
The effect of bench press and resistance band exercises on increasing arm muscle power and gyaku tsuki's punching speed results

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ABSTRACT

The aim of the research is to determine the effect of bench press and resistance band training on increasing arm muscle power and the results of gyaku tsuki punch speed in Lemkari Dojo karate athletes at junior high school 4 Medan in 2023. This research uses quantitative experimental methods. The population is 40 people and the research sample is 10 people. Dojo Lemkari karate athletes at Junior High School No 4 Medan by taking samples using purposive sampling technique. Data analysis techniques for normality test, homogeneity test and t-test. Based on the results of the push up test, the hypothesis test obtained a t test value = 60.902 > 1.894, the results of the Gyaku Tsuki punch speed test for the hypothesis test obtained a t test value = 78.125 > 1.894. The results of the research show that there is a significant effect of bench press and resistance band training on increasing arm muscle power and the results of gyaku tsuki punching speed, which is supported by consistent implementation of training with appropriate intensity levels, so as to increase muscle power and punching speed periodically.

Keywords: *Bench Press, resistance band, arm muscle power, gyaku tsuki punch*

ARTICLE INFO

Article History:

Accepted : October 20, 2020
Approved : December 22, 2020
Available Online February 2021

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INTRODUCTION

The martial art of karate originates from Japan. Karate was first known as "Tote", meaning "Chinese Hand", in Okinawa. Due to the high level of Japanese nationalism when karate entered Japan, Sensei Gichin Funakoshi changed the Okinawan kanji to "karate", which means "Empty Hand", to make it more easily accepted by Japanese society. Karate comes from two kanji: "Kara" which means "empty" and "te" which means "hand". If both kanji are combined, it means "empty hand" ([Kurniawan, 2021](#)).

Apart from other blows such as OiTsuki Chudan, Oi-Tsuki Jodan, and Uraken, the gyaku tsuki chudan blow is the blow most often performed by a karate athlete in the committee ([Mar`ati Anwar, 2023](#)). To master the gyaku tsuki punching skills well, a comprehensive training process and stages that include various variations of training are needed ([Hudain & Ishak, 2020](#)). Explosive arm muscles, which means exploding in one movement, will increase

the speed of this gyaku tsuki punch. The speed of gyaku tsuki chudan requires proper training ([Hotliber Purba, 2019](#)). Therefore, trainers must implement exercises carefully and precisely. Increasing the speed of your gyaku tsuki chudan punches can be achieved through weight training. Gyaku Tsuki Chudan is a punch technique that uses the opposite hand to reach the stomach ([Manullang et al., 2014](#)).

According to ([Bafirman & Wahyuri, 2019](#)), punching, kicking and parrying skills are key in karate, which requires high strength, speed and technique. Karate athletes must be in excellent physical condition because the sport often demands extraordinary athletic skills under extremely stressful physical conditions. Therefore, good physical condition is very important to improve athlete performance. In efforts to improve performance in karate, training that can improve all aspects of physical condition is needed. This is because the ability to be in good physical condition is very important for high or low levels of achievement. According to ([Karimah & Mulyana, 2017](#)) states that in general, the aim of training or exercise to improve physical condition is to improve the body's physiological functions by maximizing physical work. This will help achieve sports or exercise goals. For beginners in arm muscle endurance development and training, a wide variety of movements is essential. These movement variations determine the principles of the exercise ([Ginanjari et al., 2022](#)).

According to ([Kadir et al., 2022](#)), "the physical conditions referred to are strength, endurance, flexibility, agility, speed and strength", while ([Supriyoko & Mahardika, 2018](#)) states that "physical condition is one of the prerequisites that is very necessary in efforts to improve an athlete's performance, it can even be said to be the basic starting point for starting a sports achievement". Because each sport has a unique movement style, the physical condition requirements cannot be the same for all sports. This will include the technique and format of the training to be carried out, so that the training meets the needs of the sport in question ([Hernando et al., 2017](#)). Karate, which has developed into a competitive sport, has many unique and artfully crafted moves. Kata and kumite are two types of movements in karate. One of the most important techniques in karate is punching. When executing a punch, it is necessary to have explosive power in the arm muscles because the two are closely related in karate. One of the exercises that can increase the explosive power of the arm muscles is the bench press ([Aprisandy et al., 2019](#)). Of course, there is a need for good and regular training methods so that karate practitioners show good performance. Based on understanding ([Bompa & Buzzichelli, 2015](#)) about the science of biomechanics and exercise physiology, many new products about exercise techniques that were initially believed to improve physical performance can actually be dangerous for them. The main goal of exercise or training is to

achieve satisfactory results rather than further reducing body performance, every athlete must be more selective in choosing their training methods ([Cahyono et al., 2018](#)).

