Original Article

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Effect of Fartlek k on the Increase in Vo2max

Muhamad Guntur Gaos Sungkawa[1ABCDE]

[1] Universitas Suryakancana, Indonesia

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Abstract: The main purpose of this research is as one of the outputs and tasks of the coaching science course, as well as to find out the effect of fartlek training on increasing VO2Max in pjkr students of the 2023 batch. VO2Max is a key indicator of cardiovascular fitness and endurance which is very important in the activities of physical education students. The method used in this study is an experiment with a one-group pretest-posttest design. The sample consisted of 40 students who were divided into experimental and control groups, each totaling 20 students. Fartlek exercises were performed for 16 sessions in one month with significantly increased intensity. VO2Max measurements are taken before and after treatment using a bleep test. The results showed that there was a significant increase in the VO2Max of students who underwent fartlek training compared to the control group who did not receive treatment. Thus, it can be concluded that fartlek exercises are effective in increasing the VO2Max of pjkr students of the class of 2023.

Keywords: fartlek, VO2Max, endurance of pjkr students

Corresponding author:

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INTRODUCTION

Athletes in various sports, especially team sports that are highly intense and last for long durations, require a high level of aerobic fitness. VO_2max, or maximal oxygen consumption, is the main indicator of aerobic fitness and is directly related to the cardiorespiratory capacity and endurance of athletes in performing sports activities that require high stamina. Aerobic training, interval training, and high-intensity exercise have long been used to improve VO_2max (Attamimi et al., 2024).

In real life, Sport is a form of physical activity that is carried out with the aim of improving a person's physical and mental health and fostering positive traits and personality. As stated (Safitri et al., 2021), exercise can have a significant impact on a person's physical and mental health. As well as improving body fitness and fostering a sportsmanlike spirit. Sports, in terms of achievements, show the progress of a country and play an important role in shaping the country's image in the eyes of the world (Scott, 2017).

According to (J. Haryanto & Welis, 2019), VO2max is a measure of the body's ability to consume oxygen optimally during strenuous physical activity. This is an important indicator of a person's aerobic endurance. As a result, exercise methods that can effectively increase VO2max are needed. Fartlek, which comes from Swedish and means "speed game", is an exercise technique that combines sprinting, jogging, and walking in a single training session. It is considered one of the methods that is considered effective for improving aerobic endurance. These exercises improve general fitness in a fun and flexible way.

Problems in the field show that pjkr students are starting to decline when undergoing various course activities that are not practical courses. This suggests that their aerobic endurance is still lacking. Therefore, this study was conducted to see how fartlek exercise increases VO2max in pjkr students at University of Suryakancana.

MATERIAL AND METHODS

This experimental method uses a One Group Pretest-Posttest design, where research subjects are given an initial measurement (pretest), then treatment (treatment), namely fartlek exercises, and then a re-measurement (posttest) to find out the changes that occur after treatment.

The design scheme can be described as follows:

Pretest (O1)	Treatment (X)	Poststt (O2)
Initial test	Fartlek exercises	Final test

This study took all 40 PJKR students of the Class of 2023 as samples. The samples were then divided into two groups. 20 students in the experimental group received the fartlek exercise treatment, while 20 students in the control group did not receive any special treatment.

To measure the VO2max capacity, the tool used is the bleep test, which is a 20-meter back-and-forth run test with a gradually increasing speed. This test is suitable for large group testing because it is practical and does not require a lot of equipment.

To analyze the data of the research results, descriptive and inferential statistics are used. There are two tests performed: a normality test to find out if the data is distributed normally; and variance homogeneity test to find out if there is a similarity of variance between groups. Hypothesis tests use a t-test to determine pretest and posttest values after treatment. Overall, the examination was conducted with a significance level of 5% ($\alpha = 0.05$).

The mall contains the methods used, population and sampling techniques, research instruments and data analysis techniques used.

RESULTS

This study investigates how fartlek exercise increases the VO2Max of pjkr students of the Class of 2023. Before and after treatment, the Bleep test was used to collect data for the experimental and control groups.

