Journal Coaching Education Sports
https://doi.org/10.31599/jces.v5i1.3671
Vol. 5, No.1, May 2024, pp. 117-132
E-ISSN: 2722-3450 P-ISSN: 2775-3808

The Effect Of Massed Practice And Distributed Practice Methods Practice Method In Terms Of Arm Muscle Strength Training On The Accuracy Of Passing Down The Ball

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Abstract

This research aims to find out: 1) The difference in the effect of Massed Practice and Distributed Practice training methods on increasing the accuracy of lower passing bolavoli 2) The difference in the results of the accuracy of the lower pass of students who have high arm muscle strength and low arm muscle strength, 3) The interaction effect of training methods and arm muscle strength on the accuracy of bolavoli smash. In this study, the approach used was quantitative with research techniques using experiments, while the technique of taking data using tests. The population referred to in this study were male students in class IX at SMPN 1 Pucanglaban Tulungagung totaling 40 people. The research sample was ninth grade male students at SMPN 1 Pucanglaban Tulungagung totaling 30 people using purposive random sampling. Data analysis techniques using t test and anova test. The results of this study can be concluded that: 1. There is a difference in the effect of the Massed Practice and Distributed Practice training methods on increasing the accuracy of passing under bolavoli. This is evidenced by the results of the t-test results above obtained sig value. 0.011<0.05 (5% significant level) Thus the null hypothesis (Ha) is accepted. 2) There is no difference in the accuracy of passing down students who have high arm muscle strength and low arm muscle strength. This is evidenced by the results of the t-test above obtained sig value. 0.336 > 0.05 (5% significant level) Thus the null hypothesis (Ha) is rejected. 3) There is a significant effect of the interaction of training methods and arm muscle strength on the accuracy of bolavoli bolavoli in the group. This is evidenced by the calculation results obtained sig. = 0.006> 0.05 (5% significant level). This means that the null hypothesis (Ha) is accepted.

Keywords: Training Method, Arm Muscle Strength, Accuracy Of Bolavoli Lower Pass

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Artikel Info:
Submitted: **12/12/2023** Revised: **13/03/2024** Accepted: **22/04/2024** Published: **13/04/2025**

How to Cite: Zami, Z, N, Z., Himawanto, W., Harmono, S. (2024). The Effect Of Massed Practice And Distributed Practice Methods Practice Method In Terms Of Arm Muscle Strength Training On The Accuracy Of Passing Down The Ball. *Journal Coaching Education Sports*, 5(1), 117-132. https://doi.org/10.31599/jces. 5(1).3671

Author's Contribution: a – Study Design; b – Data Collection; c – Statistical Analysis; d – Manuscript Preparation; e – Funds Collection

A. Introduction

To achieve maximum performance in volleyball, physical readiness for training plays a crucial role, as every training program must always encompass several aspects such as physical condition, technique, tactics, and the psychological factors of the athlete (Hanief et al., 2018). These are fundamental factors of an athlete's performance that are interconnected to achieve success. There are high performance demands, and as the game of volleyball continues to evolve, it will experience several developments both in terms of techniques and tactics (Pujianto et al., 2021). Additionally, it is necessary to find effective and efficient training methods, especially in selecting and organizing good training methods, particularly for mastering basic techniques perfectly to achieve the expected performance (Achmad, 2018).

Basically, the techniques in volleyball, especially forearm passing, are very supportive in both playing and defense. Volleyball activities are indeed inseparable from supporting techniques such as service, passing, spike, and block. Passing techniques consist of forearm passing and overhead passing. In volleyball instruction at junior high schools, forearm passing techniques are more frequently taught to students alongside overhead passing techniques, aiming for better mastery of forearm passing (Rahmat & Wahidi, 2018).

According to Urahman & Hidayat (2019), passing is an effort or attempt by a volleyball player using a specific technique aimed at passing the ball to a teammate to be played on their own court. Good passing can create a strong attack against the opponent's area, resulting in a score. However, it is undeniable that in volleyball lessons, students often face difficulties in performing both forearm and overhead passes because they do not understand the relationship between arm muscle strength and forearm passing ability in volleyball. Ironically, very few students fall into the good category. This indicates problems in volleyball instruction. Therefore, researchers try to understand the reasons for success or failure in passing the arm muscle strength tests and aim to investigate how significant this is in relation to forearm passing tests. Given this situation, researchers seek to find out the relationship between arm muscle strength and forearm passing ability.

