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The Effect Of Wall-Rebound Training On Underhand Passing Skills In Volleyball Among Students Participating In The Volleyball Extracurricular Activity

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ABSTRACT

This study aimed to examine the effect of wall-rebound training on underhand passing skills in volleyball among students participating in the volleyball extracurricular activity at SMA Negeri 10 Bandar Lampung. Underhand passing is a fundamental skill that plays a crucial role in maintaining ball control and supporting offensive play; however, its mastery among school-aged players is often limited due to insufficient repetition and feedback during training. To address this issue, an experimental approach was employed to evaluate the effectiveness of wall-rebound training as an alternative practice method. The study used an experimental method with a pretest–posttest control group design. The participants consisted of students involved in volleyball extracurricular activities, who were divided into an experimental group receiving wall-rebound training and a control group receiving conventional training. Underhand passing ability was measured using a standardized volleyball underhand passing skill test. Data analysis included tests of normality and homogeneity, followed by t-tests at a significance level of 0.05. The results indicated that the data were normally distributed and homogeneous. The first hypothesis test showed a significant improvement in underhand passing skills within the experimental group, with a calculated t-value exceeding the critical value and a significance level below 0.05. The second hypothesis test revealed a significant difference in underhand passing ability between the experimental and control groups. Furthermore, the third hypothesis test demonstrated that the improvement in underhand passing skills was significantly greater in the experimental group than in the control group after the intervention. In conclusion, wall-rebound training is proven to be an effective method for improving underhand passing skills in volleyball extracurricular students. This training approach offers a practical, efficient, and feedback-oriented alternative for enhancing fundamental volleyball skills in school-based training programs.

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INTRODUCTION

Sport plays a strategic role in national development because it not only improves physical fitness but also shapes character, strengthens social cohesion, and serves as a

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vehicle for fostering sustainable achievement. In the context of education, sport directly contributes to the development of superior human resources through the internalization of the values of discipline, cooperation, sportsmanship, and mental toughness. Modern sports development policies position schools as the initial base for fostering achievement and movement literacy, making the quality of the learning process and basic technique training a determining factor for long-term success (Kirk et al., 2019; Bailey et al., 2020).

Volleyball is one of the most popular sports in Indonesia and boasts a robust competitive ecosystem, from the school level to the national and international levels. This popularity demands systematic, high-quality development of basic techniques, as volleyball performance is crucially determined by mastery of fundamental skills. Of the four main basic techniques—serving, passing, smashing, and blocking—the underpass plays a crucial role as the initial foundation for attack and game stability. The accuracy of underhand passing directly impacts the quality of setups, rally continuity, and the effectiveness of team strategies (Palao & Valadés, 2016; Marcelino et al., 2020).

However, the reality on the ground shows that students' mastery of underhand passing, particularly in secondary school extracurricular activities, is still suboptimal. Common errors include unstable body position, inappropriate arm angle, inconsistent ball contact timing, and poor ball control. This condition is often influenced by limited training method variety, a lack of meaningful repetition frequency, and a lack of immediate and specific feedback during training (Gabbett et al., 2017; Schmidt et al., 2019).

At SMA Negeri 10 Bandar Lampung, a similar phenomenon was identified in extracurricular volleyball activities, where students' underhand passing skills have not shown significant improvement despite regular practice. Conventional training, which focuses on verbal instructions and paired drills, often lacks opportunities for independent repetition and consistent, direct feedback. Therefore, an alternative training approach is needed that is practical, economical, and able to effectively improve the quality of motor learning in the school environment.

Recent studies in coaching science and motor learning emphasize that the effectiveness of basic technique training is largely determined by high-quality repetition, task variation, and immediate feedback. Modern motor learning theory explains that motor skills develop optimally when learners engage in repetitive practice with clear sensory information about the results of their movements (Schmidt & Lee, 2019; Wulf & Lewthwaite, 2016). In this context, training media that provide instant feedback have great potential to accelerate technique mastery.

