



## The effectiveness of "Boteli" and Fed on exercises to court tennis backhand groundstroke rally skills

*La eficacia de los ejercicios de "Boteli" y Fed para mejorar las habilidades de los golpes de revés en el tenis de mesa*

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### Abstract

**Introduction and objective:** Study aims to determine the effectiveness of Boteli exercises and fed on the groundstroke rally skills of backhand tennis in sports students.

**Methodology:** 110 sports students participated in a pseudo-experimental study with a two group pretest-posttest design over 12 meetings. Test the instrument using Hewwit's Tennis Achievement. Paired t-test and independent t-test at significance  $\alpha = 0.05$  were used for data analysis with the help of SPSS 25 software.

**Results:** Analysis of the paired t-test results showed that the Boteli and Passed exercises obtained Sig. (2-tailed) values of 0.000 and 0.024. Based on the results of the independent t-test analysis, it is known that the value of Sig. (2-tailed) of the post-test data of the second exercise is 0.001. This means that there is a difference between the average score of the Boteli and fed on exercise post-test. The average score of the Boteli exercise post-test was 11.209 and the Feeder exercise was 9.091.

**Conclusions:** Based on the results of data analysis, the two exercises influence improving the groundstroke backhand rally skills of sports students. From the results of the independent t-test analysis, it is known that the average score of the post-test of the Boteli exercise is greater than that of the fed on exercise. This means that Boteli exercises are better than Fed exercises in improving the backhand groundstroke rally skills of sports students. This study concluded that backhand groundstroke rally skills in court tennis can be improved with varied practice.

### Keywords

Exercise, groundstroke, tennis

### Resumen

**Introducción y objetivo:** El estudio tiene como objetivo determinar la efectividad de los ejercicios de Boteli y alimentar las habilidades de peloteo del tenis de revés en estudiantes de deportes.

**Metodología:** 110 estudiantes de deportes participaron en un estudio pseudoexperimental con un diseño pretest-posttest de dos grupos durante 12 reuniones. Pruebe el instrumento utilizando Tennis Achievement de Hewwit. Se utilizaron la prueba t pareada y la prueba t independiente con significancia  $\alpha = 0,05$  para el análisis de datos con la ayuda del software SPSS 25.

**Resultados:** El análisis de los resultados de la prueba t pareada mostró que los ejercicios de Boteli y Passed obtuvieron Sig. (de dos colas) valores de 0,000 y 0,024. Según los resultados del análisis de la prueba t independiente, se sabe que el valor de Sig. (de 2 colas) de los datos post-test del segundo ejercicio es 0,001. Esto significa que existe una diferencia entre la puntuación media del Boteli y la del post-test del ejercicio alimentado. La puntuación media del posttest del ejercicio Boteli fue de 11.209 y del ejercicio Feeder fue de 9.091.

**Conclusiones:** Con base en los resultados del análisis de datos, los dos ejercicios influyen en la mejora de las habilidades de peloteo de revés de los estudiantes de deportes. A partir de los resultados del análisis independiente de la prueba t, se sabe que la puntuación promedio de la prueba posterior del ejercicio de Boteli es mayor que la del ejercicio alimentado. Esto significa que los ejercicios de Boteli son mejores que los ejercicios de Fed para mejorar las habilidades de peloteo de revés de los estudiantes de deportes. Este estudio concluyó que las habilidades de peloteo de revés en el tenis de cancha pueden mejorarse con una práctica variada.

### Palabras clave

Boteli, alimentado, golpe de fondo, revés, tenis

## Introduction

High performance sports require optimal development of specific technical skills for each discipline (Roa et al., 2023). Some of the basic stroke techniques in court tennis consist of forehand, backhand, and serve. Groundstroke or forehand stroke is most often used in court tennis games in forming attacks (Irawadi & Yusuf, 2021) Not only forehand, for some people but backhand is also applied as an offensive strategy as well as a counterweight to forehand (Rive & Williams, 2012) One of the key skills in court tennis is the backhand groundstroke, which is used to return shots from the opponent's side (Agustiyanto, 2023). Developing effective backhand groundstroke skills is crucial for success in court tennis as it allows players to maintain control and balance throughout the rally (Reid et al., 2013). To mark the start of the game in court tennis, it is marked by a service stroke. The accuracy of the serve stroke can also urge the opponent to score points in court tennis (Nugroho et al., 2023) These three basic techniques need to be learned and deepened by sports players who are enthusiastic about court tennis.