Based on preliminary survey results and observations, SMP 1 Pucanglaban is a school that conducts extracurricular activities. The extracurricular activities at SMP 1 Pucanglaban, including volleyball, have been running well. Volleyball extracurricular activities are guided by a

coach and the basic techniques of volleyball have been taught and trained effectively. However, the extracurricular volleyball activities have not yet shown maximum results. It is evident that some students are still unable to perform basic techniques well, especially forearm passing. Additionally, students' arm muscle strength is rarely tested, resulting in inadequate arm muscle strength. The problems occurring during extracurricular volleyball activities and physical education lessons include students often failing to pass the ball accurately to teammates or the opponent's area, with the ball often falling short or off target. Students sometimes pass the ball carelessly, aiming only to get the ball over the net and into the opponent's area. This is problematic as forearm passing is a crucial basic technique in volleyball. The variety in volleyball training exercises is considered insufficient. Furthermore, the scores from the forearm passing tests are below the minimum competency criteria (KKM) of 75, with many students scoring below this benchmark. Therefore, it can be concluded that the basic forearm passing technique is still weak. To address this, interesting and non-monotonous training forms are needed to keep students motivated and enthusiastic during volleyball extracurricular activities. Ultimately, it is hoped that this will lead to improved student movement skills in volleyball, especially in mastering basic techniques.

The preliminary survey results conclude that students lack mastery of basic volleyball techniques taught by the teacher, one of which is accurate forearm passing. Among the students, some can perform the basic forearm passing technique well, so it is necessary to leverage these students' capabilities. Additionally, students lack motivation due to the teaching methods used by the teacher, which are seen as lacking variety, systematic organization, and proper structure. Therefore, besides forearm passing, it is essential to provide students with training in basic volleyball techniques.

According to Sutisna (2021), techniques in volleyball, especially forearm passing, are very supportive in both playing and defense. The basic passing techniques include forearm passing and overhead passing. In volleyball instruction at junior high schools, forearm passing techniques are more frequently taught to students alongside overhead passing techniques, aiming for better mastery of forearm passing. In volleyball games, the accuracy of passing from one player to another within a team is crucial because the first pass when receiving a serve is the foundation for building an attack. Mistakes in passing will disadvantage the team since

the opposing team will gain points according to the current rally-point system. Therefore, mastering passing techniques is very important. To perform this technique, basic passing techniques must first be mastered. The basic passing technique taught to beginners is forearm passing, as it is straightforward and easy to perform. According to the energy system required in volleyball, the most dominant element is strength, especially arm muscle strength.

According to Oktariana & Hardiyono (2020), strength is the muscle contraction force achieved in a single maximum effort. This maximum effort is exerted by a muscle or group of muscles to overcome resistance. Strength is a crucial element in any physical activity because it is the driving force and injury prevention. Moreover, strength plays an important role in other physical abilities components such as power, agility, and speed, making strength a key factor in achieving optimal performance. According to Samsuddin & Rahman (2016), strength is a component of physical condition related to a person's ability to use muscles to bear loads during maximum effort. Strength is widely used or needed in almost all sports, such as game sports, athletics, and martial arts.

According to Endrawan et al. (2022), arm muscle strength is the ability of the arm muscles to generate tension against resistance and lift weights. Therefore, the arm muscles must have good strength. Hanief & Purnomo (2019) state that arm muscle strength is the ability of a group of muscles in the arm to overcome given resistance.

Given the differences in the two training methods, coaches need to understand other supporting factors, one of which is arm muscle strength, when applying these training methods. However, until now, no coach has differentiated the application of these training methods concerning arm power, particularly in volleyball smashes. Based on the background of the problem, the following research questions need to be formulated: 1) Is there a difference in the impact of Massed Practice and Distributed Practice training methods on improving forearm passing accuracy in volleyball? 2) Is there a difference in the forearm passing accuracy results between students with high and low arm muscle strength? 3) Is there an interaction effect between the training methods and arm muscle strength on volleyball smash accuracy?

Therefore, research is needed related to the use of Massed Practice and Distributed Practice training methods and their impact on forearm passing accuracy. Based on the above description, the author is very interested in examining the issue with the title "The Effect of Massed Practice and

Distributed Practice Training Methods in Terms of Arm Muscle Strength Training on the Accuracy of Forearm Passing in Volleyball for Male Students in Grade IX at SMPN 1 Pucanglaban Tulungagung".

