



## The Effect Of Variations In Extensive Interval Training On Aerobic Endurance Fighter Muaythai Fightculture Medan

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### Abstract

This study aims to determine the Effect of Extensive Interval Training Variations on the Endurance of the Aerobic Fighter Muaythai FightCulture Medan 2021. This research was carried out in the UNIMED Multi-Purpose Field. The population in this study were Fighter Muaythai Fightculture and the sampling technique used a total sampling technique of 5 Muaythai athletes. The research method used was experimental method (treatment) with data collection techniques involving one independent variable and one dependent variable, namely Extensive Interval Training Variation as the independent variable and Aerobic Endurance as the dependent variable. The results of hypothesis testing showed that the probability value (Asymp. Sig) was  $0.043 < \text{significant level } 0.05$  (Asymp. Sig. (2-tailed)  $0.043 < 0.05$ ). The conclusion of the study is that there is a significant effect of Extensive Interval training on improving the 2021 Muaythai Medan Fighter Fightculture.

**Kata Kunci :** *Interval Ekstensif, Daya Tahan Aerobic, Muaythai*

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## **A. Introduction**

Sports coaching is part of efforts to improve the physical and spiritual health of the entire community, discipline, and sportsmanship, as well as the development of sports achievements that can generate national pride. In line with the existing reality, the public's need to exercise continues to increase by the goals and benefits of sports that cannot be doubted. The purpose of sport is explained by (Kosasih, 1985, p. 18) namely "The purpose of sport is not only for physical development but also for mental and spiritual development".

Muaythai is a martial art that uses kicks, punches, and slams, and is more dominant in the form of free combat martial arts that first originated in Thailand. The word Muay comes from the Sanskrit word "Maya" (martial boxing) and Thai comes from the word "Tai" (Thai tribe). Muaythai has competed in many championships, both at the district/city, provincial, and even national levels. Even Muaythai sports have also competed in various sporting events such as PRA-PON, PON, and SEA GAMES.

In achieving sports achievements several factors must be known and need special attention, namely 1. Physical factors 2. Technical factors, 3. Tactics factors and 4. Mental factors. The physical factor is the

basic thing that an athlete must have to become a champion. Physical condition plays a very important role in following the training program and when competing. One of the components in determining the physical condition of an athlete is endurance. The benchmark that is often used in determining endurance is the athlete's body's ability to take in oxygen to the fullest (Vo2Max).

Based on observations made by researchers, the lack of endurance of the Aerobic Fighter Muaythai Fightculture can be seen from the videos of their matches and training. On April 30, 2021, a field observation was carried out, and the results of a problem were found, namely, when doing the Padding Time 3 Round exercise, entering the 2nd round the Fighter experienced a decrease in stamina, which can be seen from the weakening punches and kicks and breath, and the researchers returned to watching the match video previously carried out, during the match all fighters were found to have the same problem, in fact by the time they entered the 2nd round the fighters had unintentionally shown fatigue gestures, so the tactics, techniques, and instructions in the next round were no longer carried out properly, observation data Known results From the five athletes, 3 athletes were found in the less category and 2 athletes in the sufficient

category. In this case, it proves that more effective actions are needed to be given to athletes so that the Aerobic Endurance of Fight Culture Muaythai Medan athletes is maximized .“.

One of the factors that cause low or lack of Aerobic endurance in athletes is the lack of physical training carried out by coaches and the minimal form of training given to increase Aerobic endurance in athletes.

Then, the researchers conducted interviews with coaches and athletes about what forms of exercise have been carried out so far to increase aerobic endurance, in this case, jogging. So after conducting the interview, information was obtained that the form of exercise carried out so far was only a form of basic physical exercise to increase endurance/stamina. In this case, the researcher will provide a form of exercise where the aim is to be able to increase Aerobic endurance, with a variety of Extensive Interval training, in this case, the researcher also wants to examine whether the exercise affects increasing Aerobic endurance in Muaythai Fight Culture Medan athletes.

Achieving an achievement in sports requires practice, the exercises that must be carried out must be correct, programmed, and continuous (Bompa, n.d., p. 37). "Exercise is a systematic process and works repeatedly over a long period, and is

increased gradually and individually aimed at establishing physiological and psychological functions to meet task demands." This is in line with the opinion (Satria, 2019) that systematic training will make it easier for the body to adapt to the training load and reduce the risk of injury.

