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The Effect of Resistance Band Training on Improving Basic Volleyball Techniques in Students Living in the Dogiyai Dormitory in Jayapura City

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Abstract

Volleyball requires mastery of basic techniques such as serving, passing, setting, smashing, and blocking. However, many players on the field have difficulty mastering these skills due to monotonous training methods. This study used a quantitative approach with a one-group pretest-posttest experimental design. The sample consisted of 40 students from the Dogiyai dormitory in Jayapura City who were selected using purposive sampling. The resistance band training program was implemented for six weeks with a frequency of three times per week, including serving, passing, setting, and smashing exercises. Data were obtained through a basic volleyball skills test, then analyzed using normality tests, homogeneity tests, and paired sample t-tests with the help of SPSS 22.0. The results showed an increase in the average score from 15.60 in the pretest to 17.75 in the posttest with a difference of 2.15 points. Normality and homogeneity tests showed that the data were normally distributed and homogeneous. The results of the paired sample t-test showed a significance value of 0.000 <0.05, which means there was a significant difference between the pretest and posttest. The use of resistance bands significantly improved basic volleyball technical skills among students at the Dogiyai dormitory in Jayapura City. These findings provide practical insights for coaches and educational institutions in designing more varied, effective, and efficient training methods.

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INTRODUCTION

Volleyball is a dynamic and fast-paced sport, requiring a combination of physical fitness, technical expertise, and strategic understanding to master (Astuti et al., 2025). For beginners, basic volleyball techniques such as serving, passing, setting, smashing, and blocking are fundamental skills that determine the overall quality of the game. Volleyball techniques can be mastered by practicing regularly, resulting in automatic movements in each technique (Pettoello-Mantovani et al., 2022). During play, these techniques not only help create more complex tactics and strategies but also reduce the risk of injury caused by biomechanical errors (Ahmad et al., 2024). The goal of developing basic techniques, especially for school-aged or adolescents, is to develop precise, effective, and consistent movement patterns so they can continuously improve their abilities (Akbar et al., 2024). This urgency is great because a team's attack and defense will not be successful if they do not know how to do simple things .

Facts on the ground show that the results of volleyball training for some groups of players are still not optimal. (Efendi et al., 2025). This is indicated by a decline in performance in playing volleyball which is not only influenced by physical aspects, but also influenced by technical factors and training methods (Lusiana et al., 2023). Many players still have difficulty mastering basic techniques and instability in the upper serve technique, difficulty in performing upper passes with high accuracy, and the lack of effectiveness of smashes in the game (Putra, Kurdi, et al., 2024; Ramara et al., 2025). On the other hand, coaches often lack variety in providing training methods so that the process of learning these techniques is often quite boring, consisting of repetition and monotonous exercises (Putra, Sutoro, et al., 2024; Smith et al., 2024). Boredom and decreased performance during this process can decrease motivation, cause players to revert to suboptimal techniques, reduce their long-term competitiveness, and put them at risk of dropping out of the game (Crane & Temple, 2015; Güllich & Barth, 2024).

One exercise that can be used to improve volleyball is using a resistance band. This resistance band can train strength, muscle endurance, and flexibility focused on the hands (Sutejo et al., 2024). The use of resistance bands in sports has been carried out by several coaches and academics. For example, research conducted by Ningsih and Hasanudin (2023)who conducted a trial using resistance bands to increase leg muscle endurance in Neo Angel Mataram soccer athletes, the results of their study showed an increase in leg muscle endurance in Neo Mataram soccer athletes after being given training using resistance bands. In addition, Putri and Nugroho (2025)who used resistance band training to improve jumping smash ability in 20 athletes from the Lampung Phinsi volleyball club. The results of their study showed an increase in jumping smashes in Lampung Phinsi volleyball athletes after undergoing 16 training sessions. Furthermore, Rahmadani et al. (2025)examined the effect of a six-week structured resistance-band training program on overhead serve performance among 30 students aged 10–12 years participating in an extracurricular volleyball program at SDN Bangsri Sukodono. The results of the study showed that resistance band training was effective in improving overhead serve skills in young volleyball players. Furthermore, the simplicity and portability of resistance bands make this approach feasible for schools with limited resources.

