



IJPESS

Indonesian Journal of Physical Education and Sport Science

p-ISSN 2775-765X | e-ISSN 2776-0200

Volume 4, No. 02, June 2024 Page. 140-147

<http://journal.unucirebon.ac.id/index.php/ijpess>

Differences in the Effect of Circuit Training and Fartlex Training on Increasing Vo2Max of Pencak Silat Athletes

Kamarudin^{1*}, Sasmariato², Wahyuni Rahmalia³

^{1,2,3}Physical education, health and recreation, Universitas Islam Riau. Indonesia

*Corresponding Author: kamarudin@edu.uir.ac.id

Received: 29 April 2024, Approved: 13 May 2024, Published: 30 June 2024

Abstract

Study Purpose. The purpose of this study was to determine the difference in the effect between circuit training and fartlek training in increasing VO2Max for pencak silat athletes.

Materials and Methods. This study uses experimental research methodology with independent variables of circuit training and fartlek training, the dependent variable is VO2Max. The sample in this study amounted to 26 martial arts athletes with total sampling. Circuit training exercises have an effect on increasing VO2Max, then Fartlek training has an effect on increasing VO2Max.

Results. The results of the value of the two tests obtained a value of $0.00 < 0.05$ circuit training and fartlek training of $0.01 < 0.05$. before and after being given exercise treatment it can be concluded that the results obtained by circuit training and Fartlex Exercise Influence on Increasing VO2Max athletes who are significant.

Conclusion. Based on the results of research and data analysis, it can be concluded that circuit training has a significant effect on increasing VO2Max, fartlek training has a significant effect on increasing VO2Max. when viewed from these two exercises, fartlek training has a more significant effect on increasing VO2Max for Pencak Silat athletes.

Keywords: Circuit Training, Fartlek, Vo2Max

DOI: <https://doi.org/10.52188/ijpess.v4i2.705>

©2024 Authors by Universitas Nahdlatul Ulama Cirebon



Introduction

Since sports are such an intriguing subject, many athletes focus their energies on increasing their performance and level of fitness. Sports accomplishment is dynamically progressive; it changes with time and tends to rise in tandem with advances in science and technology (Jermaina et al., 2022; Ramadhan, Effendy, & Putra Pratama, 2023). Improving sports fitness and performance in coaching efforts through massaging, breeding, training, and

research must be done in order to be able to compete sportively in every championship and be able to produce optimal achievements (George, Rohr, & Byrne, 2016; Suganda, Soegiyanto, Setyawati, Rahayu, & Rustiadi, 2023). It is evident that sports science as a whole has developed in a way that was initially only a natural explanation, and that in order to improve an athlete's performance, many discoveries of training methods that can be implemented in the daily training process have been made. This cutting-edge scientific knowledge is expected to keep up with changes that occur in the sports world.

Pencak silat is an indigenous culture of martial arts inherited from the Indonesian people (Gani et al., 2022; Setiaji, Raharjo, & Hidayah, 2022). Pencak silat is a martial arts system inherited by our ancestors as the culture of the Indonesian nation so it needs to be preserved, fostered, and developed (Sarbaitinil, Rudagi, Rahmat, Elfemi, & Isnaini, 2023). Over time pencak silat has developed very rapidly and is quite popular with the community, both children, adolescents, and even adults. Pencak silat sports have been competed both in single events such as (National championships) and at multi-event levels such as the National Sports Week (PON) (Ardini, 2017). Pencak silat is a sport that involves intense physical activity and often has a significant cardiorespiratory component. Pencak silat matches consist of 3 rounds, each round takes 2 minutes of clean time and 1 minute of rest time (Nugroho, 2020). This undoubtedly has a big impact on the athlete in the competition. An athlete needs to be in good physical shape to support the sport in which he participates. Pencak Silat competitors sometimes focus primarily on technique and strategy, ignoring other important aspects like physical fitness, which is necessary to compete at the highest level of performance. The physical condition component is the most basic component in training to improve performance in achieving achievement. There are also physical condition components that need to be considered for development are: cardiovascular endurance (Endurance), strength endurance, muscle strength (strenght), flexibility (flexibility), speed (speed), stamina, agility, muscle explosiveness (power), strength endurance (strength endurance), coordination (coordination), and balance (balance) (Popović et al., 2020; Suganda et al., 2023). These components are the main ones that must be trained and developed by athletes in sports that require these components.

