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The Effect of Heavy Bag Thrust And Battle Rope Exercise On Arm Muscle Power And Shot Put Results of Female Shot Put Athletes Dumpang Athletics Club 2025

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ABSTRACT

This study aimed to evaluate the combined effects of heavy bag thrust and battle rope exercises on arm muscle strength and shot put performance in female athletes from the Dumpang Athletics Club. This is important because it could contribute to the advancement of science and technology in Indonesian sports, ultimately improving athlete performance. The approach used was an experimental design with a single-group pre-test and post-test. Eight athletes participated in six weeks of training sessions. Their performance was assessed before and after training to gauge the effectiveness of the intervention. The results showed a significant increase in arm muscle strength, as evidenced by the calculated t-value (11.729), which was greater than the t-value (1.895). The same increase was also seen in shot put performance, where the calculated t-value (11.336) was higher than the t-value (1.895), with both results at the 0.05 significance level. It can be concluded that the combination of heavy bag thrust and battle rope exercises significantly increased arm muscle strength and shot put performance in athletes. It is hoped that the results of this study will be a consideration for coaches and clubs in designing more effective training programs to improve athletes' basic abilities.

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A. Conception and design of the study;
B. Acquisition of data;
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E. Obtaining funding

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INTRODUCTION

Sport is a physical activity performed by one or more individuals in a team or group. Many people participate in sports for various reasons, such as health benefits and the desire to enjoy a hobby or a fun lifestyle (Zulukhu et al., 2022). Athletics is a competitive sport that encompasses various types of events. These include walking, running, jumping, and throwing. These various events are often held at various events, including throwing events such as the shot put (Akkase, 2023). The shot put is one of the four throwing events in athletics, along with the discus, hammer, and javelin. As its name suggests, the shot put is performed by pushing, not throwing. This technique involves a powerful push from the shoulder, accompanied by a lifting motion of the arm, wrist, and fingers, all aimed at achieving the optimal throwing distance (Datuela et al., 2020).

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In the sport of shot put, there are several basic methods used by athletes, including the orthodox technique, the O'Brien technique, and the rotational style, as described by (Saputri et al., 2016). Success in shot put is not only determined by the ability to push the ball but also requires a good combination of various physical elements, especially muscle strength, speed of movement, and precise coordination. Furthermore, technical factors such as how to hold the ball and the push process also significantly influence the effectiveness and distance of the put. In this context, strength is a very crucial physical element when pushing in shot put. In practice, strength can be applied when pushing the ball, where strong and fast movements determine how far the push can reach. Explosive strength is one element of physical condition, and explosive strength is one of the most important for achieving the best results in shot put (Limbong et al., 2021).

In November 2024, the research team conducted direct observations at the Medan City Dumpang Athletics Club to gain real-world insights into the athletic training and development process. In the initial observations, researchers observed how training sessions were conducted in various athletic events and examined the athletes' application of basic techniques and training program plans. Then, in the second observation session, special attention was paid to the shot put event, including daily training routines and how the athletes applied the putting technique. Further observations were conducted in more depth on the shot put training, covering all phases of the activity, such as warm-up, core training, and cool-down. From the results of these observations, it was revealed that several female athletes aged between 15 and 17 years experienced less than satisfactory results in their shot put, characterized by a relatively short distance and not meeting the performance standards for that age group. This problem is thought to be closely related to deficiencies in physical condition, especially in the strength and explosive power of the arm muscles that have not yet fully developed. This weakness in the aspect of arm muscle power has the potential to be a barrier to achieving the best performance in the shot put event, because explosive power is a crucial element in producing a long and effective shot put. This condition is the reason and importance for researchers to explore alternative training methods that can significantly improve the arm muscle power and the results of the shot put of female athletes under the guidance of the Dumpang Athletics Club.

