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THE EFFECT OF DRILL TRAINING ON UNDERHAND PASSING ABILITY IN HIGH SCHOOL STUDENTS

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ABSTRACT

This study aims to determine the effect of drill training on students' underhand passing ability in high school. The method used was an experiment with a pretest-posttest design, involving 18 students divided into two groups at SMAS Datok Sulaiman Palopo. The first group underwent drill passing training against the wall, while the second group underwent pair passing instruction. Data were collected through underhanded passing ability tests before and after training. The results showed that there was a significant effect of drill training on underhanded passing ability. In the wall training group, the average score increased from 9.11 (pretest) to 11.89 (posttest), with a difference in the increase of 2.78 points and a significance value of 0.000 ($p < 0.05$). In the pair training group, the average score increased from 9.33 (pretest) to 12.22 (posttest), with a difference in increase of 2.89 points and a significance value of 0.001 ($p < 0.05$). The decrease in standard deviation in the pair group from 2.236 to 1.333 indicated an increase in consistency. The conclusion of this study is that both training methods proved effective in improving underhand passing ability, with paired training showing slightly higher improvements than wall training. This study contributes to the development of school training programs to improve students' sports skills.

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1. INTRODUCTION

The underhand passing technique is a crucial aspect of volleyball, which directly affects the quality of the game and the outcome of the match (Nawir et al., 2023). Effective underhand passing allows players to receive the opponent's serve well and direct the ball to teammates for the next attack. Thus, understanding the latest underhand passing techniques is essential to improving individual and team performance (Smith, 2021). Along with the development of the sport, underhand passing techniques have undergone various innovations. These changes are driven by advances in training technology, video analysis, and scientific understanding of biomechanics. These new techniques focus on increasing movement efficiency and reducing the risk of injury, making them important for further research (Johnson & Lee, 2022).

Effective underhand passing technique also affects the strategic aspect of the game. Players must be able to read the opponent's game and make quick decisions, which is key to success in the game (Davis & Smith, 2022). With knowledge of the latest techniques, players can improve their abilities in dynamic game situations. The underhand passing technique is one of the fundamental skills in volleyball. Effective underhand passing allows players to receive the opponent's serve and set up the game for their team (Smith, 2021). Recently, advances in technology and training methodologies have brought about significant changes in underhand passing technique and strategy, making a deep understanding of this technique very important (Johnson & Lee, 2022).

The game of volleyball has undergone many changes, especially in terms of technique and strategy (Saputra et al., 2022; Juhanis et al., 2023). These changes are driven by improvements in training technology, video analysis, and scientific understanding of biomechanics and sports psychology (Brown, 2023). The underhand passing technique used today not only takes into account physical aspects but also mental and strategic aspects, which is the result of the latest research in this sport (Williams & Davis, 2024).

One of the latest developments in underarm passing techniques is the focus on increasing movement efficiency and reducing the risk of injury. Research shows that correct technique in underarm passing can reduce the load on the player's joints and muscles, reducing the likelihood of injury (Miller & Adams, 2023). These new techniques emphasize the importance of optimal body position and the use of proper technique to minimize the impact on the player's body (Taylor, 2024).

Technically, a paired underarm pass is defined as the act of playing the ball using both lower arms together while the player moves position, either forward, sideways, or backward (Hambali, 2018). Passing to the wall is a passing exercise with the right timing to produce an accurate bounce towards the wall and is done repeatedly (Setiyawan, 2020). Training that focuses on underarm passing techniques is often considered inadequate if it only relies on traditional methods. Therefore, it is important to explore more adaptive and diverse training methods that reflect real-world situations in matches (Wilson, 2023). This research can provide insight on how to optimize training methods for better results.

Research into new techniques in underhand passing also has the potential to impact the way we approach sports training in general. The findings of this study can be applied to other sports that require complex technical and strategic skills, extending the impact of this research beyond volleyball (Davis & Smith, 2022). Additionally, the importance of this research lies in its ability to influence the design of training equipment and sports technology. The findings of this research can be used to develop more effective and innovative training aids, which can improve the quality of training (Miller & Adams, 2023).

