

The Effect of Resistance Band Training on the Increase in Arm Muscle Power of Basketball Extracurricular Participants at SMAN 5 Malang for the 2024/2025 Academic Year

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Article Information	ABSTRACT
<i>Received:</i> 13.05.2024	This study aims to identify the effect of resistance band training on increasing arm muscle power in the basketball extracurricular participants at SMA Negeri 5 Malang for the 2024/2025 academic year. The method used is an experimental approach with a one-group pre-test and post-test design. The sample consists of all 25 participants in the basketball extracurricular. Arm muscle power is measured using a two-hand medicine ball test before and after the intervention, with data analysis conducted using the t-test and SPSS software. The results show an average increase in arm muscle power from 3.48 to 4.57, an increase of 1.09 points or 31%. The t-test shows significant results ($p = 0.000$), indicating a significant difference in the mean arm muscle power before and after the resistance band intervention. The conclusion indicates that resistance band exercises have a notable effect on enhancing arm muscle strength in the basketball extracurricular participants. Resistance band training has been proven to effectively enhance arm muscle explosiveness, which affects shooting and passing performance in basketball. This research contributes to the development of arm muscle strength for basketball extracurricular participants, supporting optimal performance in both practice and competition.
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Introduction

Basketball is a sport that is very familiar among the public, especially among high school students. According to Prakoso and Sugiyanto [1], interest in basketball is not limited to a specific age group, but has involved a wide range of ages from children to adolescents. This is evidenced by the existence of extracurricular activities in schools. Basketball is played by two teams, each consisting of five players, who compete to score points by putting the ball into the opponent's hoop [2]. This sport is classified as a team sport, which requires solid teamwork to create offensive and defensive strategies. The rules in basketball are quite complex, one of which is dribbling the ball, which must be done by bouncing

the ball on the floor. The goal of the game is to score as many points as possible by putting the ball into the opponent's hoop. To achieve this, players need to master the proper shooting technique.

Shooting technique refers to the movement in which a player throws the ball towards the opponent's basket with the aim of scoring points [3]. Shooting is one of the fundamental skills in basketball. Some shooting techniques that need to be mastered include free throws, jumpshots, and lay-ups [4]. Shooting is a crucial technique in basketball. In the shooting movement, good accuracy is essential to score points. Therefore, mastering proper technique and having strong arm muscles are necessary. Most high school students have difficulty

scoring points. This is due to a lack of mastery in shooting techniques, resulting in inaccurate ball direction. One of the factors influencing this is insufficient arm muscle power. According to Hadi, Soegiyanto, and Sugiarto [5], arm muscle explosiveness, often referred to as power, is a crucial physical component that is generally required in all types of sports.

Power refers to the capacity of muscles to exert maximum strength in a short duration [6]. Players often face difficulty in generating sufficient power during both training sessions and matches, especially when making long-range shots. According to Mariati and Rasyid [7], if the explosiveness of a basketball player's arm muscles is not optimal, it can hinder the team from achieving its best performance. With proper arm muscle power, shooting results will be better and more effective. To address this issue, training with resistance bands can be used to enhance arm muscle explosiveness. Resistance bands are useful for training power, which is beneficial for every athlete. This can increase arm muscle power, impacting the player's performance on the basketball court [8]. Resistance band training is chosen as a method to improve shooting ability because it is simple yet effective in strengthening the arm muscles [9].

Based on initial observations conducted on the basketball extracurricular activities at SMAN 5 Malang, there is no training program aimed at improving arm muscle power. This has an impact during both practice sessions and matches, resulting in students not performing at their best. In this case, SMAN 5 Malang needs to implement a program to improve arm muscle power. Therefore, it is necessary to conduct a trial of resistance band training to determine its effect on the arm muscle

power of the basketball extracurricular participants at SMAN 5 Malang.

Methodology

This study applies a quantitative approach using an experimental method to explore the cause-and-effect relationship between resistance band training and the improvement of arm muscle power in basketball extracurricular participants. The research was conducted at SMAN 5 Malang and started in September 2024. The research sample consisted of basketball extracurricular participants at SMAN 5 Malang for the 2024/2025 academic year.

The study design used a pre-test and post-test design. Data was collected using a two-hand medicine ball test before the subjects received the treatment (pretest). The treatment was carried out over a period of six weeks, with three sessions per week, totaling 16 sessions. After the program concluded, the researcher conducted a final test (post-test).

Data collection involved measuring arm muscle power before and after the treatment, with data analysis using SPSS software for normality tests, homogeneity tests, and hypothesis testing. A t-test was used to determine the significance of the effect of the training method on the improvement of arm muscle power in the basketball extracurricular participants at SMAN 5 Malang for the 2024/2025 academic year.

Results

The results of the arm muscle power test conducted on 25 basketball extracurricular participants showed an average increase between the pretest and posttest data:

Tabel 1. Percentage of Average Data Improvement

Pre-test	Post-test	Difference	Percentage
3.48	4.57	1.09	31%

Based on the data in Table 1, it shows an improvement in the arm muscle power of the basketball extracurricular participants at SMAN 5 Malang for the 2024/2025 academic year. The pretest data showed an average of 3.48, while the posttest average reached 4.57. The amount of change can be observed from the average difference of 1.09, which indicates an increase of 31%.