Based on the research analysis above, the novelty of this research lies in its comprehensive application of resistance band training across all fundamental volleyball techniques serving, passing, setting, smashing, and blocking rather than focusing on a single skill as in previous studies. This integrative approach offers a new perspective on how elastic resistance can simultaneously enhance multiple technical aspects through one cohesive program. Moreover, this study targets students living in dormitories with limited training facilities, highlighting the adaptability and practicality of resistance bands as a low-cost yet effective solution for volleyball skill development. Therefore, the problem formulation in this study is "can resistance bands improve volleyball playing skills in students at the Dogiyai dormitory in Jayapura City?".

Thus, the purpose of this study is to examine the effect of resistance band-based training as an alternative method to improve basic volleyball technical skills. This method is considered potential because it is flexible, economical, can be adjusted to the athlete's ability level, and is able to target muscle groups that play a direct role in the execution of serves, passes, sets, smashes, and blocks. With proper application, resistance band training is expected to improve the quality of basic techniques while reducing the risk of injury in volleyball players.

METHODS

This study used a quantitative approach

with an experimental research design (one-group pretest-posttest design) (Creswell, 2015). This research design was chosen because it includes a pretest measurement followed by treatment and ending with a posttest for only one group (Abraham & Supriyati, 2022). Furthermore, experimental research is the most powerful research method researchers can use because it is the best way to demonstrate (establish) causal relationships between variables (Waruwu et al., 2025). The research procedure is structured in three main phases: pretest, treatment, and posttest.

This research was conducted in the Volleyball Court of the Dogiyai Student Dormitory in Jayapura City from June to July 2025. The sampling technique used in this study was purposive sampling. This sampling technique was chosen because the researcher determined several criteria, including: 1) active students; 2) familiar with volleyball; and 3) willing to be a sample. Thus, the sample in this study involved 40 students from a total population of 85 boarding students in Dogiyai, Jayapura City.

The assessment instruments and procedures for basic volleyball skills assessment are only underhand serve, overhand serve, underhand pass, overhand pass, and smash, which refer to the volleyball skills test from Tantri and Mashud (2023, pp. 40-52). Data obtained from the pretest and posttest will be tested using normality tests, homogeneity tests, and t-tests using IBM SPSS Statistics 22.0 software.

The resistance band training program was specifically designed to improve arm muscle strength in volleyball. The program was implemented over six weeks, with three sessions per week. Each session consisted of three parts: a warm-up, core exercises, and a cool-down (Bushman, 2024).

Table 1. 6-Week Resistance Band Program

Week	Underhand Pass	Overhead Pass/Set	Service	Smash	Intensity
1-2	3 sets x 10 reps	3 sets x 8 reps	7-8 reps	3 sets x 6 reps	6.5 kg (green band)
3-4	2 sets x 13 reps	2 sets x 10 reps	11 reps	3 sets x 8 reps	9 kg (red band)
5-6	3 sets x 16 reps	3 sets x 12 reps	15 reps	3 sets x 10 reps	11 kg (blue band)

RESULTS AND DISCUSSION

Descriptive analysis serves as a basic analytical approach to systematically summarize and present the core findings obtained from this study. This methodological framework provides a comprehensive overview of the research results by organizing the raw data into easily understandable patterns, allowing for initial interpretation of the results before proceeding to complex statistical testing. The results of this descriptive analysis present pretest and posttest research data involving 40 samples. The summary of the data processed using this descriptive analysis includes the mean, standard deviation, lowest and highest scores, which are presented in the following **Table 2**.