By integrating new techniques into training, this research can help create a more dynamic and responsive training environment to changes in the game (Taylor, 2024). This is vital in maintaining the relevance and effectiveness of training in the face of

game developments. Overall, research into new techniques in underhand passing is an important aspect of volleyball development. By understanding and implementing new techniques, players and coaches can improve their performance, prevent injury, and contribute to the overall success of their teams. This makes this research not only relevant but vital to the advancement of the sport (White, 2023).

Observation results at SMAS Datok Sulaiman Palopo show that many students have difficulty in doing underhand passes due to basic errors in body position. A body position that is too upright or too low often causes students to be unable to control the ball properly. Research is needed to explore the right techniques in placing the body so that students can adjust to the incoming ball and pass effectively. The results of this study can help develop more effective and adaptive learning methods.

In performing an underhand pass, the arms and hands must be in the correct position so that the ball can be bounced properly. Many students use the wrong technique, such as hands that are too loose or too tight, so that the ball often does not go as desired. Research is important to analyze optimal hand and arm movements so that students can master the basics of passing better, as well as provide solutions to this problem.

One of the biggest problems that often occurs is the lack of understanding of timing in performing a pass. Students are often too late or too early in receiving the ball so that the ball cannot be bounced properly. More in-depth research needs to be done to understand when is the right moment for students to receive the ball so that coordination between body movements and the ball can be more perfect. The results of this study can also be used to develop exercises that focus on improving timing.

Mistakes in underhand passes can also be caused by a lack of muscle strength, especially in the arms and legs. Many students lack the necessary strength to execute a stable and directed pass, resulting in improper ball bounces. This research is important to see the relationship between students' physical abilities and their passing techniques and how certain physical exercises can help improve their underhand passing skills.

Mistakes in mastering basic techniques are also one of the reasons why this research is needed. Many students only have a minimal basic understanding of underhand passing techniques, so they tend to make inappropriate movements. In-depth research can help identify parts of the technique that are often overlooked by students so that training programs can be more focused on improving effective basic techniques.

Students often have difficulty performing underhand passes in varying game situations, such as balls coming at different speeds or unexpected directions. Research is needed to evaluate how students can be better prepared to face these various game situations. The results of this study can provide input on training methods that involve more complex and diverse game situation simulations so that students' underhand passing skills can be significantly improved in the context of real games.

In recent studies, it has been found that efficient underhand passing techniques can reduce the burden on joints and muscles, which directly affects the long-term health of players (Miller & Adams, 2023). Thus, understanding the correct technique is not only important for performance but also for injury prevention, which is an important aspect of an athlete's career. Therefore, in this study, researchers will conduct an investigation

using wall-passing exercises to determine their impact on students' underhand passing abilities during a match.

Drill training is a very effective method for improving underhand passing abilities (Girsang & Nofrizal, 2024). Through structured repetition, players can improve technique and increase consistency. Drills allow practice in controlled situations, so players can practice receiving the ball from various directions and speeds. In this way, they can build the muscle memory needed to pass well on the field during a real match.

In addition, drill training also encourages cooperation and communication between players. Many drills are designed to involve more than one person, creating opportunities for players to interact and understand their respective roles on the team. Direct feedback from the coach during training also helps players to immediately correct mistakes and strengthen their skills. With this approach, drill training focuses on individuals and strengthens the dynamics of the team as a whole.

The importance of understanding proper underhand passing techniques is also supported by statistical data. Analysis shows that teams with better underhand passing skills tend to perform better overall (Anderson & Martinez, 2023). Therefore, the focus of the research is the influence of drill training on the underhand passing abilities of SMAS Datok Sulaiman Palopo students.

