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Resistance Band And Dumbbell Training On The Front Punch Ability: A Study On Pencak Silat Athletes Jokotole Bangkalan Madura

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ABSTRACT

This study aims to analyze the effect of resistance band and dumbbell training on the front punch ability of pencak silat athletes and determine the most effective training method. Method: This study used an experimental method with a one-group pretest-posttest design. The population was 20 PPS Jokotole athletes from Bangkalan Regency (aged 16-18 years). Samples were taken using a total sampling technique and divided into two groups: the resistance band group (n=10) and the dumbbell group (n=10). The training was carried out for 6 weeks with a frequency of 3 times/week. The instruments used were a punch force meter (strength) and a speed timer (speed). Data analysis used a paired sample t-test with a significance level of 0.05. Results: The results showed that both groups experienced significant improvements ($p<0.05$). The resistance band group increased their average score from 34 to 71.4 (an increase of 37.4 points), while the dumbbell group increased from 30.9 to 54 (an increase of 23.1 points). The t-test showed a significance value of 0.000 for both groups ($p<0.05$). Conclusion: Resistance band and dumbbell training both significantly affected front punch ability. However, resistance bands were more effective because they could train strength and speed simultaneously. It is recommended that coaches integrate resistance bands into the routine training programs of pencak silat athletes.

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A. Conception and design of the study;
B. Acquisition of data;
C. Analysis and interpretation of data;
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INTRODUCTION

The development of global martial arts shows that muscle strength and power are key indicators for supporting punching, kicking, and defense skills. According to (Anugraha, 2024), resistance training (resistance band training) plays a crucial role in improving neuromuscular abilities, which directly impacts martial arts athlete performance. Furthermore, (Anugraha, 2024) emphasizes that improving punching quality is significantly influenced by progressive weight training that targets specific muscle groups such as the deltoids, triceps, and shoulder muscles. Globally, karate, boxing, and taekwondo athletes have integrated weight training and resistance band training as part of their official training programs to maximize punching speed and power.

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In Indonesia, pencak silat is a rapidly developing competitive sport and is competed in various international events such as the SEA Games and Asian Games. However, challenges in developing regional athletes still include limited training facilities, varying program intensity, and a lack of Implementation of scientific research-based training methods. Research (Dharmadi, 2022) noted that most pencak silat coaches at the regional level still use traditional training patterns without integrating modern strength methods such as resistance bands and dumbbells.

In the context of pencak silat, the front punch is a fundamental technique that plays a crucial role in competition scoring. Accuracy, speed, and power of the punch are factors that determine the effectiveness of an attack. Wirnarno (2021) explained that the front punch requires muscle strength from the shoulders, arms, and upper body stability. Initial observations of PPS Jokotole athletes in Bangkalan Regency showed that some athletes lacked optimal punch power, their punches weakened easily during rapid repetitions, and they still performed poorly on arm strength tests.

Research on resistance and dumbbell training has been conducted in boxing, taekwondo, and general sports, but research specifically examining the effect of the combination of resistance bands and dumbbells on the front punch in pencak silat is still very limited. Several studies (Afiyan, 2023) have shown that resistance training increases arm power, but no research has focused on athletes at the regional level, such as Bangkalan. This is an important research question: does this training method actually improve the front punch ability of regional pencak silat athletes?

To measure the fitness and physical condition of athletes, this study used the Indonesian Physical Fitness Test (TKJI) for the 16–19 age group. Adult athletes at PPS Jokotole are generally between 17 and 18 years old, thus meeting the TKJI classification as young adults. Measuring speed and power variables in this age group is important because it is the phase when physical ability is at its peak.

Based on the description above, this study focused on examining the effect of resistance band and dumbbell training on the front punch ability of pencak silat athletes at PPS Jokotole, Bangkalan Regency. This research is expected to serve as a scientific reference for coaches in designing strength training methods tailored to the needs of local athletes.

