

Improved table tennis forehand drive precision through multiball practice

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Abstract

This study aims to determine the improvement of table tennis forehand drives through multiball exercises. The research method used a pre-experimental design (non-design) in the form of a one-group pretest and posttest design. The research subjects were students of senior high school 3 Konawe Selatan who were 15 to 18 years old. The subject's body weight varies depending on the characteristics of each individual. However, in this study, body weight was only the main focus if specific aspects related to forehand driveability existed. Height range 150 to 190 cm. So, the number of samples in this study was 20 students who fit the age and height criteria. The instrument used uses a forehand drive test for 30 seconds with a target. Data analysis used description analysis and analysis prerequisite test with data normality test, data homogeneity test, and using t-test. Based on the pretest average score of 19.90 and the posttest average score of 23.35, using a percentage increase of 17.34% using multiball exercises. The data analysis results show a significant increase in the accuracy of the table tennis forehand drive through multiball training. By improving the accuracy of the forehand drive, players can direct the ball more, leading to better scores in competition and encouraging the development of more innovative and creative training approaches in the sport through multiball training, enhancing technical and tactical skills in the game.

Keywords: precision, forehand drive, table tennis, multiball.

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INTRODUCTION

Table tennis is a sport that involves quick movements, reflexes, speed, and coordination (Castellar et al., 2019). Playing table tennis regularly can improve cardiovascular health, develop body muscles, and improve balance (Naderi et al., 2021). Playing table tennis involves developing fine motor skills, monitoring the ball quickly, and making decisions in seconds. This can help build cognitive and motor skills (Oagaz et al., 2022; Akramjonovich et al., 2022). Table tennis is important

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in promoting health, individual development, intercultural unity, and the economy (Y. Zhang & Gu, 2021).

The basic techniques are the foundation for building more complex skills in table tennis, mastering the forehand drive technique in table tennis requires consistent practice, one of which is through multiball practice, correct technique correction, and an in-depth understanding of the key elements in the movement (Oagaz et al., 2021). Without mastering the basic techniques well, players will have difficulty developing more advanced strokes and strategies (Wang et al., 2021). Mastery of basic techniques helps prevent injury. Correct body position, coordinated movements, and the right shot can reduce the risk of injury that may occur while playing (He et al., 2022). Good basic technique allows players to control the ball better, make accurate shots and take the right steps in play. This leads to an increase in the game's overall quality (Ding et al., 2022). One of the basic techniques in table tennis is the forehand drive.

Forehand drive is a very important basic technique in table tennis (Pane et al., 2021). Basic techniques in table tennis must be mastered properly. This is the foundation for later techniques in the game (Ku et al., 2022). Forehand drives are often used as attacking shots to control play. The ability to make hits with accuracy and speed can give you an advantage over the competition (Suisdareni & Tomoliyus, 2021). Basic forehand drive techniques, performed consistently, will help improve accuracy and overall quality of play. Performing a forehand drive properly involves good body alignment, which can improve coordination and balance (Tabrizi et al., 2020).

To produce an effective forehand drive, fast and precise footwork is required. This helps players in setting a good position to hit the ball (Sukadana, 2022). It helps build arm and wrist muscle strength, which is beneficial in many aspects of the game (Kong & Yam, 2022). Generating more velocity on the hit makes the ball more difficult for the opponent to respond to. Players develop more diverse game tactics, such as changing the ball's direction or dribbling opponents out of position (Ji et al., 2023).

Players with strong and accurate forehand drive have a better chance of succeeding in table tennis tournaments and competitions (Urfi et al., 2023). Improving forehand drive through practice and persistence helps develop mental aspects such as focus, concentration, and persistence (Xu & Liang, 2023).

Students need to implement the basic forehand drive technique in table tennis to avoid the ball often leaving the table or hitting the net due to a lack of accuracy in the forehand drive stroke (Siregar et al., 2022). The forehand drive does not have enough strength so that the ball is easily responded to by the opponent (Picabea et al., 2022). An unstable body position causes the forehand drive to be inconsistent and less powerful. Lack of good footwork hinders players from setting the right position to hit the ball (J. Zhang et al., 2022). Mental stress, such as anxiety or lack of confidence, can affect the technique and quality of your forehand drive. Student players have difficulty coordinating eye-hand movements when hitting the ball. Inefficient energy use causes players to tire quickly, and the quality of their strokes decreases (Li et al., 2020). Players may need help understanding when and how to use a forehand drive in tactical situations and may need help responding to diverse opponents' hitting patterns and not making optimal use of hip, body, and wrist movement. Some problems with forehand drive accuracy can be improved through multiball practice (Guarnieri et al., 2023).