Given the situation and issues, the researcher was interested in conducting a study at the club, where she would introduce a solution in the form of a training program to address the challenges faced. The proposed training program involved heavy bag and battle rope training. She chose these types of training because they both focus on increasing arm muscle strength and power. Muscle strength is crucial in shot put, as without sufficient power, the shot put will not be optimal. Muscular power is an individual's ability to exert maximum force in the shortest possible time. If a person's muscle strength is inadequate, the shot put will not be satisfactory (Aziz et al., 2021).

The training method using a battle rope can strengthen arm muscle endurance because the muscle workload when training with a battle rope is higher. In addition,

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the battle rope is also effective in training movement coordination and maintaining body balance when swinging or pulling waves on the battle rope (Rosmayani et al., 2023). According to (Rahman & Al Ghani, 2024) Shot put is an action to push by pushing a round object that has a weight according to predetermined provisions, made of metal, as far as possible. Furthermore, (Saputri et al., 2016) stated that shot put is one of the disciplines in athletics that is included in the throwing category. In the sport of shot put, there is an active role, namely through the development of explosive arm muscle power, which has a high capacity to increase the results of the push, in addition to other physical factors. Article 181 of the IAAF guidelines explains that shot put is the activity of pushing or pushing a metal ball using one hand from the shoulder position. This metal ball is a round object with a weight that varies according to category; for the junior women's category it weighs 3 kg, while for the senior women it is 4 kg. Meanwhile, in the junior men's category, the weight is 5 kg and for the senior category, the weight reaches 7.25 kg (Sari et al., 2021). (Sari et al., 2021) explain that in order to produce an optimal shot put, a person needs to be in prime physical condition. Furthermore, (Hernado et al., 2017) also emphasize that to achieve a long push, a shot putter must have the right strength, power, speed, and technique, which includes range (release height), throw angle (release angle), and throw speed (release speed).

According to Apriyanto (2010), heavy bag thrust exercises are primarily aimed at increasing upper body strength, particularly arm muscle strength. Heavy bag thrusts are a type of exercise that can help strengthen arm muscles. This exercise requires a punching bag suspended by ropes or cables and engages various muscles, including the triceps, pectoralis major, deltoids, biceps, trapezius, abdominal muscles, lateral muscles, and hip extensors. Heavy bag thrusts involve alternately pushing a heavy bag with the right and left hands. This exercise also involves movements that engage multiple arm and hip muscles to maintain their activity. Regular practice is expected to improve the muscles' ability to generate power (Putra and Yusradinafi, 2021).

Battle ropes, often known as heavy ropes, are a new fitness trend hitting gyms across the US, although ropes have been used in physical training for a long time. They provide a high-quality, comprehensive workout that engages muscles in different ways, helping to improve arm strength in those who train with them (Irwan Setiawan, 2017). They can improve arm muscle endurance, as the workload is greater when training with this equipment, and they also help train coordination and balance when moving or pulling waves on the rope. In this context, arm muscle strength is crucial for performing push-off movements (such as the shot put) (Nofianto et al., 2013).

METHODS

This study employed an experimental approach with a single-group pretest-posttest format. This format was used to assess the impact of the treatment (Heavy Bag Thrust and Battle Rope Exercise) by comparing the conditions before (pretest) and after (posttest) the intervention within the same group. This research was conducted at the

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Dumpang Athletics Club (KDA). The Dumpang Athletics Club (KDA) is a sports club located in Medan. Its training activities are led by Dumpang Siregar, the head coach and owner. KDA's training locations are at SMKN 2 Medan, located at Jln. STM. No. 12A, Medan Amplas District, and at the Medan State University Stadium. Shot put is one of the competition categories trained at the Dumpang Club. This research was conducted from July 8 to August 21, 2025, over 18 sessions over six weeks, with training sessions three times a week on Tuesdays, Thursdays, and Fridays. Each training session lasted two hours, from 4:00 PM to 6:00 PM WIB.

