The Effect of Hanging Ball Learning Method on Volleyball Smash Accuracy in Grade IX Students of MTs Hidayatul Islam Tanjungharjo

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Abstract

Volleyball is a form of physical activity that can be utilized in physical education learning to develop students' basic motor skills, such as smash or passing abilities. The study aims to examine the effect of hanging ball learning on smash abilities in volleyball learning for ninth grade students of MTs Hidayatul Islam Tanjungharjo. The research problem begins with the low ability of students to smash accurately. This study uses a quantitative approach with a pre-experimental one group pretest-posttest design. The research sample consisted of 30 students selected using a simple random sampling technique. The research instrument was a test of smash ability to the target. The treatment was carried out for 4 meetings through hanging ball learning that trains leg muscle strength, improves shot accuracy, and hits with the highest range. The results of the analysis showed an increase in the average shooting score from 5.73 in the pretest to 12.50 in the posttest. The normality test showed that the data was normally distributed, while the results of the t-test (Paired Sample T-Test) obtained a Sig. (2-tailed) value <0.05, which means there was a significant difference between the pretest and posttest results. The findings indicate that hanging ball training is effective in improving smashing ability. Therefore, physical education teachers are advised to utilize hanging ball training as an engaging learning alternative that improves motor skills and fosters character values.

How to Cite

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INTRODUCTION

Education is a key pillar in determining a nation's development because it creates high-quality, competitive human resources. High-quality human resources are innovative, creative, and productive, driven by a strong work ethic and discipline.(Sanga, 2023). Education is also an important thing in human life. In its development, education has experienced various changes and adjustments to the times(Fricticarani et al., 2023) Therefore, education is essential for future development, as the times evolve, starting with more effective communication and change. Education increasingly requires a variety of professional and management skills, as well as interdisciplinary expertise to solve its problems.(Purwaningsih et al., 2022).

Of the various sports taught in physical education, volleyball is one of the most popular today. Volleyball is a sport played by two teams of six players on a court measuring 18 x 9 m2.(Irwanto, 2021)To win a match, volleyball athletes must master good and correct attack and defense techniques.(Andre Alfais & Yudhistira, 2024). From the statement above, to master the game of volleyball, you must master several techniques, besides attacking and defending techniques, there are also basic techniques such as serving, passing, blocking, and smashing.

Smashcan be described as a strong blow from the top of the head completely and making the ball move quickly(Zen et al., 2024). There are still many mistakes that players often make when smashing a volleyball. Coordination is also important in improving the accuracy of a smash.(Maulana et al., 2025). Smashing ability is also influenced by other physical elements, such as the explosive power of the arm muscles, namely the ability of the arm muscles to receive loads with high contraction speeds in order to hit the ball hard in the volleyball smash execution.(Rachmi Marsheilla Aguss, Eko Bagus Fahrizqi, 2021). From these statements, if a volleyball athlete has physical components such as strength, explosive power, and good coordination, it will produce good smashing abilities.(Maifa, 2021).

Based on field observations of ninth-grade students at Mts Hidayatul Islam Tanjungharjo, several students have not yet mastered the basic volleyball smash technique. This is due to ineffective learning and a lack of infrastructure. There are still deficiencies in volleyball equipment that does not meet standards. Mts Hidayatul Islam Tanjungharjo only has two balls, making volleyball learning ineffective. This lack of facilities and infrastructure is likely a major factor.

Research that has been conducted previously with the title "Hanging Ball Training on Smash Ability in Extracurricular Volleyball" shows that this research has the potential to increase the accuracy of volleyball smashes.(Mahfud et al., 2023). In addition, previous research on drill smash also has almost the same potential to regulate speed and repetition, and accuracy, especially during independent practice.(Suhairi & Arifin, 2022). The latest research entitled "The Contribution of Medicine Ball and Expanding Dynamometer Exercises to Students' Volleyball Smashing Ability" states that during expanding dynamometer exercises, the exercise not only increases arm muscle strength but also trains finger muscle strength.(Hidayat et al., 2023)Some exercises that can be done usually include hitting the ball as often as possible to practice proper contact with the hand, practicing hitting the ball against a wall, and practicing hitting the ball on a hanging chair to practice proper contact with the ball and aiming accurately. Push-ups are also one of the exercises to strengthen the arm muscles and increase the effectiveness of smashes in volleyball.(Journal, 2022). Based on the problems above and previous research conducted, the researcher intends to find out "The Effect of Hanging Ball Learning Method on the Accuracy of Volleyball Smashes in Class IX Students of Mts Hidayatul Islam Tanjungharjo".