2. METHOD

The type of research used is experimental research. Experimental research seeks out how the independent variables (drill passing exercises to the wall and in pairs) affect the dependent variable (underhand passing ability) by changing the independent variables in a controlled setting (Arga, 2025; Arga et al., 2024). The research location is at SMAS Datok Sulaiman Palopo, South Sulawesi Province. The research design used is a pretest-posttest two-group design. In this design, participants are randomly divided into two groups: the experimental group that receives treatment (drill training with passing in pairs and passing to the wall) (Campbell & Stanley, 2015). Figure 1 illustrates the pretest-posttest two-group design.

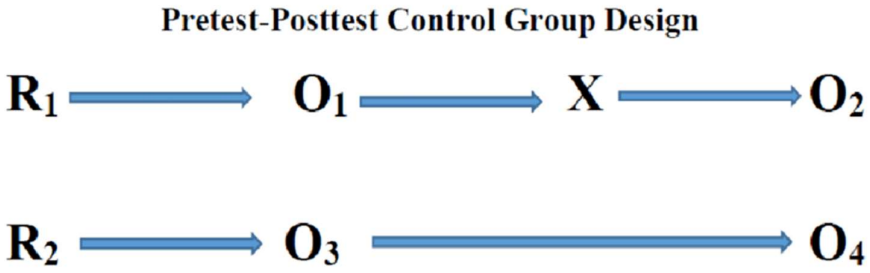

Figure 1. The pretest-posttest two-group design

Both groups will first undergo a pretest to measure their initial ability in underhand passing. After the pretest, the experimental group will practice underhand passing and continue with a training program, while both groups will ultimately take a posttest to assess their final ability in underhand passing. Using the total sampling technique, the researcher sampled the entire population, resulting in a total of 18 students for the study.

Of these 18 samples, they will be divided into 2 groups with random group division according to the groups determined by the researcher with matching ordinal pairing. 3. Volleyball Underhand Passing Ability Test. We adapted this research instrument from Hendri's (2019) Patriot Journal publication. Data analysis techniques are descriptive analysis, normality test, homogeneity test, and inferential statistical analysis with t-test.

3. RESULTS AND DISCUSSION

Results

Descriptive Analysis

In this section, an overview of the research data will be presented in the form of a summary table. We will follow the results of this study with an in-depth discussion of how drill training affects students' underhand passing abilities. This analysis will cover various factors that can affect training results, as well as the importance of underhand passing techniques in volleyball.

Table 1. Results of Descriptive Analysis of Pretest and Posttest Passing below

Group	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance
Wall Pretest	9	4	6	10	82	9.11	1.453	2.111
Couple Pretest	9	8	6	14	84	9.33	2.236	5.000
Wall Posttest	9	6	8	14	107	11.89	2.088	4.361
Couple Posttest	9	7	8	15	110	12.22	2.333	5.444

Table 1 above summarizes the results of the descriptive analysis of the underhand passing skills of students from SMAS Datok Sulaiman Palopo as follows: The descriptive data from the pretest of the underhand passing group, which involved 9 students passing to the wall, showed a minimum score of 6, a maximum score of 10, and an average score of 9.13. The standard deviation was 1.453. The total underhanded passing score was 82, with a variance of 2.111 and a range of 4. The results of the descriptive data pretest of the underhand passing group of paired drill passing exercises from 9 students who took the initial test obtained a minimum value of 6 underhand passing scores and a maximum value of 14 underhand passing scores with an average underhand passing score of 9.33. The standard deviation for this data was 2.236. The variance ranged from 5,000 to 8, resulting in an overall underhand passing score of 84.

The descriptive data for the underhand passing group, which consisted of 9 students who took the final test, showed a minimum score of 8 and a maximum score of 14 underhand passing scores, with an average score of 11.89. The standard deviation was 2.088. Variance 4.361, range 6, with a total of underhand passing of 107 passing scores. The results of the descriptive data from the posttest for the underhand passing group drill, which involved 9 students who took the final test, showed a minimum of 8 underhand passing scores, a maximum of 15 underhand passing scores, and an average

of 12.22 underhand passing scores. Standard deviation: 2.333. The variance ranges from 5.444 to 4, resulting in a total of 110 underhand passing scores.