One of the colleges in the city of Medan is the Lemkari dojo junior high school 4 medan college, which accepts the interests and talents of children from the medan area. students at junior high school 4 medan on average attend afternoon training on Tuesdays, Thursdays and Saturdays. Researchers saw karateka performing gyaku tsuki punches during afternoon practice at the junior high school 4 Medan dojo from May 23-25 2023. Researchers found that the gyaku tsuki punches performed by karateka during afternoon practice still appeared to be using inappropriate technique, which means the karateka at junior high school 4 Medan dojo does not have enough strength to deliver the blow.

The researcher found preliminary data that the gyaku tsuki blows taken by the researcher came from the karateka son dojo of Medan junior high school 4. The results of the data showed that the average ability of the gyaku tsuki karateka dojo of junior high school 4 Medan was categorized as poor. After looking at the data from the analysis of push ups and gyaku tsuki punch speed, it can be concluded that because gyaku tsuki punches are widely used in karate, a person must have good gyaku tsuki punch strength. The most crucial thing in the Gyaku Tsuki punch technique is the components of explosive power and eye and hand coordination, because these two components support the Gyaku Tsuki punch well and correctly ([Maulana et al., 2023](#)).

Reviewing this gap, it is necessary to have training and tools that will support improving the gyaku tsuki stroke. One type of exercise with weights is the bench press, which aims to increase the strength of the upper body muscles, such as the shoulders, arms and chest, by using weights from barbells ([Prabowo, 2016](#)). The same thing was stated by ([Nurtamami & Sulistyarto, 2022](#)) which states that the power lifting equipment that is widely used in heavy training aimed at increasing body formation is the bench press, a type of weight training that focuses on the growth of the chest and arm muscles (deltoid and triceps).

Bench press training is known to increase punch speed. This is in line with research conducted by ([Latuheru & Rizal, 2020](#)) entitled the effect of bench press training on straight punch speed in boxing. The results show that bench press training has a significant effect on punch speed.

Resistance Bands are a sports tool used to train arm strength which is elastic in nature and can increase strength with a very important technical approach. The use of Resistance Bands really helps with varied exercises to increase arm strength because they have stronger resistance level specifications, a weight equivalent to 12.4 kg, and extraordinary elasticity

([Ratno & Simanjuntak, 2022](#)). Some forms of Resistance Bands are as follows: a) Tube form made of rubber, which can be adjusted in length and has handles on both hands and feet; b) The basic form is made of rubber, which is quite long and more stable because it is wider, but the disadvantage of this basic form is that it tears easily due to friction; and c) Silicone forms, which have a unique non-adjustable shape, are made from silicon ([Ali et al., 2022](#)).

Another opinion was expressed by ([Waskito & Yusradinafi, 2021](#)) that Resistance bands are easy-to-carry fitness tools made of rubber and used in pencak silat to increase speed with the crescent kick style. This is because the trainer does not provide different training. According to ([Mardhika, 2016](#)) Resistance training is an integral part of almost every mode of athletic training and has become a popular mode of recreational exercise for many physically active individuals.

Apart from that, using resistance bands can increase arm muscle strength. This is confirmed by research conducted by ([Persadanta et al., 2020](#)) with the research title "The effect of resistance band exercise on the muscle power of Muay Thai athletes". The research results show that resistance bands can increase arm muscle power results with a confidence level of 95%. Arm muscle strength plays a role in strength and speed when executing a punch. Therefore, every athlete is expected to be able to carry out regular training procedures to increase arm muscle power ([Priyoko & Januarto, 2022](#)).

From the description above, it is clear that there is a strong relationship between bench press and resistance band training, which includes different physical conditions and gyaku tsuki stroke styles. Physical factors such as endurance, strength, speed, and strength. The focus of this physical conditioning training is the gyaku tsuki punch. This is in line with research conducted by ([Lamusu & Lamusu, 2023](#)) with the research title "arm muscle strength and blow speed in gyaku tsuki chudan karate students". The results of the research conducted showed that arm muscle strength and gyaku tsuki punch speed had a significant relationship.