According to Cao et al., (2020), the research said that multiball training effectively improved table tennis skills. Players involved in multiball drills experience improvements in their forehand drive technique. In addition, players may also show greater consistency in hitting the right shots. Meanwhile, according to Alexon et al., (2021), research said that multiball exercises can help players develop faster reactions to balls that come with different patterns and speeds. This can give you the advantage of evaluating and responding better to the ball in play. Based on the research results, variations in multiball exercises, including the pattern and speed of throwing the ball, can influence the level of accuracy

improvement. A more varied approach to training may produce better results. Multiball practice for players of all skill levels, from beginners to advanced players. These results provide further guidance on who will most likely benefit from the exercise.

Multiball training involves players repeatedly hitting forehand drives against balls thrown by a coach or partner (Hanim & Tomoliyus, 2019). The main objective of this exercise is to improve technique, precision, speed, and agility in executing forehand drive (Santosa et al., 2017). Multiball drills train reaction and agility in dealing with fast-moving balls and in different variations. This prepares you for dynamic playing situations where you must respond quickly and accurately to the ball (Vincze et al., 2022). Repeated forehand drives in multiball drills help improve hitting consistency, develop a good rhythm, and avoid unnecessary mistakes (Mao et al., 2023).

Solissa, (2022) conducted previous research that supports the implementation of this research, that multiball exercises can face different ball variations, including various spins and directions. This practice helps develop the ability to recognize and adapt strokes to the various situations that arise in play. Meanwhile, according to Nugroho et al., (2023), multiball training requires high focus and concentration to respond to incoming balls quickly. This helps develop mental stamina which is important in matches. The drawback in this study lies in the variations in multiball exercises that are given too limited, it is difficult to identify a significant impact on increasing the accuracy of the forehand drive. Wider variation in the independent variables can provide more informative results. Does not consider other factors that can affect the improvement of forehand drive accuracy, such as individual motivation, previous experience, or psychological factors.

Multiball drills help develop speed and timing in forehand drives, getting better at timing shots correctly (Vincze & Jurchiş, 2022). Multiball drills are a very effective tool in honing the forehand drive skills in table tennis (Vincze et al., 2023). This helps build a solid foundation of

technique and prepares you to play better in real-game situations. Multiball drills to improve table tennis forehand drive have grown to include a wider variety of balls, including different spins (topspin, backspin, sides), varied directions, and different speeds. This allows players to practice dealing with more realistic situations. Some modern multiball practice systems can record practice sessions and analyze strokes. With the help of this technology, in this study, multiball training did not use technology, but the training method received feedback from friends and coaches, players can review their shots and receive analysis on technical aspects that need to be improved. Some multiball training tools can measure data such as hitting speed, ball rotation, and reaction time. This helps players to monitor progress and achieve higher levels of precision. Multiball drills and physical exercises to improve a player's agility, speed, and overall endurance. Apart from the physical and technical aspects, the latest approaches also recognize the importance of mental training. Multiball drills can be combined with relaxation techniques, visualization, and breathing exercises to help players stay focused and calm while playing.

Multiball exercises can improve table tennis forehand shots because these exercises are carried out in a programmed and repetitive manner so that the results of the exercises can produce precise and fast strokes. With consistent repetition, correct body position, racket angle, and arm movement can be corrected so that the purpose of this study is to determine the accuracy of table tennis forehand drives using multiball exercises.

METHOD

The research method uses a pre-experimental design (non-design) in the form of a one-group pretest and posttest design, where this test is carried out with an initial test first, then carrying out the treatment, and finally carrying out the posttest to see improvements (Kusumawati, 2015). The research subjects were students of senior high school 3 Konawe Selatan who were 15 to 18 years old. The subject's body weight varies depending on the characteristics of each individual. However, in this study,

body weight was not the main focus unless specific aspects were related to forehand driveability. Height range 150 to 190 cm. So, this study's sample was 20 students who fit the age and height criteria. This study used multiball exercises, which were carried out for 6 weeks or 16 meetings each exercise was carried out on Tuesdays, Thursdays, and Saturdays, with a maximum ability of 60 times to do multiball exercises, with the intensity of heavy training at 80%, moderate 70% and light 60%.