According to Suprunenko (2021), a groundstroke or backhand stroke is a type of stroke executed with a racquet swing on the player's left side for right-handed players (Nugroho et al., 2023). Conversely, for left-handed players, the backhand shot is performed on the right side. This stroke can be executed using either one hand or both hands (Rive & Williams, 2012). A well-executed groundstroke can significantly influence the outcome of a court tennis match, as it serves as both a defensive and offensive technique (Turan et al., 2019). Therefore, it is crucial for tennis players to continuously learn and improve their skills, particularly their ability to execute a backhand groundstroke effectively, as it plays a vital role in both defence and attack.

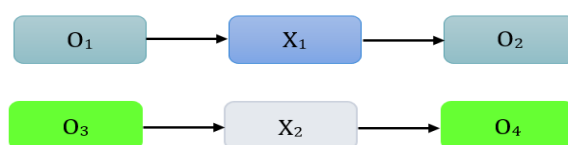
In numerous sports science programs, field tennis is often incorporated as a key component of the curriculum (Ngatman et al., 2024). As a result, it becomes essential for sports students to develop a strong foundation in the basic skills of court tennis. Mastery of these fundamental techniques not only enhances their proficiency in the sport but also plays a pivotal role in fostering their overall growth and self-development (Yu, 2019). By acquiring and refining these skills, students can expand their athletic capacity, which in turn contributes to both their academic and professional achievements within the realm of sports (Nesbitt & Bullard, 2021). The integration of field tennis into the curriculum underscores the importance of a well-rounded skill set, promoting both physical and cognitive development in sports education (Aquino & Reyes, 2022).

Varying training methods and models are one of the efforts to improve the skills and performance of athletes. Different training loads for each athlete must be adjusted individually to achieve adequate stimulation leading to improved performance (Alfonso-Asencio et al., 2022). The application of various exercises is carried out by sports actors, one of which is in the field of tennis sport. Various existing studies have proven that varied exercises can improve the performance of sportsmen, especially in tennis (Fauzan et al., (2024); (Fauzi et al., 2021)). This study aims to find out the impact of Boteli and Feeder exercises on tennis backhand groundstroke rally skills in sports students. In addition, this study also intends to find out the comparison of the effectiveness of Boteli exercises and fed on exercises.

## Method

This study is a pseudo-experimental research that aims to determine the effectiveness of Boteli and Feeder exercises on the groundstroke backhand rally skills of field tennis sports students. The design of this study uses two groups pre test – post test (Figure 1).

Figure 1. Research Design

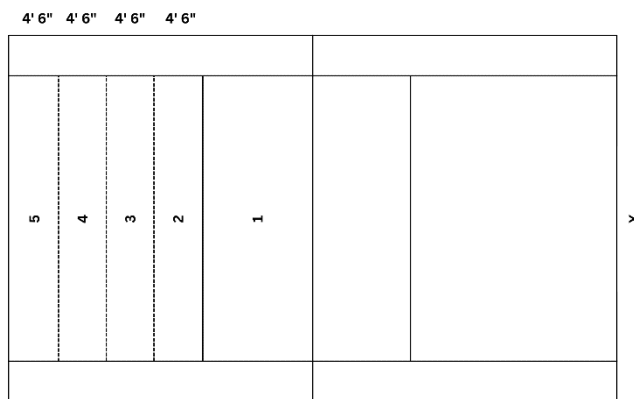


### Research Procedure

The sample in this study involved 110 sports students. The sample was divided into two groups, namely the Boteli exercise treatment group (X1) and the Fed on exercise treatment group (X2). Each group consisted of 55 sports students. Each group underwent a pretest and posttest (O). The instrument used to measure the skills of sports students in performing backhand groundstroke rallies is Hewitt's Tennis Achievement. Hewitt's Tennis Achievement is a measure of basic court tennis skills for forehand, backhand and serve strokes that have been tested for validity 0.52-0.93 and reliability 0.75-0.94 (Hewitt, 1966).

The data collection technique is by providing opportunities for 10 experiments to a sample of students. The instructor will give the ball (bait) to the sample who is in the off-court position (X) that has been determined to make a backhand groundstroke stroke. The student moved to the right position to make a backhand groundstroke and direct the ball through the net. The ball target is placed on the field that has been given a scorecard. The order of scores from the lowest 1 to the largest is 5 points. The closer the ball falls to the baseline, the higher the score obtained (5 points).