Hanging balls are a tool that can be used to practice smashing techniques in volleyball. Hanging balls are defined as balls suspended by ropes tied to the right and left sides of the ball, using a volleyball at a height within the player's reach. In addition to improving smash accuracy, the hanging ball method is also beneficial for wrist muscle training and can be used to increase jump height. Therefore, this study is crucial for demonstrating the effectiveness of hanging balls in improving volleyball smash accuracy.

The low volleyball smashing ability of students can be overcome with various learning methods. Based on the problems observed during the study, this study aims to try to provide training with the hanging ball method to improve the accuracy of volleyball smashes. In addition, the hanging ball is not only used as a medium, but also used in conjunction with an active learning model, which directly involves students in learning movement, thinking, and improving their techniques continuously. This study assesses the impact on cognitive, affective, and psychomotor aspects by assessing the improvement of technical skills (psychomotor), as well as how the

hanging ball method affects the understanding of movement concepts (cognitive) and learning motivation (affective). This article presents a systematic hanging ball learning syntax starting from orientation, demonstration, guided practice, independent practice, and evaluation. These steps have not been formulated comprehensively in previous studies.

METHODS

This study used a quantitative research method with a pre-experimental approach. The research design used was a one-group pretest-posttest design, comparing the results before and after treatment to determine accurate results. (Mahfud et al., 2023b). Experimental research is research that aims to find out how certain treatments impact other variables under controlled conditions.(Ipa Hafsiah Yakin, 2023). Other studies also mention documentation studies, which involve collecting data from journals, books, and relevant literature sources (Waruwu et al., 2025).

The design form of this research is as follows:

Pretest	Treatment	Posttest
O_1	X	O_2
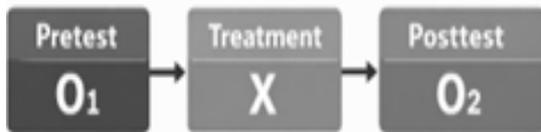
Information
O1 : Volleyball smash accuracy beginning
X : hanging ball learning
O2 : Accuracy of volleyball smash after learning hanging ball

The form of research population is a term used to describe all people, objects, or events that are the subject of research.(Candra Susanto et al., 2024)The population used in this study was 30 ninth-grade students at MTs Hidayatul Islam Tanjungharjo, with an average age of 13-14 years. This study used cluster random sampling, which means selecting samples based on existing classes.(Hangleiter & Eisert, 2023).

The instrument used in this research is a test method and measurement of smash ability. (Mahfud et al., 2023b). The purpose of this test is to measure the accuracy of smashes for quick, targeted attacks. The success of this study was measured by a higher average score for students compared to before the treatment. The equipment used for the test included a volleyball, a whistle, and a volleyball court. The implementation procedure is that students carry outThe test is in the attack or free area on the field of play, the ball is bounced or passed near the top of the

net towards the test, with or without a start, the test jumps and hits the ball over the top of the net into the field opposite where there is a target with numbers. The score taken is the target number obtained by the test in 3 implementations.

The research procedure involved four stages. The first was pretest data collection, which involved administering an initial volleyball smash accuracy test to determine students' initial abilities.The ball is bounced or passed near the top of the net. The test jumps and hits the ball into the field opposite where there is a target with numbers.The second and third treatments were providing students with basic volleyball smashing exercises using the hanging ball learning method to improve their smashing abilities. The fourth posttest, after the training or treatment period, was administered again to measure and determine skill improvement. The smashing accuracy test was administered three times, with scores obtained from the target numbers. The pretest and posttest results were analyzed to determine differences in smashing accuracy.

