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Differences Between the Effects of Side Legs And T-Drills On The Speed And Agility Of Futsal Players

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ABSTRACT

Futsal is a high-intensity sport that requires speed and agility as essential physical components to support players' performance; therefore, effective training programs such as lateral feet drill and T-drill are needed to improve these abilities. This study aimed to analyze the effects of lateral feet drill and T-drill training on the improvement of speed and agility among futsal players at SMP Bala Keselamatan Palu. The study employed a quasi-experimental design with a matching-only design approach. The samples were selected using a total sampling technique, consisting of 20 participants. The results showed significant improvements in the mean running speed of the LFD group (p-value < 0.001) and the T-Drill group (p-value < 0.001), as well as agility in the LFD group (pvalue = 0.001) and the T-Drill group (p-value < 0.001) compared to pre-intervention measurements. Although both groups experienced improvements in speed and agility, statistically both training methods were considered equivalent in their effects on the subjects (p-value > 0.05). The findings also indicated that lateral feet drill training provided better improvements in running speed, although it was not substantially superior to T-drill training in enhancing agility. Therefore, both lateral feet drill and Tdrill training had significant effects on the speed and agility of futsal players at SMP Bala Keselamatan Palu.

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INTRODUCTION

Futsal is a popular sport among teenagers and adults, so most educational institutions offer extracurricular futsal activities for their students. These extracurricular activities are expected to support the growth process and improve students' physical fitness levels. Physical fitness itself is a crucial component that plays a role in supporting student mobility and activity, leading to optimal academic performance (Elmosta & Annas, 2023).

Physical condition is the result of a training program tailored to the physical components to be improved (Zainuddin & Yusuf, 2021). Components of physical condition

include strength, endurance, muscular power, speed, flexibility, agility, coordination, balance, accuracy, and reaction.

Good physical condition plays a crucial role in supporting player performance (Herlina et al., 2020; Rahmatullah, 2019). Poor physical condition can impact a player's technical and tactical abilities in soccer. Therefore, physical components such as speed and agility need to be optimally trained without neglecting other physical components (Kardani et al., 2020; Tofikin, 2020). In soccer, important physical components include muscular strength, flexibility, speed, jumping ability, and agility. The development of these components needs to be carried out through specific and targeted training programs (Atiq et al., 2020;Priyo Utomo et al., 2021).

Agility is a player's ability to change direction and speed of movement, both while in possession of the ball and without it (Gumantan & Mahfud, 2020). Agility without the ball is demonstrated through the ability to move quickly at high intensity, change direction without losing balance, and move effectively in multiple directions. To support these abilities, leg muscle power is the most dominant muscle component compared to other muscle groups, so it requires primary attention in training programs without neglecting the development of other muscles (Putra, 2022).

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Agility is a physical component that significantly influences an athlete's performance on the field. Agility is defined as an individual's ability to move and change direction without losing balance (Kurniawati, 2017). In futsal, agility is a crucial physical component because players are required to be able to change direction quickly and maintain balance throughout the game (Herlambang et al. 2022). Therefore, agility is essential in futsal, given the high-intensity nature of this sport.

Based on the above background, the researcher feels that similar research is necessary to continue to develop effective training programs to improve running speed and agility in futsal players. Therefore, this study was conducted to evaluate a training program designed to improve speed and agility in futsal players using lateral feet drills and t-drills.

METHODS

This research is a quantitative experimental study with a quasi-experimental Matching Only Design. The study was conducted at the Salvation Army Junior High School in Palu, and lasted six weeks, with three meetings per week. The study population

consisted of 20 students who were members of the Salvation Army Junior High School futsal club.

Sampling was conducted using total sampling, given the limited population, so the athletes selected for the sample represented the entire population. Exclusion criteria for this study were subjects experiencing illness or injury, or withdrawal.

This study used two experimental groups with different treatments, hereinafter referred to as the LFD group and the T-Drill group. The selected subjects were then grouped using the Ordinal Pairing technique, resulting in 10 subjects in each group. The LFD group received Lateral Feet Drill training at each session, while the T-Drill group received T-Drill training.