The measurement results showed that the experimental group had a higher average VO2Max compared to the control group. Summary of the data for each of the following groups:

Table 1. Average VO_2Max Pre-test and Post-test Experimental Group

N	Minimum	Maximum	Mean	Std.Dev	Varians
Eksperimen	20	26,80	35,70	30,20	2,66
Control	20	30,20	39,90	34,28	2,62
Gain	20	2,10	6,70	4,08	1,39

Table 2. Average VO_2Max Pre-test and Post-test Control Group

N	Minimum	Maximum	Mean	Std.Dev	Varians
Eksperimen	20	26,80	37,10	31,36	2,89
Control	20	28,30	37,80	32,46	2,76
Gain	20	0,70	1,90	1,11	0,43

From the table above, the experimental group experienced an increase in VO_2Max by **4.08 ml/kg/min**, while the control group only experienced an increase of **1.11 ml/kg/min**.

1. Hypothesis Test (t-test)

Table 5. Pretest t-test results

Groups	Mean	Std.Dev	Sig.(2-tailed)
Eksperimen	30,20	2,66	0,196
Control	31,36	2,89	

From the table above, there was no significant difference between the experimental and control groups before treatment, with a significance value of 0.196 > 0.05.

Table 6. Posttest t-test results

Groups	Mean	Std.Dev	Sig.(2-tailed)
Eksperimen	34,28	2,62	0,039
Control	32,46	2,76	

From the table above After treatment, there was a significant difference between the experimental and control groups with a significance value of 0.039 < 0.05, which means that fartlek exercise influenced the increase in VO_2Max.

Table 7. Gain t-test results

Groups	Mean Gain	Std.Dev	Sig.(2-tailed)
Eksperimen	4,08	1,39	0,000
Controls	1,11	0,43	

From the table above, there was a very significant difference in the increase in VO_2Max between the experimental and control groups with a significance value of 0.000 < 0.05. This shows that fartlek exercise significantly increases VO_2Max.

DISCUSSION

The results of the study show that fartlek exercise significantly increases the VO2Max of pjkr students. These results support the basic theory that VO2Max is the main gauge of a person's aerobic capacity, which is heavily influenced by the type of exercise and its intensity. Fartlek exercises that combine various speeds (such as jogging, running, and sprinting) can improve heart and lung function.

(Mori Saputra et al., 2022)found that fartlek exercise can significantly improve aerobic ability. In addition, according to exercise theory, varying in intensity and duration of exercise, such as fartlek, can help muscles use oxygen more efficiently. Therefore, to improve the aerobic fitness and overall performance of athletes when facing physical stress during a match, fartlek exercises can be included in the pencak silat training plan. Due to the flexible nature of the fartlek, fartlek training improves aerobic endurance (Atradinal, 2018)In addition, fartlek exercises face the aerobic and anaerobic energy systems simultaneously. This supports the findings of previous research, in which the experimental group that received the fartlek exercise treatment showed a significant increase in VO2Max compared to the control group.

In addition, (S. Haryanto et al., 2024)It was shown that fartlek exercise improved physiological adaptation, including greater strength of the respiratory muscles, increased maximum heart rate, and efficiency of oxygen use by muscle tissue. This supports the finding that fartlek exercise can significantly increase VO2Max. The concept of overload in exercise theory, where an increase in the intensity and variation of exercise can encourage physiological adaptation of the body, corresponds to an increase in VO2Max in the experimental group. The fartlek program implemented, for example, requires a variation in speed and the body's ability to quickly adapt to changes in training load.

The experimental group showed a significant increase in VO2Max compared to the control group that only did regular exercise without fartlek treatment. This shows that fartlek training techniques are more effective in improving the aerobic abilities of pencak silat athletes, which is very important to support their performance during matches that require high endurance for a relatively long time. Therefore, the findings of this study show that fartlek training can be used as an alternative or complement to pencak silat athletes' training programs, especially to improve aerobic fitness aspects. These findings will be relevant for coaches and sports practitioners as they create scientifically based exercise plans

CONCLUSION

From the results of research and discussions, it is shown that fartlek exercises increase the VO2Max of pjkr students of the Class of 2023. This exercise shows that students can improve their aerobic abilities, which is essential for maintaining physical endurance during lectures. Fartlek exercise can improve the body's physiological adaptation, especially in the cardiovascular and respiratory systems, with a significant increase in VO2Max in the experimental group.

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