Some physical components that need to be considered for development are cardiovascular endurance, strength endurance, muscle strength (strength), flexibility (flexibility), speed, stamina, agility (agility), muscle explosive power (power), and endurance strength (strength endurance). ). These components are the main ones that must be trained and developed by athletes, especially by athletes in sports that require these components.

High-Intensity Interval Training (HIIT) is an efficient exercise for increasing physical ability which includes strength, aerobic and anaerobic endurance, flexibility, and coordination in one training session (Monaco, 2018) is a form of exercise that is used to increase endurance. aerobics (endurance). Practice techniques at the start and practice tactics. Extensive interval training means that the training load given to athletes has the following characteristics: a) Large training volume; b) Low or medium training load intensity; c) Long recovery time and; d) the frequency

and rhythm of the movements a little and slowly.

In the extensive interval training method, the exercise is performed with several repetitions and series. Each repetition and series is always followed by an interval time. What must be considered is not to run with the principle of interval training, that is, there is a systematic exchange between loading and recovery. In the extensive interval method, the loading time is also very decisive and this depends on what you want to achieve in an exercise. According to Syafruddin (Sulastio, 2018), the characteristics of the extensive interval method are moderate load intensity, namely 60% - 80%, high load volume/volume, and many repetitions, namely 20-30 times per series, not full intervals/rest, namely 45-90 seconds perseri, and the resulting training effect is an increase in speed endurance. Werner & Sharon, (Apriyanto, 2020) Cardio-pulmonary endurance is defined as the ability of the lungs, heart, and blood vessels to deliver sufficient amounts of oxygen into cells to meet the needs of physical activity for a long time

(Warni et al., 2017) Stated that VO<sub>2</sub>Max is termed maximum aerobic power or the use of oxygen in the fastest tempo, that is, consumption of quite a lot of oxygen during sports activities. So it can be concluded that aerobic endurance (VO<sub>2</sub>Max) refers to the ability to speed in

the use of oxygen not just how much oxygen is used, but for what purpose. However, it can be said that if someone does a job for a long time, then the need for oxygen to maintain endurance (stamina) becomes stable.

(Zulbahri, 2018) "aerobic durability is a basic physical component which cannot separate from increasing and protecting" (aerobic endurance is a basic physical component that cannot be separated from increasing and protecting). (Zulbahri & Melinda, 2019) General endurance or cardiorespiratory endurance is a person's ability to use his heart, respiratory and circulatory systems effectively in carrying out continuous work involving the contraction of several large muscles, at high intensity for quite a long time.

(Hardika et al., 2022) VO<sub>2</sub>max is an important factor contributing to the aerobic endurance of athletes. VO<sub>2</sub>max reflects a person's cardiorespiratory capacity so that the more oxygen that can be transported and consumed by the muscles that are active, the better the athlete's endurance will be. A principle for knowing VO<sub>2</sub>max is that you must first understand the functions of the human body, this is because every cell needs oxygen to convert food energy into ATP (Adenosine Triphosphate) which is ready to use for the work of each cell that consumes the least oxygen is the muscles in

a resting state. Contracting muscle cells need a lot of ATP. As a result, the muscles used in exercise require more oxygen. Muscle cells need a lot of oxygen and produce CO<sub>2</sub>. The need for oxygen and produce CO<sub>2</sub> can be measured through our breathing.

## **B. Method**

This type of research is an experiment, where this study looks at the effect of extensive interval variations on aerobic endurance. Before the treatment (treatment) is carried out, a pre-test is given to the sample first. This pre-test aims to obtain initial data on the endurance of the Muay Thai fighter on the battlefield. This research was carried out in the multipurpose field of Medan State University

This treatment was carried out for 6 weeks with a frequency of exercise 3 times a week. Thus, the authors use the Extensive Interval method which is considered appropriate to the problem to be studied. The variables studied in this study were extensive interval training variations as the independent variable and aerobic endurance as the dependent variable. The population of this research is all fighters fighting culture in Medan, consisting of 5 people. Sampling was determined by total sampling so that the sample for this study was all Muaythai fight culture fighters in

the field, totaling 5 people who would be given the Extension interval training method. The instrument used in this study was a test of the endurance ability of the Muay Thai Aerobic fighter using the bleep test.

