has academic and professional relevance. Second, previous studies often examined agility as a general physical component, but fewer studies directly tested ladder drills as a structured intervention for futsal dribbling ability in a university training context. Third, some earlier studies focused on speed or agility outcomes separately, while dribbling in futsal requires the integration of footwork, agility, coordination, and ball control. Fourth, there is still a need for local empirical evidence from Indonesian higher

education contexts, particularly from FIKK UNM, to strengthen the practical basis for designing futsal training programs that are simple, low-cost, and applicable in campus-based sports activities.

Based on the above problems and research gaps, this study aims to determine the effect of ladder drills training on dribbling ability in futsal games among FIKK UNM students. The independent variable in this study is ladder drills training, while the dependent variable is futsal dribbling ability. The novelty of this study lies in its focus on applying ladder drills as a structured footwork and agility training model for university students in a futsal context. This study does not merely position ladder drills as general agility training, but as a practical intervention directed toward improving the movement foundations of futsal dribbling, namely quick foot movement, coordination, balance, rhythm, directional control, and ball-possession efficiency.

In conclusion, futsal dribbling is a fundamental technical skill that must be supported by agility, coordination, speed, and efficient lower-limb movement. Preliminary observation among FIKK UNM students indicates that dribbling performance still requires improvement, particularly in ball control and movement efficiency under game pressure. Ladder drills are theoretically and empirically relevant because they develop quick footwork, agility, coordination, and body control, all of which are essential for effective futsal dribbling. Therefore, this study is important to provide empirical evidence regarding the effect of ladder drills training on dribbling ability in futsal games among FIKK UNM students, while also offering a practical training model for campus-based futsal development.

METHODS

This study employed an experimental research method to examine the effect of ladder drills training on dribbling ability in futsal games among students of the Faculty of Sports and Health Sciences, Universitas Negeri Makassar (FIKK UNM). Experimental research was considered appropriate because the study was designed to test the causal influence of one independent variable on one dependent variable through a systematic training intervention. In this study, the independent variable was ladder drills training (X), while the dependent variable was futsal dribbling ability (Y). This design is consistent with contemporary sport science research, which emphasizes that training interventions must be structured, measurable, and directly related to the physical and technical demands of the sport (Naser et al., 2017; Spyrou et al., 2020; Sekulic et al., 2019).

The research was conducted at the futsal court of FIKK UNM. The population consisted of students who actively participated in futsal activities, while the research sample involved 20 students selected based on their availability, participation consistency, and willingness to follow the entire training program. The sample size was considered relevant for an applied experimental study in a campus-based sport setting, particularly because the study focused on observing performance changes before and after a specific training treatment. Previous intervention studies in futsal and agility training have also used relatively small but controlled samples to evaluate the effectiveness of structured exercise programs (Ribeiro et al., 2020; Yanci et al., 2017; Hammami et al., 2018).

The training intervention consisted of ladder drills exercises arranged progressively to improve foot speed, agility, coordination, rhythm, balance, and change-of-direction movement. These components are highly relevant to futsal dribbling because players must be able to control the ball while moving quickly in narrow spaces and under opponent pressure. Ladder drills were selected because this training model stimulates neuromuscular adaptation, improves lower-limb coordination, and strengthens movement efficiency during rapid directional changes (Young et al., 2015; Pramono et al., 2023; Widodo et al., 2024). The exercise variations included basic in-and-out steps, lateral steps, forward shuffle, two-feet-in patterns, single-leg patterns, and multidirectional footwork patterns. The intensity and complexity of the drills were increased gradually to follow the principles of overload, progression, and specificity in sports training (Bompa & Buzzichelli, 2019; Behm et al., 2017).

Data were collected using a futsal dribbling test administered before and after the treatment. The pre-test was conducted to determine the initial dribbling ability of the students, while the post-test was conducted after the ladder drills training program to measure performance improvement. The dribbling test assessed the time required by each participant to complete a predetermined dribbling course. A shorter completion time indicated better dribbling performance. The collected data were analyzed descriptively by calculating the mean, standard deviation, minimum score, maximum score, and improvement percentage. To test the research hypothesis, inferential

statistical analysis was conducted using a paired sample t-test after the normality assumption was examined. The hypothesis was accepted if the significance value was lower than 0.05, indicating that ladder drills training had a significant effect on futsal dribbling ability among FIKK UNM students.