At the time of the pencak silat match, careful preparations were needed. A pencak silat athlete must be mature in mastering techniques, tactics, and strategies, must be able to know how much physical condition or physical fitness, and know the body composition that is owned. One of the most important components related to health is cardiorespiratory endurance. Cardiac lung endurance or also called cardio respiratory is the functional ability of the heart lungs to supply oxygen to the muscles for a long time (Al-Asiri & Shaheen, 2015; Latorre Román et al., 2017). The high and low endurance of a person depends on the high and low maximum oxygen capacity, the better a person's VO₂Max, the better his physical condition will be. VO₂Max is the ability by the greatest aerobic power a person has. it is determined by the amount of oxygen that can be supplied by the heart, breathing and hemo-hydro-lymphatic or transport O₂, Co₂, and nutrients at each minute. what is meant by VO₂Max is the maximum degree of aerobic metabolism in dynamic physical activity that a person can achieve. To increase the vital capacity of the lungs physical exercise must be done, increasing VO₂Max should be done by means of an aerobic exercise programme. the high and low VO₂Max of a person greatly affects the physical condition or physical fitness of an athlete. for this reason, an appropriate training method is needed for this. The main purpose and goal of exercise or training is to help athletes to improve their skills and achievements as much as possible (Bahtra, Asmawi, Widiastuti, & Dlis, 2020; Puncreobutr & Promptuth, 2016), One of the exercises to improve the physical condition of athletes is circuit training. Circuit training is a type of training programme that differs from other training

programmes and principles such as: the principle of increased training, the principle of overload, the principle of specificity, the principle of individualisation and the principle of recovery (Sudirman et al., 2024) Furthermore, according to (Ignácio, da Silva, Plissari, Quevedo, & Réus, 2019), Circuit training is training that consists of several posts where each post has a predetermined form of exercise.

Circuit training in this study consists of 6 posts, starting from sit ups, back ups, split jump, hexagon, rope run, and shuttle run. So it can be said that circuit training is an exercise method that involves a series of movements or physical activities performed sequentially with little or no rest between each movement. usually, each of these movements or activities focuses on different muscle groups. circuit training usually consists of several different exercise 'stations' or 'posts', where each station has a specific movement or activity. while fartlex training is a form of exercise that can increase VO2Max. Fartlek comes from Swedish which means playing with speed. The form of exercise is for example 50 metres of full speed (speed) 200 metres of jogging and so on with an exercise portion of about 35 minutes to 45 minutes (Almy & Sukadiyanto, 2014) Next Fartlek training is a training method that combines running with varying speeds. This exercise can be done in nature with various conditions such as hilly, sandy soil, grassy soil, soft soil, and so on (Gumantan & Fahrizqi, 2020; Satriawan et al., 2023). Based on some of the theories above, it can be concluded that fartlex training is an endurance system to build, develop, or maintain the body condition of an athlete.

Materials and Methods

Study Participants

The research sample amounted to 26 athletes of Pencak Silat Student Activity Unit of Riau Islamic University with total sampling technique. There are 3 stages in each research, namely, the first is the VO2Max test. The instrument in this study is an instrument using the Bleep Test method which is carried out at the Riau Islamic University Football field, from all 26 Riau Islamic University Student Activity Unit Pencak Silat athletes. These two experimental groups were formed with paired matching techniques. The technique of implementation is to consider data from the initial test results to be divided into a balance between group A and group B which has an even speed. This means that the fast and the less fast will be equal in number for each group equally, the training group, namely group A (group that practices circuit training), and group B (group that practices fartlek).

Study Organization

The type used is quasi experimental research, which is experimental research carried out in only one group called the experimental group without a comparison group or control group (Arikunto Suharsimi, 2010). The method in this study uses a Pretest-Post test design according to. The type of research used is experimental research with a quantitative approach. The independent variable is circuit training and fartlek training, while the dependent variable is VO2Max.

Statistical Analysis

Using data analysis using Paired T-test analysis using SPSS 25.