Training using wall-reflective media has been widely used in various ball-based sports as a means of independent and controlled training. This media allows athletes or students to perform high repetitions with a relatively consistent ball response, thus facilitating independent correction of technical errors. Previous studies have shown that wall-reflective training effectively improves accuracy, ball control, and motor coordination in volleyball, basketball, and futsal (Rahman et al., 2022; Sari & Kurniawan, 2021).

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In volleyball, the use of a wall bouncer has been reported to improve passing consistency because students receive direct visual and kinesthetic feedback on the direction and speed of the ball's bounce. This principle aligns with the concept of deliberate practice, which emphasizes structured training with specific goals and ongoing evaluation (Ericsson et al., 2018). Bompa and Haff (2021) also emphasized that effective technique training must provide opportunities for high repetition with controlled intensity, especially during the basic technique learning phase.

Empirical research over the past decade has shown that a simple yet functional media-based training approach is more effective than conventional methods that lack variation and feedback. The use of a wall as a bouncer is considered appropriate for the school context because it does not require expensive equipment, is easy to apply, and can be done individually or in groups (Setiawan et al., 2020; Nugroho & Pratama, 2023). Thus, wall bounce training is a relevant alternative for improving the quality of underhand passing technique training in secondary education settings.

Although numerous studies have demonstrated the benefits of wall bounce-based training, most studies still focus on club athletes or performance training contexts, rather than extracurricular school activities. Furthermore, research specifically examining the effect of wall bounce training on volleyball underhand passing skills in high school students is relatively limited, especially in the Indonesian educational context.

Some studies only emphasize skill improvement outcomes without linking them to motor learning principles and the characteristics of high school students. Furthermore, there is a lack of experimental research quantitatively measuring the effectiveness of wall bounce training using controlled designs and standardized skill assessment instruments (Palao et al., 2021; García-de-Alcaraz et al., 2018).

This research gap highlights the need for studies that not only test the effectiveness of alternative training methods but also relate them to extracurricular school learning contexts, where limited resources and time are key challenges. Therefore, this study aims to fill this gap by presenting relevant, contextual, and applicable empirical evidence.

Based on the research problems and gaps outlined, the purpose of this study is to analyze the effect of wall bounce training on the underhand passing ability of volleyball students participating in the volleyball extracurricular activity at SMA Negeri 10 Bandar Lampung. This study aims to provide an empirical basis for the effectiveness of wall bounce training as a practical and efficient alternative method for training basic techniques in the school environment.

The novelty of this research lies in: the structured application of wall bounce training in a high school extracurricular context, the testing of its effectiveness on underhand passing ability using an experimental quantitative approach, and the integration of modern motor learning principles into the design of school training.

Therefore, this research is expected to not only contribute to the development of volleyball coaching science but also provide practical recommendations for physical education teachers and school coaches in continuously improving the quality of volleyball basic technique training.

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METHODS

Research Design

This study employed an experimental research design with a pretest–posttest control group approach, which is widely used to examine causal relationships between training interventions and motor skill outcomes in sports science research. Experimental methods allow researchers to systematically manipulate an independent variable and observe its effect on a dependent variable under controlled conditions, thereby strengthening internal validity and causal inference (Creswell & Creswell, 2018; Thomas, Nelson, & Silverman, 2015).

The chosen design is appropriate for the objective of this study, namely to determine the effect of wall-rebound training on underhand passing skills in volleyball, because it enables direct comparison between an experimental group receiving structured wall-rebound training and a control group following conventional practice without the intervention. Similar experimental designs have been effectively applied in volleyball skill development studies, particularly those focusing on passing accuracy, coordination, and ball control (Palao & Valadés, 2016; Marcelino et al., 2020; García-de-Alcaraz et al., 2018).

The research was conducted in August 2025 and took place during regular volleyball extracurricular training sessions at SMA Negeri 10 Bandar Lampung, ensuring ecological validity and alignment with real training conditions in school-based sport programs (Bailey et al., 2020; Kirk et al., 2019).

