



The Effect Of Ladder Drill Training With Zig-Zag Run On Increasing The Agility Of Futsal Players

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Article Info

Article History :

Received : February 2026

Revised : March 2026

Accepted : March 2026

Keywords:

Futsal
Increased Agility,
Ladder Drill,
Zig-Zag Run.

Abstract

Agility is one of the essential physical components required in futsal because the game demands rapid movements, quick direction changes, and high coordination. However, observations of futsal players at Bala Keselamatan Palu Christian Junior High School indicated that many players still exhibited low agility during gameplay. Therefore, an appropriate training model is needed to improve players' agility performance. This study aimed to determine the effect of ladder drill training combined with zig-zag run exercises on improving the agility of futsal players. The research employed a quantitative approach using an experimental method with a pretest-posttest design. The population consisted of all futsal players of Bala Keselamatan Palu Christian Junior High School, totaling 20 participants, and all were selected as the research sample using total sampling. The agility level of players was measured using the T-Drill Agility Test. The training program was conducted for 16 meetings with structured sessions consisting of warm-up, core training, and cool-down. Data analysis was carried out using a t-test to compare pretest and posttest results. The findings revealed a significant improvement in agility after the implementation of ladder drill and zig-zag run training. The total agility time decreased from 397.67 seconds in the pretest to 353.24 seconds in the posttest, indicating an improvement of approximately 11%. The statistical test showed that tcount (8.862) was greater than ttable (2.093) at a significance level of 5% with a degree of freedom of 19. These results indicate that ladder drill combined with zig-zag run training has a significant effect on improving the agility of futsal players. Thus, the training method can be recommended as an effective program to enhance agility performance in futsal athletes.



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ISSN 2685-6514 (Online)

ISSN 2477-331X (Print)

INTRODUCTION

Sport is a physical training activity, which is a physical activity to enrich and improve the ability and skills of basic movements and skills (sports branches) (Yunis Bangun, 2016). Sport is a form of human movement behavior that is carried out specifically in sports that have various directions and goals so that sport is a phenomenon that is relevant to social life for each person. (Mahfud & Fahrizqi, 2020)

Exercise is an important element in life and is one of the crucial aspects of physical needs for humans. This activity is a manifestation of movements carried out by humans in a certain branch with various clear objectives, so that sport becomes a phenomenon that is closely related to the social life of individuals. In addition, sports also function as a medium to support the physical development necessary in the process of growth and development of children. Schools act as a place for children to learn about physical activity through physical education lessons. Therefore, the importance of the role of sports for children cannot be underestimated, so planned and sustainable coaching is needed. (Mahfud & Fahrizqi, 2020)

Futsal is a sports game that is played within 2 x 20 minutes. For 40 minutes, players are required to always be active to move. The futsal sports game is played by 5 players, 1 goalkeeper and 4 attackers. "Futsal is formed from the sport of football, although it has similarities in the game, but in terms of the field, tools and regulations, it is very different from football (Asshiddiqi Wahyudi, 2016)

Futsal is categorized as an anaerobic sport that relies on the metabolism of energy without oxygen through two main systems: the system Phosphocreatine (PCr) and anaerobic glycolysis (lactate system). These two mechanisms allow the body to produce energy instantly to support the characteristics of futsal games that demand high speed and intensity, as seen in match simulations.(Tauba, 2021)

Futsal is one of the sports that is widely loved by the Indonesian people, in this day and age futsal is not only loved by men but also by many women who love futsal (Vera Yuliawati, 2023). Futsal is a ball game played by two teams, each of which consists of five people. The goal is to put the ball into the opponent's goal by manipulating the ball with his feet (Nugraha and al. , 2023)

Futsal is one of the sports whose game is based on football, but the difference with football is that futsal is played by 5 against 5 people and on a field that is relatively smaller than the football field, Futsal is a type of closed football that is officially authorized by the International Football Association, Federation Internationale de Football Association. (FIFA) (St. Bernard & Fauzi, 2022)

Futsal is a type of game that originated from football, but it differs from football in that futsal involves only five players and is played on a smaller area and field compared to football.(Gumantan et al., 2021)

Exercise is an activity that is carried out systematically and planned in improving the body's function. In sports

activities, exercises are useful for improving skills. Harsono stated that training is a systematic process of practicing that is carried out repeatedly, with over time increasing the amount of load. Meanwhile, Bompa said that exercise is to achieve the goal of improving the organism's system and its function to optimize sports performance or performance.