Figure 2. Groundstroke Backhand Punch Analyzers



### Data Analysis

The data analysis in this study used paired and independent t-tests with a significant level of  $\alpha = 0.05$ . The paired t-test analysis was aimed at determining the effect of Boteli and Feeder exercises on the backhand groundstroke skills of sports students. Independent t-test analysis was used to determine the comparison of the effectiveness of the two exercises on the backhand groundstroke skills of court tennis.

The data to be analyzed must be ensured to be normal and homogeneous. To achieve these prerequisites, normality and homogeneity tests are carried out. The normality test used was the Shapiro-Wilk test technique with a significance level of  $\alpha = 0.05$ . Meanwhile, the homogeneity test was carried out using the Levenne test technique. The basis for decision-making in the normality and homogeneity test is if the Sign value.  $> 0.05$ , it means that the residual value is distributed normally and homogeneously.

### Results

Based on table 1. It is known that the average pre-test value of the groundstroke backhand rally of sports students is 6.736 with a standard deviation and standard error mean of 3.0381 and 0.4097. After receiving Boteli's practice treatment, it was known that the average post-test rally groundstroke backhand score of sports students was 11.209 with a standard deviation and standard error mean of 3.5625 and 0.4804. Meanwhile, in the Diumpan training treatment group, it was known that the average value of the pre-test rally groundstroke backhand was 7.645 with a standard deviation and standard error mean of 4.0169 and 0.5416. The average post-test score after being given the Fedeed practice treatment was 9.09 with standard deviation and standard mean error of 3.069 and 0.414.



Table 1. Backhand Groundstroke Rally Skill Stats

Statistics	Pre-test Boteli	Post-test Boteli	Pre-test Fed on	Post-test Fed on
N	55	55	55	55
Nilai Rata-rata	6,736	11,209	7,645	9,09
Std. Deviasion	3,0381	3,5625	4,0169	3,069
Std. Error Mean	0,4097	0,4804	0,5416	0,414

In the results of the normality test presented in table 2. presented the overall results of the post-test and pre-test data of the Boteli training group and the Feeder exercise obtained a Sign value. above 0.05. Based on the results and by reviewing the basis of decision-making, it is interpreted that all post-test and pre-test data of the Boteli exercise group and the Feeder exercise have residual values that are normally distributed.

Table 2. Data on the Results of the Normality Test

	Group	Statistics	df	Sig.
Groundstroke Backhand Rally Skills	Pre-test Boteli	0,980	55	0,471
	Post-test Boteli	0,967	55	0,141
	Pre-test Fed on	0,977	55	0,381
	Post-test Fed on	0,986	55	0,790

Based on the results of the homogeneity test (Table 3), it is known that the pre-test and post-test data of both groups obtained a value of Sig. 0.116. With these values and based on the guidelines for taking conclusions, the pre-test and post-test data of the two groups are homogeneous.

Table 3. Data on Homogeneity Test Results

Pre-test and Post-test Skills Rally Groundstroke Backhand Boteli and Fed on Exercises	Levenne Statistiek	df1	df2	Sig.
	1,990	3	216	0,116

The results of the data analysis of the paired t-test Boteli exercise are presented in table 4. The data explained that the value of Sig. (2-tailed) or the probability is 0.000. Based on the decision-making guidelines, the value  $< 0.05$ . So it can be interpreted that Boteli training has a significant influence on the backhand groundstroke rally skills of court tennis in a sample of sports students.

Table 4. Data from the Analysis Results of the Paired T-test Boteli Exercise

Training	Descriptive	Pre-test	Post-test
Rally Groundstroke Backhand with Boteli Exercise	N	55	55
	Mean	6,736	11,209
	Std. Deviasi	3,0381	3,5625
	Std. Error Mean	0,4097	0,4804
	Correlation		0,060
	t		-7,306
	Sig. (2-tailed)		0,000

In the results of the paired t-test analysis of the Fed exercise (table 5), it is known that the probability value or Sig. (2-tailed) is 0.024. In accordance with the basis of decision-making, the value  $< 0.05$  which means that the Passed exercise has an effect on the groundstroke backhand rally skills of the sample of sports students. However, the influence was not too significant on the rally groundstroke backhand skills of the sample of sports students.