METHODS

This study used an experimental method with a one-group pretest-posttest design. The study population was all adult pencak silat athletes at PPS Jokotole, Bangkalan Regency, totaling 20 people (aged 16-18 years). Samples were taken using a total sampling technique, then divided into two groups: the resistance band training group (n=10) and the dumbbell training group (n=10). The research procedures included: (1) a pretest of front punch ability, (2) administering treatment for 6 weeks with a frequency of 3 times/week, and (3) a posttest after the treatment was completed.

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RESULTS AND DISCUSSION

Result

Table 1.
Pre-test and Post-test Result Data Group Resistance Band

No	Athlete Name	Pre-Test	Post-Test	Difference
1.	Alfarezel Askara Krishna	38	75	37
2.	Galang Al Furqoun	31	68	37
3.	Moh. Khoiron Irhais	30	65	35
4.	Bagus Syaiful Rei Fano	31	69	38
5.	R. Zhafir Barraki	38	73	35
6.	Moh. Andry Kurniawan	40	75	35
7.	Esmeralda Kartika Dwiandra	36	74	38
8.	Rika Maharani Rachman	30	73	43
9.	Fhaizha Indian women amalin	31	69	38
10.	Belgian Laila Safitri	35	73	38

Based on the table above can known that all over athletes in the group resistance band experience improvement mark after given treatment. The average pre-test score as big as 34 and rising become 71.4 post-test results. The average increase was 37.4 points show that exercise resistance band give good influence to ability blow front athletes . This is caused by Because resistance band give burden elastic that can increase muscle strength gradually in accordance with movements performed Athletes. Furthermore, resistance bands also help athletes train their punching speed due to the flexible resistance. This significantly contributes to increasing front punch power, which was the primary focus of this study.

Table 2.
Result Data Pre-Test And Post-Test Group Dumbbells

No	Athlete Name	Pre-Test	Post -Test	Difference
1.	Adil Maulana	29	55	26
2.	Nahwan Adiraya Syaputra	32	57	25
3.	Riski Pratama Handoyo	31	53	22
4.	Muhammad Andry Kurniawan	30	52	22
5.	Izul Maulana Riqza	35	61	26
6.	Faizha Wanindia Amalina	33	55	22
7.	Aina Nurin Anggaraini	30	52	22
8.	Siti Masiroh	30	55	25
9.	Syla Dwi Idah	31	51	20
10.	Nazwa Salsabilla Aristia	28	49	21

Based on the results of the study for both groups, it was found that the resistance band group experienced a greater improvement than the dumbbell group. The average improvement for the resistance band group was 37.4 points, while the dumbbell group saw an improvement of 18.4 points. This difference in improvement indicates that the resistance band is more effective in improving the front punch ability of pencak silat athletes. This can be explained because the front punch in pencak silat requires a significant element of power, namely a combination of strength and speed. Resistance bands are better able to train both components than dumbbells, which focus solely on muscle strength.

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The hypothesis testing in this study was conducted to determine whether there was a significant effect of resistance band and dumbbell training on the front punch ability of pencak silat athletes at PPS Jokotole, Bangkalan Regency. The test was conducted by comparing the pre-test and post-test results for each group after receiving the training treatment throughout the study period. The front punch test was administered for 1 minute to measure the athletes' ability to execute punches quickly, accurately, and consistently. Assessments were conducted before training (pre-test) and after the entire training program was completed (post-test). This study used a paired sample t-test because the data being compared came from the same group, before and after the training treatment.

Based on data analysis in the resistance band group, the average pre-test score was 34, while the average post-test score was 71.4. This indicates a 37.4-point increase in athletes' forehand ability after resistance band training. This increase indicates that resistance band training significantly improved athletes' forehand ability. During the 1-minute test, athletes demonstrated an increase in the number of faster, stronger, and more targeted strokes compared to before the treatment. The t-test results showed a significance value of 0.000 < 0.05, thus concluding that resistance band training significantly impacts the front punching ability of pencak silat athletes.

This indicates that resistance band training has been proven effective in increasing arm and shoulder muscle strength, as well as punching speed. The resistance band provides an elastic load that follows the direction of the punching motion, making the training more specific to the athlete's technical movements. Therefore, the hypothesis that resistance band training impacts athletes' front punching ability is accepted.