Figure 1. Hanging ball media

This data analysis is used to analyze quantitative data in the form of test results processed using the T-test through the application, namely SPSS 27 for Windows.(Oktariana & Hardiyono, 2020)The technique used in this study involves several stages of statistical data analysis. First, a normality test is used to determine whether the data being analyzed is normal. Second, a paired sample t-test is used to determine the pretest and posttest results in one experimental group. The results of the data analysis are compared and

conclusions are drawn to determine the research findings.(Trimizi et al., 2020).

RESULTS AND DISCUSSION

Pretest score is results test ability beginning student before being given treatment, whereas mark posttest is results test ability student after follow series activity hanging ball learning.

Table 1. Pretest and posttest results

Name	Preetest	Information	Posttest	Information
AYC	8	Good	14	Very good
WATER	5	Not enough	12	Good
ANA	4	Not enough	14	Very good
ASS	6	Not enough	12	Good
ARF	4	Not enough	14	Very good
AKB	7	Enough	13	Very good
AKA	6	Not enough	13	Very good
CAS	7	Enough	12	Good
AND	3	Very less	13	Very good
DNN	6	Not enough	12	Good
EPA	7	Enough	11	Good
EDY	4	Not enough	14	Very good
FFR	8	Enough	13	Very good
FCN	5	Not enough	12	Good
FHH	3	Very less	12	Good
LOB	4	Not enough	12	Good
MCAR	6	Not enough	11	Good
MIF	8	Enough	12	Good
MYRA	5	Not enough	12	Good
Mrs.	6	Not enough	12	Good
MUF	5	Not enough	14	Very good
MBH	7	Enough	13	Very good
MMM	8	Enough	12	Good
MRAP	4	Not enough	12	Good
MKR	6	Not enough	14	Very good
NAZ	7	Enough	12	Good
RAA	7	Enough	12	Good
SMR	6	Not enough	13	Very good
WMA	4	Not enough	12	Good
ZFR	6	Not enough	13	Very good

Based on the **Table 1** above, occurs improvement mark ability smash on part big participant after given treatment through hanging ball learning . Before treatment, majority student is in the category less and enough, whereas after treatment there is improvement to category good and very good. The **Table 1** below serve distribution frequency and percentage results test ability volleyball smash at the stage pretest and posttest based on categorization level ability. Here results participant pretest and posttest scores study.

Figure 2. Preetest   Posttest

Table 2. Frequency results pretest and posttest

	Pre-test			Posttest	
Category	Freq	Presentation	Category	Freq	Presentation
Very good	0	0%	Very good	13	43.33%
Good	1	3.33%	Good	17	56.67%
Enough	9	30%	Enough	0	0%
Not enough	18	60%	Not enough	0	0%
Very less	2	6.67%	Very less	0	0%

Based on **Table 2**, the percentage participant with category good and very good increase from 3.33% to 43.33%, while participant in category less and very less decrease from 60% to 0%. This is show that treatment given influential positive to improvement ability volleyball smash participant .
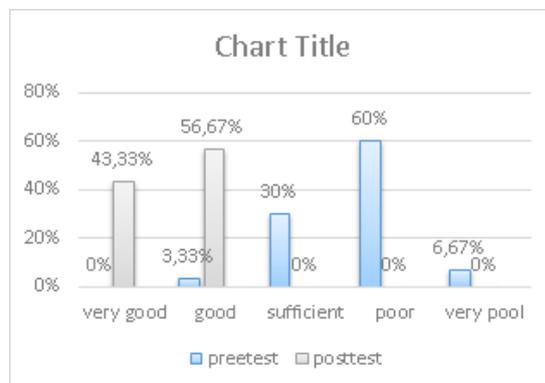

Figure 3. Frequency diagram of pretest and posttest

Table 3. Mean data

	Preetest	Posttest	Discription
Mean	5.73	12.50	Normal
N	30	26	Normal
Std. Deviation	1.507	.860	Normal

In the **Table 3** the show that ability smash on the result pretest own mean worth 5.73 experienced improvement in results posttest worth 12.50. In case this, after 4 meetings do treatment

use hanging ball learning values pretest and posttest increase with significant.