B. Methods

The research approach used is quantitative. The research method employed in this study is the experimental method using a 2 x 2 factorial design. According to Sudjana, a factorial experiment is one in which almost all levels of a factor are combined or crossed with all levels of each other factor present in the experiment. This research was conducted at SMPN 1 Pucanglaban Tulungagung. The research was carried out over 5 weeks, with a frequency of 2 times a week. Training sessions started at 15:00 and ended at 17:30 WIB. Overall, the training was conducted 3 times per week over 14 sessions, in addition to the pre-test and post-test which were conducted in 2 sessions.

The population referred to in this study is the male students of grade IX at SMPN 1 Pucanglaban Tulungagung, totaling 40 individuals. The research sample consists of 30 male students of grade IX at SMPN 1 Pucanglaban Tulungagung. In this study, the sample was determined using purposive random sampling, which is a sampling technique based on the ranking or needs required in the research. The data in this study were obtained through tests and measurements of the accuracy of forearm passing in volleyball. Data collection was done using test and measurement techniques. The data analysis technique included the prerequisite tests for analysis, which involve normality and homogeneity tests. Hypothesis testing in this study was conducted using two-way analysis of variance (ANOVA) with the help of SPSS version 23.

C. Result and Discussion

Based on the results of the research conducted, the following research data will be described:

Table 1. Description of the Data Results of Arm Muscle Strength Tests for the Massed Practice and Distributed Practice Training Methods on Improving the Accuracy of Volleyball Forearm Passing.

Training method	Arm muscle strength	Statistic	Lower Passing Accuracy		
			Initial test	Final test	Improved
Distributed Practice	High	Total	225.00	313.00	88
		Mean	15.0000	20.8667	5.8667

Training method	Arm muscle strength	Statistic	Lower Passing Accuracy		
			Initial test	Final test	Improved
		SD	3.50510	3.64234	0.13724
	Low	Total	200.00	262.00	62
		Mean	13.3333	17.4667	4.1334
		SD	3.45722	2.77403	-0.68319
Massed Practice	High	Total	228.00	268.00	40
		Mean	15.2000	17.8667	2.6667
		SD	2.42605	2.16685	-0.2592
	Low	Total	177.00	246.00	69
		Mean	11.8000	16.4000	4.6
		SD	3.60951	3.18030	-0.42921

From the calculation of table 1 above, the results of descriptive analysis of the average value based on the distributed practice method group show that the increase in passing accuracy in the high category arm muscle strength from the initial data average value of 15.1 with a standard deviation of 3.50 the final test was 20.87 with a standard deviation of 3.64. A comprehensive overview of the average value of the accuracy of passing under volleyball can be seen in the histogram of the comparison of values as follows:

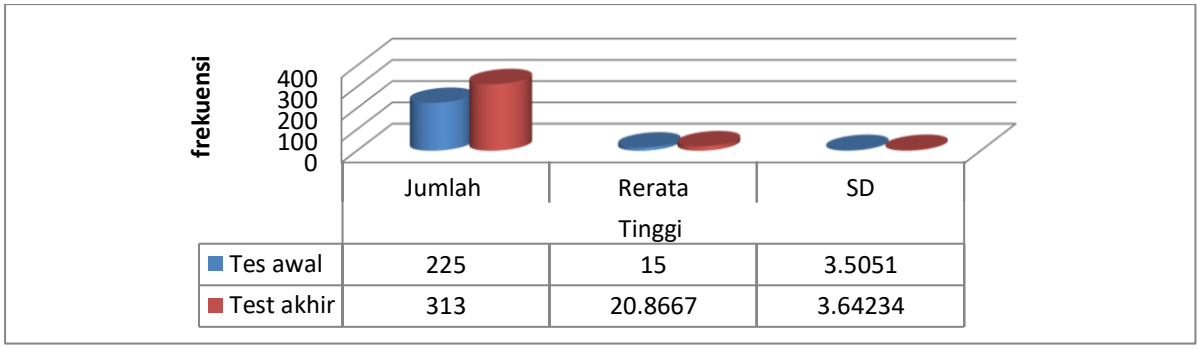

Figure 1 Distributed practice method on improving passing accuracy in high category arm muscle strength

