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Differences in the Effects of Heavy Bag Thrust and Resistance Band Training On Arm Muscle Power in Lion Dojo Karate Athlete of the Year 2024

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Abstract
This study aims to determine the Differences in the Effects of Heavy Bag Thrust and Resistance Band Training on Arm Muscle Power of Singa Dojo Karate Athletes in 2024. The research method used is the experimental method. The sampling technique used is purposive sampling. The number of athlete samples used was 16 people. This research was conducted at the Srigunting Complex, Block P. No. 50, Medan Sunggal District, Medan City, for 6 weeks with a training frequency of 3 (three) times a week. Statistical calculations using the t-test.The first hypothesis analysis uses pre-test and post-test data from the Heavy Bag Thrust exercise group on Arm muscle Power, where the t count is 4.705, the t table value is obtained with df = n - 1 (8 - 1 = 7) at a significant level of α = 0.05 is 1.894, thus t count> t table (4.705> 2.1318). Thus, it means that ho is rejected and ha is accepted, so it can be concluded that there is a significant effect of Heavy Bag Thrust exercise on the Arm muscle Power of the 2024 Singa Dojo Karate Athletes. The second hypothesis analysis uses pre-test and post-test data from the Resistance Band exercise group on Arm muscle Power, where the t count is 6.263, the t table value is obtained with df = n - 1 (8 - 1 = 7) at a significant level of α = 0.05 is 1.894, thus t count> t table (6.263> 2.1318). Thus it means that ho is rejected and ha is accepted, so it can be concluded that there is a significant effect of Resistance Band training on the arm muscle Power of Dojo Singa Karate Athletes in 2024.The third hypothesis analysis uses post-test and post-test data from the Heavy Bag Thrust and Resistance Band training group on Arm muscle Power, where the tcount is 68.10, the ttable value with dk = n - 1 (8 - 1 = 7) at the significant level α = 0.05 is 1.894, thus tcount > ttable (68.10 > 2.1318). This means that ho is rejected and ha is accepted, so it can be concluded that the Heavy Bag Thrust training variation has a significantly greater influence on the arm muscle power of the 2024 Singa Dojo karate athletes.

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1. INTRODUCTION

Sports are essential because they are inseparable from one of the most basic human activities: movement (Rofiqoh & Wiriawan, 2024). All age groups, from children to grandmothers, enjoy sports. Participation in athletic activities has a positive effect on mental and physical well-being. Karate is a type of martial art that involves the use of skilled and naturally gifted unarmed fighters with the ability to cause devastating damage. High levels of aggression are characteristic of this sport (Novak, Loncar, Sinkovic, Barbaros, & Milanovic, 2023). The mental attitude taught in martial arts is as important as physical strength and strong fighting techniques. Some examples of this mental attitude include high levels of aggression, lack of self-control, and the courage to be disciplined (Geng, Xu, Ning, & Liu, 2023).

Competing at a high level in karate matches requires a lot of knowledge and practice, as well as a lot of self-confidence. Yasir et al. (Zhang, Wang, Sha, & He, 2021) asserted On April 14, 2010, the founders of Dojo Singa located in the Sri Gunting Blok P complex, determined to create an environment that allows everyone's hidden talents to develop. One of the karate schools recognized by FORKI North Sumatra is Dojo Singa Medan. Experienced and certified at the national and international levels, Sensei Nofri Gentawan trains students at this Dojo Singa school and has a fairly large student population in Medan. Athletes from Dojo Singa have achieved great success, namely, five gold medals, eight silver medals, and three bronze medals were won by Dojo Singa athletes at the 2024 Medan city collaboration circuit match (Honchar, Gantcheva, Borysova, & Kovalenko, 2022).

On Tuesday, Wednesday, and Friday at 19.00 WIB-21.00 WIB, I observed the Dojo Singa athletes during their training sessions on May 6, 2024 to May 20, 2024 (Wea, 2021). The athletes seemed to lack arm muscle power because their movements were still very slow when hitting, making it easy for opponents to block or even block their attacks (Purnamasari, Novian, Febrianty, & Rismayadi, 2024). Therefore, the researcher found that the arm muscle power of Dojo Singa karate athletes still needed to be improved and increased, so the researcher provided the form of Heavy Bag Thrust and Resistance Band training (Blkoor et al., 2023).