Sugiyono (2017) states that a population is a broad area encompassing objects or subjects with a specific number and characteristics determined by the researcher to be analyzed and then conclusions drawn. From this explanation, it can be concluded that a population includes all individuals who can be selected as samples in a study. In this study, the population consisted of all 15 female shot put athletes in the athletic dumping club. (Sugiyono, 2018) a sample is a portion of a population that is used as a data source in a study, where the population is a collection of characteristics possessed. In this study, the number of samples to be analyzed is 8 people taken using the purposive sampling method. According to (Arikunto, 2014) states that "purposive sampling (drawing based on objectives) is a sampling method based on the researcher's opinion that respondents will provide the necessary information in accordance with the research objectives". Therefore, the sample in this study was taken using a purposive sampling technique (drawing based on objectives) that has met the following criteria:

a. Is a female actively involved as a shot put athlete at the Dumpang Athletics Club.
b. Is between the ages of 15 and 17, which corresponds to the adolescent age group focused on in the analysis.
c. Has at least one year of training experience in shot put.
d. Is free from any physical injuries, especially to the upper body (arms, shoulders, or back) that could affect training results.
e. Follows the training program regularly and with discipline, according to the schedule determined by the club.
f. Is willing to follow all stages of the training program provided by the researcher and signs a consent form as a research participant.

Research Variables

a. Independent Variable: Heavy Bag Thrust and Battle Rope Exercises.
b. Dependent Variable: Arm muscle power and shot put results

Research Design

The research design used was a One Group Pretest-Posttest Design, which is illustrated in the following table :

Table 1.
Research Design

Pre-test O_1	**Treatment X**	**Post-test O_2**
Pretest	Heavy Bag Thrust Exercise Battle Rope Exercise	Posttest

Source : Arikunto (2014)

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Table 2.
Norma Tes Two Hand Medicine Ball Putri

Norm (Meter)	Description
3,52 – 4,03	Very Good
2,95 – 3,51	Good
2,38 – 2,94	Adequate
1,81 – 2,37	Poor

Source : Yudho (2022)

Data Collection Techniques

Data were collected through :

a. Pree-Test : Assessing arm muscle strength and shot put results before the intervention
b. Intervention Implementation : Undertaking a six-week training program.
c. Post-Test : Assessing arm muscle strength and shot put result after the intervention.

Data Analysis Techniques

Data were analyzed using the following statistical steps :

a. Normality Test : Using the Shapiro-Wilk method to check whether the data were normally distributed
b. T-test (Paired Samples t-test): To evaluate significant differences between pretest and posttest results. The hypothesis is considered accepted if the calculated t-value is greater than the t-table at a significance level of $\alpha = 0.05$

$$W = \frac{b^2}{ss}$$

$$b = \sum_{i=1}^{m} a_i (x_{n+1-i} - x_i)$$

$$ss = \sum_{i=1}^{n} (x_i - \bar{x})^2$$

RESULTS AND DISCUSSION

Description of Research Data

This study aims to explore the impact of heavy bag thrust and battle rope exercises on arm muscle strength and shot put performance of female athletes coached by the Dumpang Athletics Club in 2025. The interventions provided included heavy bag thrust and battle rope exercises. The training was carried out after the initial data collection stage in the form of a two-hand medicine ball push test and a shot put performance test. After implementing the training program, it was continued with post-treatment testing. The results of the tests and measurements carried out after the 6-week training program can support the validity of the proposed hypothesis. The results of the tests and measurements show a histogram of the pre-test data as follows: Frequency Distribution and Histogram Graph of Arm Muscle Power Pre-Test

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Table 3.
Frequency Distribution of Arm Muscle Power Pretest

Intervals	Frequency
1,92 - 2,17	2
2,18 - 2,43	2
2,44 - 2,69	1
2,70 -2,95	3
Total	**8**

Source : Researcher Data

Frequency distribution data from the pre-test results analyzed using the Sturges frequency distribution method showed that the class range was 0.99 with a total of 4 classes and a class interval of 0.25. Of the total of 8 athletes, in the 1.92-2.17 interval class there were 2 people, in the 2.18-2.43 interval there were also 2 people, while in the 2.44-2.69 interval there was 1 person, and in the 2.70-2.95 interval there were 2 people. After that, planned training was carried out for 6 weeks with a training frequency of 3 times a week, then post-test data was taken as the final test.