Data analysis was conducted to evaluate normality, homogeneity, and conduct hypothesis testing (t-test). The results of the analysis can be seen as:

Normality Test

The results of the analysis using SPSS version 22 to determine whether the data is normally distributed can be found in Tabel 2.

Tabel 2. Normality Test of Arm Muscle Power Data

Group	Sig. Value	Information
Pre-test	0.114	Normal
Post-test	0.462	Normal

Based on the results in Tabel 2, the pretest and posttest data show a p-value (Sig.) > 0.05 , indicating that the research variables are normally distributed.

Tabel 3. Homogeneity Test of Arm Muscle Power Data

Group	Sig. Value	Information
Pre-test and Post-test	0.419	Homogeneous

Based on the results in Tabel 3, the arm muscle power data of the basketball extracurricular participants at SMAN 5 Malang for the 2024/2025 academic year shows a significance value of $0.419 > 0.05$. From these results, it can be concluded that the variance is homogeneous.

Tabel 4. Hypothesis Test T-Test

Group	Sig. Value	Information
Pre-test and Post-test	0.000	Hypothesis Accepted

From the results of the t-test, it can be seen that the data from the Pre-test and Post-test produced a significance value (sig.) of $0.000 < 0.05$. Therefore, it can be concluded that there was an effect of resistance band training on increasing the arm muscle power of extracurricular basketball students at SMAN 5 Malang.

Dicussion

The increase in arm muscle power or explosiveness is due to the intensive resistance band training provided. Strengthening the arm muscles is a crucial aspect to improve explosiveness, efficiency, and reduce the risk of injury, both when launching an attack and defending against an opponent's attack. Muscle strength and endurance are essential in supporting optimal performance. However, many individuals tend to neglect muscle strength development for various reasons, such as discomfort training at a fitness center, limited space for equipment at home, and other factors. To address these barriers, tools like resistance bands are designed as a solution. Power can be defined as the muscle's ability to generate tension against resistance. Therefore, the right type of exercise to increase muscle strength is resistance training, which involves movements such as pushing, lifting, or pulling specific loads. These loads can be body weight or external weights like dumbbells, barbells, resistance bands, or similar equipment [10].

Functional training has become one of the options in training programs to optimize

Homogeneity Test

The results of calculating data homogeneity using SPSS series 22 are as in Tabel 3.

Hypothesis Testing

The next stage is hypothesis testing to assess the effect of the applied training method on increasing arm muscle power through a t-test. The results of the t-test can be found in Tabel 4.

athletic performance, with the primary focus on strengthening multiple muscle groups and joints simultaneously. The use of resistance bands or elastic rubber bands in this training can be recommended as an effective method to enhance the strength and endurance of the upper arm muscles. In its application, it is important to adjust the use of this tool to the structured phases of the training program according to the periodization and ensure that the training tempo is maintained correctly for optimal results. Resistance bands can be integrated into training programs as part of dynamic warm-up sessions to prepare athletes before entering the main training session [11].

A resistance band is a training tool that uses elastic rubber as a form of resistance. It is used to increase arm muscle power by quickly pulling the resistance band, with the primary focus on the triceps, which play a key role in supporting arm movement during shooting [12]. This has led to an increase in arm muscle power in basketball players at SMAN 5 Malang. This is evident from the average increase of 1.09, with a 31% improvement, demonstrating the effectiveness of this training in supporting the development of passing and shooting skills in basketball.

This training has proven to be effective in increasing arm muscle explosiveness as it involves contractions in several muscles, such as the triceps, serratus anterior, anterior deltoid, biceps, forearm muscles, and pectoralis major. Resistance bands are often used by sports experts to develop biomotor skills and

support performance improvement during training sessions and competitions [13]. Of course, basketball training and competitions require consistent physical condition, especially since this sport uses the hands as a key element in performing lay-ups, passing, shooting, and more. Therefore, this training can play a specific role in improving arm muscle strength and endurance.

In general, resistance band training can increase the arm muscle power of athletes. Resistance bands have a more significant impact compared to training with a 1 kg dumbbell weight in improving arm muscle power [14]. There is a strong connection between arm muscle explosiveness and eye-hand coordination, where improvements in both will positively affect basketball shooting ability. Conversely, if arm muscle explosiveness

and eye-hand coordination are underdeveloped, basketball shooting performance will also decline. These two abilities have a significant impact on a basketball player's performance in a match or competition. Therefore, based on several statements and the results of this study, it can be concluded that resistance band training is important for improving arm muscle power in sports.

Conclusions

Based on the results of data analysis, explanations, research test results, and analysis, it can be concluded that there is an effect of resistance band training on the increase in arm muscle power of the basketball extracurricular participants at SMAN 5 Malang for the 2024/2025 academic year.

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