The data obtained will later be processed using the "Wilcoxon test". Before the data is processed, a requirements analysis test is carried out, namely the normality test using the Kolmogorov Smirnov test.

## **C. Result and Discussion**

### **Result**

Based on the analysis of the initial test data, the effect of interval training on the aerobic endurance ability of the Medan Muaythai Fightculture Fighter, namely with a sample of 5 people, the highest score was 53.9, the lowest score was 36.75, the average was 47.61 and the standard deviation (SD) was 6 ,60. Meanwhile, based on the analysis of the final test data, the effect of interval training variations on the aerobic endurance ability of the Medan Muaythai Fightculture Fighter, namely with a sample of 5 people, the highest score was 62.45, the lowest score was 50.5, the average was 57.43 and the standard deviation (SD) 4.91. For more details, a frequency distribution table will be made below:

**Table 1. Distribution of Preliminary and Posttest Data Frequency The Effect of Extensive Interval Variation on Aerobic Endurance Ability**

Category	Pre Test		Post Test			
	Interval	Frequen cy	Percent	Interval	Frequen cy	Percent
Well	>57	-	-	>57	3	60
Very well	52-56	-	-	52-56	2	40
Enough	42-52	1	20	42-52	-	-
Not enough	39-43	4	80	39-43	-	-
Less	<38	-	-	<38	-	-
Total		5	100		5	100

Source: Research Results (2020)

**Table 2. Normality Test**

Tests of Normality			
Data	Statistic	Kolmogorov-Smirnov <sup>a</sup>	
		df	Sig.
Pre Test	.287	5	.200*
Post Test	.248	5	.200*

Source: Research Results (2022)

Based on the results of processing the Normality test data with the Kolmogorov-Smirnov Test, the normality value of the data distribution is obtained as in the following table:

In the normality test table, the Pre-test and Post-test data above show the Sig

value. 0.200. This value is greater than the alpha value ( $0.200 > 0.05$ ). So based on the results of the normality test it is known that the significance is  $0.200 > 0.05$ , it can be concluded that the distribution of data on the pre-test and post-test is normally distributed.

**Table 3. Wilcocon Test**

Test Statistics <sup>a</sup>	
	Post Test - Pre Test
Z	-2.023 <sup>b</sup>
Asymp. Sig. (2-tailed)	.043

Source: Research Results (2022)

This hypothesis was tested with a non-parametric test using the Wilcoxon test formula. The results of this hypothesis analysis are described in the attachment and summarized in the following table:

It is known that the probability value (Asymp. Sig) is  $0.043 < 0.05$  significant level. it can be concluded that the value (Asymp. Sig) is  $0.043 < 0.05$ . then conclusions are drawn from the hypothesis

that  $H_0 =$  rejected,  $H_1 =$  Accepted. So it can be concluded with a Hypothetical sound, namely "There is an Effect of

Extensive Interval Training on Aerobic Endurance. Fighter Fightculture Muaythai Medan".

## **Discussion**

Extensive interval training to increase endurance Aerobic fighter Muaythai Fightculture Extensive interval training is a form of training to improve the physical condition of a Muaythai athlete. In other words, that with extensive intervals can increase the Maximum Oxygen Volume ( $Vo_{2Max}$ ) / Aerobic Endurance of a Muaythai Athlete.

(Astuti et al., 2020) in principle, the extensive interval method is a training method that is the same as regular interval training in which intensity, repetition, number of sets, and rest are determined. The extensive interval method is known through medium load intensity which ranges from 60 to 80%, large amounts of load through many repetitions, and not full rest. So the implementation of the extensive interval method, namely the number of repetitions of the exercise, will physiologically affect the level of function of the organs of the body such as the heart, lungs, and blood vessels to the workload being carried out. Thus, it is hoped that the effect of the training will be an increase in endurance ability, what is meant here is aerobic endurance. In practice, the

extensive interval method has certain characteristics and therefore allows a relatively large load volume. From this opinion, it can be explained that extensive interval training using medium-intensity loads allows us to provide large volumes through many repetitions. Thus this method can also affect the ability of aerobic endurance.

So you can be sure that Muaythai sports require good physical conditions to achieve satisfactory results. In this study, it discusses proving the form of Extensive Interval Training in increasing the Endurance of the Aerobic Fighter Muaythai Fightculture Medan 2021.