The data used in this study is primary data, or data obtained by the researcher during the study. Data collection techniques included direct testing and measurements. Subjects' running speed data was obtained from the 30-meter Sprint Test, and agility data was obtained from the Agility T-Test. Data collection was conducted at the baseline and endline of the study period to assess the effects before and after treatment in each group.

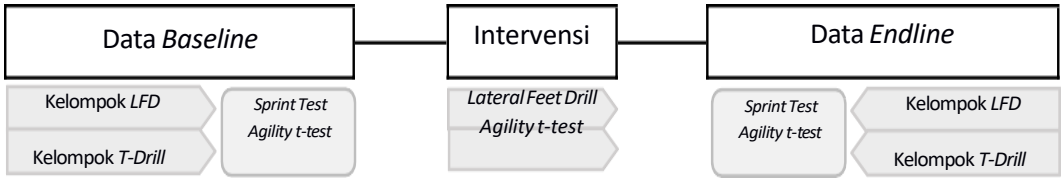

Figure 1.
Intervention flow diagram

Data processing was carried out using Microsoft Excel 2019, and statistical analysis was conducted using SPSS 23.0 for Windows. Descriptive tests were conducted to show the distribution and characteristics of subjects in both groups. Normality was then tested using the Shapiro-Wilk test. A paired sample t-test or Wilcoxon signed ranks test was used to compare data before and after the intervention, while an independent sample t-test or Mann-Whitney test was used to compare subjects' speed and agility scores after the intervention between groups. An independent t-test was also used to determine which treatment provided the greatest improvement in the dependent variable by testing the post-pre delta value. The significance level was set at $p<0.05$.

RESULTS AND DISCUSSION

Result

The study was conducted on a population of 20 subjects from the Palu Salvation Army Junior High School futsal club. Group selection was carefully conducted to ensure an even distribution of subjects based on the initial data for the dependent variable, which was analyzed using a matching technique. The results presented data in the form of speed and agility test results at each measurement time point: baseline and endline

of the study period. The normality test showed a p-value >0.05, so parametric testing was continued with a paired sample t-test. Table 1 shows the average running speed of subjects in the LFD and T-Drill groups before the intervention: 4.43 ± 0.11 and 4.13 ± 0.12, respectively. After the intervention, there was a significant increase in the LFD group's running speed to an average of 4.60 ± 0.13, with a p-value <0.001. The T-Drill group also experienced an increase to 4.61 ± 0.18, a significant difference from the pre-intervention running speed. So it can be concluded that providing Lateral Feet Drill and T-Drill training can have a significant effect on the subject's running speed.

Table 1.
Subjects' Running Speed Before and After Intervention

Variable	Measurement Period		p-value
	Pre-Test	Post-Test	
LFD Group	4.43 ± 0.11	4.60 ± 0.13	<0.001*
T-dril Group	4.13 ± 0.12	4.61 ± 0.18	<0.001*

Table 2 shows that the average agility scores of subjects in the LFD and T-Drill groups before the intervention were 10.93 ± 0.50 and 11.16 ± 0.52, respectively. After the intervention, there was a significant difference in the agility scores of the LFD group, with an average of 11.39 ± 0.49, with a p-value of 0.001. The T-Drill group also experienced a significant difference, with a score of 11.38 ± 0.49. This increase was also significantly different from the subjects' agility scores before the intervention. Therefore, it can be concluded that the Lateral Feet Drill and T-Drill training sessions significantly impacted the subjects' agility.

Table 2.
Subject Agility Before and After Intervention

Variable	Measurement Period		p-value
	Pre-Test	Post-Test	
LFD Group	10.93 ± 0.50	11.39 ± 0.49	0.001*
T-dril Group	11.16 ± 0.52	11.38 ± 0.49	<0.001*

The training programs provided to the subjects included Lateral Feet Drills and T-Drills, which are types of training that can improve running speed and agility. Table 3 displays the average values after the training programs were administered for each variable, namely speed and agility. The results of the Independent T-Test showed that the average running speed values for both types of training programs were not significantly different. The statistical analysis also showed that the two types of training programs did not significantly affect the subjects' agility. This indicates that both types of interventions or training methods were considered statistically equivalent in their effects on the subjects' running speed and agility.