RESULTS AND DISCUSSION

Result

The results of this study describe the effect of ladder drills training on futsal dribbling ability among students of the Faculty of Sports and Health Sciences, Universitas Negeri Makassar (FIKK UNM). The analysis was conducted through descriptive statistics, normality testing, homogeneity testing, paired sample t-test, and independent sample t-test. In this study, dribbling ability was measured based on the time needed to complete the dribbling test. Therefore, a lower score indicates better dribbling performance.

Descriptive Statistical Analysis

Table 1.
Descriptive Statistics of Futsal Dribbling Ability

Descriptive Statistics	Ladder Drills Pre-test	Ladder Drills Post-test	Control Pre-test	Control Post-test
N	10	10	10	10
Mean	17.9840	14.7830	17.7710	17.3010
Standard Deviation	2.16761	1.39283	2.03125	2.15719
Variance	4.699	1.940	4.126	4.653
Range	7.42	4.45	5.90	6.30
Minimum	14.31	12.35	14.64	13.84
Maximum	21.73	16.80	20.54	20.14
Sum	179.84	147.83	177.71	173.01

Source: Data processing, 2025.

Based on Table 1, the ladder drills group showed a clear improvement in dribbling performance. The mean pre-test score was 17.9840 seconds, while the mean post-test score decreased to 14.7830 seconds. This indicates an improvement of 3.2010 seconds, or approximately 17.80%. The decrease in completion time shows that students were able to perform futsal dribbling more quickly after receiving ladder drills training.

Meanwhile, the control group also showed a slight decrease in mean score, from 17.7710 seconds in the pre-test to 17.3010 seconds in the post-test. The improvement was only 0.4700 seconds, or approximately 2.64%. This indicates that although the control group experienced a small improvement, the magnitude of change was much lower than that of the ladder drills group.

Table 2.
Mean Comparison of Pre-test and Post-test Dribbling Scores

Group	Pre-test Mean	Post-test Mean	Improvement
Ladder Drills	17.9840	14.7830	3.2010
Control Group	17.7710	17.3010	0.4700

The comparison shows that the ladder drills group achieved a greater reduction in dribbling time than the control group. Since lower time reflects better performance, the ladder drills training program contributed more effectively to improving futsal dribbling ability among FIKK UNM students.

Normality Test

Before hypothesis testing was conducted, the normality of the data was tested using the Kolmogorov-Smirnov and Shapiro-Wilk tests.

Table 2.
Normality Test Results

Variable	Kolmogorov-Smirnov Statistic	Sig.	Shapiro-Wilk Statistic	Sig.	α	Description
Ladder Drills	0.090	0.200	0.997	1.000	0.05	Normal
Control Group	0.114	0.200	0.948	0.649	0.05	Normal

The normality test results show that the ladder drills group obtained a Kolmogorov-Smirnov significance value of 0.200 and a Shapiro-Wilk significance value of 1.000. Both values are greater than 0.05, indicating that the data were normally distributed. Similarly, the control group obtained a Kolmogorov-Smirnov significance value of 0.200 and a Shapiro-Wilk significance value of 0.649. Since both values are also greater than 0.05, the control group data were normally distributed. Therefore, parametric statistical tests could be used for further analysis.

Homogeneity Test

The homogeneity test was conducted using Levene's Test to determine whether the initial data variance between the ladder drills group and the control group was homogeneous.

Table 3.
Homogeneity Test Results

Pre-test Group Comparison	Levene Statistic	Sig.	α	Description
Ladder Drills and Control Group	0.003	0.959	0.05	Homogeneous

Source: Data processing, 2025.

Table 3 shows that the Levene Statistic value was 0.003 with a significance value of 0.959. Since the significance value was greater than 0.05, the pre-test data of the ladder drills group and the control group were homogeneous. This means that both groups had relatively equal initial variance before the treatment was given.

Paired Sample t-Test of the Ladder Drills Group

Table 4.
Paired Sample t-Test Results of the Ladder Drills Group

Group	Test	Mean	Mean Difference	t-count	df	Sig. (2-tailed)	t-table
Ladder Drills	Post-test	14.7830	3.20100	6.618	9	0.000	1.833
Ladder Drills	Pre-test	17.9840					

Source: Data processing, 2025.