Table 2. Descriptive Statistics of Pretest and Posttest

	Pretest	Posttest
Mean	15.60	17.75
Standard Deviation	2.69	2.67
Lowest Value	10	14
The highest score	21	25

The results **Table 2** of the descriptive analysis show that the average pretest is 15.60 and the average posttest is 17.75, in this case indicating an increase through the difference in scores obtained by students of 2.15. The pretest results show the lowest score obtained by students is 10 and the highest score obtained by students is 25. Meanwhile, the posttest results show the lowest score is 14 and the highest score is 25. The standard deviation in the pretest results is 2.69 and the standard deviation in the posttest results is 17.75.

Based on which presents the results of the normality test using the Shapiro-Wilk method, the Sig. value for the pretest group is 0.396 and the posttest group is 0.056. Because these values have exceeded the threshold with a significance level of $\alpha = 5\%$ or 0.05, indicating that the data from the two groups are normally distributed. This confirms that the normality assumption is met for the pretest and posttest groups.

Based on the homogeneity test results in Table 4, the Sig. value for the pretest and posttest values shows a value of 0.949. Therefore, this value is greater than the significance level of $\alpha = 5\%$ or 0.05, it can be concluded that the data has a homogeneous variance.

From which compares the test results of the experimental group, it can be seen that the Sig. value obtained is 0.000. Compared to the alpha value, the Sig. value is significantly smaller ($0.000 < 0.05$), so H0 is rejected and H1 is accepted. This indicates a statistically significant difference between the pretest and posttest results. Therefore, it can be concluded that resistance

band training has a positive effect on basic volleyball technical skills in students at the Dogiyai dormitory, Jayapura City.

The findings above indicate that training using resistance bands has a significant effect on the basic volleyball technical skills of students at the Dogiyai dormitory in Jayapura City. Based on the data, the mean pretest and posttest values showed a decrease of 2.15 with a t-test result of 0.00, which is smaller than the significance level of 0.05, indicating the effect of using resistance bands on the basic volleyball technical skills of students at the Dogiyai dormitory in Jayapura City. The influence of resistance band training extends beyond statistical improvement. Physiologically, it enhances muscle strength, joint stability, and coordination of movement patterns that are directly involved in volleyball techniques. Psychologically, it increases motivation and engagement due to the dynamic and varied nature of the exercises. Technically, students demonstrated better control, accuracy, and consistency in performing serves, passes, and smashes after six weeks of training. These effects collectively indicate that resistance band training not only improves performance outcomes but also promotes holistic physical and technical development in volleyball players.

This is in line with research Saputra et al. (2022) who found that resistance band-based training can increase specific muscle strength, especially in explosive movements. Furthermore, research by Aslamy et al. (2025) demonstrated that resistance band training significantly increased smash speed in volleyball. This aligns with the concept of weight training, which emphasizes the use of elastic resistance as a means of progressively increasing muscle strength.

When used as a training tool, resistance bands offer several benefits, including their adaptability and ability to apply additional pressure without the need for heavy equipment. When athletes use resistance bands, they have the ability to modify the intensity of their training by adjusting the thickness of the band or selecting different resistance levels. This lends credence to the concept of progressive overload, which emphasizes progressively increasing load to give muscles the opportunity to adapt and develop without increasing the risk of injury. This research contributes to the field of sports training, particularly in the area of increasing speed, which can be achieved with volleyball smashes through the use of resistance band training. The implications of this research can be implemented in volleyball athletes' training plans to maximize their performance in terms of power, explosiveness, and improve their fundamental volleyball techniques.

CONCLUSION

Based on the research findings, it can be concluded that resistance band training has been shown to have a notable impact on improving basic volleyball technical skills among students at the Dogiyai dormitory in Jayapura City. There was a increase in mastery of serving, passing, setting, and smashing techniques as a result of the six-week training program, as evidenced by the increase in average scores from pre-test to post-test. Resistance bands are an alternative training strategy that is not only effective, but also versatile, cost-effective, and easy to use in various situations, especially with limited facilities. Furthermore, this strategy has the potential to prevent players from getting bored with repetitive training while increasing their enthusiasm, which in turn helps ensure continuous improvement in basic technical skills.

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