Results

Based on the results of the research that has been carried out by treating circuit training exercises on VO2Max and fartlek exercises on VO2Max, the results of the data analysis are

processed using SPSS from both data obtained from before and after doing circuit training exercises and fartlek training exercises.

Table 1. Average Calculation Results of circuit training and Fartlek exercise treatment

Group	Mean	Standard Deviation
<i>Circuit Training</i>	543	45, 00
<i>Fartlek</i>	545	46, 1437

Based on the results of the above research in [Table 1](#), the data obtained from the test in the form of Circuit Training and Fartlek, the table shows that the average result of the improvement of the Circuit training group is 543 with a standard deviation of 45 then the average Fartlek group is 545 with a standard deviation of 46, 1437.

Table 2. Results of Frequency Calculation of Circuit Training and Fartlek Running Exercises

		Mean	N	Str. Deviation	Std.error Mean
Pair 1	Circuit Training pre-test	43.2308	13	3.08782	0.67906
	Circuit Training final test	44.0000	13	3.54949	0.77936
Pair 2	Fartlek pre-test	42.2538	13	5.28023	2.25939
	Fartlek final test	44.2538	13	5.51298	2.32395

[Table 2](#) in pair 1 Based on the results of the above research, the data obtained from the test with an initial VO2Max of 0.67906 after being given circuit training treatment of VO2Max 0.77936 there is an increase in the number of VO2Max results with circuit training training. Pair 2 Based on the results of the research above, the data obtained from the test with an initial VO2Max of 2.25939 after being given the treatment of fartlek training of VO2Max 2.32395 there is an increase in the number of VO2Max results with Fartlek training.

Table 3. Calculation Results of Circuit Training and Fartlek Paired samples correlations

		N	Correlation	Sig.
Pair 1	Circuit training pre-test	13	0.947	.000
	Circuit Training final test			
Pair 2	Fartlek pre-test	13	0.986	.000
	Fartlek final test			

In [table 3](#) with the results of the calculation of the paired sample t test obtained a value of 0.00 <0.05 circuit training while fartlek training 0.00 <0.05 will be used to calculate the statistical hypothesis so that it shows that there is a significant difference before and after the circuit training and fartlek training.

Table 4. Mean calculation results of circuit training and fartlek training paired sample test

	Mean	Std. Deviations	Std. Error Mean	Paired Differences		t	df	Sig. (2-tailed)	
				96% Confidence Interval of the Difference					
				Lower	Upper				
Pair 1	Circuit training pre-test Circuit Training final test	-87723	.95782	.31405	-24.673	-32718	-4.883	.12	.012
Pair 2	Fartlek pre-test Fartlek final test	-300.000	200.000	.37634	-36.044	-24.957	-8.121	12	.000

Discussion

Circuit training exercises before and after treatment can be concluded to have an effect on increasing VO2Max; the Fartlex exercise test results are $0.01 < 0.05$ so that it can be declared significant. Based on the value of the circuit training test results, $0.00 < 0.05$ can be declared significant. Therefore, it can be concluded from the data that Fartlek exercise before and after treatment has an effect on VO2Max, but that Fartlek exercise has a more significant effect than circuit training, even though the latter has an influence that is not greater than Fartlek exercise.

Even if Fartlek training is more important than circuit training, it can be concluded from the discussion above that both types of training have an impact. Similar to earlier studies, the results are visible. The test results on circuit training exercises obtained at $0.00 < 0.05$ are declared significant; therefore, it can be concluded that circuit training exercises have an effect on VO2max both before and after being given treatment. Similarly, the test results on Fartlex exercise obtained at $0.01 < 0.05$ are declared significant; therefore, it can be concluded that Fartlek exercise has an effect on VO2max both before and after being given treatment (Almy & Sukadiyanto, 2014) This study's findings demonstrate that fartlek exercise significantly improves cardiovascular endurance. Moreover, the study's findings (Gumantan & Fahrizqi, 2020) This study concluded that fartlek training showed a significant increase compared to interval training. The difference in improvement from the two exercises gives a clear indication that there are factors that can affect the achievement of a person's maximum ability, physiologically that the closer a person's ability to maximum ability (the higher a person's ability) the more difficult it is to increase it. However, many factors can affect it both externally and internally, such as techniques that have not been mastered properly and correctly or motivation to improve physical abilities as implemented by each sample. These factors may be one of the many obstacles that can hinder optimisation when the VO2max test is carried out.