The training process is basically very important and must be done by athletes to improve their physical abilities and condition. Exercise is basically a transformation process towards the better, which is to improve: the quality of the body, the functional ability of the limbs, and the mental quality of the child who trains. (Ismadraga & Lumintuarso, 2015)

Agility is also very much needed in various sports, especially sports that require speed to change direction quickly, such as futsal games, which have the characteristics of a small field, so that the movement of changing direction quickly without losing balance is very necessary. The application of agility training requires the right form of training so that the improvement can be felt by athletes when training and competing, especially in futsal athletes in Central Sulawesi (Palu City). By having endurance, speed, and agility, an athlete can play using a futsal pattern well.

Agility is a very popular tool for trainers, as a way to improve speed, coordination, response speed, and agility in athletes. (Laughter) and al. , (2020) Agility is the ability of a person to be able to change direction quickly and

precisely at the time of movement without losing balance (Diputra, 2015)

Agility is very important for futsal players in mastering dribbling techniques. This is in stark contrast to the futsal players of the Semarang Youth Identity team. The results of the observation explained that the futsal players of the Semarang Youth Identity team had poor physical condition. (Purnomo & Irawan, 2021)

Ladder drill is a form of agility exercise using a tool that resembles a ladder placed on the floor. The way to use this tool is by jumping with one foot or two feet. This exercise has a lot of effect on the leg muscles (Dasilva) and al., (2017)

Ladder drill is a form of jumping exercise using one or two legs by jumping over a ladder-shaped rope placed on the floor or ground. This exercise helps the process of improving basic movement aspects such as body balance, reflex movements, muscle endurance, reaction speed, and coordination between body parts (Syahida 2015).

Ladder drill is a form of jumping exercise using one or two legs by jumping over a rope in the form of a ladder placed on the floor or ground. (Maretno & Arisman, 2020) Ladder drill is a form of physical exercise that uses a coordination ladder (agility ladder) placed on the floor or ground, with an exercise pattern in the form of rapid foot movements through each ladder box.

Zig-zag is a term used to indicate running with high agility at close distances, it's a good idea to record the time when doing agility training using zig-zag running (St. Bernard & Fauzi,

2022). Meanwhile, zig-zag run is a form of exercise that emphasizes repeated changes in the direction of running with a winding pattern resembling the letter "Z".

Seeing the problems that exist in the places found on the field, especially in the Futsal players of the Christian Junior High School Bala Selamat Palu, there are many players who are not able to have agility. One of the reasons is that the kurkur is given forms of exercise that make agility increase.

Looking at the problems mentioned above, cohesiveness is needed. One of the factors that reduces cohesiveness in Team is not having agility in the game of futsal. To create this cohesiveness, hard training and a good training pattern are needed. Therefore, the researcher wants to apply the ladder drill with zig-zag run on Team futsal of Palu Salvation Christian Junior High School to see if there is an influence on agility in futsal games. So that they can create good achievements in the future.

METHODS

This study uses a quantitative approach with an experimental method. The research design applied is Pretest-posttest Control Group Design. The study population was all futsal players of Palu Salvation Christian Junior High School which amounted to 20 people. The sample was taken as a whole (total sampling) because the population was less than 100 people.

Sampling

The sample in this study amounted to 20 Futsal players from the Palu Salvation Army Christian Junior

High School. The sample was selected from all players who actively participated in training without a special selection process. And anyone who is willing

The sampling technique used is accidental sampling, which is the determination of respondents based on who is willing to take part in this research instrument. Therefore, the number of samples is not determined by a specific statistical formula, but based on the number of respondents who were successfully reached during the data collection time.