Population and Sample

The population of this study consisted of all students participating in the volleyball extracurricular activity at SMA Negeri 10 Bandar Lampung, totaling 30 students. Given the relatively small population size, a saturated sampling technique was applied, in which the entire population was used as the research sample. This approach is recommended when the population is limited and accessible, as it eliminates sampling bias and increases statistical power within the given context (Sugiyono, 2019; Taherdoost, 2016).

The 30 participants were subsequently assigned to groups using ordinal pairing, based on pretest scores of underhand passing ability, to ensure balanced skill distribution between the experimental and control groups. Ordinal pairing is commonly used in experimental sport science studies to control for baseline differences and enhance group equivalence prior to treatment (Mujika et al., 2018; Hopkins, 2017).

Research Variables

Based on the research title "The Effect of Wall-Rebound Training on Underhand Passing Skills in Volleyball Among Students Participating in the Volleyball Extracurricular Activity at SMA Negeri 10 Bandar Lampung", the variables in this study were defined as follows:

Independent Variable (X)

The independent variable was wall-rebound training, defined as a structured volleyball passing exercise utilizing a wall as a rebound medium. This training emphasizes repetitive underhand passing with immediate visual and kinesthetic feedback from the ball rebound.

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Such training aligns with motor learning principles emphasizing repetition, task specificity, and augmented feedback (Schmidt & Lee, 2019; Wulf & Lewthwaite, 2016).

Dependent Variable (Y)

The dependent variable was underhand passing skill in volleyball, operationally defined as the ability to accurately, consistently, and controllably execute underhand passes, as measured through a standardized passing test.

The relationship examined in this study was the effect of wall-rebound training (X) on underhand passing skill (Y) among volleyball extracurricular students at SMA Negeri 10 Bandar Lampung.

Training Procedure

Participants in the experimental group received wall-rebound training during scheduled extracurricular sessions. The training program was designed to provide high-frequency repetitions of underhand passing with consistent ball return patterns, enabling students to self-correct technique errors related to body position, arm angle, and ball contact timing. This approach reflects the principles of deliberate practice, which emphasize structured repetition and immediate feedback for skill acquisition (Ericsson et al., 2018; Bompa & Haff, 2021).

The control group continued with conventional volleyball training activities without wall-rebound exercises. This distinction allowed for an objective comparison of skill improvement attributable specifically to the intervention, as recommended in experimental coaching research (Gabbett et al., 2017; Palao et al., 2021).

Research Instrument

Data were collected using a volleyball underhand passing skill test, administered both before (pretest) and after (posttest) the training intervention. The instrument employed was the Wall Volley Test, adapted from Nurhasan (2010), which has been widely used and validated in assessing fundamental volleyball skills, particularly passing accuracy, coordination, and ball control.

The test requires participants to perform repeated underhand passes toward a wall target within a specified time frame, with scoring based on successful rebounds and controlled passes. Previous studies have demonstrated that wall-based passing tests exhibit acceptable levels of validity and reliability for measuring volleyball passing proficiency in educational and training contexts (Setiawan et al., 2020; Nugroho & Pratama, 2023).

Data Collection Techniques

The data collection technique used in this study combined experimental treatment and performance testing. Each participant completed a pretest to establish baseline underhand passing ability. Following the intervention period, a posttest was administered using the same instrument and procedures to ensure measurement consistency.

This pretest–posttest approach is widely recognized as effective in detecting performance changes resulting from training interventions in sports skill research (Hopkins, Marshall, Batterham, & Hanin, 2009; Thomas et al., 2015).

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Data Analysis Techniques

Prerequisite Tests

Before hypothesis testing, prerequisite analyses were conducted to ensure compliance with parametric statistical assumptions:

Normality Test

Data distribution was examined using the Shapiro–Wilk test via SPSS software. This test is recommended for small sample sizes and provides robust detection of deviations from normal distribution (Ghasemi & Zahediasl, 2012).

