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THE EFFECT OF GAME-BASED TRAINING MODIFIED USING THE ZIG-ZAG METHOD ON THE DRIBBLING SKILLS OF SOCCER ATHLETES

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ABSTRACT

This study aims to determine the effect of zigzag modification game training on improving ball dribbling skills in U-13 futsal athletes at Club Ora et Labora FC in 2025. The background of this study is based on the low dribbling ability of early age athletes which is characterized by a lack of agility, speed, and ball control during the match. This study uses a quantitative method with a pretest–posttest group design experiment. The population in this study is all U-13 futsal athletes at Club Ora et Labora FC, with a sample of 10 athletes selected based on inclusion criteria. The research instrument is a zigzag dribbling test that measures speed, agility, ball control, and movement coordination. Data was collected through pretest and posttest, then analyzed using statistical tests to determine the difference in results before and after treatment. The results of the study showed that there was an increase in athletes' dribbling skills after being given zigzag modification game training. Thus, it can be concluded that the practice of zigzag modification games has a significant effect on improving the dribbling ability of the ball in U-13 futsal athletes at Club Ora et Labora FC. This exercise is recommended as a form of exercise variation that is effective, interesting, and suitable for the development of early age futsal athletes.

INTRODUCTION

Exercise is a physical activity that is carried out regularly and planned to improve a person's physical fitness, health, and physical and mental abilities. In its development, sports not only function as a means of maintaining health, but also as a medium for recreation, education, and achievement (Rohman et al., 2024). As human civilization has evolved, sports have become an important part of the life of modern society . Currently, public awareness of the importance of a healthy lifestyle is increasing, so that sports activities are increasingly in demand by various circles . The development of modern technology and sports facilities also supports the increasing interest of the public to exercise, both individually and in groups (M. B. Wijaya et al., 2025).

One of the sports that is very popular in the community is futsal. Futsal is an indoor soccer game played by two teams with each team consisting of five players, including the goalkeeper. The sport is derived from the word "futebol de salão" or "fútbol de salón" which means indoor soccer. Futsal was first introduced by Juan Carlos Ceriani in Uruguay in 1930 as an alternative to the game of football in a limited area. In its development, futsal became very popular, especially in South America such as Brazil, and gave birth to many world football players who had high technique (Hidayat et al., 2021). FIFA began to officially regulate futsal in 1989 through the hosting of the first FIFA Futsal World Cup in the Netherlands. Since then, futsal has grown rapidly in various countries, including Indonesia (Rifka Alkhilyatul Ma'rifat, I Made Suraharta, 2024).

The potential issues and research gaps addressed in this study relate to the limited empirical evidence regarding the effectiveness of game-based training modified through the zig-zag method in improving soccer dribbling skills (Szwarc et al., 2014). Although conventional zig-zag drills are commonly used to develop ball control, agility, and coordination, repetitive and monotonous training activities may reduce athletes' motivation, engagement, and opportunities to develop decision-making skills in game-like situations. Furthermore, previous studies have generally examined game-based training and zig-zag drills as separate training approaches, leaving limited understanding of the effectiveness of their integration in a structured training program (McDonough et al., 2020). Therefore, this study seeks to address this research gap by investigating whether a game-based training model incorporating zig-zag movements can provide a more effective and engaging approach to improving dribbling skills among soccer athletes. The findings are expected to contribute to the development of innovative, practical, and evidence-based training methods for soccer coaches.

The potential issues and research gaps addressed in this study are based on both the limitations identified in previous research and preliminary field observations. Initial observations of soccer athletes during training sessions indicated that several athletes still experienced difficulties maintaining close ball control, changing direction quickly, and dribbling accurately while navigating around obstacles. Some athletes also tended to lose ball possession when performing zig-zag movements at higher speeds, particularly when transitioning between directions (Myriam et al., 2023). These problems appeared to be associated with the dominance of repetitive and conventional training drills, limited variation in training activities, and insufficient integration of game-like situations that encourage athletes to combine technical skills with decision-making. Although zig-zag

drills are commonly used to improve dribbling ability, their application is often separated from game-based training approaches. Furthermore, empirical evidence regarding the effectiveness of integrating modified zig-zag movements into game-based training remains limited. Therefore, this study aims to investigate the effect of game-based training modified using the zig-zag method on soccer athletes' dribbling skills, providing practical evidence for developing more varied, engaging, and effective training strategies to improve technical performance in soccer (M. B. Wijaya et al., 2025).