Materials and Tools

In this study, the instruments used consisted of test tools to measure bound variables and supporting equipment for treatment. All measurement and training activities were carried out on the futsal field of Palu Bala Salvation Christian Junior High School.

Agility Measurement Instrument (T-Drill Agility Test) To measure the level of agility of futsal players, researchers use the T-Drill Agility Test. The materials and tools required for the implementation of this test include:

Cones: A total of 4 pieces arranged to form the letter 'T' with a certain distance between the cones.

Tape Measure/Meter: Used to determine the precise distance between cones, which is 10 yards (about 9.14 meters) from cones A to B, B to C, and B to D.

Stopwatch: Used to accurately measure a player's travel time in seconds.

Whistle: Used as a start signal for test takers. Record Sheet: Stationery and result form to document the time gain data of each sample. Training Apparatus

(Treatment) The equipment used in the process of providing Ladder Drill and Zig-Zag Run training treatment includes:

Agility Ladder: The main tool used in ladder drill exercises to train the agility of the player's legs. Cones: Used as resistance or crossing markers in zig-zag run exercises. Futsal Ball: Used as a supporting equipment in the player's physical activity on the field.

Stopwatch and Whistle: Used by researchers to monitor the duration of core training (60 minutes) as well as warm-up and cool-down sessions (15 minutes each). All of these instruments were chosen to ensure that the agility data obtained was objective and could be measured in terms of achievement before and after the training program.

Procedure

The procedure in this study includes systematic steps starting from initial data collection to the implementation of training interventions. The research was carried out for 16 meetings.

Pre-test Before being given the treatment, all samples (20 players) conducted an initial test to measure the initial agility level using the T-Drill Agility Test. The implementation procedure includes: Participants warmed up for 15 minutes. Participants stand at the starting line (Cone A), then run a sprint forward 10 yards to Cone B.

From Cone B, participants shuffle sideways to Cone C, then sideways to Cone D, and back to Cone B. The test ended with a backpedal run from Cone B back to the finish line in Cone A. Travel

time is recorded in seconds using a stopwatch. After the initial test, the sample was given a Ladder Drill and Zig-Zag Run training program with the procedure for each meeting as follows:

Warm-up (15 minutes): Includes running around the field and static/dynamic stretches to reduce the risk of injury. Core Training (60 minutes): Implementation of the main training program (Ladder Drill and Zig-Zag Run Exercises) that have been compiled by the researcher.

Cool-down (15 minutes): Muscle relaxation for recovery of physical condition, followed by evaluation or correction of exercise results.

Post-test After completing 16 practice meetings, all samples took the final test. The procedure used in the final test is identical to the procedure in the initial test to ensure the validity of the comparison of agility data before and after treatment.

Data Analysis

This study uses a quantitative approach with an experimental method. The research design applied is Pretest-Posttest Control Group Design. This design was chosen to compare the effects of two different treatments, namely ladder drill and zig-zag run exercises, on the agility variables of futsal players. Researchers compared the experimental group to the control group to accurately identify cause-and-effect relationships through pre-intervention and post-intervention measurements.

RESULTS

This section presents main data regarding the effect of ladder drill variations with zig-zag runs on the agility

of futsal players of Palu Salvation Christian Junior High School.

Research Subject: Involving 20 futsal players.

Research Time: The pre-test will be conducted on October 3, 2025, and the final test (post-test) on November 15, 2025.

Training Program: Conducted 17 meetings, with a frequency of 3 times a week (Wednesday, Friday, Saturday).

Key Findings: There was a significant increase in agility of 11%. The group's total time decreased from 397.67 seconds during the pre-test to 353.24 seconds during the post-test

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Tables and Figures

4.1.1 In Initial Test Results

The initial test was carried out with the aim of finding out the initial data

before players were given Ladder Drill exercises with Zig-Zag Run. The initial test data is the agility data of the futsal players of the Christian Junior High School Hammer Salvation Army using the T-Drill test. The initial test data collection was carried out on October 3, 2025 in the field of the Smp Christian Junior High School of the Central Malawisi Salvation Army.