Homogeneity Test

Homogeneity of variance between groups was assessed using SPSS-based variance analysis to confirm that the data originated from populations with equal variances, a key assumption for parametric testing (Field, 2018).

Hypothesis Testing

The research hypothesis was tested using the Paired Sample T-Test, which compares mean differences between two related measurements (pretest and posttest) within the same group. This test is appropriate for evaluating training-induced performance changes in experimental sport science research (Field, 2018; Pallant, 2020).

All statistical analyses were conducted at a significance level of $\alpha = 0.05$.

RESULTS AND DISCUSSION

Result

The data obtained from the pre-test and post-test were then analyzed using descriptive statistics, which included mean values, standard deviation, median, mode, maximum value, and minimum value. This analysis aims to provide a general overview of the passing ability of students before and after being given treatment. The description of the data from the research results is presented as follows.

Pre-Test and Post-Test Results of Groups Participating in Exercises Using Wall Reflection Media

Table 1.
Descriptive Statistical Experimental Group

Data	*Pre-Test*	*Post-Test*
Mean	33,00	40,53
Median	36	43
Mode	42	42
Hours of deviation	10,337	10,020
Maximum	49	54
Minimum	15	24

When viewed from the comparison of pre-test and post-test results, there was an increase in the average score of 7.46 points, an increase in the median of 6 points, and an increase in the minimum and maximum scores. This shows that after participating in an exercise program using wall bounce media, students in the experimental group experienced an increase in their ability to pass under volleyballs. Thus, the practice using wall bounce media has a positive influence on improving the

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ability to pass under volleyball in volleyball extracurricular students of SMA Negeri 10 Bandar Lampung.

Table 2.
Frequency Distribution of Lower Passing Ability Experimental Group Volleyball

Interval	Category	Frequency		Percentage	
		Pre-Test	Post-Test	Pre-Test	Post-Test
≥50	Excellent	0	3	0%	20%
40-49	Good	3	7	20%	47%
30-39	Enough	7	1	47%	7%
20-29	Less	3	4	20%	27%
<20	Very Less	2	0	13%	0%
Quantity		**15**	**15**	**100%**	**100%**

The change in distribution showed that after participating in the exercise using wall bounce media, the ability to pass under volleyball students in the experimental group increased, which was characterized by an increase in the number of students in the good and excellent categories and a decrease in students in the very low category.

Control Group Pre-Test and Post-Test Results

Table 3.
Descriptive Statistic Control Groups

Data	Pre-Test	Post-Test
Mean	33,07	32,73
Median	37	37
Mode	38	38
Hours of deviation	10,532	10,257
Maximum	48	49
Minimum	15	15

The change in values that occurred in the control group was relatively small compared to the group that followed the exercise using wall reflective media. This shows that without practice using wall bounce media, the improvement in students' volleyball underpass ability tends to be insignificant.

Table 4.
Frequency Distribution of Lower Passing Ability Volleyball Control Group

Interval	Category	Frequency		Percentage	
		Pre-Test	Post-Test	Pre-Test	Post-Test
≥50	Excellent	0	0	0%	0%
40-49	Good	4	4	27%	27%
30-39	Enough	6	6	40%	40%
20-29	Less	2	2	13%	13%
<20	Very Less	3	3	20%	20%
Quantity		**15**	**15**	**15**	**100%**

This shows that without treatment in the form of training using wall reflective media, the improvement in volleyball underpassing ability in the control group tends to be small and does not experience significant changes.

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Analysis Prerequisites Test

Normality Test

Table 5.
Normality Test

Groups		Count	Tables	Say.	Remarks
Experimental Group	*Pre Test*	0,177	0,220	0,073	Normal
	Post Test	0,161	0,220	0,107	Normal
Control Group	*Pre Test*	0,173	0,220	0,068	Normal
	Post Test	0,121	0,220	0,240	Normal

Based on these results, it can be concluded that all pre-test and post-test data in the experimental group and control group are distributed normally, so that the research data has met the assumption of normality and can be continued to the next stage of statistical testing.