Physical fitness, game strategy, skills, and mental readiness are important factors in the success of karate sports. Maintaining prime physical fitness is the first and most important step in honing the skills that are very much needed by successful karate athletes in any sport. The ability to demonstrate karate skills depends greatly on the extent to which one has mastered both the basics of the art as a whole and the explosive movements that are part of it (Chen et al., 2021). An athlete's power determines the power of his punches, jump height, running speed, and other biomotor abilities, making it a vital component of a sport like karate (Palimi, Tang, Alvarez, Kuru, & Li, 2022).

Power is the ability of muscles to exert maximum force in a very short time. The focus of this study is on arm muscle power (Risnawati, Humaid, & Sulaiman, 2024). This is considering the fact that many Singa Dojo karate practitioners still lack good and suboptimal arm muscle power. Therefore, the researcher provides a heavy bag thrust and resistance band training program designed to increase arm muscle power (Hariadi & Winarni, 2021). In accordance with the observations made by the researcher, the researcher provides Heavy Bag Thrust and Resistance Band training treatments to Dojo Singa karateka to find out how the differences in the effects of these exercises affect arm muscle power (Johan et al., 2023).

The researchers chose the heavy bag thrust and resistance band training variables, namely:

1. In karate training there are punches or attacks that use the arm muscles, such as the gyaku zuki, oi zuki, and yama zuki punches.
2. In heavy bag thrust training, which involves pushing the punching bag with your arms, it is the same as when you punch, there is a push that involves the arm muscles so that heavy bag thrust training can increase the power of the athlete's arm muscles.
3. Resistance band training is training that uses elastic rubber tied to a pole and pulled with the arms so that there is a push that can increase the athlete's arm muscles in attacking with punches.

2. METHODS

This research will be conducted at Dojo Singa located in the Srigunting complex, Block P. No. 50, Medan Sunggal District, Medan City, North Sumatra Province. In this study, 18 meetings will be held. Where the meeting will be held 3 times a week at 19.00 to 21.00 WIB. So that this

research lasts for 6 weeks, it is expected that according to the research plan it will begin in October 2024 (Jariono, Nurhidayat, Sudarmanto, Nyatara, & Marganingrum, 2021).

Population can be interpreted as all elements in research including objects and subjects with certain characteristics and characteristics (Jusuf, Khatimah, Rahmawati, Mahardhika, & Santoso, 2020). So in principle, the population is all members of a group of humans, animals, events, or objects that live together in a place that has been planned to be the conclusion of the final results of a study (Mahendra, 2021). So the population is not only people, but also organizations, animals, human works and other natural objects (Davies et al., 2025). The population used was Dojo Singa Medan karate athletes totaling 40 people.

According to Sugiyono (Hidayat Cakrawijaya, 2021) states that: "A sample is a portion of the number and characteristics possessed by a population." Sample determination is carried out using the Purposive Random Sampling technique, which is a technique or method of sampling that uses the principle of probability in determining its sample elements (Puriana, Putranto, Aran, & Azmi, 2024). The sample in this study was taken based on the following requirements:

a) Registered and active as a Singa Dojo Medan athlete.
b) Not currently being sampled for other research.
c) Willing to be a research sample.
d) Blue and Brown Belt

So, we obtained part of the total sample needed, namely 16 people, who will be used as samples in this study (Lockie, Orr, & Dawes, 2022).

This study uses experimental techniques (Sukmawati, Dlis, & Pelana, 2020). Sugiyono (Same, 2021) defines experimental research techniques as a quantitative approach that uses experiments to determine the impact of independent variables (treatments) on dependent variables (outcomes) in a controlled setting. Hypothesis testing uses a t-test by comparing the mean between pre-test and post-test. If the t-count value is smaller than the t-table, then Ha is rejected, if the t-count is greater than 1 table, then Ha is accepted (Genç & Ciğerci, 2020).

3. RESULTS AND DISCUSSION

Description Research result

Pre-Test and *Post-Test* Data on the Difference in the Effect of *Heavy Bag Thrust* and *Resistance Band* Training on Arm Muscle Power of Dojo Singa Karate Athletes in 2024

The following is a graph of the *pre-test* and *post-test data for the Medicine Ball Thrust* exercise group of *the Heavy Bag Thrust* .