While in the massed practice method group it can be seen that the increase in passing accuracy in high category arm muscle strength from the mean value of the initial data is 15.2 with a standard deviation of 2.43 the final test is 17.87 with a standard deviation of 2.17. A comprehensive overview of the average value of the accuracy of passing under volleyball can be seen in the histogram of the comparison of values as follows:

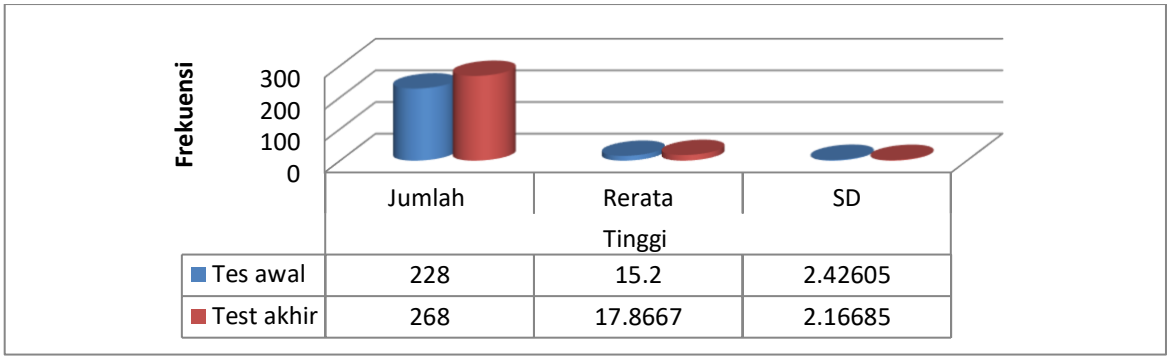

Figure 2 Massed practice method on improving passing accuracy in high category arm muscle strength

The results of descriptive analysis of average values based on the distributed practice method group show that the increase in passing accuracy in low category arm muscle strength from the initial data average value of 13.3 with a standard deviation of 3.46 the final test was 17.47 with a standard deviation of 2.77. A comprehensive overview of the average value of the accuracy of passing under volleyball can be seen in the histogram of the comparison of values as follows:

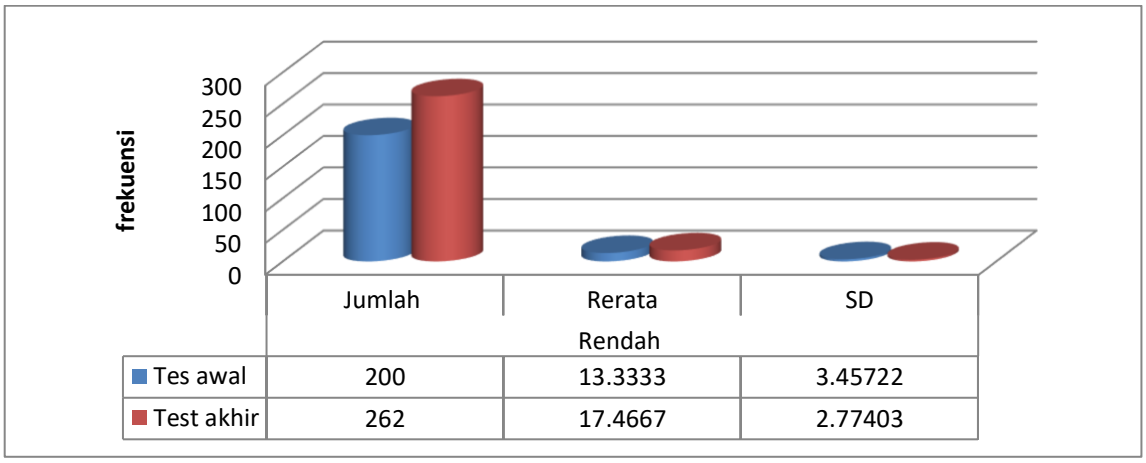

Figure 3 Distributed practice method on improving passing accuracy in low category arm muscle strength

While in the massed practice method group, it can be seen that the increase in passing accuracy in the high category of arm muscle strength from the mean value of the initial data is 11.8 with a standard deviation of 3.61 the final test is 16.40 with a standard deviation of 3.18. A comprehensive overview of the average value of the accuracy of passing under volleyball can be seen in the histogram of the comparison of values as follows:

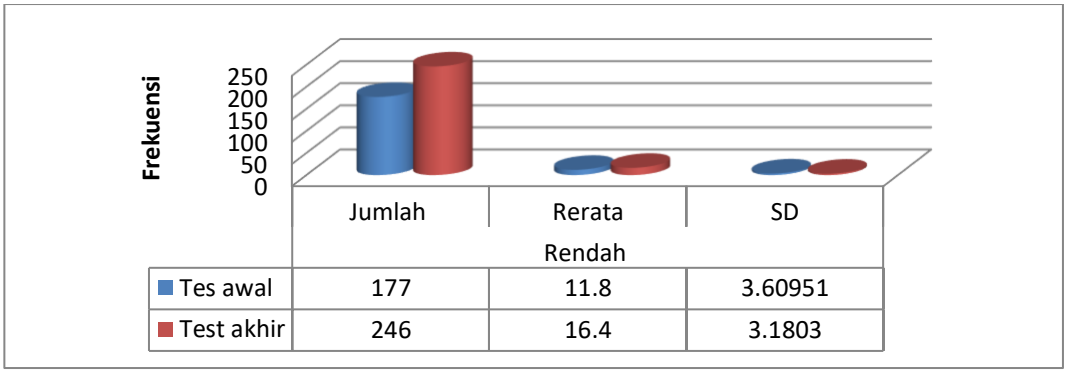

Figure 4 Massed practice method on improving passing accuracy in low category arm muscle strength

Before data analysis is carried out, the normality distribution needs to be tested. The data normality test in this study used the Liliefors method. The results of the data normality test conducted on each group are as follows:

Table 2. Summary of Data Normality Test Results

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
AWAL_Metode latihan terdistribusi_Tinggi	.146	15	.200*	.945	15	.446
AKHIR_Metode latihan terdistribusi_Tinggi	.122	15	.200*	.965	15	.772
AWAL_Metode latihan massal_Tinggi	.163	15	.200*	.950	15	.522
AKHIR_Metode latihan massal_Tinggi	.206	15	.088	.877	15	.062
AWAL_Metode terdistribusi latihan_Rendah	.166	15	.200*	.951	15	.535
AKHIR_Metode terdistribusi practice_Rendah	.168	15	.200*	.931	15	.287
AWAL_Metode latihan massal_Rendah	.187	15	.166	.920	15	.196
AKHIR_Metode latihan massal_Rendah	.150	15	.200*	.937	15	.350

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

From the results of the normality test conducted on the initial test of the high distributed practice method, a significance value (sig.) of 0.446 was obtained, which is greater than the 5% significance level of 0.05. Therefore, it can be concluded that the data in the initial test of the high distributed practice method is normally distributed. In the final test of the high distributed practice method, a significance

value (sig.) of 0.772 was obtained, which is also greater than the 5% significance level of 0.05. Hence, it can be concluded that the data in the final test of the high distributed practice method is normally distributed.

From the results of the normality test conducted on the initial test of the high massed practice method, a significance value (sig.) of 0.552 was obtained, which is greater than the 5% significance level of 0.05. Therefore, it can be concluded that the data in the initial test of the high massed practice method is normally distributed. In the final test of the high massed practice method, a significance value (sig.) of 0.062 was obtained, which is greater than the 5% significance level of 0.05. Hence, it can be concluded that the data in the final test of the high massed practice method is normally distributed.

From the results of the normality test conducted on the initial test of the low distributed practice method, a significance value (sig.) of 0.535 was obtained, which is greater than the 5% significance level of 0.05. Therefore, it can be concluded that the data in the initial test of the low distributed practice method is normally distributed. In the final test of the low distributed practice method, a significance value (sig.) of 0.287 was obtained, which is also greater than the 5% significance level of 0.05. Hence, it can be concluded that the data in the final test of the low distributed practice method is normally distributed.

From the results of the normality test conducted on the initial test of the low massed practice method, a significance value (sig.) of 0.196 was obtained, which is greater than the 5% significance level of 0.05. Therefore, it can be concluded that the data in the initial test of the low massed practice method is normally distributed. In the final test of the low massed practice method, a significance value (sig.) of 0.350 was obtained, which is greater than the 5% significance level of 0.05. Hence, it can be concluded that the data in the final test of the low massed practice method is normally distributed.