Conclusions

Based on the results of research and data analysis, it can be concluded that circuit training exercises have a significant effect on increasing VO2Max, fartlek exercises have a significant effect on increasing VO2Max. when viewed from these two exercises, fartlek exercises have a more significant effect on increasing VO2Max of Pencak Silat Athletes of Riau Islamic University Student Activity Unit.

Acknowledgements

The authors would like to express their gratitude, especially to Riau Islamic University for helping to direct the research and writing the article as the output of the research.

Conflict of interest

In this study from the start of licensing to the post-test there was no conflict.

Reference

- Al-Asiri, Z. A., & Shaheen, A. A. M. (2015). Body Mass Index and Health Related Physical Fitness in Saudi Girls and Adolescents Aged 8 - 15 Years. *Open Journal of Therapy and Rehabilitation*. <https://doi.org/10.4236/ojtr.2015.34016>
- Almy, M. A., & Sukadiyanto, S. (2014). Perbedaan Pengaruh Circuit Training dan Fartlek Training Terhadap Peningkatan V02 Max dan Indeks Massa Tubuh. *Jurnal Keolahragaan*, 2(1), 59–68. <https://doi.org/10.21831/JK.V2I1.2603>
- Ardini, F. (2017). Pengaruh Pelatihan Teknik Relaksasi Pernafasan Dalam Terhadap Competitive State Anxiety Pada Atlet Ukm Bulu Tangkis Universitas Negeri Surabaya. *Character: Jurnal Penelitian Psikologi*, 4(2). <https://doi.org/10.21831/jk.v2i1.2603>
- Arikunto Suharsimi. (2010). *Prosedur Penelitian (Suatu Pendekatan Praktik)* (Revisi). Yogyakarta: Rineka Cipta.
- Bahtra, R., Asmawi, M., Widiastuti, & Dlis, F. (2020). Improved vo2max: The effectiveness of basic soccer training at a young age. *International Journal of Human Movement and Sports Sciences*, 8(3), 93–102. <https://doi.org/10.13189/saj.2020.080304>
- Gani, R. A., Achmad, I. Z., Julianti, R. R., Setiawan, E., Németh, Z., Muzakki, A., ... Habibie. (2022). Does the Athletes' Leg Muscle Power Increase After the Tabata Aquatic Program? *Physical Education Theory and Methodology*, 22(1), 56–61. <https://doi.org/10.17309/TMFV.2022.1.08>
- George, A. M., Rohr, L. E., & Byrne, J. (2016). Impact of nintendo wii games on physical literacy in children: Motor skills, physical fitness, activity behaviors, and knowledge. *Sports*, 4(1), 4–13. <https://doi.org/10.3390/sports4010003>
- Gumantan, A., & Fahrizqi, E. B. (2020). Pengaruh Latihan Fartlek dan Cross Country Terhadap Vo2max Atlet Futsal Universitas Teknokrat Indonesia. *SPORT-Mu: Jurnal Pendidikan Olahraga*, 1(01), 1–9. <https://doi.org/10.32528/SPORT-MU.V1I01.3059>
- Ignácio, Z. M., da Silva, R. S., Plissari, M. E., Quevedo, J., & Réus, G. Z. (2019). Physical Exercise and Neuroinflammation in Major Depressive Disorder. *Molecular Neurobiology*, 56(12), 8323–8335. <https://doi.org/10.1007/s12035-019-01670-1>
- Jermaina, N., Kusmaedi, N., Ma'mun, A., Gaffar, V., Purnomo, E., & Marheni, E. (2022). Effects of Relaxation Exercises to Reduce Anxiety in Beginner Athletes. *International Journal of Human Movement and Sports Sciences*, 10(6), 1275–1283. <https://doi.org/10.13189/saj.2022.100618>
- Latorre Román, P., Moreno del Castillo, R., Lucena Zurita, M., Salas Sánchez, J., García-Pinillos, F., & Mora López, D. (2017). Physical fitness in preschool children: association with sex, age and weight status. *Child: Care, Health and Development*, 43(2), 267–273.