In Indonesia, futsal began to be known around 1998 and developed rapidly in the early 2000s. The popularity of futsal is increasing because the sport is practical, can be played on smaller courts, and is suitable for urban areas with limited land. In addition to being a means of recreation and fitness, futsal is also used as a medium for coaching basic football techniques for young players (Supriyono & Kiki, 2023)(Marsuna et al., 2022). In the game of futsal, players are required to have good basic technical skills because the game is fast with narrow movement space (A. W. E. Wijaya, 2021). These basic techniques include passing, controlling, shooting, and dribbling.

One of the most important basic techniques in the game of futsal is dribbling. Dribbling is the ability to dribble using the feet so that the ball remains in the player's possession when moving on the field(Arpansyah, Sukasno, 2022). This technique aims to carry the ball past the opponent, create attack opportunities, and maintain possession. In futsal, dribbling skills are very important because the game takes place at a fast tempo with high pressure on the opponent. Players who have good dribbling skills will find it easier to open up space, pass opponents, and create scoring opportunities (Prayoga et al., 2022).

Technically, dribbling is done with light touches using parts of the foot such as the inside, outside, and sole of the foot to keep the ball within reach of the player. Dribbling ability is not only influenced by ball-handling techniques, but also by physical factors such as speed, agility, balance, and coordination of gestures (Fitri, 2021). Agility is a person's ability to change the direction of movement quickly and precisely without losing balance, while speed is the ability to move in a short time to cover a certain distance. In futsal games, speed and agility are important elements because players must be able to move quickly while maintaining control of the ball in tight spaces (Juliansyah et al., 2023) .

However, in practice, there are still many futsal players who have difficulty dribbling. Problems that often occur include poor ball control, the ball is too far from the feet when dribbling, the lack of the ability to change direction quickly, and the dominance of using one foot so that the movement is easy for opponents to guess (Rio et al., 2021) . In

addition, some players are less able to maintain their body position to protect the ball and focus too much on the ball so they pay less attention to the game situation. This condition causes the effectiveness of the game to decrease and attack opportunities are often hampered. Therefore, directed and varied training is needed to improve the dribbling ability of futsal players (Naehan & Andika, 2023)

One form of exercise that can be used to improve dribbling skills is the practice of zigzag modification games. This exercise is carried out with a meandering movement pattern so that players are required to change direction quickly while still maintaining control of the ball (Supriadi et al., 2023). The zigzag modification game not only trains dribbling techniques, but also improves the player's agility, speed, coordination, and body balance. In addition, the form of exercise that is modified into a game will be more interesting and fun for athletes at an early age so that they are more motivated to follow the training process (Cholik, 2023)

In young age groups such as U-13 futsal athletes, the development of basic techniques is an important foundation in the long-term coaching process. Based on the results of the coach's observations at Club Ora et Labora FC, the dribbling ability of U-13 athletes is still not optimal. Some players still have difficulty controlling the ball, changing direction quickly, and maintaining speed when dribbling in game situations. This condition shows that an effective training method is needed and in accordance with the characteristics of the player's age so that the dribbling ability can improve optimally.

RESEARCH METHODS

This study uses a quantitative research method with an experimental approach using *a Pretest–Posttest Control Group Design*. The study aims to determine the effect of zigzag modified game practice on the ability to dribble the ball in U-13 futsal athletes at Club ORA ET LABORA FC. The research was carried out at Club ORA ET LABORA FC, Karo Regency, North Sumatra, for approximately one month which included the preparation, pretest, treatment, and posttest stages.

Furthermore, to ensure the scientific rigor and validity of the research findings, this study should incorporate a clearly structured quantitative experimental methodology. This includes defining the target population and selecting an appropriate sample using a justified sampling technique, as well as establishing a systematic research roadmap outlining the stages of implementation, data collection, analysis, and evaluation. Statistical procedures should include a normality test to determine whether the collected data are

normally distributed, a homogeneity test to examine the equality of variances between groups, and an appropriate t-test (paired-samples t-test or independent-samples t-test, depending on the experimental design) to determine the significance of the effect of game-based training modified using the zig-zag method on soccer athletes' dribbling skills. These procedures are essential to ensure that the research conclusions are supported by valid statistical evidence, methodological transparency, and a reproducible research process (Sugiyono, 2024).