Based on Table 4, the paired sample t-test for the ladder drills group obtained a t-count value of 6.618, while the t-table value was 1.833. The significance value was 0.000, which is lower than 0.05. Therefore, the null hypothesis was rejected. This result indicates that there was a significant difference between the pre-test and post-test scores in the ladder drills group. The mean difference of 3.20100 seconds shows that ladder drills training had a significant effect on improving futsal dribbling ability among FIKK UNM students.

Paired Sample t-Test of the Control Group

Table 5.
Paired Sample t-Test Results of the Control Group

Group	Test	Mean	Mean Difference	t-count	df	Sig. (2-tailed)	t-table
Control Group	Post-test	17.3010	0.47000	5.056	9	0.000	1.833
Control Group	Pre-test	17.7710					

Source: Data processing, 2025.

Based on Table 5, the control group obtained a t-count value of 5.056, while the t-table value was 1.833. The significance value was 0.000, which is lower than 0.05. This indicates that there was also a significant difference between the pre-test and post-test scores in the control group. However, the mean improvement was only 0.47000 seconds. This improvement was much smaller than the improvement achieved by the ladder drills group. Therefore, although the control group showed a statistically significant change, the practical improvement was limited compared with the group that received ladder drills training.

Independent Sample t-Test of Post-test Scores

Table 6.
Independent Sample t-Test Results of Post-test Scores

Test	Group	Mean	Mean Difference	t-count	df	Sig. (2-tailed)	t-table
Post-test	Ladder Drills	14.7830	2.51800	3.101	18	0.006	2.093
Post-test	Control Group	17.3010					

Table 6 shows that the post-test comparison between the ladder drills group and the control group obtained a t-count value of 3.101, while the t-table value was 2.093. The significance value was 0.006, which is lower than 0.05. Therefore, the null hypothesis was rejected. This result indicates that there was a significant difference in post-test dribbling ability between students who received ladder drills training and students in the control group.

The mean post-test score of the ladder drills group was 14.7830 seconds, while the control group obtained a mean score of 17.3010 seconds. The mean difference was 2.51800 seconds. Because dribbling performance is interpreted based on time, the lower mean score in the ladder drills group indicates better performance. Thus, ladder drills training was more effective than the control condition in improving futsal dribbling ability.

Overall, the research findings show that ladder drills training significantly improved futsal dribbling ability among FIKK UNM students. The ladder drills group experienced a greater reduction in dribbling time than the control group, with an improvement of 3.20100 seconds compared with only 0.47000 seconds in the control group. The normality and homogeneity tests confirmed that the data met the requirements for parametric analysis. Furthermore, both the paired sample t-test and the independent sample t-test supported the hypothesis that ladder drills training had a significant effect on dribbling ability in futsal games. These findings demonstrate that ladder drills can be used as an effective training method to improve foot speed, agility, coordination, and movement efficiency in futsal dribbling among university students.

Discussion

The results of this study indicate that ladder drills significantly improved the dribbling ability of futsal students at the Faculty of Football (FIKK) at Universitas Negeri Malang (UNM). This was demonstrated by the t-test results in the experimental group, which obtained a significance value of $0.000 < 0.05$, with a calculated t-value of 6.618, which was greater than the t-table of 1.833. Descriptively, the average dribbling ability of students in the ladder drills group increased from 17.9840 seconds in the initial test to 14.7830 seconds in the final test. Because the dribbling instrument uses time units, the decrease in travel time indicates improved performance. The average difference of 3.20100 seconds demonstrates that ladder drills not only have a statistical impact but also provide practical significance for movement efficiency, foot speed, and ball control in futsal situations.

These findings reinforce the understanding that dribbling in futsal is not simply the skill of pushing the ball with the feet, but rather a complex skill involving neuromuscular coordination, agility, balance, body orientation, and quick decision-making. In futsal, the limited playing space and intense pressure from opponents require players to be able to change direction quickly without losing possession of the ball. Therefore, the improvement in dribbling ability in the ladder drill group can be explained by improvements in footwork, stride rhythm, body stability, and motor response to changes in direction. This aligns with the findings of Febrian and Perwira (2021), Akmal and Lesmana (2019), Rista et al. (2019), Mudian and Prasetyo (2023), and Hidayat et al. (2026), who emphasized that agility, speed, and coordination are essential components in developing quality futsal dribbling.