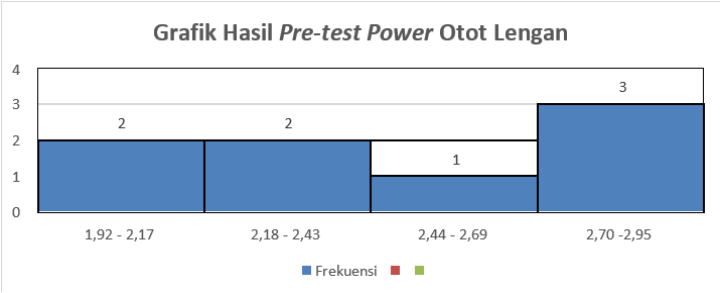

Figure 1.
Histogram Graph of Arm Muscle Power Pre-test Results

Frequency Distribution and Histogram Graph of Arm Muscle Power Pre-Test

Table 4.
Frequency Distribution of Post-Test Arm Muscle Power

Intervals	Frequency
3,02 – 3,25	2
3,25 – 3,49	3
3,50 – 3,73	1
3,74 – 3,97	2
Total	**8**

Source : Researcher Data

Frequency distribution data from the post-test results processed using the Sturges frequency distribution method showed the following results: the class range reached 0.93, the number of classes was 4 and the interval for each class was 0.23. Of the total of 8 athletes, those included in the class interval 3.02-3.25 were 2 people, for class 3.26-3.49 there were 3 people, class 3.50-3.73 consisted of 1 person, and for 3.74-3.97 there were 2 people. This information describes the data after the athletes underwent treatment for 6 weeks with a training frequency of 3 times a week.

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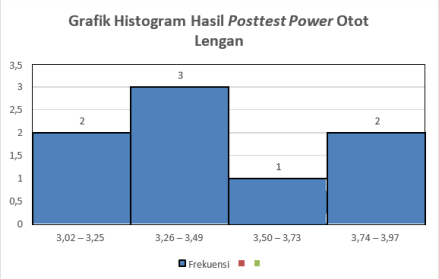

Figure 2.
Histogram Graph of Arm Muscle Power Posttest Results

Frequency Distribution and Histogram Graph of Shot Put Pretest Results

Table 5.
Frequency Distribution of Pree-Test Rejection Results

Intervals	Frequency
4,83 – 5,21	2
5,22 – 5,60	2
5,61 – 5,99	2
6,00 – 6,38	2
Total	**8**

Source : Researcher Data

The frequency distribution data of the pre-test results processed using the Sturges frequency distribution method produced information in the form of a class range of 1.52, the number of classes 4, and a class interval of 0.38. Of the total of 8 athletes, distributed in the interval class 4.83-5.21 there were 2 people, class 5.22-5.60 also 2 people, class 5.61-5.99 as many as 2 people, and class 6.00-6.38 also 2 people. After that, structured training was carried out for 6 weeks with a frequency of 3 times a week and then post-test data was collected as a final test.

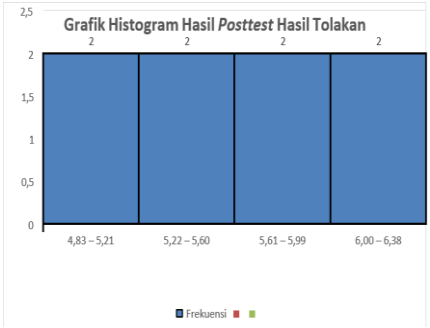

Figure 3.
Histogram Graph of Posttest Results of Rejection Results

Frequency Distribution and Histogram Graph of Post-Test Shot Put Results

Table 6.
Frequency Distribution of Post-Test Rejection Results

Intervals	Frequency
6,58 – 7,26	3
7,27 – 7,95	2
7,96 – 8,64	1
8,65 – 9,33	2
Total	**8**

