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Effectiveness of the Mud Jump Training Method on Improving Volleyball Jumping Spike

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Abstract
Volleyball requires optimal jumping spike ability as the main attacking technique to score points. This skill is influenced by leg muscle strength and explosive power. This study aims to determine the effectiveness of the mud jumping training method in improving the jumping spike ability of volleyball athletes. The research employed a one group pre-test and post-test design, with a sample of 13 volleyball athletes selected purposively. The measurement instrument used was the vertical jump test. Data were analyzed using the Kolmogorov-Smirnov normality test and Paired Sample t-test with SPSS 26. The results indicated that the data were normally distributed (Sig. > 0.05) and there was a significant difference between the pre-test and post-test results (Sig. 0.000 < 0.05) with an average increase of 2.23 cm. The study concludes that the mud jumping training method is effective in improving the jumping spike ability of volleyball athletes.

Keywords: *Volleyball, Jumping Spike, Mud Jumping Training, Vertical Jump*

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INTRODUCTION

Volleyball is one of the most popular sports with a high level of competition (Yusmar et al., 2017; Bayo et al., 2019). The game consists of techniques such as service, underhand passing, overhead passing, spike, and blocking, in which the spike plays a crucial role as the main weapon to score points (Hidyatullah, 2023). An effective spike requires a high jump and a powerful hit; therefore, the take-off ability is a critical factor.

Observations in Pasiragung Village indicate that the average take-off ability of volleyball players is still low. Some players also make mistakes in jumping techniques, resulting in suboptimal jumps. In fact, the height of the jump greatly affects the effectiveness of the spike (Durahim & Sarman, 2021; Latif & Purnomo, 2023). A spike executed from a position higher than the net can be hit at a sharp downward angle, making it difficult for the opponent to return (Irwanto, 2021).

Good jumping ability is key to a successful spike, thus training aimed at improving jump performance is essential. One potential method is mud jump training, which is believed

to enhance leg muscle strength, explosive power, endurance, and improve jumping techniques (Ramadhan, 2022).

This study aims to determine the effectiveness of mud jump training in improving the volleyball jumping spike ability in Pasiragung Village. The results are expected to contribute to the development of more effective training methods, benefiting not only athletes in Pasiragung Village but also serving as a reference for volleyball coaches and enthusiasts.

METHOD

The study employed a one group pre-test and post-test design, with a sample of 13 volleyball athletes selected through purposive sampling. The measurement instrument used was the vertical jump test. Data were analyzed using the Shapiro–Wilk normality test and the Paired Sample t-test in IBM SPSS 26.

RESULTS AND DISCUSSION

Result

After conducting the initial test (pre-test), followed by the treatment, and concluding with the final test (post-test), data on jump height measured using the vertical jump test were obtained. The data were then analyzed using a t-test with a significance level of 5% ($\alpha = 0.05$).

Table. 1. Pre-test Data Description

No	Criteria	Score	f	%
1	>50 cm	5	5	39
2	39-49 cm	4	8	61
3	31-38 cm	3	0	0
4	23-30 cm	2	0	0
5	0-22 cm	1	0	0
Total			13	100

Table 1, the results of the initial test (pre-test) on the jumping spike ability of volleyball players show that out of 13 participants, 5 individuals (39%) achieved a jump height of more than 50 cm, while 8 individuals (61%) fell within the range of 39–49 cm. There were no participants with jump heights in the categories of 31–38 cm, 23–30 cm, or 0–22 cm. This data indicates that before undergoing the mud-jump training method, the majority of participants were in the moderate jump height category (39–49 cm), while the remainder belonged to the high jump height category (>50 cm).

Table. 2. Post-test Data Description

No	Criteria	Score	f	%
1	>50 cm	5	10	78
2	39-49 cm	4	3	22
3	31-38 cm	3	0	0
4	23-30 cm	2	0	0
5	0-22 cm	1	0	0
Total			13	100

Table 2, the results of the final test (post-test) show that out of 13 participants, 10 individuals (78%) achieved a jump height of more than 50 cm, while 3 individuals (22%) were within the range of 39–49 cm. These results indicate that after undergoing the mud-jump training method, the majority of participants reached the high jump height category (>50 cm).

Table. 3. Data Normality Test (Shapiro-Wilk)

Variable	Shapiro-Wilk Statistic	Sig. (p)	df
Pre-test	0.937	0.414	13
Post-test	0.954	0.653	13

Based on Table 3, the results of the normality test showed a significance value of 0.414 for the pre-test and 0.653 for the post-test, both of which are greater than 0.05. Therefore, it can be concluded that the pre-test and post-test data are normally distributed. This indicates that the normality assumption is met, allowing the hypothesis testing to proceed using parametric tests, such as the Paired Sample t-test.

Table. 4. Hypothesis Test (Paired Sample t-test)

Variable	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Pre-test Pos-test	2.23	1.423	0.395	5.651	12	0.001

Based on the results of the paired sample t-test, the Sig. (2-tailed) value was 0.001 < 0.05, leading to the rejection of H_0 and acceptance of Ha. Therefore, there is a significant difference between the pre-test and post-test scores. The mean difference of 2.23 indicates an improvement in jumping spike ability after undergoing the mud-jump training method.

Discussion

Based on the results of data analysis, it was found that there was a significant difference between the pre-test and post-test scores of volleyball athletes' jumping spike ability after participating in the mud-jump training method. The average pre-test score of 51.62 increased to 53.85 in the post-test, with a mean difference of 2.23 points. The results of the Paired Sample

t-test showed a Sig. (2-tailed) value of 0.001 < 0.05, indicating that the mud-jump training method is effective in improving jumping spike performance.

This improvement aligns with the theory stating that lower limb strength and explosive power are key factors in performing an effective jumping spike. Mud-jump training provides greater natural resistance compared to hard surfaces, forcing the leg muscles to work harder. According to Iqbal & Iskandar (2020), resistance-based training can stimulate neuromuscular adaptations, improve muscle coordination, and strengthen type II muscle fibers, which are crucial for explosive movements such as jumping. A study by Ramadhan (2022) also reported an increase in lower limb power through varied mud-jump training in volleyball players.

Furthermore, the unstable mud surface forces athletes to enhance their balance and body control during takeoff. This is consistent with Rosadi (2020) statement that training on unstable surfaces can improve joint stability and strengthen supporting muscles, thereby contributing to better jumping performance.

These findings are also in line with those of Putra (2018), who reported that training involving jumping on sandy or muddy surfaces can significantly increase vertical jump height in volleyball athletes. Similarly, Widodo (2020) found that training in mud for three weeks, with a frequency of three sessions per week, could improve vertical jump performance by 8–12%.

Therefore, the results of this study provide further empirical evidence that the mud-jump training method can serve as an effective alternative to plyometric training. This method not only enhances lower limb strength and explosive power but also improves balance, coordination, and overall body stability, all of which play a crucial role in the success of the jumping spike in volleyball.

CONCLUSION

The mud-jump training method has been proven effective in improving the jumping spike ability of volleyball athletes. This is demonstrated by a statistically significant increase in the average pre-test and post-test scores. Training on a mud surface provides greater natural resistance and demands better balance and body control, thereby enhancing lower limb strength, explosive power, coordination, and body stability. Therefore, mud-jump training can be an effective alternative plyometric exercise to support jumping spike performance in volleyball.

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