Physiologically, ladder drills provide repeated stimulation to the nervous system and muscles to produce fast, coordinated, and efficient foot movements. Training patterns such as in-and-out, lateral steps, forward shuffles, quick feet, and various changes of direction require students to rapidly contract leg muscles in short, explosive movement patterns. This adaptation is associated with increased neuromuscular efficiency, which is the ability of the central nervous system to activate motor units more quickly and in a coordinated manner. Slimani et al. (2016), Behm et al. (2017), Chaabene et al. (2018), Hammami et al. (2018), and Kons et al. (2023) explain that training based on speed, agility, and motor reaction can improve athlete performance by improving intramuscular coordination, explosive response, and change-of-direction efficiency. Therefore, the increase in dribbling time in this study can be understood as a result of neuromotor adaptations developed during the training process.

From a technical skill perspective, ladder drills are relevant to dribbling because the step patterns in these exercises resemble the movement requirements of futsal: short, fast, rhythmic, and controlled steps. Futsal players with good footwork will find it easier to maintain the distance between the ball and their feet, control the tempo of their touches, and maintain balance when passing obstacles or opponents. Misbahul et

al. (2024), Widodo et al. (2024), Kurniawan and Amiq (2025), Suhdy (2026), and Syah (2025) found that ladder drills contribute to improving agility, foot speed, and dribbling skills in futsal. The results of this study align with these findings, as students who participated in ladder drills were able to significantly reduce dribbling time compared to the control group. In other words, ladder drills are able to connect physical and technical components in one applicable training pattern.

Compared to the control group, the effect of ladder drills appeared stronger. The control group did experience an increase from 17.7710 seconds to 17.3010 seconds, with a mean difference of 0.47000 seconds and a significance level of $0.000 < 0.05$. However, this increase was much smaller than that of the experimental group. The small change in the control group could be due to factors such as testing experience, regular futsal playing, motivation during the post-test, or minor adaptations to the measurement instrument. However, in practice, the control group's improvement did not indicate a significant change in performance. In contrast, the ladder drills group achieved an increase of 3.20100 seconds, almost seven times greater than the control group. This difference indicates that improving dribbling ability is not sufficient based on regular play but requires systematic, targeted training that aligns with the components of futsal movement.

The results of the unpaired sample mean difference test in the post-test also support this conclusion. The t-value of 3.101 is greater than the t-table of 2.093, with a significance of $0.006 < 0.05$. The average post-test for the ladder drills group was 14.7830 seconds, while the control group was 17.3010 seconds, with a difference of 2.51800 seconds. Because a shorter travel time indicates better dribbling ability, the ladder drills group had superior performance. This finding supports the principle of specificity of training, that training will provide optimal results if the form of movement matches the demands of the skills to be developed. In the context of futsal, ladder drills are suitable for dribbling needs because they train fast steps, changes of direction, foot rhythm, body coordination, and movement control in a limited area. This principle is also supported by Yanci et al. (2017), Sekulic et al. (2019), Serrano et al. (2020), Zeljko et al. (2020), and Ribeiro et al. (2020), which places agility and the ability to change direction as crucial factors in game performance.

Conceptually, the success of ladder drills in this study is also related to the characteristics of futsal as a high-intensity game. Futsal requires players to perform short sprints, make sudden stops, turn, avoid opponent pressure, and make decisions quickly. Naser et al. (2017), Spyrou et al. (2020), Beato et al. (2021), Castillo et al. (2021), and Miloski et al. (2016) explain that futsal is characterized by intermittent movements that require a combination of physical capacity and technical skills. Therefore, training that focuses solely on technique without strengthening footwork quality will be inadequate. Ladder drills are relevant because they can improve the fundamental movements that underpin dribbling techniques, especially when players must dribble in tight spaces and face opponent pressure.

Furthermore, the results of this study demonstrate that the FIKK UNM students, who served as research subjects, responded well to the training program. This is important because sports students are required to possess not only theoretical understanding but also practical competency in their respective sports. Improving dribbling through ladder drills demonstrates that simple, inexpensive, and easy-to-implement training methods can still lead to improved performance when structured progressively and performed consistently. These findings align with those of Pramono et al. (2023), Fauzan et al. (2024), Khanina et al. (2025), Anggraini et al. (2026), and Adi et al. (2025), who emphasized that variations of ladder-based agility training can be used as a practical strategy to improve the movement quality of athletes or students in sports games.