The instrument used uses a forehand drive test for 30 seconds, according to [Saiful \(2021\)](#), carried out using a predetermined target with the highest total score for 30 seconds. Data analysis used description analysis and analysis prerequisite tests with data normality tests, data homogeneity tests, and the t-test using SPSS version 26. In the study results, a validity test was carried out at 0.97 with a significant level of 0.05 and a reliability test of 0.98, therefore, the data in this study are valid and reliable.

The process of taking the subject is selecting the appropriate subject for research. This can include age, gender, health status, previous experience and other relevant characteristics, so the subjects in this study amounted to 20 people based on these characteristics. For the initial data collection, a table tennis forehand drive accuracy test begins with warming up first and then carrying out the test for 30 seconds with a predetermined target. After that, multiball exercises are carried out for 16 meetings held every Tuesday, Thursday and Saturday. Furthermore, the implementation of the final test is again to test the accuracy of the table tennis forehand drive and whether there is an increase in the final test after carrying out the multiball exercise. The final process uses descriptive statistical analysis and continues with the data analysis prerequisite test, namely the normality test, homogeneity, and t-test using SPSS version 26.

RESULT

Table 1. Analysis of the results of table tennis forehand drive accuracy

Variable	N	Min	Max	Mean	Standard deviation	P value
Implementation of the pretest forehand drive	20	18	24	20,65	1,565	0,000
Implementation of the posttest forehand drive	20	21	27	23,45	1,701	

Based on the results of the analysis of the accuracy of the table tennis forehand drive, there were 20 samples with an average number at the pretest of 19.90 with a maximum value of 23 times the accuracy of the forehand drive and a minimum value of 16 times, and a standard deviation of 1.917. The diagram of the results of the descriptive analysis is as follows:

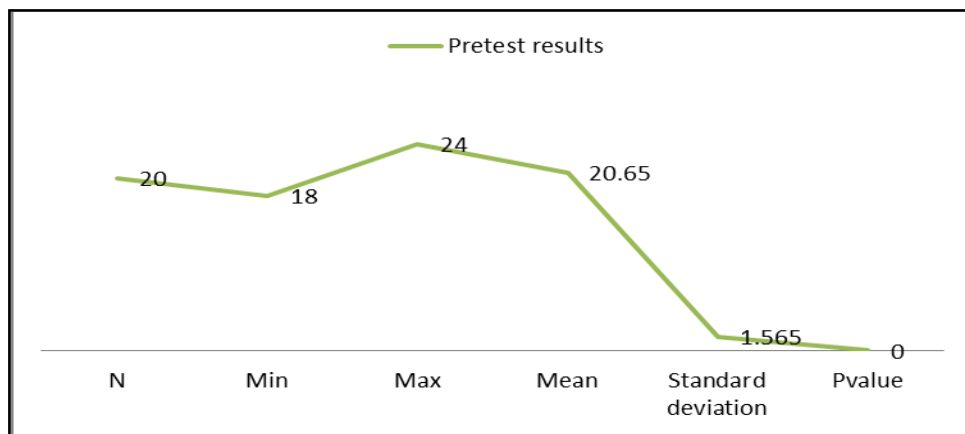


Figure 1. Pretest descriptive analysis diagram

The average number of posttest implementations is 23.35, with a maximum value of 27 times the accuracy of the forehand drive and a minimum value of 20 times, and the standard deviation is 1.899. Based on the results of descriptive data analysis, the average increase was 3.45, which was an increase from implementing multiball exercises. The diagram of the results of the descriptive analysis is as follows:

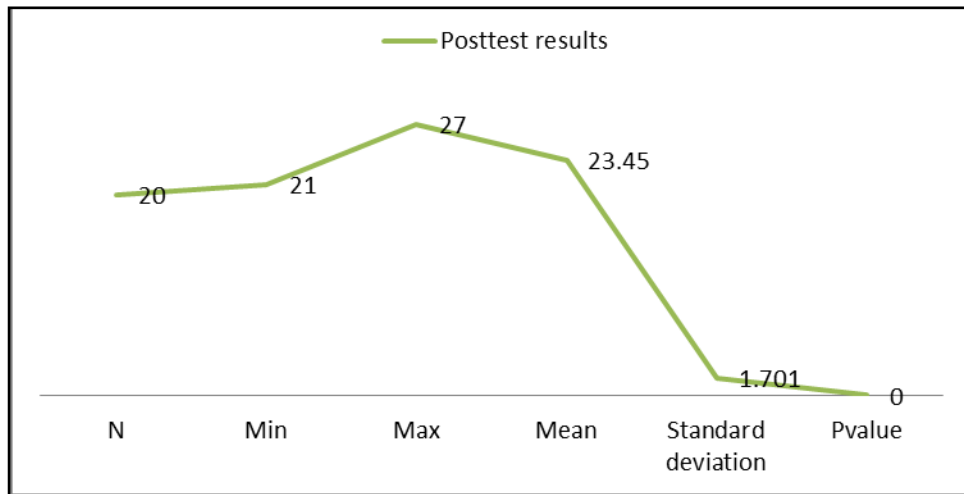


Figure 2. Posttest descriptive analysis diagram

Table 2. Distribution of the implementation of research results

Variable	Score intervals	Freq	Percent	Variable	Score intervals	Freq.	Percent
Distribution Pretest	18 - 19,13	5	25%	Distribution Posttest	21 - 22,13	5	25%
	19,14 - 20,27	3	15%		22,14 - 23,27	5	25%
	20,28 - 21,41	7	35%		23,28 - 24,41	5	25%
	21,42 - 22,55	3	15%		24,42 - 25,55	3	15%
	22,56 - 23,69	1	5%		25,56 - 26,69	1	5%
Total	23,70 - 24	1	5%	Total	26,70 - 27	1	5%
		20	100%			20	100%

A score interval is a measurement scale in statistics with special characteristics. Values have a clear, measurable order on an interval scale, and the distance between values is fixed and comparable. Based on the distribution of table tennis forehand drive accuracy pretest of 25%, the percentage of forehand drive accuracy before carrying out multiball exercises, the frequency of 5 people, with an interval score of 18-19.13. A 15% percentage of table tennis forehand drive accuracy before carrying out multiball exercises, a frequency of 3 people, with an interval score of 19.14-20.27. A 35% percentage of table tennis forehand drive accuracy before carrying out multiball exercises, a frequency of 7 people, with an interval score of 20.28-21.41. A 15% percentage of table tennis forehand drive accuracy before carrying out multiball exercises, a frequency of 3 people, with an interval score of 21.42-22.55. A 5% percentage of table tennis forehand drive accuracy before carrying out multiball exercises, a frequency of 1 person, with an interval score of 22.56-23.69. A 5%

percentage of table tennis forehand drive accuracy before carrying out multiball exercises, a frequency of 1 person, with an interval score of 23.70-24.

Based on the results of the posttest distribution of table tennis accuracy forehand drive of 25%, the percentage of forehand drive accuracy after carrying out multiball exercises, a frequency of 5 people, with an interval score of 21-22.13. The percentage of table tennis forehand drive accuracy is 25% after carrying out multiball exercises, the frequency is 5 people, with an interval score of 22.14-23.27. The percentage of table tennis forehand drive accuracy is 25% after carrying out multiball exercises, the frequency is 5 people, with an interval score of 23.28-24.41. A 15% percentage of table tennis forehand drive accuracy after carrying out multiball exercises, a frequency of 3 people, with an interval score of 24.42-25.55. A 5% percentage of table tennis forehand drive accuracy after carrying out multiball exercises, a frequency of 1 person, with an interval score of 25.56-26.69. A 5% percentage of table tennis forehand drive accuracy after carrying out multiball exercises, a frequency of 1 person, with an interval score of 26.70-27. The next analysis is the research prerequisite test, which aims to check whether the data that has been collected fulfills certain assumptions needed to apply appropriate statistical analysis. The aspects tested in the prerequisite test consist of the normality test, homogeneity test, and t-test.