Application through the method of extensive interval training with the intensity of the exercise given starts low to moderate, the pulse in the implementation of the exercise is below 170 times per minute, the exercise repetitions are given a lot, the exercise intervals are carried out short, the number of sets of exercises given is large, the training distance starts 800 meters to 1200 meters shows a very good impact in increasing the Aerobic Endurance of athletes.

Based on the results of testing the

hypothesis proving that extensive interval training can have a significant effect on increasing the endurance of the Medan Muaythai Fightculture Aerobic fighter, this can be seen from the difference in the average value (mean) in the initial test before being given extensive interval training treatment, which is equal to 47.61 and after being given the treatment, an average value (mean) of 57.43 was obtained, meaning that there was an increase of 9.82. After analyzing the data on the results of the study using the Wilcoxon test, it was found that the probability (Asymp. Sig) was  $0.043 < 0.05$ . then  $H_0 =$  rejected,  $H_1 =$  Accepted. So it can be concluded with a hypothetical sound, namely "There is an Effect of Extensive Interval Training on the Endurance of the Aerobic Fighter Fightculture Muaythai Medan 2021". This means that extensive interval training by providing 16 exercises with a frequency of 3 times a week, turned out to have a significant effect on increasing the endurance of the Aerobic Fighter Muaythai Fightculture Medan.

This may be caused by the implementation of extensive interval training in this study and the repetition of the exercise increased every 3 meetings, with the implementation of the players running 200-1000 meters with a total of 28-38 repetitions. where the rest given between repetitions ranges from 45 to 90 seconds,

while rest between sets is 45-90 seconds so that the effect can increase the athlete's Aerobic Endurance. (Dikdik Zafar Sidik, M.Pd., Paulus L. Pesurnay, Drs. Luky Afari, n.d., p. 35) The extensive interval training method is carried out with the intensity of the exercise given starting low to moderate, the pulse during the exercise is below 170 times per minute, lots of exercise repetitions, short exercise intervals, a large number of exercise sets, 800 meters to 1200 meters of training distance. Furthermore, the intensive interval training method is given with the exercise intensity given between moderate to high, exercise pulse above 170 times per minute, exercise repetitions

Thus it can be concluded that there is an effect of extensive interval training on increasing the endurance of the Medan Muaythai Fightculture Aerobic fighter.

From a physiological point of view, the form of extensive running training contributes to changes in the work of the heart and lungs. This is the opinion put forward by (R. Soekarman, 1987) that in general aerobic physical exercise will contribute to the ability of the heart and lungs, while anaerobic exercise will contribute to increased strength and muscle hypertrophy. According to (Dr. Bafirman HB, M. Kes. & Dr. Asep Sujana Wahyuri, S.Sc., 2018, p.34) Physiological endurance is related to the ability of the heart and



respiratory organs. The ability of the heart to increase the minute volume (cardiac output) to transport oxygen and substances used in the metabolic system. With the heart's resistance to work, the blood will pump more smoothly so that the cells that require blood flow can be met according to their needs

Therefore, the most basic changes are the increase in metabolism, provision of aerobic energy, and increase in the cardiovascular system. Based on the above opinion, it is also in line with the opinion of (Peter G J M Janssen, 1987) which says that if a person does aerobic endurance sports for a certain period of time, the pulse reflex point will increase. This increase is due to changes in the cardiovascular system such as changes in heart size, changes in muscle

mitochondria, changes in blood vessels as well peningkatan kadar haemoglobin (HB) darah.

The results of the analysis of data and facts in the field and supported by relevant research, the researcher found that through the provision of an extensive interval training method it is very good to support a training process to improve the Aerobic Endurance of Athletes, through the application of this exercise it has a positive impact on increasing Aerobic Endurance which will later support for other aspects of training. adapted at least 3 articles that are by the results of the study. Furthermore, the relationship between the two is concluded to be a new theory or findings from research.

#### **D. Conclusion**

Based on the results of the research above, it can be concluded in this study that "There is a significant effect of extensive interval training on the Endurance of the Aerobic Fighter Muaythai Fightculture Medan 2021.