Therefore, this discussion confirms that ladder drills have a significant impact on improving the futsal dribbling abilities of FIKK UNM students. This improvement occurs because ladder drills train the key elements that underpin dribbling, namely foot speed, agility, coordination, balance, stride rhythm, and efficient change of direction. Research data demonstrates that the ladder drill group experienced greater improvement than the control group, both statistically and practically. Therefore, ladder drills can be recommended as an effective, applicable, and relevant training method to improve dribbling skills in futsal, especially in the context of learning and sports coaching in a college environment.

CONCLUSION

Based on the results of the study, it can be concluded that ladder drills training has a significant effect on improving dribbling ability in futsal games among FIKK UNM students. This conclusion is supported by the

descriptive and inferential statistical results, which showed a clear improvement in the experimental group after receiving the ladder drills training program. The mean pre-test score of the ladder drills group was 17.9840 seconds, while the mean post-test score decreased to 14.7830 seconds. Since the dribbling test was measured using time, the decrease in score indicates better dribbling performance. The mean difference of 3.20100 seconds demonstrates that the students were able to complete the dribbling task faster after participating in the training.

The paired sample t-test also confirmed that the improvement was statistically significant, with a t-count value of 6.618, which was higher than the t-table value of 1.833, and a significance value of $0.000 < 0.05$. In comparison, the control group only showed a small improvement of 0.47000 seconds, from 17.7710 seconds to 17.3010 seconds. Furthermore, the independent sample t-test on the post-test scores showed a significant difference between the ladder drills group and the control group, with a t-count value of 3.101 and a significance value of $0.006 < 0.05$.

These findings indicate that ladder drills are more effective than ordinary training conditions in improving futsal dribbling ability. Therefore, ladder drills can be recommended as a practical, systematic, and applicable training method to develop foot speed, agility, coordination, balance, and movement efficiency in futsal dribbling among university students.

REFERENCES

- Adi, M. A. D. N., & S, A. (2025). Agility training for futsal players: A systematic literature review. *COMPETITOR: Jurnal Pendidikan Kepelatihan Olahraga*, 17(2), 1830–1841. <https://doi.org/10.26858/cpjok.v17i2.265>
- Akhmad, I., Dewi, R., Suprayitno, & Priyambada, G. (2023). The effect of quick strength training on the agility and leg power of futsal junior athletes. *International Journal of Human Movement and Sports Sciences*, 11(2), 477–483. <https://doi.org/10.13189/saj.2023.110227>
- Akmal, I., & Lesmana, H. S. (2019). Kontribusi kecepatan dan kelincahan terhadap kemampuan dribbling pada pemain SSB POSS. *Jurnal Patriot*, 1(3), 1197–1210. <https://journals.badnurmedisa.org/index.php/orkes/article/download/105/94>
- Amani-Shalamzari, S., Khoshghadam, E., Doniaee, A., Parnow, A., Bayati, M., & Clemente, F. M. (2019). Generic vs. small-sided game training in futsal: Effects on aerobic capacity, anaerobic power and agility. *Physiology & Behavior*, 204, 347–354. <https://doi.org/10.1016/j.physbeh.2019.03.017>
- Apriantono, T., Juniarsyah, A. D., Adnyana, I. K., Hasan, M. F., & Resmana, D. (2023). The effect of speed training on the physical performance of adolescent futsal players. *Jurnal SPORTIF: Jurnal Penelitian Pembelajaran*, 9(1), 172–184. https://doi.org/10.29407/js_unpgri.v9i1.19047
- Beato, M., Coratella, G., & Schena, F. (2016). Brief review of the state of art in futsal. *The Journal of Sports Medicine and Physical Fitness*, 56(4), 428–432. <https://pubmed.ncbi.nlm.nih.gov/25942062/>
- Belo, J., Valente-dos-Santos, J., Pereira, J. R., Duarte-Mendes, P., Gamonales, J. M., & Paulo, R. (2024). Study of body composition and motor skills of futsal athletes of different competitive levels. *Sports*, 12(5), 137. <https://doi.org/10.3390/sports12050137>
- Bompa, T. O., & Buzzichelli, C. A. (2019). *Periodization: Theory and methodology of training* (6th ed.). Human Kinetics. <https://us.humankinetics.com/products/periodization-6th-edition>
- Branquinho, L., Ferraz, R., Teixeira, J., Neiva, H. P., Sortwell, A., Forte, P., Marinho, D. A., & Marques, M. C. (2022). Effects of a plyometric training program in sub-elite futsal players during the pre-season period. *International Journal of Kinesiology and Sports Science*, 10(2), 42–50. <https://doi.org/10.7575/aiac.ijkss.v.10n.2p.42>
- Bumrung, N., Jansupom, C., Rohmansyah, N. A., Khaothin, T., & Hiruntrakul, A. (2025). Acute effects of combined high-intensity interval training and step aerobics training on agility in male futsal athletes during the pre-season. *Middle East Journal of Rehabilitation and Health Studies*, 12(3). <https://doi.org/10.5812/mejrh-158636>

