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The Effect of Handgrip and Catch Only Training on The Accuracy of The Backhand Drive in Table Tennis

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Keywords

Backhand Drive; Handgrip; Catch Only; Training; Impact.

Abstract

The results of the observations indicate that training programs still tend to be monotonous, with a greater focus on repeating basic techniques without incorporating more varied methods. This results in athletes' accuracy skills not developing optimally. This study aims to determine the effect of handgrip and catch-only training on the accuracy of the table tennis backhand drive, as well as to compare the effectiveness of the two methods. This study employs a quantitative approach and experimental methods, utilizing a quasi-experimental two-group pre-test-post-test design. The sample consisted of 12 athletes selected using total sampling. The instrument used in this study was the backhand drive accuracy test according to Tomoliyus. Data analysis techniques included the Paired Sample T-Test and linear regression analysis using the Model Summary. In the handgrip training group, the average accuracy score at the pre-test was 61.33 points, and the average post-test score was 66.33 points. In the catch-only training group, the average accuracy score at the pre-test was 57.83 points, and the average post-test score was 77.33 points. The p-value (Sig. 2-tailed) for the handgrip training group was 0.376 (value > 0.05), and the p-value (Sig. 2-tailed) for the catch-only training group was 0.025 (value < 0.05). The percentage effects of the handgrip and catch-only training methods were 57% and 80.2%, respectively. The conclusion of this study is that both training methods in this study had an effect on the accuracy of the athletes' backhand drive strokes; however, there was a significant effect on backhand drive accuracy before and after the catch-only training compared to the handgrip training. A limitation of this study is that research specifically examining the relationship between grip strength training and reaction speed in relation to backhand drive accuracy remains limited.

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INTRODUCTION

Table tennis is a popular sport that encompasses competitive, recreational, and educational aspects, in which mastery of basic techniques such as the serve, drive, spin, chop, push, smash, lob, loop, and block is an absolute requirement for achieving optimal performance (Afdal Yakin, 2024; Budi & Arwandi, 2020). One of the most crucial basic techniques that athletes must master perfectly is the drive shot, which consists of the forehand drive and the backhand drive (Lestari, 2019). The drive stroke itself is executed by moving the racket diagonally upward from a closed position, and together with other techniques, it serves as the primary foundation for building game strategies (Subekti, 2018; Safrian, 2024). Specifically, the backhand drive is often relied upon to control the game and return the ball quickly and accurately; although it can be used to handle backspin, this technique is considered more effective in anticipating topspin shots (Herliana, 2020).

Two key physical components that play a crucial role in table tennis, particularly in the backhand drive, are grip and reaction speed. Good grip strength allows players to control the racket more stably, produce consistent shots, and minimize errors during contact between the racket and the ball (Mcmaster, 2017). Meanwhile, reaction speed is a person's ability to respond to a stimulus in the shortest possible time (Rozy, 2015).

Both of these physical components can be developed through training methods such as handgrip exercises and catch-only drills. Handgrip exercises are a training method to develop hand grip strength performed by pulling a handgrip spring with a specific resistance adjusted to the trainee's ability until maximum strength is achieved (Galih et al., 2022). Catch-only training (catching a ball) is a simple yet effective form of reaction training stimulus for improving an individual's motor reaction speed, as this training works by enhancing the efficiency of the central nervous system, sensorimotor coordination, and the ability to anticipate movement (Salamudin et al., 2025).

Table tennis is a sport enjoyed by people of all ages, from children and college students to adults and seniors. At the school level, table tennis is typically introduced through extracurricular activities, while in the community, interest can be fostered through Table Tennis Associations (PTM). One such Table Tennis Association (PTM), Nirwana Mijen, located in the city of Semarang, serves as a platform for community members with an interest and talent in the sport of table tennis. Based on observations at the Nirwana Mijen Table Tennis Association in Semarang, this club has significant potential to develop athletes' skills. Field findings indicate that some athletes at the Nirwana Table Tennis Club often miss returns and are ill-prepared when receiving the ball. Field observations also reveal that training at the club remains largely monotonous, with a focus on repetitive basic techniques rather than more varied and innovative methods. Although there is already a general training program, there is a lack of specific training protocols based on scientific evidence to isolate and improve backhand stroke accuracy in club-level athletes. The lack of specialized training can result in athletes' accuracy skills not developing optimally. This can impact the precision of the backhand drive, which is one of the fundamental techniques in the game.

Based on this background, the researcher was interested in analyzing the effects of handgrip strength training and reaction speed training on the accuracy of table tennis players' backhand drives. The objectives of this study were to determine the effect of handgrip exercises on the accuracy of backhand drives in table tennis, to determine the effect of catch-only training on the accuracy of the backhand drive, and to determine which is more effective between handgrip exercises and catch-only training on the accuracy of the backhand drive in table tennis.

METHODS

This study employed a quantitative approach using an experimental method. An experimental method is a research method in which subjects are assigned a specific treatment. The treatments administered in this study were handgrip exercises to train grip strength and catch-only exercises to train the subjects reaction speed. The research design used is a quasi-experimental design in the form of a two group pre-test post-test design, in which the subjects are divided into two groups based on the exercise treatment administered.