The homogeneity test aims to test the equality of variances between group 1 and group 2. The homogeneity test in this research was conducted using the test of homogeneity of variance. The results of the homogeneity test between group 1 and group 2 are as follows:

Table 3. Summary of Data Homogeneity Test Results

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Awal_Akhir Metode distributed practice_Tinggi	.002	1	28	.969
Awal_Akhir Metode massed practice_Tinggi	.004	1	28	.951
Awal_Akhir Metode distributed practice_Rendah	.875	1	28	.358
Awal_Akhir Metode massed practice_Rendah	.461	1	28	.503

Research hypothesis testing was carried out based on the results of data analysis and interpretation of variance analysis. The Newman-Keuls range test was taken as a mean test step after Anava. With regard to the results of variance analysis and Newman-Keuls range test, there are several hypotheses that must be tested. The order of testing is adjusted to the order of the hypotheses formulated in chapter III. The results of data analysis required for hypothesis testing are as follows:

1. The difference in the effect of the Massed Practice and Distributed Practice training methods on increasing the accuracy of bolavoli lower passes

Table 4. The effect of Massed Practice and Distributed Practice training methods on increasing the accuracy of passing under volleyball

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Metode distributed practice_massed practice	Equal variances assumed	3.605	.068	2.742	28	.011	3.00000	1.09429	.75846	5.24154
	Equal variances not assumed			2.742	22.806	.012	3.00000	1.09429	.73524	5.26476

Based on the t-test results above, the sig value is obtained. 0.011 <0.05 (5% significant level) Thus the null hypothesis (H0) is accepted, which means that there is a difference in the effect of the Massed Practice and Distributed Practice training methods on increasing the accuracy of bolavoli lower passes.

2. Differences in the results of the accuracy of the lower pass of students who have high arm muscle strength and low arm muscle strength

Table 5. Differences in the results of the accuracy of the lower pass of students who have high arm muscle strength and low arm muscle strength

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Metode distributed practice_ massed practice	Equal variances assumed	.206	.653	.979	28	.336	1.06667	1.08963	-1.16535	3.29868
	Equal variances not assumed			.979	27.493	.336	1.06667	1.08963	-1.16720	3.30054

Based on the t-test results above, the sig value is obtained. 0.336 > 0.05 (5% significant level) Thus the null hypothesis (H0) is accepted, which means that there is no difference in the accuracy of the lower pass of students who have high arm muscle strength and low arm muscle strength.

From the results of the homogeneity test on the initial_ final test of the distributed practice_tinggi method, the sig value is obtained. 0.969 where the value is greater than the 5% significant level of 0.05. So it can be concluded that between the groups in this study have a homogeneous variance.

From the results of the homogeneity test at the beginning_end of the massed practice_tinggi method, the sig value is obtained. 0.951 where the value is greater than the 5% significant level of 0.05. So it can be concluded that between groups in this study have homogeneous variance.

From the results of the homogeneity test on the initial_ final test of the distributed practice_low method obtained a sig value. 0.358 where the value is greater than the 5% significant level of 0.05. So it can be concluded that between groups in this study have homogeneous variances.

From the results of the homogeneity test at the beginning_end of the massed practice method_low obtained a sig value. 0.503 where the value is greater than the 5% significant level of 0.05. So it can be concluded that between the groups in this study have homogeneous variances.

3. The effect of the interaction of training methods and arm muscle strength on the accuracy of volleyball bolavoli

Table 4.6 The effect of the interaction of training methods and arm muscle strength on volleyball accuracy

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Awal_Akhir Metode latihan terdistribusi_Tinggi	Between Groups	258.133	1	258.133	20.204	.000
	Within Groups	357.733	28	12.776		
	Total	615.867	29			
Awal_Akhir Metode latihan_Tinggi massal	Between Groups	53.333	1	53.333	10.081	.004
	Within Groups	148.133	28	5.290		
	Total	201.467	29			
Awal_Akhir Metode terdistribusi latihan_Rendah	Between Groups	128.133	1	128.133	13.043	.001
	Within Groups	275.067	28	9.824		
	Total	403.200	29			
Awal_Akhir Metode latihan massal_Rendah	Between Groups	158.700	1	158.700	13.715	.001
	Within Groups	324.000	28	11.571		
	Total	482.700	29			
Metode distributed practice+ massed practice Tinggi_ Metode distributed practice+ massed practice Tinggi_	Between Groups	218.376	1	218.376	10.691	.006
	Within Groups	364.357	28	12.643		
	Total	785.733	29			

a. Based on the results showed that the distributed practice method in the high muscle strength group category of pretest and posttest values from the calculation results obtained sig. = 0.000 <0.05 (5% significant level). This means that the null hypothesis (H0) is rejected and (Ha) is accepted so that there is a significant effect on the distributed practice method group in the high muscle strength group category.