Normality test was conducted to ensure the research variables were normally distributed. The Shapiro-Wilk test was used for calculations, and SPSS 27 was used to process the data, resulting in the following results.

Table 4. Results of Normality Test (Shapiro-Wilk)

Class	Statistics	df	Sig	discription
Pree	.928	30	,097	Normal
Post	.892	30	.101	Normal

The **Table 4** shows that the research data is normally distributed because the Sig. (significance) value is greater than 0.05. Parametric statistics can be used to continue the research because all data are normally distributed.

Next, the hypothesis test used was a paired sample t-test analysis. This test was conducted using SPSS 27 as a tool, and the results of the paired sample t-test, the value of t = -18.987 df = 25 was obtained, and Sig. (2-tailed) = < .001 This value indicates that there is a significant difference between the pretest and posttest because the Sig. value is < 0.05. Thus, it can be concluded that there is a significant increase in the participants' volleyball smash ability after the hanging ball learning treatment.

The results of the data study indicate that the volleyball smashing ability of ninth-grade students at Mts Hidayatul Islam has improved after receiving treatment through hanging ball learning as a training method. This improvement is reflected in the comparison of results before and after treatment which shows the development of students' abilities in mastering smash techniques more optimally. Psychological aspects such as strong mentality tend to be able to perform consistently in pressure situations or decisive matches, aspects of tiered and continuous training are the main key to improving sports achievements.(Ahdan et al., 2020) And(Luti et al., 2023).This indicates that the use of hanging ball learning positively contributes to improving smashing skills in volleyball learning. The research data were found to be normally distributed based on the results of the normality test, thus meeting the requirements for parametric analysis. Furthermore, the results of the hypothesis testing using t-test calculations revealed a significant difference between abilities before and after treatment. Thus, it can be concluded that hanging ball learning is quite effective as an alternative learning strategy that can

improve volleyball smashing skills in junior high school students.

This research is in line with previous findings "The Effect of Hanging Ball Training on Smash Accuracy in Volleyball Extracurricular Activities"(Mahfud et al., 2023).It has the potential to improve students' volleyball smashing abilities. In the context of physical education, volleyball learning supports students' physical, cognitive, affective, and social development. (Lemonade, 2024)Students can improve their physical fitness, motor skills, and attitudes of sportsmanship and responsibility through volleyball learning. (Usra, 2023)Team games, such as volleyball, can also help students interact and work together in groups. (Sari & Aryanti, 2024) In this study, learning hanging ball requires students to coordinate leg muscle strength, hit accuracy, and hit with the highest range, in line with research showing that volleyball can also improve motor skills in physical education learning. (At et al., 2025)This is in line with research results which show that smash drill training significantly improves smashing ability in volleyball players. (Drill & Smash, 2020)This is in accordance with the results of other studies that also used the drill smash method to improve the accuracy of volleyball smashes. (Atiq, nd, 2023). Thus, learning to hang ball not only prioritizes the hanging ball as a medium, but also has the function of developing motor skills and increasing the accuracy of volleyball smashes.

Although the results of this study indicate a significant improvement in students' smashing abilities through hanging ball learning, there are several limitations that require critical examination. First, the study only used a single method, a one-group pretest-posttest pre-experimental design. Second, the treatment duration of four sessions was relatively short for assessing the long-term effectiveness of the intervention, so the sustainable impact of hanging ball learning on smashing skills cannot be fully determined. Furthermore, external variables such as students' learning motivation levels, daily physical conditions, and social attitudes during learning were not strictly controlled during the study, potentially influencing the results.