Source : Researcher Data

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Frequency distribution data from the post-test results that have been processed using the Sturges frequency distribution method shows the following results: the class range is 2.73, the number of classes is 4, and the class interval is 0.68. Of the total of 8 athletes, there are 3 people in the 6.58-7.26 interval class, 2 people in the 7.27-7.95 class, 1 person in the 7.96-8.64 class, and 2 people in the 8.65-9.33 class. The data describes the condition of the athletes after undergoing treatment for 6 weeks with a training frequency of 3 times per week.

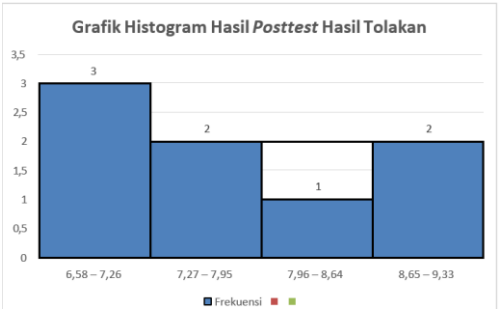

Figure 4.
Histogram Graph of Posttest Results of Rejection Results

Normality Test

Table 7.
Normality Test

Exercise	Group	W count	W table	Description
Arm Muscle Power	Pree-test	0,946	0,818	Normal
	Post-test	0,978	0,818	Normal
Shot Put Results	Pree-test	0,983	0,818	Normal
	Post-test	0,965	0,818	Normal

Source : Researcher Data

Based on the tests that have been carried out, calculations using the Microsoft Excel program show that the information is spread with a normal distribution in both the pretest and posttest.

Paired Sample t-test

The t-test is used to investigate the hypothesis that training influences performance improvement. With a 95% confidence level, if the t-test results show a significance value greater than 0.05, it can be concluded that there is no effect between the applied treatment and the pre-test and post-test results. On the other hand, if the significance value

Table 8.
Arm Muscle Power Test

	Mean	Std. Dev	T_{Count}	T_{table}	df
Limb Power	0,997	0,243	11,729	1,895	7

Based on the t distribution table with df = n-1 (8-1 = 7) at the α level of 0.05 = 1.895, which means t count 11.729 > t table 1.895, it can thus be concluded that there is a real difference in the pretest and posttest data.

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Table 9.
Shot Put Test Results

	Mean	Std. Dev	T_{Count}	T_{table}	df
Kick Speed	2,222	0,556	11,336	1,895	7

Based on the t-distribution table with degrees of freedom (df) = n-1 (8-1 = 7) at the α level of 0.05 of 1.895, it can be seen that the calculated t of 11.336 is greater than the t-table of 1.895. Thus, it can be concluded that there is a significant difference between the pretest and posttest data.

CONCLUSION

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

1. Heavy Bag Thrust and Battle Rope Exercises impact the arm muscle strength of female shot put athletes from the Dumpang Athletics Club in 2025.
2. Heavy Bag Thrust and Battle Rope Exercises impact the shot put performance of female athletes from the Dumpang Athletics Club in 2025.

Researchers provide recommendations to coaches and athletes based on the study's findings. The following are the researchers' recommendations:

1. Coaches
   Coaches are encouraged to incorporate Heavy Bag Thrust and Battle Rope Exercise into their regular training programs, paying attention to principles such as intensity, variation, and periodization to ensure optimal and sustainable improvements in shot put performance.
2. Athletes
   Athletes are advised to maintain consistency in their established training programs and to pay attention to psychological factors such as motivation and mood to maximize training results and support improved performance in competitions.
3. Future Research
   Future researchers should add other variables, such as leg muscle strength or shot put technique, and use more complex research designs (such as experiments with a control group) to gain a deeper understanding of the effectiveness of this training program.