- Da Costa, J. L. T., Spineli, H., Júnior, P. B., Prado, E. S., & de Araujo, G. G. (2021). Physiological and technical demands of the small-sided and generic games in female futsal players. *Motriz: Revista de Educação Física*, 27, e10210018120. <https://doi.org/10.1590/S1980-65742021018120>
- Febrian, R. A., & Bakti, A. P. (2021). Latihan ball feeling dan latihan ladder drill terhadap kelincahan menggiring bola pemain sepak bola. *Kesehatan Olahraga*, 9(3), 381–390. <https://doi.org/10.26740/jurnal-kesehatan-olahraga.v9i3.41403>
- Gadea-Uribarri, H., Fernández-Luna, Á., Castillo, D., Raya-González, J., & Sánchez-Sánchez, J. (2024). External load evaluation in elite futsal: Influence of match results and game location. *Sports*, 12(8), 214. <https://doi.org/10.3390/sports12080214>
- Haryesa, M. A., Nurdin, F., & Sulaiman, I. (2021). VO2Max and agility to futsal dribbling technique skills. *Gladi: Jurnal Ilmu Keolahragaan*, 12(3), 52–60. <https://doi.org/10.21009/GJK.123.08>
- Illa, J., Alonso, Ò., Serpiello, F. R., Hodder, R., & Reche, X. (2021). Positional differences in the most demanding scenarios of external load variables in elite futsal matches. *Frontiers in Psychology*, 12, 625126. <https://doi.org/10.3389/fpsyg.2021.625126>
- Ilham, R. A. P., Agus, A., Bafirman, Arsil, Bahtra, R., Kurniawan, R., Makadada, F. A., Perdana, G. S., Lolowang, D. M., Mangolo, E. W., Ayubi, N., Ndayisenga, J., Sibomana, A., & Jean-Berchmans, B. (2024). The effect of combination of cone drill (zigzag) with core stability, combination of ladder drill (snake jump) with core stability, and speed on agility of futsal players: A factorial experimental design. *Retos*, 58, 1–11. <https://doi.org/10.47197/retos.v58.105462>
- Irawan, A., Fitranto, N., Hasibuan, M. H., Prabowo, E., Diyananda, D., Sukriadi, S., Paranoan, A., & Ihsani, S. I. (2024). Impact of plyometric training on sprint and agility performance in college-level futsal athletes: A comparative study using hurdle jumps and box jumps. *Fizjoterapia Polska*, 2024(5), 50–55. <https://doi.org/10.56984/8ZG020C68QJ>
- Juliansyah, R., Nurudin, A. A., & Nugraheni, W. (2023). Perbandingan latihan zig-zag run dan ladder drill dalam meningkatkan keterampilan dribbling. *Jurnal Educatio FKIP UNMA*, 9(1), 217–222. <https://doi.org/10.31949/educatio.v9i1.4394>
- Misbahul, M., Widodo, H. M., Hidayatullah, F., & Purwoto, S. P. (2024). The effect of ladder drill training on the dribbling agility of futsal extracurricular students. *JSES: Journal of Sport and Exercise Science*, 6(2), 67–72. <https://doi.org/10.26740/jses.v6n2.p67-72>
- Naser, N., Ali, A., & Macadam, P. (2017). Physical and physiological demands of futsal. *Journal of Exercise Science & Fitness*, 15(2), 76–80. <https://doi.org/10.1016/j.jesf.2017.09.001>
- Nimphius, S., Callaghan, S. J., Bezodis, N. E., & Lockie, R. G. (2018). Change of direction and agility tests: Challenging our current measures of performance. *Strength & Conditioning Journal*, 40(1), 26–38. <https://doi.org/10.1519/SSC.0000000000000309>
- Pizarro, D., Práxedes, A., Travassos, B., & Moreno, A. (2020). Development of defensive actions in small-sided and conditioned games with offensive purposes in futsal. *Frontiers in Psychology*, 11, 591572. <https://doi.org/10.3389/fpsyg.2020.591572>
- Purnomo, A., & Irawan, F. A. (2021). Analisis kecepatan dan kelincahan dalam menggiring bola pada tim futsal. *Sepakbola*, 1(1), 1–7. <https://doi.org/10.33292/sepakbola.v1i1.90>
- Rahardian, M. R., Hariyanto, E., & Hariyoko, H. (2019). Pengaruh model latihan ladder drill lateral dan zig-zag hops terhadap peningkatan kelincahan. *Indonesian Journal of Sport and Physical Education*, 1(1), 27–33. <https://journal2.um.ac.id/index.php/jospe/article/view/9884>
- Rozi, M. F., Resmana, R., Selviani, I., Okilanda, A., Sumantri, R. J., Suganda, M. A., & Suryadi, D. (2023). Imagery and agility training: How do they affect the reaction ability of futsal goalkeepers? *Physical Education Theory and Methodology*, 23(3), 325–332. <https://doi.org/10.17309/tmf.2023.3.02>

