



The Effect of Ladder Drill and Zig-Zag Exercises on Footwork Agility in Badminton Players PB. Dahlia Pagaralam

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ABSTRACT

This study aims to determine whether ladder drills and zig-zag exercises affect footwork agility in badminton players of PB. Dahlia Pagaralam. The research method used is an experimental method with a Two-Group Pretest-Posttest Design. The data collection technique involved testing. The sample consisted of all male athletes of PB. Dahlia Pagaralam, totalling 20 athletes, was selected using a total sampling technique. Data were analyzed using hypothesis testing with the t-test. The results for Group 1 showed a t-value = 12.676, which is greater than the critical value (t-table = 1.833). Group 2 showed a t-value of 15.922, which is also greater than the t-table value. This indicates differences between the two exercises in improving agility. To determine which of the two exercises had a greater effect, the mean pretest and posttest scores for Group 1 were 22.40 and 25.70, respectively. For Group 2, the corresponding scores were 19.70 and 22.30. Thus, Group 1 experienced an increase of 3.30, whereas Group 2 increased by 2.60. These results suggest that the ladder drill exercise has a more significant effect on improving badminton footwork agility compared to zig-zag.

Keywords: Ladder Drill, Zig-Zag, Footwork Agility

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INTRODUCTION

Physical education is an integral part of the education curriculum from primary to higher education levels. It serves as a balancing activity to prevent boredom among students. According to Samsudin (2008) and Bayu et al. (2015), physical education is a learning process involving physical activities designed to enhance physical fitness and develop motor skills, knowledge, healthy lifestyle behaviours, sportsmanship, and emotional intelligence.

Sports involve repetitive physical activities intended to enhance physical fitness and overall health. Sports are widely enjoyed and have become an integral part of people's daily lives, serving not only as a means of health but also as a form of recreation, education, and achievement. Badminton is one of the most popular sports in Indonesia.

According to Nugroho R.A. (2020), badminton is a flagship sport in Indonesia, with many athletes achieving international success in tournaments such as the All England, Sudirman Cup, Thomas and Uber Cups, and the Olympics. Indonesia won its first Olympic gold medal in badminton at the 1972 Munich Olympics through Rudy Hartono. In 1992, Susy Susanti and Alan Budikusuma secured gold medals in singles at the Barcelona Olympics. Indonesia continued this tradition through 2008 and achieved further success with Liliyana Natsir and Tontowi Ahmad in 2016, followed by Greysia Polii and Apriani Rahayu at the Tokyo Olympics in women's doubles.

Badminton is played with rackets and a shuttlecock, either in singles or doubles format. According to Djoko Pramono (2024), badminton is a sport involving two players or teams striving to control the shuttlecock across the net. Arief Kusuma (2024) further states that badminton demands agility, speed, precision, and power. To excel in badminton, players must master various techniques, including agility.

Agility encompasses several forms, each playing a critical role in an athlete's performance. First is reactive agility, which refers to the player's ability to respond to stimuli quickly and accurately for instance, when required to move instantly toward a shuttlecock suddenly directed to the corner of the court. This type of agility is essential for responding to opponents' unpredictable shots, such as drop shots or drives. Next is change-of-direction agility, which is the athlete's ability to swiftly alter the direction of body movement while maintaining balance. This skill is especially relevant for executing footwork to reach the shuttlecock in any direction forward, sideways, or backwards.

Another form is transitional agility, which is the ability to shift efficiently from a stationary position to rapid movement and vice versa. This agility is frequently utilized after serving, where the player must quickly prepare for the opponent's return shot. Lastly, patterned agility involves the ability to move quickly while following specific movement patterns, such as zigzags or lateral motions that simulate real match scenarios. This type of agility is commonly developed through exercises such as ladder drills and zig-zag runs, which help improve movement precision and speed when changing positions on the court.

Ladder drills are exercises designed to develop foot agility and synchronized body movement. According to Sutiyono (2014), the purpose of ladder drills is to facilitate a wide range of diverse foot movements and patterns. These skills can become second nature, enabling the body to respond quickly to the various degrees of movement required in competitive sports. This exercise typically uses an apparatus resembling a ladder laid flat on the floor. On the other hand, zig-zag is a physical exercise involving sharp directional changes in a zig-zag pattern. Both ladder drills and zig-zag runs can be utilized to enhance agility. As Ahmad (2018) notes, these training methods are commonly used to improve an athlete's overall agility.