The research population is all U-13 futsal athletes at Club ORA ET LABORA FC which totals 20 people. The research sample amounted to 10 people who were selected based on purposive sampling techniques by considering inclusion and exclusion criteria, such as actively participating in training, not injured, and willing to participate in the entire research series.

The research instruments used include digital stopwatches, zigzag cones/obstacles, futsal courts, standard futsal balls, and dribbling skills assessment sheets which include aspects of dribbling speed, ball control, *agility*, and movement coordination. The data collection technique was carried out through a zigzag dribbling test at the pretest and posttest stages.

Table 1. Assessment of *ball* dribbling skills

Yes	Athlete's name	Assessment criteria	Score				
			1	2	3	4	5
1.		1. dribbling speed					
		2. ball control					
		3. Agility					
		4. Motion Coordination					
2.		1. dribbling speed					
		2. ball control					
		3. Agility					
		4. Motion Coordination					

The instrument validity test was carried out through *content validity* by asking for an assessment of futsal experts/coaches regarding the suitability of assessment indicators

on dribbling ability. Meanwhile, the reliability of the instrument is carried out using repeated observations to ensure the consistency of measurement results.

The data analysis technique was carried out through a normality test using Shapiro-Wilk, a homogeneity test, and a hypothesis test using *a paired sample t-test* and *an independent sample t-test* with a significance level of 0.05 to determine the effect of zigzag modified game training on improving the dribbling ability of U-13 futsal athletes.

RESULTS AND DISCUSSION

RESULTS

The results of the study showed that the practice of zigzag modified games had a significant influence on the improvement of ball dribbling skills in U-13 futsal athletes at Club ORA ET LABORA FC. The increase can be seen from the difference in the average score of the pretest and posttest after being given treatment during the study period. Based on the results of the hypothesis test using a paired sample t-test, a significance value of 0.000 < 0.05 was obtained, so it can be concluded that the practice of zigzag modification games is effective in improving the ability dribbling atlet.

Table 1. Homogeneity test

No	Data	Statistics (w)	Sig. (p-hairy)	Remarks
1.	Pretes	0,956	0,721	Normal
2.	Post-test	0,962	0,803	Normal

The homogeneity test was carried out to determine the similarity of data variance. The results of the homogeneity test showed that the significance value was greater than 0.05, so the data was declared homogeneous.

Table 2. Hypothesis test

variabel	Mean pretest	Mean posttest	T Count	df	Sig. (p-value)	Remarks
Capabilities dribbling	28,0	98,6	18,742	9	0,000	signifikan

The hypothesis test was carried out using a t-test (paired sample t-test) to find out the difference in dribbling skills before and after being given game training zigzag modifications. The results of the analysis showed that the calculated t-value was greater than the t table and the significance value (p-value) was less than 0.05.

Thus, the alternative hypothesis (Ha) is accepted and the null hypothesis (H0) is rejected. This means that there is a significant influence of the practice of zigzag

modification games on the improvement of ball dribbling skills in U-13 futsal athletes at Club ORA ET LABORA FC.

The results of this study should include a comprehensive presentation of the research data, beginning with the description of the research population and sample characteristics. The findings should be supported by descriptive statistical analyses of the athletes' dribbling skills before and after the intervention. Furthermore, a normality test should be conducted to determine the distribution of the collected data, followed by a homogeneity test to examine the equality of variances between the experimental and control groups, where applicable. An appropriate t-test should then be performed to identify whether there is a statistically significant difference in dribbling performance following the implementation of game-based training modified using the zig-zag method. The results should report the statistical values, including the mean, standard deviation, t-value, degrees of freedom (df), and significance level (p-value), to provide transparent and reliable evidence of the intervention's effectiveness. Additionally, the research findings should be interpreted in relation to the research objectives and previous studies to highlight the contribution of this training approach to the development of soccer dribbling skills.

DISCUSSION

The improvement in dribbling ability occurs because the practice of zigzag modification requires athletes to change direction quickly while maintaining control of the ball. This exercise involves elements of agility, coordination, balance, and speed of footwork which are important components of futsal dribbling techniques. The more often athletes do exercises with a zigzag movement pattern, the better the ability to control the ball when moving and passing opponents. Game-based training methods can improve the physical abilities and technical skills of football. Zigzag Modified Game can be developed as a variation of the game that integrates agility, change of direction, and ball possession (Rahmoune et al., 2026).