Data on the results of the initial test of the agility of the Sulu Salvation Army Christian Junior High School futsal players using the T-Drill test is listed in table 4.1 below.

Table 4.1 Results of the Initial Test of Futsal Player Agility in the Palu Salvation Army Christian Junior High School Team Using the T-Drill Test

Yes	Name	L/P	Time/second
1	Elnoe	L	18.86
	Ahugra		
2	h	L	20.51
3	Aldi	L	18.07
4	Kevin	L	20.61
5	Isaiah	L	18.89
6	Janes	L	20.41
7	Cliffer	L	19.06
8	Abed	L	24.02
9	Rizki	L	19.02
10	Christo	L	19.31
11	Comb	L	18.79
12	Erik	L	21.08
13	Gabriel	L	22.55
14	Rafael	L	21.24
15	David	L	20.15
16	Juan	L	19.21
	Descen		
17	d	L	18.45
18	William	L	18.51

19	Alvaro	L	20.02
20	Jordan	L	18.91
Σ	Quantity		398.68 seconds

Based on table 4.1 above, it shows the initial test of increasing the agility of 20 futsal players of Palu Salvation Junior High School, showing that the fastest time obtained was 18.07 seconds, while the lowest time or the latest was 24.02 seconds.

4.1.2 Final Test Results

The final test was carried out with the aim of finding out the final data after the player was given a Ladder Drill exercise with Zig-Zag Run. The final test data is the agility data of the futsal players of the Christian Junior High School Hammer Salvation Army using the T-Drill test. The initial test data collection was carried out on November 15, 2025 at the Smp Christian Junior High School of the Central Selawesi Selawesi Salvation Army.

Data on the results of the final test of the agility of the futsal players of the Christian Junior High School Reinforcement Palu using the T-Drill test is listed in table 4.2 below.

Table 4.2 Final Test Results of Futsal Player Agility in the Palu Salvation Army Christian Junior High School Team Using the T-Drill Test

No	Name	L/P	Time/second
1	Elnoe	L	17.31
	Ahugr		
2	ah	L	17.44
3	Aldi	L	16.30
4	Kevin	L	17.30
5	Isaiah	L	16.40

6	Janes	L	18.40
7	Cliffer	L	17.10
8	Abed	L	19.12
9	Rizki	L	18.10
	Christ		
10	o	L	16.51
11	Comb	L	16.55
12	Erik	L	19.41
	Gabrie		
13	l	L	20.44
14	Rafael	L	17.31
15	David	L	16.58
16	Juan	L	19.10
	Desce		
17	nd	L	17.30
	Willia		
18	m	L	17.21
19	Alvaro	L	18.30
20	Jordan	L	17.05
Σ	Quantity		354.53 seconds

Based on table 4.2 above, for the improvement of the agility of futsal players at Palu Bala Salvation Christian Junior High School after being given treatment, namely in the form of a variation of ladder drill training with zig-zag runs for 6 weeks which is carried out in accordance with the training program made, the final test results obtained are obtained at the earliest, which is 16.30 seconds at the latest time, which is 20.40 seconds

The result of the calculation of the t-test where $t_{count} =$, obtained $t_{8.862}$ $t_{table} = 2.093$ because t-count is greater than t-table or $8.862 > 2.093$ at a significant level of 5 % with a degree of difference (d.b) = $N-1 (20-1) = 19$ or an increase in pre-test (initial test) and post-test (final test)

which is 44.43 with an increase of 11%, then hypothesis No. (H0) which is stated to have no effect is rejected, so that the alternative hypothesis (H1) is accepted.