<https://doi.org/10.1111/cch.12404>

- Nugroho, A. (2020). Analisis Penilaian Prestasi Teknik Dalam Pertandingan Pencak Silat. *Jorpres (Jurnal Olahraga Prestasi)*, 16(2), 66–71. <https://doi.org/10.21831/JORPRES.V16I2.31655>
- Popović, B., Cvetković, M., Mačak, D., Šćepanović, T., Čokorilo, N., Belić, A., ... Bogataj, Š. (2020). Nine months of a structured multisport program improve physical fitness in preschool children: A quasi-experimental study. *International Journal of Environmental Research and Public Health*, 17(14), 1–10. <https://doi.org/10.3390/ijerph17144935>
- Puncreobutr, V., & Promputh, C. (2016). The Impact of Exercise on Increasing Lower Leg Muscles Strength - With Specific Reference to Male Futsal Athletes in Goal Shooting Accuracy. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2772505>
- Ramadhan, R., Effendy, F., & Putra Pratama, A. (2023). Sports Education on Student Learning Motivation Seen from the Roles Involved in Sport Education Using Handball. *Indonesian Journal of Physical Education and Sport Science*, 4(2), 22–30. <https://doi.org/10.52188/ijpess.v4i1.511>
- Sarbaitinil, S., Rudagi, R., Rahmat, I., Elfemi, N., & Isnaini, I. (2023). Expressing Philosophical Discourse In Pencak Silat As A Pillar of Character Education And Strengthening Social Ties In Society. *Journal of Pragmatics and Discourse Research*, 3(2), 150–162. <https://doi.org/10.51817/jpdr.v3i2.301>
- Satriawan, R., Amar, K., Irawan, E., Fitriani, A., bagus Endrawan, I., Taman Siswa Bima, S., & Author, C. (2023). Survey of Motivation on Bima Town People to Participate in Recreational Sports Activities In the New Normal Era. *Indonesian Journal of Physical Education and Sport Science*, 3(1), 39–47. <https://doi.org/10.52188/IJPESS.V3I1.374>
- Setiaji, O., Raharjo, B. B., & Hidayah, T. (2022). Development of An Integrated Moodle-Based Physical Education E-learning with Religious Content on the Topic of Pencak Silat at SMA Genus Nusantara Boarding *Journal of Physical ...*, 11(3), 356–364. <https://doi.org/10.15294/jpes.v11i3.61755>
- Sudirman, R., Mashud, Aprial, B. M., Tahapary, J. M., Gunawan, Samodra, Y. T. J., ... Nawir, N. (2024). Plyometric training and circuit training in terms of eye-hand coordination: how it affects the explosive power of sickle attacks? *Retos*, 52, 131–137. <https://doi.org/10.47197/RETOS.V52.101330>
- Suganda, M. A., Soegiyanto, Setyawati, H., Rahayu, S., & Rustiadi, T. (2023). Development of physical fitness tests for early childhood 4–6 years. *Fizjoterapia Polska*, 23(1), 40–49. <https://doi.org/10.56984/8ZG07B6FF>

Information about the authors:

Dr. Kamarudin., M.Pd: kamarudin@edu.uir.ac.id, <https://orcid.org/0009-0005-6729-0836>, Physical education, health and recreation, Universitas Islam Riau. Indonesia

Dr. Sasmarianto., M.Pd: sasmarianto@edu.uir.ac.id, <https://orcid.org/0000-0003-0570-881X>, Physical education, health and recreation, Universitas Islam Riau. Indonesia

Wahyuni Rahmalia.,: wahyunirahmalia@student.uir.ac.id, Physical education, health and recreation, Universitas Islam Riau. Indonesia

Cite this article as: Kaarudin. Sasmariato. Rahmalia, Wahyuni.. (2024). Differences in the Effect of Circuit Training and Fartlex Training on Increasing Vo2Max of Pencak Silat Athletes. *Indonesian Journal of Physical Education and Sport Science (IJPESS)*, 4 (2), 140-147. <https://doi.org/10.52188/ijpess.v4i2.705>