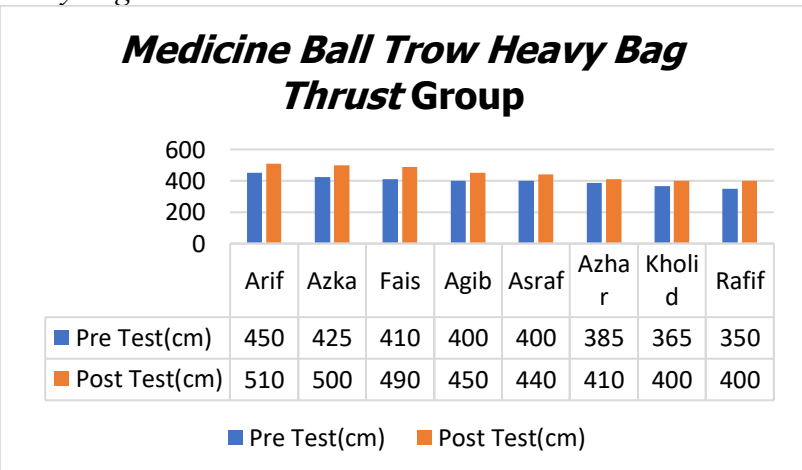

Figure 1. Graph *Pre-Test* And *Post-Test Medicine Ball* Trow *Heavy Bag Thrust Group*

pre-test results for the arm muscle *power of the Heavy Bag Thrust* exercise group can be seen . with the *Medicine Ball Trow test instrument* , data was obtained with an average *pre-test* of 390 ,

a *variance* value of 1,020 and a standard deviation of 31.9 . Then for the *post-test value* with an average of 4.50 , a variance value of 2,057 and a standard deviation of 4.5.3. The following is a graph of the *pre-test* and *post-test data of the Medicine Ball Trow Resistance Band* exercise group .

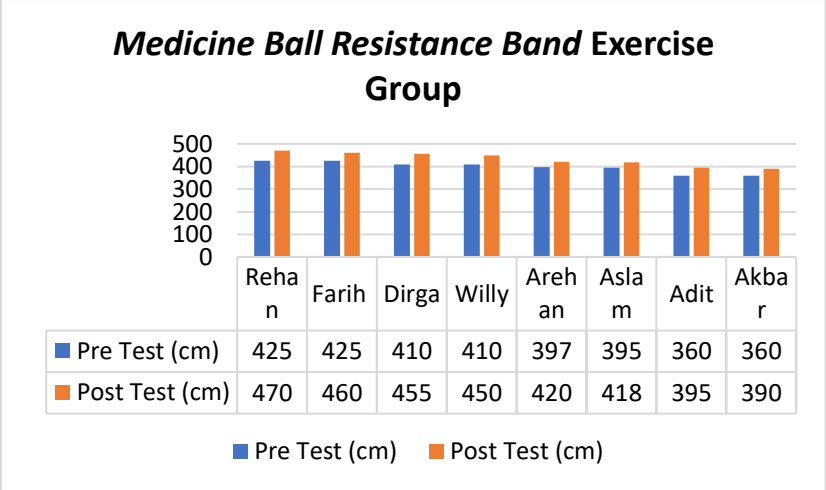

Figure 2. Graph *Pre-Test* And *Post-Test Medicine Ball* Trow *Resistance Band Group*

pre-test results for the arm muscle *power of the Resistance Band* training group can be seen . with the *Medicine Ball Trow test instrument* , data was obtained with an average *pre-test of* 397.7 , a variance value of 663.3 and a standard deviation of 25.7 . Then for the *post-test value* with an average of 4 32.2, a variance value of 936.2 and a standard deviation of 30.6.