Based on data analysis for the dumbbell group, the average pre-test score was 30.9, while the average post-test score was 54. This indicates a 23.1-point increase in athletes' front punching ability after dumbbell training. This improvement demonstrates that dumbbell training also impacts athletes' front punching ability. During the 1-minute test, athletes demonstrated a significant increase in the number of punches compared to before training.

Dumbbell training helps increase muscle strength in the arms, shoulders, chest, and other supporting muscles, which play a crucial role in producing powerful punches. The better an athlete's muscle strength, the better their front punch results. The t-test results showed a significance value of 0.000 < 0.05, thus concluding that there is a significant effect of dumbbell training on the front punch ability of pencak silat athletes. Therefore, the hypothesis stating that dumbbell training affects athletes' front punch ability is also accepted.

Comparison of the results of the t-test between the two groups: Based on the results of the study on both groups, it was found that the resistance band group had a higher improvement than the dumbbell group. The resistance band group experienced an increase of 37.4 points, while the dumbbell group experienced an increase of 23.1 points. This difference in results indicates that resistance band training is more effective than dumbbell training in improving the front punch ability of pencak silat athletes.

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This is because resistance bands not only train muscle strength but also directly train movement speed and punch coordination. Meanwhile, dumbbells are more dominant in improving muscle strength alone. In pencak silat, the front punch requires not only strength but also speed, accuracy, and explosive power. Therefore, resistance bands provide more optimal results because they can train all of these components simultaneously.

Based on the statistical test results, it can be seen that both training methods, resistance bands and dumbbells, had a significant effect on improving the front punch ability of pencak silat athletes from PPS Jokotole, Bangkalan Regency. However, resistance band training showed greater improvement than dumbbell training. This proves that resistance bands are a more effective training method for improving athletes' front punch ability. Therefore, the research hypothesis stating that resistance band and dumbbell training have an effect on the front punch ability of pencak silat athletes is accepted and proven based on the results of the study.

Discussion

The results showed that resistance band training resulted in a higher improvement (37.4 points) than dumbbell training (23.1 points). This is because resistance bands use an elastic resistance system that directly follows the direction of the punch. When athletes simulate punches using resistance bands, the arm, shoulder, chest, and core muscles work simultaneously, resulting in optimal power gains. Anugraha et al. (2024) stated that resistance band training can improve neuromuscular abilities, which directly impacts the punching performance of martial arts athletes.

Meanwhile, dumbbell training was more dominant in increasing maximal muscle strength, particularly in the deltoid, triceps brachii, and pectoralis major muscles. These results align with research by Wiriawan & Wibowo (2023), which explains that variations in dumbbell training can significantly increase arm muscle strength and power. However, because the front punch in pencak silat requires not only strength but also speed and explosive power, resistance bands are superior because they can train all three components simultaneously.

This research reinforces the findings of Sahariana et al. (2023) showed that a combination of dumbbell and resistance band training effectively increased arm muscle strength. However, this study's novel contribution is the evidence that for the specific front punch movement in pencak silat, resistance bands provide higher effectiveness than dumbbells due to their variable and more functional resistance properties. Arm muscle strength (push-ups 19.4 ± 3.05 repetitions) and abdominal muscle strength (sit-ups 24.0 ± 3.16 repetitions) showed quite good results. Leg explosive power (vertical jump 45.1 ± 4.31 cm) also showed 30% of athletes in the good category. This is in line with Herianto et al. (2021) who found a positive relationship between leg muscle strength and badminton athletes' smashing ability. Athletes with good leg explosive power tend to be more explosive in performing jump smashes and fast footwork.

CONCLUSION

1. Resistance band training significantly improved the front punch ability of pencak silat athletes ($p<0.05$).
2. Dumbbell training also significantly improved the front punch ability of pencak silat athletes ($p<0.05$).
3. Resistance band training was more effective than dumbbell training in improving front punch ability because it simultaneously trained strength and speed.

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