The population in this study consists of all table tennis athletes affiliated with the PTM Nirwana Mijen Club in Semarang. The sample involved in this study comprises 12 athletes selected using total sampling. This study was conducted from January to February 2026 and took place at the PTM Nirwana Sports Hall, Mijen, Semarang.

The instrument used in this study was a backhand drive accuracy test administered to athletes at PTM Nirwana in Mijen, Semarang.

This study consisted of three main procedural stages. The first stage of the study included preparation, submission of the research permit application, observation, sample selection, and collection of initial pre-test data. The second stage involved administering the exercise interventions to each group of subjects: handgrip exercises and catch only exercises. The handgrip exercise and catch only training programs consisted of several phases: the adaptation phase (sessions 1–5); the development phase (sessions 6–11); and the consolidation phase (sessions 12–16). The third stage of the study involved collecting final post-test data, reporting the data analysis, and conducting statistical tests. The data analysis techniques used in this study included: the Shapiro Wilk test and T-ANOVA as prerequisite tests for data normality and homogeneity; the Paired Sample T-Test to assess the effect of the exercise intervention; and the Model Summary linear regression test to determine the magnitude of the effect.

RESULTS AND DISCUSSION

The data from the pre-test and post-test measurements of backhand drive accuracy are presented in the form of descriptive and inferential statistics. The distribution of the statistical results of the backhand drive accuracy test is presented in **Table 1**.

Table 1. Distribution of Pre-test and Post-test Results for Backhand Drive Accuracy Measurements.

Group	Mean	SD	Max	Min
Group 1 (Handgrip Training)				
Pre-test	61,33	13,47	85	43
Post-test	66,33	19,18	91	40
Group 2 (Catch-Only Training)				
Pre-test	57,83	22,78	83	24
Post-test	77,33	31,57	124	35

Referring to **Table 1**, it presents the distribution of backhand drive accuracy measurement results for athletes from PTM Nirwana, Mijen, Semarang City, divided into two groups based on handgrip training and catch-only training. It was found that in the handgrip training group, the average accuracy score during the pretest was 61.33 points, with maximum and minimum scores of 85 and 43 points, respectively. The relatively large standard deviation (SD = 13.47) indicates inconsistency in the scores achieved by each athlete. In the post-test measurement following the handgrip training, the subjects' average accuracy score was 66.33 points, with maximum and minimum scores of 91 and 40 points, respectively. The relatively large standard deviation of the average score (SD = 19.17) indicates that during the post-test measurement of backhand drive accuracy in the group that received handgrip training, there was a disparity in the scores achieved by each athlete. These average results indicate that there was an improvement in backhand drive accuracy among athletes who received handgrip training, as evidenced by their scores on the pre-test and post-test.

In the catch-only training group, the athletes' average accuracy score on the pre-test was 57.83 points, with maximum and minimum scores of 83 and 24 points, respectively. The relatively large standard deviation (SD = 22.78) indicates significant variation in the scores obtained by individual athletes. In the post-test measurement after the athletes were given catch-only training, the average accuracy score for the backhand drive was 77.33 points, with maximum and minimum scores of 124 and 35 points, respectively. The relatively large standard deviation (SD = 31.57) indicates that there was variation in the scores obtained by each athlete. Based on the difference in athletes' average scores between the pre-test and post-test, it was

found that there was an improvement in the athletes' backhand drive accuracy after they were given catch-only training.

It is known that to apply inferential descriptive statistical tests, the results of the normality and homogeneity of variance tests must be included. The results of the normality test are presented in **Table 2.**

Table 2. Normality Test of Backhand Drive Accuracy Measurement Results

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre-test Data Points	.154	12	.200*	.954	12	.694
Post-test Data Points	.138	12	.200*	.964	12	.832

Referring to **Table 2**, based on the results of the normality test using the Shapiro-Wilk test, the significance values (Sig.) for each dataset in the pre-test and post-test phases were above 0.05, specifically: 0.694 for the pre-test data and 0.832 for the post-test data. These test results indicate that the data are normally distributed, thus confirming that the normality assumption is met for subsequent parametric statistical analysis. The results of the data homogeneity test are presented in **Table 3.**

Table 3. Homogeneity Test of Backhand Drive Accuracy Measurement Data

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
Accuracy Points *Backhand Drive*	Based on Mean	.988	1	22	.331
	Based on Median	.984	1	22	.332
	Based on Median and with adjusted df	.984	1	19.847	.333
	Based on trimmed mean	.987	1	22	.331

Referring to **Table 3**, based on the results of the homogeneity test using the T-ANOVA test, the significance value (Sig.) for both pre-test and post-test data is > 0.05, indicating that the data is homogeneous. The fulfillment of these prerequisite tests serves as the foundation for further statistical data analysis. The results of the test examining the effect of handgrip training on backhand drive accuracy are presented in **Table 4.**

Table 4. Paired-Sample T-Test Results for Pre-test and Post-test Backhand Drive Accuracy in the Handgrip Training Group