Based on the explanation above, ladder drills and zig-zag exercises are essential components of physical training that contribute significantly to agility development. They enhance agility performance and training outcomes. Additionally, athletes are expected to increase both the frequency and duration of training to gain more comprehensive instruction and guidance from coaches. Considering this background, the researcher conducted a study entitled "The Effect of Ladder Drill and Zig-Zag Exercise on Footwork Agility in Badminton Players of PB. Dahlia Pagaralam."

METHODS

In any research, the use of a method is essential, as it provides a systematic approach to conducting and completing the study. A research method is defined as a scientific procedure used to obtain data for specific purposes and uses (Sugiyono, 2021). By selecting and applying the appropriate method, the research process can be carried out effectively. Therefore, this study employs an experimental method.

The experimental research method is used to determine the effect of a specific treatment on another variable under controlled conditions. The experimental method is a way to identify cause-and-effect relationships (also known as causal relationships) between two factors that are deliberately manipulated by the researcher while eliminating, reducing, or controlling other confounding variables (Sugiyono, 2021). Thus, this method is used to determine whether a significant effect exists among the selected variables in the research.

Based on the explanation above, the experimental method is a type of research method employed by researchers to examine the effect of one or more variables on another. The researcher chose this method because this study aims to determine the effectiveness of implementing ladder drills and zig-zag exercises on the footwork agility of badminton athletes at the PB level. Dahlia Pagaralam.

This study adopts a two-group pretest-posttest design, in which the experiment is conducted on two groups, including a comparison group. The research procedure begins with administering a pretest to both groups, followed by a treatment, and concludes with a posttest. Data collection techniques are a critical component of any research, as the main objective of the research is to generate findings (Sugiyono, 2019). According to Widiastuti (2019), testing and measurement are integrated elements that form a comprehensive unit of analysis. A test is an instrument used to assess performance and to collect data. In this study, the researcher used both pretest and posttest techniques to determine the effects of the treatment applied to the sample. Data collection was conducted through tests and measurements, which are essential for obtaining objective and reliable data.

RESULTS AND DISCUSSION

Based on the analysis conducted by the researcher, the pretest results for the ladder drill training are as follows:

Table 1. Statistical Description of the Ladder Drill Training

Description	Result	
	Pretest	Posttest
N Statistic	10	10
R Statistic	5	6
Minimum	20	23
Maximum	25	29
Standard Deviation	1.776	1.889
Variance Statistic	3.156	3.567

Based on Table 1, it can be seen that the pretest results for the ladder drill training showed a mean score of 22.40 with a standard deviation of 1.776. The highest score achieved was 25, while the lowest score was 20. Posttest results of the ladder drill training showed a mean score of 25.70 with a standard deviation of 1.889. The highest score recorded was 29, while the lowest score was 23. The detailed data distribution can be seen in the following table:

Table 2. Frequency Distribution of Ladder Drill Training

Category	Pretest		Posttest	
	Frequency	Percentage	Frequency	Percentage
Very Good	0	10%	10	10%
Good	3	30%	80	80%
Fair	7	70%	10	10%
Poor	0	0%	0	0%

From the table above, it can be observed that, among the badminton athletes who underwent ladder drill training, three athletes were categorised as Good (30%), and seven athletes were categorised as Fair (70%). On the posttest, it can be seen that among the badminton athletes who underwent ladder drill training, one athlete was categorised as Very Good (10%), eight athletes as Good (80%), and one athlete as Fair (10%).

Based on the results of the analysis, the t-value (t_h) for the pretest and posttest in Group 1 is 12.676, while the critical t-value (t_t) is 1.833 with degrees of freedom ($df = N - 1$, where $N = 10$, so $df = 9$). Therefore, since $t_h = 12.676 \geq t_t = 1.833$, it can be concluded that H_0 is rejected and H_a is accepted, indicating that ladder drill training has a significant effect on the footwork agility of badminton athletes at PB. Dahlia Pagaralam. For Group 2, the t-value (t_h) for the pretest and posttest is 15.922, with the same t-table value of 1.833 and $df = 9$. Since $t_h = 15.922 \geq t_t = 1.833$, it can also be concluded that H_0 is rejected and H_a is accepted, meaning that zig-zag training has a significant effect on the footwork agility of badminton athletes at PB. Dahlia Pagaralam.