DISCUSSION

In this section, the researcher presents the findings based on the data obtained when this research was conducted. The results of the hypothesis test proved that the average difference in agility of futsal players of Palu Salvation Christian Junior High School before being given Ladder Drill with Zig-Zag Run was 19.93. while after being given Ladder Drill with Zig-Zag Run, the average agility of Palu Christian Junior High School futsal players was 17.73 with an increase of 2.2

Agility is one of the aspects of physical freshness that is used as a benchmark in measurement tests in the implementation of athlete tests and various other tests, there are many tests to measure agility but at the time of the previous test used various items Test, to measure agility by using trajectory assistance and stopwatch for Timer. In this test, the faster the participant performs, the better the results, in this case timeliness is very important in determining success Test (Gumantan & Mahfud, 2020)

The variety of exercises applied, namely Foot in Each, Feet in Each, In In Out Out, X-Over Zig-Zag, and Zig-Zag Run, simultaneously train several neuromuscular and physical aspects that support agility. Acceleration and Deceleration: The zig-zag run exercise requires the subject to slow down the

movement (deceleration) before turning, and to accelerate the movement (acceleration) after turning, which is very relevant to the futsal game situation. Coordination and Balance: Stair drills focus on foot-eye coordination and dynamic balance (Gökhan, 2017). The fast and complex movement patterns in the drill ladder stimulate the nervous system to send signals faster to the muscles, increasing the rate of force development (ROFD). Strengthening of Muscles and Tendons. continuously varying movements and increasing the duration of the exercise each week (the principle of overload or overloading) cause conditions in tendons, ligaments, and muscles, especially in the legs, which increase the stability and strength to withstand force during sharp turns (Haff & Triplett, 2016). Overcoming Boredom (Boredom): Consistency in training is essential; variety can maintain the athlete's intrinsic motivation, ensure active participation, and maximize adaptation (Dardas, 2021). These findings are in line with previous research showing that structured agility training programs, such as ladder drills and conerill (similar to zig-zag runs), are effective in improving agility performance in team sports athletes (Faigenbaum et al., 2017).

The results of the study show that there is a significant influence of training Ladder Drill with Zig-Zag Run in the game of Futsal. The existence of this influence shows that the exercise Ladder Drill with Zig-Zag Run It can be used as an exercise to increase agility in the game of futsal because the training material provided in the implementation of the

research meets or is in accordance with the principles of training.

In futsal games, the agility component is very important. Agility is one of the basic elements of physical condition and performance in the game. It takes good agility to be able to play with agility in chasing and keeping the ball when playing is very important. Agility is one of the basic elements of physical condition and performance in the game. It takes good agility to be able to play with agility in chasing and keeping the ball while playing

CONCLUSION

Based on the results of the research and discussion in the previous chapter, it can be concluded that there is an effect of variations in ladder drill exercises with zig-zag runs on increasing the agility of futsal players at Palu Salvation Christian Junior High School with t -calculation 8.862 results $>$ t -table $2,093$, with a significance value of $5\% = 0.05$, with a degree of difference (d.b) = $N-1 (20-1) = 19$ or pre-test improvement (initial test) and post-test (final test) was 44.43 with an increase of 11% . So there is a significant difference between the data before being given ladder drill exercise with zig-zag run and after being given ladder drill exercise with zig-zag run. Thus, it was concluded that there was an effect of ladder drill training with zig-zag run on increasing the agility of futsal players at Palu Salvation Christian Junior High School

ACKNOWLEDGEMENT

The author expresses his sincere appreciation and gratitude to various parties who have supported the implementation of this research:

1. Tadulako University, especially the Faculty of Teacher Training and Education (FKIP) and the Health and Recreation Physical Education Study Program, for the facilities and academic support provided.
2. The supervisors and examiners of the thesis, namely Mr. Tri Murtono Tri Murtono, S.Pd., M.Pd., Krisyanto Batong Lumaa, S.Pd., M.Pd., Drs Hendrik Mentara, S.Pd., M.Pd., Dr. Andi Saparia, S.Pd., M.Pd., AIFO for valuable guidance, input, and direction during the research and writing process.
3. The Bala Selamat Christian Junior High School futsal team, who have been willing to be the subject of research and provide support during the implementation of training and data collection.
4. The author's family, especially parents and siblings, for their invaluable prayers, motivation and moral support.
5. Fellow students and friends of pjkr class B 22 who have provided enthusiasm, scientific discussions, and assistance in the research process.
6. All parties who cannot be named one by one, who have contributed in various forms to the completion of this research.

The author also expressed his gratitude to Allah SWT for all the blessings and opportunities given.

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