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REFERENCES

Akhmad, I. (2013). Dasar-Dasar Melatih Fisik Olahragawan. Medan: Unimed Press.

Akkase, A. (2023). Analisis Gerak Biomekanika Pada Tolak Peluru Gaya O'brien. Journal Physical Health Recreation (JPHR), 4(1), 171–178.

Apriyanto, J. (2010). Perbedaan Pengaruh Latihan Pliometrik Medecine Ball Throw dan Heavy Bag Thrust terhadap Kemampuan Lempar Lembing Gaya Hop Step pada Siswa Putra Kelas VIII SMP Negeri 1 Tulung Kabupaten Klaten Tahun Pelajaran 2009/2010.

Arikunto, S. (2014). Prosedur Penelitian: Suatu Pendekatan Penelitian. In Rineka Cipta.

Aziz, A., Nurwita, S. N. S., & Supriyanto, S. (2021). Hubungan Kekuatan Otot Lengan terhadap Hasil Tolak Peluru Gaya Ortodoks Siswa Kelas VIII di SMP Negeri 3 Bengkulu Tengah. Journal of Education and Culture, 1(1).

Datuela, A. Y., Hadjarati, H., & Liputo, N. (2020). Latihan Heavy Bag Thrust Terhadap Tolak Peluru. Jambura Health and Sport Journal, 2(1), 28–32.

Handayani, S. (2021). Anatomi dan fisiologi tubuh manusia. CV. Media Sains Indonesia.

Limbong, A. T. B., Ishak, M., & Komarudin, E. (2021). Hasil Lemparan Pada Olahraga Tolak Peluru. Jurnal Master Penjas & Olahraga, 2(2), 117–126.

Nofianto, C. A., Junaidi, S., & Nugroho, P. (2013). Sumbangan Daya Ledak Otot Lengan, Otot Tungkai, Kelentukan Togok Dalam Tolak Peluru. Journal of Sport Science and Fitness, 2(3).

Putra, M. K., & Yusradinafi, Y. (2021). Pengaruh Latihan Heavy Bag Thrust dan Latihan Medicine Ball Throw Terhadap Hasil Pukulan Lurus Pencak Silat Pada Siswa SMA. Jurnal Pion, 1(2), 55–59.

Rahman, F., & Al Ghani, M. (2024). Analisis Hasil Belajar Tolak Peluru Menggunakan Modifikasi Bola Plastik. SEMNASFIP.

Rosmayani, R., Wardoyo, H., & Jauhari, M. (2023). Perbandingan Latihan Resistace Band dan Battle Rope Terhadap Peningkatan Daya tahan Otot Lengan. SPORT-Mu: Jurnal Pendidikan Olahraga, 4(2), 110–122.

Saputri, R. F., Winarno, M. E., & Surendra, M. (2016). Model Pembelajaran Teknik Dasar Tolak Peluru Gaya Menyamping Siswa Kelas VII di SMPN 12 Malang. Jurnal Pendidikan Jasmani, 26(1), 176–187.

Sari, P. S., Putra, D. D., Iswana, B., & Okilanda, A. (2021). Pengaruh latihan incline push up depth jump terhadap hasil tolak peluru gaya ortodox siswa SMP Negeri 29 Palembang. Jurnal MensSana, 6(1), 75–83.

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Sudjana. (1975). Metoda statistika: untuk bidang biologi, farmasi, geologi ...

Sugiyono. (2018). Metode Penelitian Kuantitatif. Alfabeta

Tarsito. https://books.google.co.id/books?id=hqtVNQAACAAJ

Zulukhu, A., Badri, H., Septri, S., & Gemaini, A. (2022). Motivasi Berolahraga Masyarakat Jorong Air Balam Pada Masa Pandemi Covid-19. STAMINA, 5(2), 53–63.