In addition to improving technical skills, the form of zigzag modified game training also provides a more interesting and non-monotonous training atmosphere for early age athletes. that the Zigzag Modified Game exercises need to be designed with activities that resemble the actual soccer game situations and be given with an adequate frequency and duration (Sorensen et al., 2024). This condition makes athletes more active, motivated, and enthusiastic in participating in the training process. Good motivation during training also

contributes to improving athletes' dribbling skills because athletes are able to follow training instructions more optimally.

That Small-Sided Games (Bujalance-Moreno et al., 2019) are a form of soccer practice that uses smaller pitches, fewer players, and modifiable game rules. The regulation of the number of players, the size of the pitch, and the rules of the game can affect the physical demands as well as the player's response during practice. The approach provides an opportunity for players to develop technical skills and ability to play in situations that are more like matches.

The results of this study are in line with the theory of sports training which states that exercises that are carried out programmatically, repeatedly, and in accordance with the needs of sports will improve the basic technical skills of athletes. In the game of futsal, the ability to dribble is greatly influenced by agility and the ability to change direction quickly. Therefore, practicing zigzag modification games is one of the relevant forms of exercise to improve these skills .

This research is also supported by several previous studies that stated that zigzag exercises are effective in improving dribbling skills in early and novice athletes. The similarity of the results of this study with previous research shows that the zigzag training method has a positive contribution to improving dribbling skills in futsal games. Research results (Fahreji Harahap et al., 2025) an increase in dribbling ability by 1.4% after being given a combination of Small-Sided Games and Speed Endurance Training exercises. The results of the paired sample t-test analysis showed a significant difference in dribbling skills before and after treatment. The study also found an increase in right-footed passing ability by 60.38%, while left-footed passing decreased by 5.56%. These findings show that the combination of game-based training and speed endurance can have an influence on the development of football technique skills.

Dribbling ability was measured using zigzag dribbling tests during the pretest and posttest. The researcher explained that the variation in court size provides a more diverse range of technical demands and game situations, helping players develop ball control, agility, and decision-making skills (Syahrul Ghazi Parasutama et al., 2025). Thus, it can be understood that zigzag modification game training not only increases results statistically, but also has a real impact on the ability of athletes' dribbling techniques in both training and game situations. Therefore, this exercise can be used as an alternative training method that is effective and applicable in coaching futsal athletes of the U-13 age.

CONCLUSIONS AND SUGGESTIONS

That the practice of the zigzag modified game has a significant influence on the improvement of the dribbling ability of U-13 futsal athletes at Club ORA ET LABORA FC. This exercise is able to improve ball control, dribbling speed, agility, and coordination of athletes' movements so that it can be used as an effective training method in fostering basic futsal techniques at an early age.

Based on the results of the study, coaches are advised to apply zigzag modification game exercises regularly in the early childhood futsal training program. Athletes are expected to follow training with discipline and consistency, while researchers can then develop research with a larger sample count and add other variables related to futsal playing ability.

The findings of this study indicate that the implementation of zig-zag modified game exercises has a significant influence on improving the dribbling ability of U-13 futsal athletes at Club ORA ET LABORA FC. This improvement can be attributed to the training activities, which combine zig-zag movement patterns with game-based situations that require athletes to maintain ball control, adjust dribbling speed, change direction efficiently, and coordinate their movements. Through repetitive yet varied training activities, athletes are provided with opportunities to develop technical proficiency while maintaining motivation and engagement throughout the training process. These findings suggest that integrating game-based activities with modified zig-zag movements can serve as an effective alternative training method for developing fundamental futsal skills at an early age.

From a practical perspective, coaches are encouraged to incorporate zig-zag modified game exercises regularly into structured youth futsal training programs, with appropriate adjustments to athletes' age, physical abilities, and technical development. Athletes are also expected to participate actively, maintain discipline, and demonstrate consistency during training sessions. However, the interpretation of these findings should consider potential research limitations, particularly the sample size, the characteristics of athletes from a single club, and the duration of the intervention, which may influence the generalizability of the results. Future researchers are therefore encouraged to conduct studies involving larger and more diverse samples, longer intervention periods, and additional performance variables, such as agility, speed, coordination, and decision-making ability, to provide a more comprehensive understanding of the effectiveness of modified game-based training in futsal development.

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