Table 3. Normality results of research data

Variable	Test statistic	Significant	Distribution
Implementation pretest	0,188	0,061	Normal
Implementation posttest	0,146	0,201	Normal

Based on the results of the research with the normality test, it can be seen that the value obtained during the pretest is $0.061 > 0.05$, with this result, it is known that the data is normally distributed. Whereas in the implementation of the posttest of $0.201 > 0.05$, it is known that the data is normally distributed. Based on the data normality test results, it can be concluded that the data collected has a pattern similar to the normal distribution, meaning that the data is evenly distributed around the mean

value, and parametric statistical analysis which assumes normality, can be used with confidence.

Table 4. Results of research data homogeneity test

Results	Statistic	df1	df2	Sig.
Pretest and posttest data	0,162	1	38	0,689

Based on the results of the research homogeneity test, the magnitude of the significant results is $0.689 > 0.05$, it can be concluded that the study results are homogeneous.

Table 5. Results of the research T-test

Variable	t	df	Sig.
Implementation pretest and posttest	30,512	19	0,000

Based on data analysis, it can be seen that the t-test value is 30.512 with a significance of $0.000 < 0.05$, meaning that between the implementation of the pretest and posttest, there is an increase in the implementation of the posttest using multiball exercises. Based on the pretest average score of 19.90 and the posttest average score of 23.35, using a percentage increase of 17.34% using multiball exercises.

DISCUSSION

Based on the results of data analysis, there was a significant increase in the accuracy of the table tennis forehand drive through multiball training with the t-test results of 30,512 with an increase percentage of 17.34%. Improving the accuracy of the forehand drive in table tennis through multiball drills is a strategy that is commonly used to hone a player's technique and skills. This method involves focused and intense practice with the help of a coach or training partner. [Cao et al., \(2020\)](#) show that the player's multiball training focuses on the correct forehand drive technique. With the help of a coach or training partner, players can improve technical aspects such as body position, arm movement, and leg movement. This helps build a solid base for more accurate shots. According to [Alexon et al., \(2021\)](#), in his research said that through multiball training, players can do higher repetitions of shots in a short time. These repetitions help strengthen brain and muscle

connectivity, making movements more automatic and natural. This contributes to increasing consistency in shot results.

Precision and Accuracy in multiball practice, the ball is operated consistently by the trainer or practice partner. This allows the player to practice shots with consistent height, speed, and rotation, which are essential for increasing the precision and accuracy of the shot (Pane et al., 2020). Players' multiball drills get immediate feedback from a coach or practice partner. This helps identify technical errors that may occur and fix them quickly. This feedback supports continuous improvement in hitting technique (Gu et al., 2019). Multiball practice requires players to focus intensively (Jumarsa & Murniat, 2020). High concentration is required to respond quickly and accurately to the operated ball. It helps to develop better concentration and reaction skills in game situations.

Players feel more confident in facing forehand drives with consistent reps and improved technique. A better understanding of technique and improving hitting results gives confidence when playing in real matches. Although multiball drills focus on the forehand drive, improving this technique can also positively impact general table tennis skills. The development of technical skills will affect the game as a whole. It's important to remember that multiball practice should be combined with other practice, including practising with real opponents and participating in a variety of game situations. These exercises are part of a comprehensive training plan to ensure balanced development in the game of table tennis.

CONCLUSION

Multiball exercises have a significant role in increasing the accuracy of forehand drives in table tennis. Multiball practice consistently assists players in building a consistent and accurate forehand drive technique. Multiball drills are an effective method of increasing forehand drive accuracy in table tennis. Hit repetition, ball variety, feedback, and focus on technical aspects are key factors in significantly improving this shot. By including multiball drills in a training program, players can improve their technical skills and improve their performance in real matches. Since the

study was conducted with limited participants, generalizing the results to the population is difficult. Variability in how coaches or partners manage multiball drills affects results. Consistency is needed in providing multiball practice so that results are reliable. Research may be primarily on the technical aspects of the forehand drive without considering tactical or psychological factors that can affect accuracy. Multiball drills significantly improve the accuracy of the forehand drive. These results suggest that this training method can be a valuable approach to developing the technical skills of table tennis players.

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