Statistical Requirements Testing

Arm Muscle Power Normality Test

Table 1. Results Test Normality Data *Pre-Test* And *Post-Test Heavy Bag Thrust* Exercise Group Against Arm Muscle Power Lion Dojo Karate Athlete of the Year 2024

Variables	Average and Deviation standard	*LO*	*Ltabel*	*α*	Note
Data *pre-test Medicine Ball Trow* Kelompok Latihan *Heeavy Bag Thrust*	X =390,7 S =26,04	0,088212	0,285	0,05	Normal
Data *post-test Medicine Ball Throw* Kelompok Latihan *Heeavy Bag Thrust*	X =450 S =45,3	0,186089	0,285	0,05	Normal

Arm Muscle Power Normality Test

Table 2. Results Test Normality Data *Pre-Test* And *Post-Test Resistance Band* Training Group Against Arm Muscle PowerLion *Dojo Karate Athletes* 2024

Variables	Average and Deviation standard	*LO*	*Ltabel*	*α*	Note
Data *pre-test Medicine ball Trow Resistance Band* Exercise Group	X = 397.7 S = 25.7	0.178634	0.285	0.05	Normal

Data *post test Medicine Ball Throw Resistance Band* Exercise Group	X = 432.2 S = 30.5	0.155554	0.285	0.05	Normal

Homogeneity Test

Arm Muscle *Power* Homogeneity Test

Table 3. Results of the Homogeneity Test of *Pre-Test* and *Post-Test Data of the Heavy Bag Thrust* Training Group on Arm Muscle *Power of Dojo* Singa Karate Athletes in 2024

Homogeneity Test	F_{hitung}	F_{tabel}	α	df(n-1)	Information
Pre-test Variance And *Post test*	2,016	4.47	0.05	7	Homogeneous

Homogeneity testing for each treatment is complemented by a change test at the level of interest α = 0.05 between *the pre-test* and *post-test* for the results of *the Medicine Ball* Thrust homogeneity test between the pre-*test* and *post-test data Medicine Ball* Thrust $F_{\text{table value}}$ for α = 0.05 obtained $F_{\text{table}} = 4.74$. And $F_{Hitung} = 2.016$ This means that $F_{\text{count}} < F_{\text{table}}$ (2.016) < (4.74). So it can be concluded that the *pre-test post-test* data of the *Heavy Bag Thrust* Exercise group are homogeneous .

Arm Muscle *Power* Homogeneity Test

Table 4. Results of the Homogeneity Test of *Pre-Test* and *Post-Test Data of the Resistance Band* Training Group on Arm Muscle *Power of Singa Dojo* Karate Athletes in 2024

Homogeneity Test	F_{hitung}	F_{tabel}	α	df(n-1)	Information
Pre-test Variance And *Post test*	1,497	4.74	0.05	7	Homogeneous

Homogeneity testing for each treatment is complemented by a change test at the level of interest α = 0.05 between *the pre-test* and *post-test* for *Resistance Band* homogeneity test between *pre-test* and *post*-test *data Resistance Band F* $_{\text{table}}$ value for α = 0.05 obtained $F_{\text{table}} = 4.74$. And $F_{Hitung} =$ 1.497 This means that $F_{\text{count}} < F_{\text{table}}$ (1.497) <(4.74). So it can be concluded that the *pre-test post-test data of the Resistance Band* Exercise group is homogeneous .

Hypothesis Testing

After conducting normality tests and homogeneity tests, a hypothesis test was conducted to see the difference in the effect of Heavy Bag Thrust and Resistance Band training on the Arm Muscle Power of Dojo Singa Karate Athletes in 2024.

Hypothesis test value t with dk = n – 1 = 8– 1 At the real stage □ = 0.05 = 1.894 which means t_count>t_table =8.807>1.894 H_(0) is rejected and H_a is accepted. In this case, it can be concluded that the variation of Heavy Bag Thrust training has a significant effect on the Arm Muscle Power of Dojo Singa Karate Athletes in 2024

Hypothesis value t with dk = n – 1 = 8 – 1 1 At the real stage □ = 0.05 = 1.894 which means t_count>t_table = 11.16> 1.894 H_(0) is rejected and H_a is accepted. In this case it can be concluded that the variation of Resistance Band training has a significant effect on the Arm Muscle Power of Dojo Singa Karate Athletes in 2024

Hypothesis value t with dk = n – 1 = 8 – 1 At the real stage □ = 0.05 = 1.894 which means t_count> t_table = 68.10> 1.894 H_(0) is rejected and H_a is accepted. In this case it can be concluded that the variation of Heavy Bag Thrust training has a significant effect on the Arm Muscle Power of Dojo Singa Karate athletes in 2024.