Based on the explanation of the problem above, researchers want to conduct research to find out whether there is an effect of bench press and resistance band training on increasing arm muscle power and the results of gyaku tsuki punch speed in karate athletes at Lemkari dojo junior high school 4 Medan in 2023. The main reason is that researchers can increase the strength of Gyaku Tsuki's punches through the training they provide. In karate, gyaku tsuki blows are also often performed during matches. Based on the results of the analysis of both the Gyaku Tsuki punch speed test and the arm muscle strength test, researchers found that Kayla, Chelsea, Revi, Liza, Naila, and Fitri, Aisyah, Okta, and Revi were considered to have low levels of arm muscle strength. Thus the title of this research is "The Effect of Bench Press and

Resistance Band Training on Increasing Arm Muscle Strength and Gyaku Tsuki Punching Speed Results in Karate Athletes at LEMKARI Dojo junior high school 4 Medan in 2023".

METHOD

In accordance with the research objectives, this type of research uses quantitative research with experimental methods. Before conducting the experiment, the researcher first took initial data, then provided treatment for 6 weeks with training intensity 3 times a week ([Nebahatqoru et al., 2021](#)). This research was conducted over two months, namely September-October 2023, with 18 meetings with an intensity of 3 times a week. The subjects in this research were karate athletes from Lemkari Dojo, junior high school 4 Medan. The sampling technique used was purposive sampling with the sample criteria determined by the researcher, namely female. The underlying reason for sampling was only female athletes, because based on the results of observations of athletes who did not have optimal arm muscle power and punch speed, they were only found in female athletes. Apart from these criteria, another criterion is 15-17 years old. The following table shows the average height and weight of the research sample.

Table 1.average height and weight of the sample

No	Initials	Age	TB	BB
1	KY	17 years	157 cm	53 kg
2	CS	15 years	158 cm	47 kg
3	FT	15 years	154 cm	43 kg
4	RV	15 years	154 cm	48 kg
5	LZ	15 years	153 cm	42 kg
6	AS	17 years	158 cm	52 kg
7	OT	17 years	160 cm	55 kg
8	NL	15 years	155 cm	50 kg

Athletes are at kyu level 2 and 1 (blue and brown belts), actively participating in training, willing to be samples, mentally and spiritually healthy. So, according to the criteria specified above. So a sample of 8 athletes with the appropriate criteria was drawn. A research instrument is a data collection tool used to measure observed natural and social phenomena ([Sahir, 2021](#)). The instruments used in this research are divided into two. The first instrument used was the

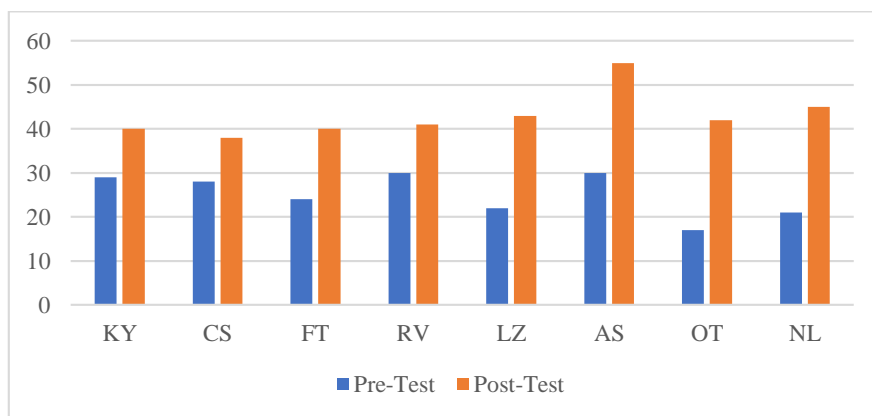
push up test which was carried out in two phases, namely: (1) Initial phase; Face down position, both arms are straight, body weight is supported by both hands and a small part by the tips of the feet. Head upright and from waist to head in a straight line, and (2) Implementation phase; The body is lowered by bending both arms so that the chest almost touches the floor. The second instrument is that researchers use a target hitting test with speed to measure hitting speed. They used a measuring tool for arm strength with target hits with a validity of 0.76 and a reliability of 0.82. The data analysis technique used is a prerequisite test consisting of a normality test and homogeneity test, then a hypothesis test.