As for this research, as a continuation of the conclusions, namely as follows (1) the results of this study prove that extensive interval training can increase the endurance of the Aerobic Fighter Muaythai Fightculture Medan 2021. (2) To

strengthen the results of this study, those who wish to carry out research to conduct research with the same title, in another sample group.

Trainers should pay attention to forms other than extensive interval training in an Aerobic Endurance training program in Muaythai sports.

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## F. Conflict of Interest

No conflict of interest

## Reference

- Apriyanto, K. D. (2020). Cardiorespiratory Endurance , Flexibility , Agility and Balance Profile of Sport Science Student in Sport Science Faculty Universitas Negeri. *Medikora*, 19(1), 17–23.  
<https://journal.uny.ac.id/index.php/medikora>
- Astuti, Y., Zulbahri, Z., Erianti, E., & Rosmawati, R. (2020). Pelatihan Metode Interval Ekstensif Terhadap Kemampuan Daya Tahan Aerobik. *Jurnal Abdidas*, 1(3), 109–118.  
<https://doi.org/10.31004/abdidas.v1i3.25>
- Bompa, O. T. (n.d.). *Theory And Methodology Of Training*. Dubuque. Kendal/Hunt Publishing company.
- Dikdik Zafar Sidik, M.Pd., Paulus L. Pesurnay, Drs. Luky Afari, M. P. (n.d.). *Pelatihan Kondisi Fisik*. PT. Remaja Rosdakarya.
- Dr. Bafirman HB, M.Kes., A., & Dr. Asep Sujana Wahyuri, S.Si., M. P. (2018). *PEMBENTUKAN KONDISI FISIK*. PT RajaGrafindo Persada.
- Hardika, N., Musa, S., Studi, P., Jasmani, P., Jongkat, K., Mempawah, K., & Maksimal, V. O. (2022). Pengaruh Metode Latihan Interval Anaerob ATP-PC Terhadap Peningkatan  $Vo_{2max}$  pada Atlet Lari Sprint IKIP PGRI Pontianak. 1(1), 60–68.
- Kosasih, E. (1985). *Olahraga Teknik dan Program Latihan*. Akademika Presindo.
- Monaco, M. (2018). The Effect of High Intensity Interval Training vs Resistance-Based Circuit Training. *Western Michigan University*.  
[https://scholarworks.wmich.edu/honors\\_theses/2999/](https://scholarworks.wmich.edu/honors_theses/2999/)
- Peter G J M Janssen. (1987). *Training lactate pulse rate*. Polar Electro.
- R. Soekarman. (S1987). *Dasar olahraga :untuk pembina, pelatih dan atlet*. Inti Idayu Press.
- Satria, M. H. (2019). Pengaruh Latihan Kekuatan Jari-Jari tangan Terhadap Peningkatan Kemampuan Passing Atas Dalam Permainan Bolavoli. *Journal Sport Area*, 4(1), 230–239.  
<https://journal.uir.ac.id/index.php/JSP/article/view/2349>
- Sulastio, A. (2018). Pengaruh Metode Latihan Interval Ekstensif dan Intensif Terhadap Prestasi Lari 400 Meter Putra Atlet PASI Riau. *Journal Sport Area*, 1(2), 1–9.  
<https://doi.org/10.30814/sportarea.v1i2.382>
- Warni, H., Arifin, R., & Bastian, R. A. (2017). Pengaruh Latihan Daya Tahan (Endurance) Terhadap Peningkatan  $Vo_{2Max}$  Pemain Sepakbola. *Multilateral Jurnal Pendidikan Jasmani Dan Olahraga*, 16(2), 121–126.  
<https://doi.org/10.20527/multilateral.v16i2.4248>
- Zulbahri, & Melinda, C. (2019). Metode Practice Style dan Guided Discovery Style Serta Keterampilan Teknik Dasar Atlet Bulutangkis. *Prosiding SENFIKS (Seminar Nasional Fakultas Ilmu Kesehatan Dan Sains)*, 1(1), 28–37.
- Zulbahri, Z. (2018). Tingkat Kemampuan Daya Tahan Jantung dan Pernafasan Mahasiswa Pendidikan Olahraga dan Kesehatan Universitas Pasir Pengaraian. *Gelanggang Olahraga: Jurnal Pendidikan Jasmani Dan Olahraga (JPJO)*, 3(1), 96–101.  
<https://doi.org/10.31539/jpjo.v3i1.852>