Table 5. Paired T-test Analysis Results Data Fed on Exercise

Training	Descriptive	Pre-test	Post-test
Backhand Groundstroke Rally with Fed on Exercise	N	55	55
	Mean	7,645	9,09
	Std. Deviasi	4,0169	3,069
	Std. Error Mean	0,5416	0,414
	Correlation		0,178
	t		-2,330
	Sig. (2-tailed)		0,024



Table 6. Independent T-test Analysis Results Data

Exercise	N	Mean	t	Sig. (2-tailed)
Boteli	55	11,209	3,341	0,001
Fed on	55	9,091		

The data description in Table 6 shows the results of independent t-test analysis of post-test data for both groups. The purpose of the study, analysis is to determine the effectiveness of both treatments on the real groundstroke backhand skills of a sample of sports students. The average score of the Boteli exercise post-test was 11.209 and the Feeder exercise was 9.091. The probability value or Sig. (2-tailed) is known to be 0.001 or  $< 0.05$ . By the basis of decision-making, it means that there is an average difference between the post-test results of the two treatment groups. From the average values presented in Table 6, it is known that the average value of the sample group given the Boteli exercise treatment is greater than the average value of the sample group with the Feeder treatment.

## Discussion

Tennis is a sport that depends on neuromuscular performance during play (Cruz et al., 2023). In this study, the physical attributive variables of the sample were not included. It is possible that this variable can affect the result of the backhand groundstroke. Through research (Turner et al., 2021) which researched the relationship between the physical and cognitive attributes of junior tennis players with groundstroke or stroke performance proved that the relationship between groundstroke stroke performance and physical attribute variables. The posture of course greatly affects the player in deciding the type of punch or groundstroke of the backhand (Rive & Williams, 2012). Thus, the study of the physical attributive relationship to tennis backhand strokes needs to be studied in the future. This study demonstrates that varying training exercises can significantly enhance backhand groundstroke rally skills in field tennis athletes. Both Boteli and Fed on exercises have proven effective in improving performance, with Boteli exercises showing a more pronounced impact. Statistical analysis using a paired t-test revealed a significant influence of Boteli exercises on backhand groundstroke rally skills, with a Sig. (2-tailed) value of 0.000. While Fed on exercises also demonstrated some positive effects, their influence was less significant, with a Sig. (2-tailed) value of 0.024. Independent t-test analysis further confirmed the superiority of Boteli exercises in terms of average post-test rally groundstroke scores. One limitation of this study is the lack of consideration for the physical attributive variables of the sample. The player's physique undoubtedly plays a crucial role in backhand groundstroke performance. Future research should investigate the relationship between physical attributes and training variations to gain a more comprehensive understanding of skill development in field tennis. Previous studies have also shown the effectiveness of exercise modifications in improving tennis skills. Combining Boteli exercises with interval training can enhance forehand groundstroke rally skills (Agustiyanta et al., 2022). Backhand exercises using targets highlighted the positive impact on backhand-hitting ability (Ardhiansyah & Nurhidayat, 2021). Overall, the findings of this study provide compelling evidence for the effectiveness of both Boteli and Fed exercises in improving backhand groundstroke rally skills in field tennis athletes. However, the results highlight the superiority of Boteli exercises in this regard (Crespo & Martinez-Gallego, 2023). These insights offer valuable guidance for coaches and athletes seeking to optimize their training programs and enhance their tennis performance (Lanzoni et al., 2021). Future research could delve into the specific components of Boteli exercises that contribute to their effectiveness and explore whether these benefits extend to other tennis strokes or player populations.

## Conclusions

This study demonstrates that varying exercises can significantly enhance backhand groundstroke rally skills in field tennis players. Both Boteli and Fed exercises have proven effective in improving performance, with Boteli exercises showing a more pronounced impact. Statistical analysis using a paired t-test revealed a significant influence of Boteli exercises on backhand groundstroke rally skills, with a Sig. (2-tailed) value of 0.000. While Fed exercises also demonstrated some positive effects, their

influence was less significant, with a Sig. (2-tailed) value of 0.024. Independent t-test analysis further confirmed the superiority of Boteli exercises in terms of average post-test rally groundstroke scores. One limitation of this study is the lack of consideration for physical attributive variables of the sample. The player's physique undoubtedly plays a crucial role in backhand groundstroke performance. Future research should investigate the relationship between physical attributes and training variations to gain a more comprehensive understanding of skill development in field tennis. Overall, the findings of this study provide compelling evidence for the effectiveness of both Boteli and Fed exercises in improving backhand groundstroke rally skills. However, the results highlight the superiority of Boteli exercises in this regard. These insights offer valuable guidance for coaches and athletes seeking to optimize their training programs and enhance their tennis performance. Further research could delve into the specific components of Boteli exercises that contribute to their effectiveness and explore whether these benefits extend to other tennis strokes or player populations.

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