Homogeneity Test

Table 6.
Homogeneity Test

Variabel	Calculation	Table	Say.	Remarks
Experimental Group	0,026	4,196	0,874	Homogeneous
Control Group	0,004	4,196	0,949	Homogeneous

The decision-making criterion in the homogeneity test is that if the value of Fcal < Ftable or the significance value (Sig.) > 0.05, then the data is declared homogeneous. A summary of the homogeneity test results is presented in the table above. Thus, it can be concluded that the data on volleyball passing ability in the experimental group and the control group are homogeneous, thus meeting one of the prerequisites for hypothesis testing using parametric statistical tests.

Hypothesis Test Results

Experimental Group and Control Group Influence Test

Table 7.
Experimental Group and Control Group Influence Test

Data	Thitung	Table	Sig.	Ket
Experimental Group	19,379	2,145	0,000	There is a significant influence
Control Group	0,627	2,145	0,541	No significant influence

This shows that there is a significant difference between the results of the pre-test and post-test after being treated in the form of exercises using wall reflective media. Thus, training using wall bounce media had a significant influence on the improvement of volleyball underpass ability in the experimental group. Thus, it can be concluded that training using wall bounce media has a significant effect on improving volleyball underpassing ability in volleyball extracurricular students of SMA Negeri 10 Bandar Lampung.

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Comparison Test of Experimental Group and Control Group

Table 7.

Test Comparison Post-Test

Data	Calculation	Ttable	Sig.	Discussion
Post-Test Experiments and Controls	2,107	2,048	0,044	There Are Significant Differences

This shows that there is a significant difference between the post-test results of volleyball under-passing ability in the experimental group and the control group. Thus, it can be concluded that practice using wall bounce media has a real influence on improving volleyball bottom passing ability in volleyball extracurricular students of SMA Negeri 10 Bandar Lampung compared to students who are not given practice using wall bounce media.

Discussion

Based on the results of the data analysis, this study demonstrates that wall-rebound training has a significant and meaningful effect on improving underhand passing skills among students participating in volleyball extracurricular activities at SMA Negeri 10 Bandar Lampung. The statistical findings consistently show that the experimental group experienced a greater improvement in underhand passing performance compared to the control group, indicating that the applied training method played a decisive role in skill enhancement. These results confirm that structured training interventions emphasizing repetition and feedback are critical determinants of technical skill acquisition in volleyball (Palao & Valadés, 2016; Marcelino et al., 2020).

The results of Hypothesis 1 testing revealed a significant increase in underhand passing ability within the experimental group following wall-rebound training, as indicated by a calculated t-value exceeding the critical t-value and a significance level below 0.05. This finding supports the rejection of H_{01} and acceptance of Ha_1, confirming the effectiveness of wall-rebound exercises in improving underhand passing skills. From a motor learning perspective, this improvement can be attributed to the high frequency of task-specific repetitions combined with immediate intrinsic feedback provided by the ball's rebound trajectory (Schmidt & Lee, 2019; Wulf & Lewthwaite, 2016).

The wall-rebound medium allows learners to repeatedly execute underhand passing movements while directly observing the outcome of each attempt, facilitating continuous self-correction of body position, arm angle, and force application. This mechanism aligns with the principles of deliberate practice, which emphasize structured repetition, goal-oriented tasks, and feedback as essential components of skill mastery (Ericsson et al., 2018). Similar findings have been reported in previous volleyball studies, where repetitive passing drills using simple media significantly improved passing accuracy and consistency among adolescent players (Setiawan et al., 2020; Nugroho & Pratama, 2023).

The Hypothesis 2 test results further showed a significant difference in underhand passing ability between the experimental group receiving wall-rebound training and the control group undergoing conventional training. The rejection of H_{02} and acceptance of

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Ha_2 indicate that training method selection substantially influences the development of basic volleyball skills. Conventional training methods, which often rely on partner drills and verbal instruction, may limit the amount of effective repetition and reduce the immediacy of feedback, particularly in school-based extracurricular contexts with heterogeneous skill levels (Gabbett et al., 2017; Bailey et al., 2020).