Discussion of Research Results

To facilitate drawing conclusions from the research results, the results of the data analysis are discussed. Testing the first and second hypotheses shows that resistance band and heavy bag thrust exercises have a significant effect on the arm muscle strength of Singa Dojo Karate participants in 2024. Arm muscle power in this study used resistance band and heavy bag thrust exercises. Heavy Bag Thrust is an exercise to push a punching bag with the left and right hands alternately. This exercise also involves the arm muscles and pelvic muscles which are designed to work and train them continuously. With regular training, it is hoped that the muscle's ability to perform tasks will develop. The purpose of heavy bag thrust training according to Apriyanto (2010:34) is to strengthen the upper limbs, especially the arm muscles. The punching bag used in the Heavy Bag Thrust exercise is hung on a rope. The abdominal muscles, external obliques, deltoids, triceps, pectoralis, biceps (arms), taraphezeus, and hip extensor muscles are all trained during heavy lifting movements. Heavy lifting exercises are ideal for throwing movements (Adianto, 2022).

Elastic rubber training aids called resistance bands are intended to improve muscle strength and flexibility. Since this equipment has varying levels of resistance, it can be used by a variety of athletes, from beginners to experts. The mobility of Resistance Bands is one of its benefits, allowing users to train anywhere (Kumar & Zemková, 2022). A variety of exercises, such as warm-ups, rehabilitation, and strength training, are also available with this equipment. Using resistance bands can also reduce the chance of injury because they put less stress on the joints compared to heavy weights. As a result, resistance bands are a versatile and efficient tool for training almost every muscle. The findings from the initial hypothesis data analysis on how heavy bag push training affects the arm muscle strength of Dojo Singa athletes in 2024 showed that Ha was accepted and Ho was rejected based on the results of the t-test. The conclusion in this case is that the Heavy Bag Push training variant significantly affects the Arm Muscle Strength of Dojo Singa karate participants in 2024. The findings of the second hypothesis analysis, which examined how resistance band training affects the arm muscle strength of Dojo Singa athletes in 2024, showed that Ha was accepted while Ho was rejected based on the results of the t-test. The Arm Muscle Strength of Dojo Singa karate participants in 2024 was significantly affected by the Resistance Band training modification in this case (Yuwono, Rahayu, Sulaiman, & Rustiadi, 2020). Examination of the third hypothesis data revealed that, in 2024, the arm muscle strength of Dojo Singa athletes was more affected by the heavy bag push training than by the resistance band (Tritama, Purnama, & Syaifullah, 2022). Based on the t-test findings, Ho was accepted and Ha was rejected. Thus, it can be said that the resistance band training variant had a significantly greater impact on the arm muscle strength of Dojo Singa karate athletes in 2024 (TOBBY, 2023).

All three hypothesis tests showed that, in terms of increasing arm muscle strength of the 2024 Singa dojo karate athletes, heavy bag thrust training had a significantly greater impact than resistance band training.

4. CONCLUSION

Based on the research results above, the following conclusions can be drawn:

1. There is a significant effect of heavy bag thrust training on the arm muscle strength of Singa Karate Dojo athletes in 2024.
2. There is a significant effect of resistance band training on the arm muscle strength of Singa Karate Dojo athletes in 2024.
3. The Heavy Bag Thrust Training Group Has a Significantly Greater Influence Than the Resistance Band Training Group on the Arm Muscle Power of Karate Dojo Singa Athletes in 2024.

5. SUGGESTION

Based on the results of the study using two different forms of training, the researcher in this case provides suggestions that can be used as considerations to improve the performance of men's hanging long jump:

1. For coaches to provide more varied training as an effort to reduce athlete boredom during training and pay more attention to forms of training that are appropriate for the athlete.
2. Physical education teachers, coaches can use Heavy Bag Thrust exercises and Resistance Band exercises as a form of Arm Muscle Power training program.
3. For readers who plan to conduct similar research, it is recommended to conduct research with the same title, but with more groups and samples to strengthen the findings of this study.

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