Table 3.
Differences in Types of Interventions on Subjects' Speed and Agility

Variabel	Interval Types		p-value
	Lateral Feet Drill	T-Drill	
Speed	4.60 ± 0.13	4.61 ± 0.18	0.957
Agility	11.39 ± 0.49	11.38 ± 0.49	0.954

Table 4 displays the effect of the two intervention types on the speed and agility of the subjects in both groups. The values displayed represent the difference, or delta, before and after the intervention for each variable. Subjects' running speed during the Lateral Feet Drill exercise given to the LFD group showed a positive trend, increasing by 3.8%. This value is quite small compared to the percentage change in the T-Drill group, which also experienced a positive trend, or increase, of 11.6%. Statistical tests showed a significant difference in the delta values of subjects' running speed between the treatment groups, with a p-value of 0.006.

The percentage change in agility scores for the Lateral Feet Drill exercise was 4.2%, showing a positive trend. While the T-Drill exercise, despite showing a positive trend, only had a 2% effect on the subjects' agility scores. Statistical tests showed a significant difference between the two types of exercise on the subjects' agility, with a p-value of 0.036. Therefore, it can be concluded that the Lateral Feet Drill exercise in the LFD group had a better effect on running speed. However, it did not significantly improve agility compared to the T-Drill exercise in the T-Drill group.

Table 4.
Effect of Intervention Type on Subjects' Speed and Agility

Variabel	Interval Types		p-value
	Lateral Feet Drill	T-Drill	
Speed (Delta)	0.17 ±0.05	0.47 ±0.26	0.006*
% Change	3.8%	11.6%	
Agility (Delta)	0.46 ±0.30	0.21 ±0.09	0.036*
% Change	4.2%	2%	

In various sports, coaches are required to improve athletes' physical abilities, particularly speed and strength, as these two components are crucial factors in determining success or failure in a match. The high level of competition between athletes and sports institutions encourages coaches to design and implement effective training methods to optimize athlete performance. One form of training widely used to improve physical abilities, particularly speed and agility, is the lateral feet drill and the t-drill. Both training methods are considered to contribute significantly to improving athlete performance in various sports, including soccer and futsal.

Discussion

The results of this study indicate that lateral feet drill and t-drill training significantly impacted the subjects' speed and agility after undergoing the program. Although statistically significant effects were observed for each type of training, the results indicate similarities in the increase in the subjects' speed and agility. This is a result of the adaptation of the training provided. Although the two types of training are different, this approach can be concluded that the increase in speed and agility is the result of structured and systematic training. Agility ladder training is a training method that requires a high level of concentration and complex motor coordination. This contributes to an increase in the moment of force during muscle contraction, thereby

improving coordination within the motor skill system, ultimately resulting in increased agility (Akhmad and Musrifin, 2023).

The training program in this study applied the concept of internal loading with maximal to supermaximal intensity levels, ranging from 90% to 105%. The training intervention was delivered in a structured manner over a six-week period, with a frequency of three sessions per week, to ensure a consistent and adequate training stimulus for the subjects' physiological adaptations. According to Akhmad (2015), muscle adaptation after exercise occurs when muscle cells enlarge (hypertrophy) and become stronger.

Furthermore, regular exercise over a six-week period is expected to provide optimal results in increasing the speed and agility of the study subjects. The training program was carried out three times a week, allowing for sustainable physiological adaptation. This aligns with the theory proposed by Suryadi (2021), which states that regular exercise of three to five times per week, with a duration of less than 60 minutes and involving large muscle groups, can improve physical fitness by improving cardiovascular and respiratory function, muscle strength, and bone health.

CONCLUSION

Lateral feet drills and t-drills each significantly improved running speed and agility. However, the results did not differ between the training types. Lateral feet drills provided a higher percentage increase in running speed, but not significantly better than t-drills in improving agility. The findings of this study provide an alternative for designing training variations to improve the speed and agility of futsal athletes. However, the study still has limitations, including the characteristics of the subjects not being included in the subject selection process due to a limited population.

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