RESULTS AND DISCUSSION

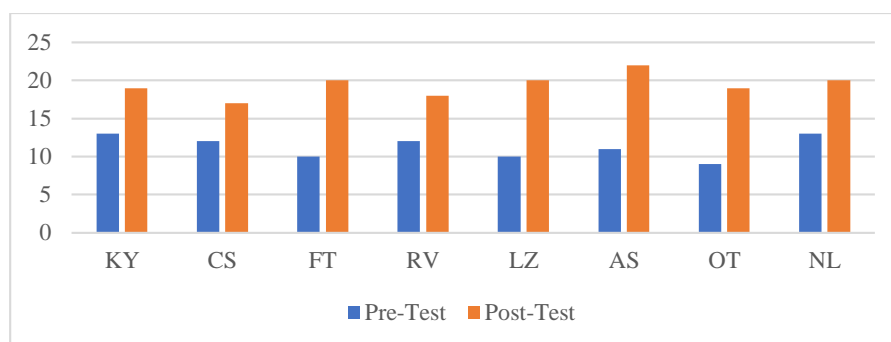
Results

Description of pre-test and post-test data on the effect of bench press and resistance band training on increasing arm muscle power and gyaku tsuki punch speed results in karate athletes at Lemkari Dojo junior high school 4 Medan in 2023. The aim of this research is to determine whether bench press training and resistance bands increase arm muscle power and gyaku tsuki punch speed.

The treatment given is by providing bench press and resistance band exercises to increase arm muscle power and gyaku tsuki punch speed so that with this it is hoped that these exercises can increase arm muscle power and gyaku tsuki punch speed where the treatment and training is given for 6 weeks or even 18 meetings so that with the training meetings that the researchers conducted, several hypotheses emerged that were proposed by showing them in graphical form. The test and measurement results show a histogram of pre-test and post-test data.



Picture1. Pre-test and post-test results of arm muscle power



Picture2. Pre-test and post-test results of Gyaku Tsuki's punch speed

To determine whether the proposed hypothesis is true or not, statistical analysis is carried out on the data that has been collected. The following is a description of pre-test and post-test data from measurement results that have been processed statistically:

Table 2. Pre-test and post-test results of bench press and resistance band training on increasing arm muscle power

No	Name	Pre-Test	Post-Test
1	KY	29	40
2	CS	28	38
3	FT	24	40
4	RVs	30	41
5	LZ	22	43
6	US	30	55
7	OT	17	42
8	NL	21	45
Number of samples (n)		8	
Average		25,125	43
Standard deviation		4,853	5,291
Average difference		17,875	
The standard deviation is different		6,642	
T-count		60,902	
T-table		1,894	

According to the pre-test results From the analysis of the results of the push up test carried out by the Lemkari Dojo college karateka JUNIOR HIGH SCHOOL 4 Medan, an average value of 25.125 was found and a standard deviation of 23.553 was found. The standard deviation is 28 and the post-test average is 43. The average difference between the pre- and post-test averages is 17.875, and the standard deviation is 6.642. So the value obtained for Tcount>Ttable is 60.902 for t-count and 1.894 for t-table.

Table 3.Pre-test and post-test results of bench press and resistance band training on Gyaku Tsuki punch speed results

No	Name	Pre-Test	Post-Test
1	KY	13	19
2	CS	12	17
3	FT	10	20
4	RVs	12	18
5	LZ	10	20
6	US	11	22
7	OT	9	19
8	NL	13	20
Number of samples (n)		8	
Average		11,25	19,375
Standard deviation		1,488	1,505
Average difference		8,125	
The standard deviation is different		2,356	
T-count		78,125	
T-table		1,894	

According to the pre-test results From the analysis of the results of the punch speed test carried out by the Lemkari Dojo college karateka JUNIOR HIGH SCHOOL 4 Medan, an average value of 11.25 was obtained and a standard deviation of 1.488 was found. The standard deviation is 1.505 and the post-test average is 19.375. The average difference between the

means before and after the test is 8.125, and the standard deviation difference is 2.356. So the value obtained for $T_{count} > T_{table}$ is 78.125 for t-count and 1.894 for t-table.

Normality test

The normality test is used to determine whether research findings are normal. tested both before and after testing. The normality test formula used in this research is the Liliefors test. If the conditions in the table $0.05 L_{count} < L_{table}$ are met then the data is considered normal.