- Sekulic, D., Zeljko, I., Pehar, M., Corluka, M., Versic, S., Pocek, S., Drid, P., & Modric, T. (2022). Generic motor abilities and anthropometrics are poorly related to futsal-specific agility performance: Multiple regression analysis in professional players. *Baltic Journal of Health and Physical Activity*, 14(3), 259–268. <https://doi.org/10.2478/bhk-2022-0032>
- Serrano, C., Felipe, J. L., García-Unanue, J., Ibáñez, E., Hernando, E., Gallardo, L., & Sánchez-Sánchez, J. (2020). Local positioning system analysis of physical demands during official matches in the Spanish futsal league. *Sensors*, 20(17), 4860. <https://doi.org/10.3390/s20174860>
- Slimani, M., Chamari, K., Miarka, B., Del Vecchio, F. B., & Chéour, F. (2016). Effects of plyometric training on physical fitness in team sport athletes: A systematic review. *Journal of Human Kinetics*, 53(1), 231–247. <https://doi.org/10.1515/hukin-2016-0026>
- Spyrou, K., Freitas, T. T., Marín-Cascales, E., & Alcaraz, P. E. (2020). Physical and physiological match-play demands and player characteristics in futsal: A systematic review. *Frontiers in Psychology*, 11, 569897. <https://doi.org/10.3389/fpsyg.2020.569897>
- Suci, W., Sukrawan, N., Rahma, Lilo, D. K., & Purwanto, D. (2026). The effect of ladder drill training on improving the agility of futsal players at the Madama Angels Club. *COMPETITOR: Jurnal Pendidikan Kepeleatihan Olahraga*, 18(1), 1685–1695. <https://doi.org/10.26858/cpjok.v18i1.675>
- Suryadi, D., Okilanda, A., Yanti, N., Suganda, M. A., Mashud, Santika, I. G. P. N. A., Vanagosi, K. D., & Hardinata, R. (2023). Combination of varied agility training with small sided games: How it influences football dribbling skills? *Pedagogy of Physical Culture and Sports*, 27(3), 190–197. <https://doi.org/10.15561/26649837.2023.0302>
- Thieschäfer, L., & Büsch, D. (2022). Development and trainability of agility in youth: A systematic scoping review. *Frontiers in Sports and Active Living*, 4, 952779. <https://doi.org/10.3389/fspor.2022.952779>
- Widodo, S., Hendra, J., Saleh, K., Putra, I. M., & Saputra, D. I. M. (2024). Pengaruh latihan ball feeling dan ladder drill terhadap kemampuan dribbling pada pemain Brotherhood Futsal Club. *Indonesian Journal of Physical Activity*, 4(2), 143–149. <https://doi.org/10.59734/ijpa.v4i2.84>
- Wiranata, F. A., Kusuma, I. D. M. A. W., Phanpheng, Y., Bulqini, A., & Prianto, D. A. (2023). The effect of 6 weeks of combination of three cone exercise using ball and high-intensity interval training on the agility and dribbling ability of student futsal athletes. *Physical Education Theory and Methodology*, 23(5), 686–691. <https://doi.org/10.17309/tmfv.2023.5.05>
- Zainuddin, F., & Yusuf, P. M. (2021). Pengaruh latihan ladder drill terhadap kelincahan dan kecepatan pemain futsal Undikma. *Jurnal Ilmiah Mandala Education*, 7(2). <https://doi.org/10.58258/jime.v7i2.2064>