Paired Samples Test									
		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Accuracy Backhand Drive	Pre-test – Post-test	-5.000	12.617	5.151	-18.241	8.241	-.971	5	.376

Referring to **Table 4** regarding the results of the T-Test analysis of pre-test and post-test point scores after handgrip training, it is found that the p-value (Sig. 2-tailed) is 0.376 (p-value > 0.05). These results indicate that there is no significant effect on backhand drive accuracy scores before and after handgrip training. The results of the test examining the effect of catch-only training on backhand drive accuracy are presented in **Table 5.**

Table 5. Paired Sample T-Test Results for Pre-Test and Post-Test Backhand Drive Accuracy in the Catch Only Training Group

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Accuracy Backhand Drive	Pre-test – Post-test	-19.500	15.096	6.163	-35.343	-3.657	-3.164	5	.025

Referring to **Table 5** regarding the results of the T-test analysis of pre-test and post-test score data following catch-only training, it is found that the p-value (Sig. 2-tailed) is 0.025 (p-value < 0.05). These results indicate that there is a significant effect on backhand drive accuracy before and after the catch-only training. The percentage of the effect of handgrip and catch-only training on backhand drive accuracy is presented in **Table 6.**

Table 6. Percentage of Influence of Handgrip and Catch-Only Training

Model Summary

	R	R Square	Adjusted R Square	Std. Error of the Estimate
Exercise *Handgrip*	.755[a]	.570	.463	9.876
Exercise *Catch Only*	.895[a]	.802	.752	11.343

Referring to **Table 6**, the percentage of influence of handgrip and catch-only training is shown. For handgrip training, the R-Square coefficient of determination is 0.57, indicating that the influence of handgrip training on backhand drive accuracy is 57%. For catch-only training, the R-Square coefficient of determination is 0.802, indicating that the effect of catch-only training on the accuracy of the backhand drive is 80.2%.

Referring to **Table 1**, it was found that handgrip training for hand grip strength and catch-only training for reaction speed had an impact on the accuracy of the backhand drive of athletes from PTM Nirwana, Mijen, Semarang City. This is indicated by an increase in the average accuracy score for the backhand drive between the pre-test and post-test, although there is a difference in the effects of handgrip training versus catch-only training on the athletes' backhand drive accuracy. Referring to Table 4, it is found that there is no significant effect of handgrip training based on the results obtained during the pre-test and post-test for the athletes (Sig. 2-tailed = 0.376). This finding is contrary to the research by N. Puspita, B. Lian & M. T. Akhbar. (2023), which states that handgrip training significantly influences table tennis performance. Handgrip strength training in table tennis has a significant impact on improving technical skills, not only regarding the drive stroke but also other techniques such as serving ability (Berhimpong et al., 2023). Another finding by Sahabuddin et al., (2022) indicates that handgrip strength contributes 79% to forehand stroke ability. The results of this study, in line with previous research, indicate that the accuracy of the backhand drive stroke is not solely influenced by grip strength, although grip strength does affect stroke technique in table tennis.

Referring to **Table 5**, it is evident that there is a significant effect of catch-only training on athletes' backhand drive accuracy. This is demonstrated by the T-Test results when athletes scored points during the pre-test and post-test (Sig. 2-tailed = 0.025). These findings suggest that athletes' reaction speed significantly impacts backhand drive accuracy. Catch-only training is a training method that emphasizes direct visual and motor stimuli, and this emphasis is highly relevant for sports requiring rapid responses, such as table tennis (Langitan, 2026). Research by Moh et al., (2015) explains that reaction time drill training has been proven to significantly improve the accuracy and precision of backhand drive strokes in table tennis. Other previous studies also indicate that reaction time training has a significant

effect and is strongly correlated with the accuracy of backhand drive shots (Kadeira, 2021). The alignment of the results of this study with previous research further reinforces the finding that reaction time influences the accuracy of backhand drive shots.

Referring to **Table 6**, it was found that catch-only training for reaction speed was more effective in improving the accuracy of the backhand drive than handgrip training for grip strength in athletes. This can be seen from the percentage measured in points when the athletes performed the pre-test and post-test, where catch-only training had an 80.2% effect on the athletes' backhand drive accuracy. Although catch-only training in this study was considered more effective, handgrip training also had a 57% effect, although this was not statistically significant.

CONCLUSION

Based on the results of the above analysis, it was concluded that there was no significant effect of handgrip training on the accuracy of the backhand drive, and there was a significant effect of catch-only training on the accuracy of the backhand drive. Based on these findings, catch-only training is more effective in improving the accuracy of the backhand drive. These two findings indicate that, in terms of backhand drive accuracy, visual-motor reaction time is a more critical indicator than static grip strength. A limitation of this study is that there is still little discussion or research addressing grip strength training methods and reaction speed specifically in relation to backhand drive accuracy; therefore, further research is needed to compare the findings of this study with those of studies using different subject criteria. As for the recommendations intended for PTM Nirwana, Mijen, Semarang City, as the subjects of this study, it is hoped that the existing research findings will provide training methods tailored to the relevant physical components to support the athletes' technical abilities, such as the two training methods applied in this study.

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