b. Based on the results showed that the massed practice method in the high muscle strength group category of pretest and posttest values from the calculation results obtained sig. = 0.001 <0.05 (5% significant level). This means that the null hypothesis (H0) is rejected and (Ha) is accepted so that there is a significant effect on the distributed massed method group in the high muscle strength group category.

c. Based on the results showed that the distributed practice method in the low muscle strength group category pretest and posttest values from the

calculation results obtained sig. = 0.001 <0.05 (5% significant level). This means that the hypothesis (H0) is rejected and (Ha) is accepted so that there is a significant effect on the distributed practice method group in the low muscle strength group category.

d. Based on the results showed that the massed practice method in the low muscle strength group category of pretest and posttest values from the calculation results obtained sig. = 0.001 <0.05 (5% significant level). This means that the hypothesis (H0) is rejected and (Ha) is accepted so that there is a significant effect on the distributed massed method group in the low muscle strength group category.

e. Based on the results of the study, it shows that the distributed massed method with massed practice with low muscle strength group category pretest and posttest values from the calculation results obtained sig. = 0.006 <0.05 (5% significant level). This means that the hypothesis (H0) is rejected and (Ha) is accepted so that there is a significant effect of the interaction of training methods and arm muscle strength on the accuracy of bolavoli bolavoli in the group.

D. Discussion

There is a difference in the impact of Massed Practice and Distributed Practice training methods on improving the accuracy of volleyball underhand passing. This is evidenced by the results of the t-test, which yielded a significance value (sig.) of 0.011 < 0.05 (5% significance level). Therefore, the alternative hypothesis (Ha) is accepted, and the null hypothesis (H0) is rejected.

This difference is shown by the improvement results in each group. In the massed practice group, there was an average increase of 2 points in the accuracy of underhand passing for the high category group and an average increase of 4 points for the low category group. In the distributed practice group, the improvement in the accuracy of underhand passing was 5 points for the high category and 4 points for the low category.

There is no difference in the accuracy of underhand passing between students with high and low arm muscle strength. This is evidenced by the results of the t-test, which yielded a significance value (sig.) of 0.336 > 0.05 (5% significance level). Therefore, the null hypothesis (H0) is accepted, and the alternative hypothesis (Ha) is rejected.

Thus, there is no difference between the groups with high and low arm muscle strength because both groups still showed

improvements in the accuracy of underhand passing within their respective groups.

The relationship between these two variables is directly proportional, meaning that the greater the arm muscle strength, the better the underhand passing ability. Conversely, if the arm muscle strength is poor or insufficient, the underhand passing ability will also be poor.

An engaging training method is a form of learning that involves students in an enjoyable atmosphere and optimizes their sports activities. Based on the research results mentioned earlier, the application of massed practice and distributed practice methods in teaching volleyball underhand passing significantly affects the accuracy of volleyball underhand passing.

D. Conclusion

Based on the results of the research and the results of the data analysis that has been carried out, the following conclusions can be obtained: 1) There is a difference in the effect of Massed Practice and Distributed Practice training methods on increasing the accuracy of lower passing bolavoli; 2) There is no difference in the results of the accuracy of the lower pass of students who have high arm muscle strength and low arm muscle strength; 3) There is an interaction effect of training methods and arm muscle strength on the accuracy of volleyball.

Based on the results of research using the distributed practice method and massed practice where the distributed practice method is a form of exercise that is interspersed with breaks between training times while massed practice is a learning method that is implemented without being interspersed with breaks between training times until the specified time limit. The results show that it is more effective to use distributed practice with breaks so that it can better control students during practice with more optimal results.

E. Acknowledgments

Thank you to the lecturer in charge of the table tennis course who assisted the authors in refining this article. And to the entire writing team who contributed to the completion of this article.

F. Conflict of Interest

No conflict of interest

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