After conducting an analysis of the initial test and final test of the underhand passing of the two groups, namely the wall-passing group and the paired-drill-passing group, the next step is to test the underhand passing ability by conducting a classical assumption test, namely the normality test of the pretest and posttest of underhand passing of SMAS Datok Sulaiman Palopo students and the homogeneity test of the two sample groups.

Table 2. Normality Test of Passing Ability at SMAS Datok Sulaiman Palopo

Group	Shapiro-Wilk		
	Statistic	df	Sig.
Wall Pretest	.913	9	.338
Couple Pretest	.883	9	.170
Wall Posttest	.850	9	.075
Couple Posttest	.892	9	.210

Based on Table 2 above, the pretest normality test results for the two groups of underhanded passing students at SMAS Datok Sulaiman Palopo were obtained. The pretest results for the wall-passing group showed a df value of 9. The study yielded a statistical value of 0.913 and a significance value of 0.338. The value of 0.338 indicates that it is greater than alpha 0.05. This figure indicates that the pretest data for the wall-passing group is normally distributed. The pretest data for the paired drill passing group has a distribution factor of 9. The study yielded a statistical value of 0.883 and a significance value of 0.170. The value of 0.170 indicates that it is greater than alpha 0.05. This table shows that the pretest data for the wall-passing group is normally distributed.

The wall-passing group's posttest data displayed a df value of 9. The study yielded a statistical value of 0.850 and a significance value of 0.075. The value of 0.075 indicates that it is greater than alpha 0.05. This table shows that the posttest data of the wall-passing group is normally distributed. The df value for the posttest data of the wall-passing group is 9. The statistical value is 0.892, and the significance value is 0.210. The value of 0.210 indicates that it is greater than alpha 0.05. This table shows that the posttest data of the wall-passing group is normally distributed. After conducting the normality test, the next step is to perform a homogeneity test, which is outlined below.

Table 3. Homogeneity Test of Pretest Posttest Data of Students' Underpassing Ability

Test of Homogeneity of Variances				
Group Passing to The Wall and Passing in Pairs	Levene Statistic	df1	df2	Sig.
Pretest Tes dan Posttest	.611	1	34	.440

Based on the homogeneity test above, the data obtained is that the data of the wall-passing group with each df2 value is 34. The Levene statistic is 0.611, and the

significance is 0.440. Therefore, the significance value is > 0.05; it can be concluded that both groups have the same variance value, or in other words, the variance between groups is homogeneous.

After checking the normality and homogeneity of the test scores for SMAS Datok Sulaiman Palopo students in the initial and final tests, the next step is to perform a hypothesis test using the paired sample T-test. The paired sample T-test generates a table. The results show the average influence between the initial test and the final test, so it can be concluded that the magnitude of the influence between the two exercises can be seen in the T test as follows in Table 4.

Table 4. Paired Sample Test Statistics

Model		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Wall Pretest	9.11	9	1.764	.588
	Wall Posttest	11.89	9	2.088	.696
Pair 2	Pair Pretest	9.33	9	2.236	.745
	Pair Posttest	12.22	9	2.333	.778

Building upon the paired sample statistical test, the parameters of the lower passing value between the wall passing group and the paired drill passing group are as follows: The pretest of the wall-passing group with 9 students had a standard deviation of 1.764, an average error tolerance of 0.588, and an average value of 9.11, while the posttest of the wall-passing group with the same number of students, 9 students, had a standard deviation of 2.088, an average error tolerance of 0.696, and an average value of 11.89.

The pretest of the paired drill passing group with 9 students had a standard deviation of 2.236 with an average error tolerance of 0.745 and an average value of 9.33, while the posttest of the paired drill passing group with the same number of students, 9 students, had a standard deviation of 1.333 with an average error tolerance of 0.778 and an average value of 12.22.