Based on these limitations, further research is recommended using two methods. The research design can also be improved by using a quasi-experimental approach involving a control group, so that the treatment effects can be compared more objectively and reliably. Furthermore, a longer treatment duration is needed so that the long-term effect of volleyball learning on improv-

ing smash skills can be measured more accurately. Future research is also recommended to combine hanging ball media with dynamic training and examine the hanging ball learning on students' motivation, learning interest, and confidence in volleyball smashing.(Asmarani, 2025).

CONCLUSION

This study confirms that hanging ball learning can be used as an alternative physical education learning strategy to develop volleyball smashing skills in junior high school students. This game can stimulate leg muscle strength co-ordination, improve hitting accuracy, and hit with the highest range. However, this study has limitations in using only one method and duration of research, so further research is needed using two methods and longer training durations to obtain more comprehensive results. Physical education teachers are expected to adapt hanging ball in the learning process to improve motor skills and foster character values.

REFERENCES

Ahdan, S., Priandika, AT, Andhika, F., & Amalia, FS (2020). Design Of Learning Media For Basic Techniques Of Volleyball Using Android-Based Augmented Reality Technology. 8 (3), 221–236 .

Andre Alfais, M., & Yudhistira, D. (2024). Development of attacking and defending strategies for the sport of volleyball: construct validity. Journal of Physical Education and Sports , 23 (3), 186–196.

Asmarani, WA (2025). The Effect of Smash Training Using Hanging Balls and Smash Drill Training on Smash Accuracy in Volleyball Games for Male Students of Class VII of Negeri 1 Puri Mojokerto . 0008 , 572–581.

At, C., Senior, S., & Wonosobo, K. (2025). Analysis of Basic Volleyball Smash Technique Skills In Extracurricular . 17 (2), 1486–1495.

Atiq, A. (nd). Arus Jurnal Sosial dan Humaniora (AJSH) The Effect of Drill Training on Volleyball Smash Results in the Physical Education Student Activity Unit, Tanjungpura University, Pontianak .

Candra Susanto, P., Ulfah Arini, D., Yuntina, L., Panatap Soehaditama, J., & Nuraeni, N. (2024). Quantitative Research Concepts: Population, Sample, and Data Analysis (A Literature Review). Multidisciplinary Journal of Science , 3 (1), 1–12. https://doi.org/10.38035/jim.v3i1.504

Drill, LB, & Smash, K. (2020). Volume 3 no II Year 2020 ISSN 2614-2775 (Print) ISSN 2621-8143

(Online) The Effect Of Box Drill Training On Volleyball Smash Ability Zuhar Ricky, . 3 (Ii), 112–123.

Fricticarani, A., Hayati, A., R, R., Hoirunisa, I., & Rosdalina, GM (2023). Educational Strategies for Success in the Era of Technology 5.0. Journal of Educational Innovation and Information Technology (JIPTI) , 4 (1), 56–68. https://doi.org/10.52060/pti.v4i1.1173

Hangleiter, D., & Eisert, J. (2023). Computational advantages of quantum random sampling. Reviews of Modern Physics , 95 (3). https://doi.org/10.1103/RevModPhys.95.035001

Hidayat, T., Barat, NT, Hamzanwadi, U., & Barat, NT (2023). Indonesian Journal of Sports and Health (JOKI) available online at https://jurnal.stokbinaguna.ac.id/index.php/jok Contribution Of Medicine Ball Exercise . 3 , 115–122.

Ipa Hafsiah Yakin. (2023). Qualitative Research: Qualitative Research Methods. Equilibrium Journal , 5 (January), 1–7.

Irwanto, E. (2021). Volleyball Textbook: History, Basic Techniques, Strategy, Rules, and Refereeing. K-Media , 1–117.

Journal, SPORT (2022). Physical Condition Profile Of Volleyball Athletes At Tectona Club Indonesian University of Education Indonesian University of Education Indonesian University of Education Abstract . 2 (2), 91–100

Lemon, K. (2024). rejected and H . 5 (1), 99–113. https://doi.org/10.33369/gymnastics

Luti, F., Keguruan, F., Ilmu, dan, Kristen, U., & Wacana, A. (2023). Physical education teachers' strategies in improving students' cognitive and psychomotor aspects through volleyball learning .