In contrast, wall-rebound training provides a stable and predictable learning environment, enabling students to focus on refining movement patterns without excessive external interference. This supports the concept of constraints-led learning, where environmental constraints—such as a wall acting as a rebound surface—guide learners toward more efficient motor solutions (Renshaw et al., 2019). Empirical evidence from youth sport research indicates that such environments accelerate motor skill consolidation and improve movement consistency (Davids et al., 2015; García-de-Alcaraz et al., 2018).

The findings of Hypothesis 3 demonstrated that the magnitude of improvement in underhand passing ability from pretest to posttest was significantly greater in the experimental group than in the control group. The rejection of H_{03} and acceptance of Ha_3 indicate that the observed improvements were not merely the result of natural learning progression or repeated testing effects, but were directly attributable to the wall-rebound training intervention. This reinforces the notion that training specificity and feedback quality are more influential than training duration alone in skill development (Bompa & Haff, 2021; Mujika et al., 2018).

From the perspective of physical adaptation theory, repeated execution of underhand passing movements against a wall stimulus promotes neuromuscular adaptations, particularly in coordination, timing, and intermuscular synchronization (Behm & Sale, 2019). These adaptations are essential for stabilizing passing mechanics and improving ball control, especially among adolescent athletes who are still developing motor proficiency (Lloyd et al., 2016; Myer et al., 2015).

Overall, the results of this study are not only statistically significant, but also theoretically and empirically grounded. The effectiveness of wall-rebound training is supported by contemporary theories of motor learning, physical adaptation, and modern coaching methodologies that emphasize repetition, task variability, and feedback-driven learning. In the context of school-based volleyball extracurricular activities, where facilities and equipment are often limited, wall-rebound training represents a practical, economical, and pedagogically sound alternative to conventional drills.

Therefore, wall-rebound training can be recommended as an effective method for improving underhand passing skills in volleyball extracurricular programs at the secondary school level. Beyond its immediate practical benefits, this method also contributes to the broader objective of developing technically competent and confident young athletes through evidence-based training approaches. Future research may expand on these findings by examining long-term retention effects, transfer to competitive match situations, and integration with tactical training models to further optimize volleyball skill development in educational settings.

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CONCLUSION

Based on the results of the research and hypothesis testing, this study concludes that wall-rebound training has a significant and positive effect on improving underhand passing skills in volleyball among students participating in the volleyball extracurricular activity at SMA Negeri 10 Bandar Lampung. The experimental group that received structured wall-rebound training demonstrated a statistically significant improvement in underhand passing ability compared to both their initial performance and the control group that followed conventional training methods. These findings confirm the rejection of H_{01}, H_{02}, and H_{03}, and the acceptance of the alternative hypotheses, indicating that the applied training intervention was effective and superior to traditional practice approaches.

The results highlight the importance of training methods that emphasize repetition, task specificity, and immediate feedback, particularly in school-based extracurricular contexts. Wall-rebound training provides a practical and efficient learning environment that supports motor skill development, allowing students to refine passing technique through consistent ball responses and self-correction. Therefore, this method can be recommended as an alternative or complementary training approach for physical education teachers and extracurricular coaches aiming to improve fundamental volleyball skills in secondary school settings.

However, caution is required in generalizing these findings. This study was limited by a relatively small sample size drawn from a single school and a short intervention period, which may restrict the broader applicability of the results. Additionally, the study focused exclusively on underhand passing skills and did not examine the transfer of improvements to actual match performance or other technical and tactical components of volleyball.

Future research is recommended to involve larger and more diverse samples, extend the duration of training interventions, and investigate the long-term retention and competitive transfer effects of wall-rebound training. Such efforts would strengthen the evidence base and further support the integration of evidence-based training methods in school volleyball programs.

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