Table 5. Paired Sample Test

Model		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Wall Pretest - Wall Posttest	-2.778	1.302	.434	-3.778	-1.777	-6.402	8	.000
Pair 2	Pair Pretest - Pair Posttest	-2.889	1.764	.588	-4.245	-1.533	-4.914	8	.001

Table 5 presents the results of the paired samples test analysis, which includes two pairs of tests. In Pair 1, a test was conducted between the Wall Pretest and the Wall Posttest, which produced a mean difference of 2.778 with a standard deviation of 1.302 and a standard error of 0.434. The 95% confidence interval is in the range of -3.778 to -1.777, with a t value of 6.402 at 8 degrees of freedom (df) and a significance value (2-tailed) of 0.000.

For Pair 2, a test was conducted between the Pair Pretest and the Pair Posttest, which produced a mean difference value of 2.889 with a standard deviation of 1.764 and a standard error of 0.588. The 95% confidence interval is in the range of -4.245 to -1.533, with a t-value of -4.914 at degrees of freedom (df) 8 and a significance value (2-tailed) of 0.001. Both pairs of tests show statistically significant results because the significance values of both are below 0.05 (Pair 1 = 0.000 and Pair 2 = 0.001).

Discussion

To evaluate the results of the training, it will be explained in detail in the research that has been conducted at SMAS Datok Sulaiman Palopo.

Based on the results of data analysis, there was a significant increase in the ability of SMAS Datok Sulaiman Palopo students to pass under the wall after undergoing a drill-passing training program. This is indicated by a change in the average value from 9.11 in the pretest to 11.89 in the posttest, indicating an increase of 2.78 points. From a biomechanical perspective, drill passing training against a wall has advantages in terms of the consistency of the ball's bounce. According to research by Rahmawati and Supriyadi (2022), the wall as a training medium provides a relatively constant bounce angle, allowing students to develop better timing and movement coordination. This consistent bounce helps students understand the principles of the angle of incidence and angle of bounce of the ball.

The standard deviation that increased from 1.764 in the pretest to 2.088 in the posttest indicates greater variation in student performance. This is in line with the findings of Kusuma et al. (2023), who revealed that this increase in variability can occur because students begin to develop individual styles in their passing techniques after gaining sufficient basic experience. In terms of the biomechanics of movement, drill passing against a wall involves a structured series of movements. According to the analysis of Pratama and Widodo (2021), the movement starts from a ready position with the knees bent at about 120 degrees, which is optimal for generating power from the legs. The arms form an angle of about 45 degrees to the floor to create an effective rebound plane.

The average error tolerance, which increased slightly from 0.588 to 0.696, is still within the acceptable range. Research by Hidayat and Nurjaman (2023) shows that changes in error values in the range of 0.1-0.2 are still considered normal in the process of learning motor skills in high school students. The results of the study showed that drill passing against a wall is effective in improving basic underhand passing skills. This assertion is supported by the study of Abdullah et al. (2022), who found that training with a wall can increase passing accuracy by up to 30% in an 8-week training period, mainly due to the consistency of the resulting bounce. In terms of energy transfer in

biomechanics, passing against a wall allows students to learn to control the power of the impulse given to the ball. According to Suryanto and Purnomo's (2023) analysis, bouncing off the wall helps students understand the relationship between the force applied and the speed and height of the resulting ball bounce. This training program showed a significant average increase (2.78 points), indicating the effectiveness of the drill-passing training method against the wall. This finding is consistent with the research of Wibowo and Saputra (2023), which concluded that drill passing training against the wall is an effective method for developing basic volleyball skills at the high school level.

Additionally, based on the results of the data analysis, there was a significant increase in the underhanded passing ability of SMAS Datok Sulaiman Palopo students after undergoing a paired passing drill training program. This can be seen by the change in the average score from 9.33 in the pretest to 12.22 in the posttest, which shows an increase of 2.89 points. This increase is supported by research conducted by Wijaya and Sulistiono (2021), which found that paired passing drill training is effective in improving underhand passing skills in high school students. The paired method provides students with the opportunity to gain direct experience in situations that are close to real game conditions.