Mahfud, RM, Anwar, K., & Hidayatullah, F. (2023a). The Effect Of Hanging Ball Training On Smash Accuracy In . 5 (2), 142–148.

Mahfud, RM, Anwar, K., & Hidayatullah, F. (2023b). The Effect of Hanging Ball Training on Smash Accuracy in Volleyball Extracurricular Activities. Jambura Journal of Sports Coaching , 5 (2), 142–148. https://doi.org/10.37311/jjsc.v5i2.21044

Maifa, S. (2021). Journal of Physical Education, Health & Recreation (PORKES) | 62. Journal of Health Education & Recreation , 4 (1), 62–68.

Maulana, A., Basri, MH, Suparto, A., & Jasmani, PP (2025). The Relationship between Arm Muscle Strength and Body Weight to Smash Accuracy in Volleyball in PBV. Young Pioneers Influence Match Results. Effective smashes do not only depend on in volleyball games (Asnaldi, 2020; Destriana et al., 2. Jurnal Keolahraga , 11 (1), 15–25.

Oktariana, D., & Hardiyono, B. (2020). The Influence of Arm Muscles Explosive Power, Limb Muscles Explosive Power, and Abdominal Muscle Strength on Volleyball Smash Results in Students of SMK Negeri 3 Palembang. The

Influence of Arm Muscles Explosive Power, Limb Muscles Explosive Power, and Abdominal Muscle Strength on. Journal of Coaching Education Sports , 1 (1), 13–26. https://doi.org/10.31599/jces.v1i1.82

Purwaningsih, I., Oktariani, O., Hernawati, L., Wardarita, R., & Utami, PI (2022). Education as a System. Visionary Journal: Research and Development in Educational Administration , 10 (1), 21. https://doi.org/10.33394/vis.v10i1.5113

Rachmi Marsheilla Aguss, Eko Bagus Fahrizqi, PAW (2021). Effectiveness Of Vertical Jump On Volleyball Smash Ability Men. Indonesian Journal Of Physical Education , 17 (1), 1–9.

Sanga, LD . . & WY (2023). (2023). Education is a Determining Factor of National Competitiveness. Proceedings of the National Seminar on Social Sciences and Technology. (SNISTEK), 5, 84–90. Https://Doi.Org/10.33884/Psnistek.V5i.8067 , 5 (September), 84–90.

Sari, WT, & Aryanti, S. (2024). Hanging ball training on top serve ability in extracurricular volleyball . 12 (2), 115–126.

Suhairi, M., & Arifin, Z. (2022). Multilateral: Journal of Physical Education and Sports Development of reaction-based volleyball smash drill tool using android Volleyball smash drill tool development reaction based using android IKIP PGRI Pontianak, Indonesia Introduction Teknologi me . 21 (1), 71–86.

Trimizi, T., Iman, I., & Elfry, E. (2020). The Effect of the Part-Whole Method on Basic Underhand Passing Techniques in Volleyball. Khatulistiwa Journal of Physical Education , 1 (1), 19. https://doi.org/10.26418/jpjk.v1i1.43579

Usra, M. (2023). The Impact of Hanging Ball Training Method on Volleyball Under Passing and Hands Eye Coordination . 15 , 4527–4536. https://doi.org/10.35445/alishlah.v15i4.3862

Waruwu, M., Pu`at, SN, Utami, PR, Yanti, E., & Rusydiana, M. (2025). Quantitative Research Methods: Concepts, Types, Stages, and Advantages. Scientific Journal of Educational Professions , 10 (1), 917–932. https://doi.org/10.29303/jipp.v10i1.3057

Zen, MZ, Ma'arif, I., Prasetyo, GB, & Hidayat, ZW (2024). Basic Smash Technique Skill Level in Volleyball Games among Physical Education Students. SPRINTER: Journal of Sports Science , 5 (3), 373–377. https://doi.org/10.46838/spr.v5i3.627