Table 3. Mean Score of Groups 1 and 2

		Paired Samples Statistics			
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest Kelompok 1	22.40	10	1.713	.423
	Posttest Kelompok 1	25.70	10	1.337	.542
Pair 2	Pretest Kelompok 2	19.70	10	1.703	.616
	Posttest Kelompok 2	22.30	10	1.947	.539

From the table above, it can be observed that the mean pretest and posttest scores for Group 1 were 22.40 and 25.70, respectively. Meanwhile, the mean scores for Group 2 were 19.70 and 22.30, respectively. Thus, there was an improvement

of 3.30 points in Group 1, whereas Group 2 showed an improvement of 2.60 points. Based on these results, ladder drill training has a greater effect on the footwork agility of badminton athletes at PB. Dahlia Pagaralam compared to zig-zag, as the improvement in Group 1 (3.30) was higher than that in Group 2 (2.60).

This study aimed to determine whether ladder drills and zig-zag exercises affect the footwork agility of professional-level badminton athletes. Dahlia Pagaralam. The research began with a pretest to measure athletes' agility, followed by group assignment (ordinal pairing) and a six-week treatment period involving ladder drills and zig-zag exercises. Following the training program, a post-test was administered. The study employed a two-group pretest-posttest design to compare the conditions before and after the intervention, enabling a more accurate assessment of the differences between the two training methods.

The results showed that Group 1, which received ladder drill training, and Group 2, which received zig-zag training, both experienced improvements in footwork agility after the six-week intervention. Based on the t-test analysis, Group 1 showed a t-value 12.676 compared $t_{table} = 1,833$ with $df = N - 1$ dimana $N = 10$ jadi $df = 9$, sehingga dapat disimpulkan $t_{hitung} = 12.676 \geq t_{table} = 1,833$ and group pretest and posttest group 2 showed 15.922 compared $t_{table} = 1,833$ with $df = N - 1$ which is $N = 10$ jadi $df = 9$, indicating that $t_{hitung} = 15.922 \geq t_{table} = 1,833$. These results indicate that both training methods led to improvements in the footwork agility of badminton athletes at the professional level. Dahlia Pagaralam. The mean pretest and posttest scores in Group 1 were 22.40 and 25.70, respectively. In Group 2, the corresponding scores were 19.70 and 22.30, respectively. Thus, there was an increase of 3.30 points in Group 1 and 2.60 points in Group 2. These results suggest that ladder drill training had a greater impact on improving the footwork agility of the athletes compared to zig-zag. The findings also reveal that some athletes were able to significantly enhance their agility and optimize their footwork. This was likely due to their commitment, discipline, and strong motivation during training. However, since this study employed an experimental design, it did not monitor athletes' activities outside of the scheduled training sessions, which may also have influenced the outcome. Overall, the results indicate that both ladder drill and zig-zag have a significant effect on improving the

footwork agility of PB Dahlia Pagaram's badminton athletes. These findings align with several previous studies that have examined agility-based training as a means to enhance athletic movement performance.

For example, Marzuki Riyadi (2021), in his study titled "The Effect of Ladder Drill and Shuttle Run Training on Footwork Agility of Badminton Players at Bina Pratama Club, Kebumen", concluded that regular ladder drill training improves foot speed and agility, particularly in sports requiring rapid and patterned movement like badminton. This supports the current study, where the ladder drill group demonstrated significant improvements in foot coordination.

Furthermore, Citra Malasari (2019) stated that zig-zag is effective in enhancing the ability to change direction quickly and in a controlled manner. In badminton, this skill is crucial, as players must move swiftly in all directions to reach the shuttlecock. These findings are consistent with the present study, which found that zig-zag running contributed to improved lateral agility and movement acceleration.

Additionally, Melkianus Udam (2017) emphasized that a combination of agility drills, such as ladder drills and zig-zag running, improves neuromuscular coordination and reaction time, both of which directly affect footwork effectiveness. This reinforces the current study's conclusion that ladder drills and zig-zag running exercises have a significant positive impact on footwork agility.

CONCLUSIONS

The results of this study indicate that both ladder drill training and zig-zag running have a significant impact on improving the agility of footwork in badminton athletes at PB Dahlia Pagaram. This finding is consistent with the results of several previous studies that have examined agility training as a means to enhance athletic movement performance. Thus, the relationship between the results of this study and relevant previous research demonstrates consistency in showing that agility-based training significantly contributes to improving movement performance, particularly in terms of footwork agility in badminton.

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