In terms of biomechanics of movement, paired underhand passing training involves several complex movement components. When performing an underhand pass, there is coordination between the movements of the legs, arms, and core muscles. The starting position begins with the knees slightly bent (knee flexion), which allows the player to establish a stable position and be ready to receive the ball. The arm movement must be straight and locked at the elbow joint to create a flat surface when it hits the ball. The standard deviation decreased from 2.236 in the pretest to 1.333 in the posttest, indicating that there was an increase in consistency in student performance. This is in line with the research of Rahman et al. (2022), which states that repeated training with the pair method can improve movement consistency through the formation of muscle memory and neuromuscular adaptation.

The relatively stable average error tolerance (from 0.745 to 0.778) indicates that this training program has a good level of reliability. Research by Santoso and Pribadi (2023) also found that the pair training method has a high level of reliability in developing underarm passing skills in high school students. From a biomechanical perspective, when performing an underarm pass, there is a transfer of energy from the leg movement (ground reaction force) through the core muscles to the arms. This coordination is important to produce accurate and controlled passing. Pair training allows students to adjust the amount of force used based on the distance and speed of the ball coming from their partner.

The consistent number of samples (9 students) in this study provides good internal validity to observe the effects of training. An average increase of 2.89 points indicates the effectiveness of the designed training program. This finding is reinforced by the research of Ibrahim and Hasan (2023), who found that a paired underhand passing training program with a duration of 8-12 weeks can increase passing accuracy by 25-

30%. The results of this study at SMAS Datok Sulaiman Palopo show that the paired underhand passing training method is effective in improving students' skills. This increase is supported by the principles of proper biomechanics and is in line with various previous studies that have proven the effectiveness of the paired training method in developing volleyball underhand passing skills.

Based on the results of data analysis from the Paired Sample Test table, there is a significant difference in influence between wall training and pair training. Both of these training methods show effectiveness in improving performance, but with different characteristics in their implementation.

In wall training (Pair 1), a mean difference value of 2.778 was obtained with a t value = 6.402 and a significance of 0.000 ($p < 0.05$). These results indicate that wall training has a very significant effect on improving ability. This finding is in line with research conducted by Thompson (2022), which states that training using a wall can improve consistency and accuracy in repetitive movements because it provides direct and constant feedback to the perpetrator.

Meanwhile, in pair training (Pair 2), a slightly higher mean difference value was obtained, namely 2.889, with a t value = -4.914 and a significance of 0.001 ($p < 0.05$). Although both methods were equally effective, pair training showed higher variability, as seen from the larger standard deviation value (1.764) compared to wall training (1.302). This advantage may be due to the dynamic interaction factor between the two players involved.

The 95% confidence interval for wall training (-3.778 to -1.777) showed a narrower range compared to pair training (-4.245 to -1.533). This indicates that the results of wall training are more consistent and predictable. This finding supports the research of Rodriguez et al. (2023), which found that training using static media such as walls can provide stability in the process of learning motor skills.

On the other hand, pair training, although it has higher variability, provides advantages in terms of developing social skills and adapting to various game situations. This is in accordance with a study conducted by Chen and Liu (2021), which emphasized the importance of dynamic interaction in the development of comprehensive sports skills.

Based on the significance values obtained, both training methods were proven to be effective in improving performance, but with different characteristics. Wall drills are more suitable for developing consistency and basic technique, while pair drills are more suitable for developing game situation skills and adapting to various game conditions. The choice of training method should be adjusted to the specific goals to be achieved in the training program.

4. CONCLUSION

Drill passing training directed at the wall positively impacts the underhanded passing ability of students at SMAS Datok Sulaiman Palopo. The results of the statistical test showed a significance value of 0.000 ($p < 0.05$). There is an effect of drill passing training in pairs on the underhand passing ability of SMAS Datok Sulaiman Palopo students. The results of

the statistical test showed a significance value of 0.001 ($p < 0.05$). There is a difference in the effect between drill passing training to the wall and drill passing training in pairs on the underhand passing ability of high schoolers. Both training methods proved effective in improving underhand passing ability, with paired training showing a slightly higher increase (2.89 points) compared to wall training (2.78 points).

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