Table 4. Results of Research Data Normality Test

Data	Lcount	Table	Information
Pre-test push ups	0.157	0.285	Normal
Post-test push ups	0.25	0.285	Normal
Pre-test punch speed	0.174	0.285	Normal
Post-test punch speed	0.213	0.285	Normal

With $n = 8$ and a significance level of 0.05, $L_{count} = 0.157$ and $L_{table} = 0.285$ calculated from pre-test push up data. $L_{count} = 0.25$ and $L_{table} = 0.285$ with $n = 8$ and a significance level of 0.05 obtained from post test push up data, $L_{count} = 0.174$ and $L_{table} = 0.285$ calculated from pre-test punch speed data. $L_{count} = 0.213$ and $L_{table} = 0.285$ with $n = 8$ and a significance level of 0.05 obtained from post test data on punch speed. It can be concluded that the sample comes from a population with a regularly distributed population because $L_{count} < L_{table}$.

Homogeneity Test

Table 5. Homogeneity Test Results

Exercise	Data	Variant	Fcount	Ftable	α	conclusion
Bench press exercises and Resistance bands	pre-test push ups	4,853	1,090	3.79	0.05	homogeneous
	Post-test push ups	5,291				
Resistance bands	Pre-test punch	1,488	1,011	3.79	0.05	homogeneous
	Punch post-test	1,505				

Based on the results of the push up test calculations attached, the result is $F_{count} = 1.090$ at the $\alpha = 0.05$ level, $F_{table} (7,7) = 3.79$. So $F_{count} 1.090 < F_{table} 3.79$. The conclusion is drawn that the research data is homogeneous.

Hypothesis testing

The findings calculated on the push up test show that the hypothesis T count is 60.902. The difference between this result and the Ttable value with $dk = n - 1$ ($8 - 1 = 7$) is 1.894 at a significance level = 0.05. The findings calculated on the stroke speed test show that the hypothesis Tcount is 78.125. The difference between this result and the Ttable value with $dk = n - 1$ ($8 - 1 = 7$) is 1.894 at a significance level = 0.05. Therefore, it is determined that in 2023 bench press and resistance band training will significantly increase arm muscle power and gyaku tsuki punch speed results in karate athletes from Lemkari dojo at junior high school 4 Medan. This is in line with research conducted by (Fella Maifitri, 2018) in his research entitled "The Effect of Weight Training Using the Bench Press on the Explosive Power of Karate Athletes' Arm Muscles" that weight training using the bench press has an effect on the explosive power of the arm muscles of UK UNP karate athletes.

Discussion

To make it easier to draw conclusions from research findings, the analysis of research data is discussed in terms of its findings. Karate athletes at Lemkari Dojo junior high school 4 Medan, there is a significant effect of large increases in power due to bench press and resistance band training, according to debates based on research findings. The explanation above makes it clear that bench press and resistance band training has a high impact on power. This research examines the effect of bench press and resistance band training on increasing arm muscle power and gyaku tsuki punch speed in karate athletes at Lemkari Dojo junior high school 4 MEDAN in 2023.

The results of this research are in line with research conducted by ([Hidayat et al., 2019](#)) which shows that, by looking at the difference between the initial and final test results, bench press training has an impact on the speed of the pencak silat stroke. Bench press exercises strengthen the arm muscles so that athletes can make the best punches. Another opinion is expressed by research that has been carried out by ([Mahfud et al., 2022](#)) in his research which states that resistance bands can have a significant effect on punch power.

([Kadir et al., 2022](#)), "the physical conditions referred to are strength, endurance, flexibility, agility, speed and strength", while ([Supriyoko & Mahardika, 2018](#)) states that "physical condition is one of the prerequisites that is very necessary in efforts to improve an athlete's performance

The procedure carried out is by providing bench press and resistance band training for 6 weeks or a total of 18 meetings which provide new things in terms of training and experience, especially to athletes and coaches, by providing bench press and resistance band training,

significant improvements occur. on the results of increasing the power and speed of the gyaku tsuki punches that have been trained. The following is an explanation of the influence of bench press and resistance band training to increase arm muscle power and results of gyaku tsuki punch speed in karate athletes at Lemkari dojo at junior high school 4 Medan in 2023:

Bench Press

Bench press training has a positive influence on increasing arm muscle strength and the results of gyaku tsuki punch speed in karate athletes at Lemkari dojo junior high school 4 Medan in 2023. This is because bench press training develops the strength of the upper body muscles, including the shoulder, arm, and chest muscles. and chest. This movement involves the use of external weights to lift and lower the weight, which provides an effective stimulus to increase arm muscle strength. Arm muscle strength is important in karate because movements such as punches and blocks require strength and coordination of the arm muscles to be performed with high speed and accuracy.

Bench press exercises also increase arm muscle power, which is important in karate to increase the speed and power of punches. Arm muscle strength is related to the ability to produce fast and powerful movements, which is very relevant in karate movements such as the gyaku tsuki punch. Bench press exercises help increase arm muscle power by providing an effective stimulus to develop the strength and speed of the muscles involved in these movements. Bench press exercises also help improve balance and coordination of the body's muscles.

Apart from that, using resistance bands can increase arm muscle strength. This is confirmed by research conducted by [\(Persadanta et al., 2020\)](#) with the research title "The effect of resistance band exercise on the muscle power of Muay Thai athletes". The research results show that resistance bands can increase arm muscle power results with a confidence level of 95%. Arm muscle strength plays a role in strength and speed when executing a punch. Therefore, every athlete is expected to be able to carry out regular training procedures to increase arm muscle power [\(Priyoko & Januarto, 2022\)](#).

By increasing the strength and power of the arm muscles, karate athletes can perform movements better, which is important in karate to avoid opponent attacks and carry out effective attacks. Better coordination also helps karate athletes perform more complex movements with more power and speed

Resistance Bands

Resistance band training has a positive influence on increasing arm muscle power and the results of gyaku tsuki punch speed in karate athletes. This is because Resistance band

exercises develop the strength of the arm muscles by providing adjustable resistance. This helps karate athletes in increasing the arm muscle strength necessary to deliver blows with greater force. Arm muscle strength is important in karate because movements such as punches and blocks require strength and coordination of the arm muscles to be performed with high speed and accuracy. Apart from strengthening muscles, resistance bands can also be used to train flexibility and body mobility. This is very useful for reducing the risk of injury and improving joint health.

This is in line with the opinion of Frank et al, ([Ismayawati, 2016](#)) where the combination of resistance band training is very effective in increasing jump height and leg strength, increasing speed and agility. Apart from that, training using resistance bands can also increase joint strength and can be used for aerobic exercise. Resistance bands are a sports tool that minimizes injury because they don't have too much weight. This makes it safe for use by people just starting to train or those in the process of recovery. So, based on the overall research results, it can be seen that the form of bench press and resistance band training has a positive influence on increasing arm muscle strength and the results of the gyaku tsuki punch speed.

This research has several limitations. First, this research is limited to one place, namely junior high school 4 Medan. The research might be a little different if it was done elsewhere. However, the possibility does not deviate much from research findings. Second, a factor that can hinder research is the short time. so that it can influence the research results. Third, the research subjects only discussed the significant influence on increasing arm muscle strength and the results of gyaku tsuki punch speed in LEMKARI dojo karate athletes at junior high school 4 Medan in 2023, especially female athletes.

CONCLUSION

From the results of the hypothesis testing that has been carried out, it can be concluded that bench press and resistance band training have a significant influence on increasing arm muscle power and the results of gyaku tsuki punch speed in karate athletes from LEMKARI dojo at SMP Negeri 4 Medan in 2023. The push up test results show the hypothesis T count is 60.902; the difference between this result and the Ttable value with $dk = n - 1$ ($8 - 1 = 7$) is 1.894 at the significance level = 0.05. The results of the punch speed test show that the hypothesis Tcount is 78.125; the difference between this result and the Ttable value with $dk = n - 1$ ($8 - 1 = 7$) is 1.894 at the significance level = 0.05. As a result, in 2023, karate athletes from junior high school 4 Medan Lemkari Dojo found that their arm muscle strength had increased significantly by using the bench press and resistance bands. The implications for further research and several

relevant parties based on the results of this research are as follows. It is hoped that this research will make a greater contribution to sports science and athletic development, especially karate. It is hoped that coaches, athletes and sports teachers will gain a better understanding of proper training techniques. Therefore, they must be able to choose the right training for each sport in order to contribute to improving sports performance, and to develop sporting achievements, appropriate training must be implemented in order to produce outstanding athletes.

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