

The fartlek exercise method for improving cardiac, lung and anaerobic endurance (UNY indoor hockey athlete)

Metoda ćwiczeń fartlek do poprawy wytrzymałości sercowo-oddechowej oraz wytrzymałości beztlenowej (hokeiści halowi UNY)

Agus Priyadi^(A,B,C,D,E,F,G), Danarstuti Utami^(B,C,D), Bimo Alexander^(E,F), Khusnul Khotimah^(B,F)

Department Of Sport Science, Universitas PGRI Yogyakarta, Indonesia

Abstract

This study intends to determine the effect of the fartlek training method on increasing cardio-pulmonary endurance and anaerobic endurance for men's indoor hockey athletes at Yogyakarta State University. This type of research is an experimental research, using the one group pretest - posttest design method. The population in this study were UNY male indoor hockey athletes with a total of 12 people. The data collection technique in this study is a test. The 2.4 km running test instrument uses the Cooper test method to measure heart-lung endurance and the RAST test to measure anaerobic endurance. Data analysis in this study used the t-test, namely by comparing the pretest and posttest results of the experimental group. Based on data from the t-test analysis between pretest and posttest, the fartlek training method on increasing heart lung endurance has a calculated t value of 4.007 and t table df = 11 at a 5% significance level of 2.20. The calculated t value is 4.007 > t table of 2.20, and the p value = 0.002, because p is less than 0.05, there is a significant difference. Judging from the results of the average heart lung endurance capacity, the average pretest value was 12.58 and the average posttest value was 11.31, because the average pretest value was greater than the average posttest value so there was an increase heart lung endurance was 1.27 / 10.09%. Furthermore, the results of the second analysis, the t-test between the pretest and posttest of the fartlek training method on increasing anaerobic endurance, had a calculated t value of 22.951 and the t table value df = 11 at a significance level of 5%, namely 2.20. The calculated t value is 22,951 > t table is 2.20, and the p value = 0.000, because p < 0.05 there is a significant difference. Judging from the average value of anaerobic endurance ability, the average pretest value is 305.16 and the average posttest value is 416.03, because the average pretest value is < the average posttest value, so there is an increase anaerobic endurance of 110.87 / 6.33%. Thus, it can be concluded that there is an influence of the fartlek training method on increasing cardiopulmonary endurance and anaerobic endurance in men's indoor hockey athletes at Yogyakarta State University. because p < 0.05, there is a significant difference. Judging from the average value of anaerobic endurance ability, the average pretest value is 305.16 and the average posttest value is 416.03, because the average pretest value is < the average posttest value, so there is an increase anaerobic endurance of 110.87 / 6.33%. Thus, it can be concluded that there is an influence of the fartlek training method on increasing cardiopulmonary endurance and anaerobic endurance in men's indoor hockey athletes at Yogyakarta State University. because p < 0.05, there is a significant difference. Judging from the average value of anaerobic endurance ability, the pretest average value is 305.16 and the posttest average value is 416.03, because the pretest average value is < than the posttest average value, so there is an increase anaerobic endurance of 110.87 / 6.33%. Thus it can be concluded that there is an effect of the fartlek training method on increasing cardio-pulmonary endurance and anaerobic endurance in men's indoor hockey athletes at Yogyakarta State University. so there is an increase in anaerobic endurance of 110.87 / 6.33%. Thus, it can be concluded that there is an influence of the fartlek training method on increasing cardiopulmonary endurance and anaerobic endurance in men's indoor hockey athletes at Yogyakarta State University. so there is an increase in anaerobic endurance of 110.87 / 6.33%. Thus, it can be concluded that there is an influence of the fartlek training method on increasing cardiopulmonary endurance and anaerobic endurance in men's indoor hockey athletes at Yogyakarta State University.

Keywords

fartlek exercise method, cardiac pulmonary endurance, and anaerobic endurance

Streszczenie

Celem niniejszego badania jest określenie wpływu metody treningu fartlek na zwiększenie wytrzymałości kardiopulmonarnej i beztlenowej u męskich hokeistów halowych Uniwersytetu Stanowego w Yogyakarta. Badanie ma charakter eksperymentalny i wykorzystuje metodę badawczą pretest - posttest z jedną grupą. Populację stanowią mężczyźni hokeiści halowi UNY, łącznie 12 osób. Technika zbierania danych w tym badaniu to testy. Instrumentem testu biegowego na dystansie 2,4 km jest metoda testu Coopera, służąca do mierzenia wytrzymałości sercowo-płucnej, oraz test RAST do mierzenia wytrzymałości beztlenowej. Analizę danych przeprowadzono za pomocą testu t, polegającego na porównaniu wyników pretestu i posttestu grupy eksperymentalnej. Na podstawie danych z analizy testu t między pretestem a posttestem, metoda treningu fartlek w zwiększaniu wytrzymałości sercowo-płucnej wykazała wartość t obliczoną na 4,007 przy t tabeli df = 11 na poziomie istotności 5% wynoszącym 2,20. Obliczona wartość t wynosi 4,007 > 2,20 z tabeli t, a wartość p = 0,002, co oznacza, że istnieje istotna różnica. Biorąc pod uwagę wyniki średniej zdolności wytrzymałości sercowo-płucnej, średnia wartość pretestu wynosiła 12,58, a średnia wartość posttestu 11,31, co oznacza wzrost wytrzymałości sercowo-płucnej o 1,27/10,09%. Ponadto wyniki drugiej analizy, test t między pretestem a posttestem metody treningu fartlek w zwiększaniu wytrzymałości beztlenowej, wykazały obliczoną wartość t wynoszącą 22,951 przy wartości tabeli t df = 11 na poziomie istotności 5%, czyli 2,20. Obliczona wartość t wynosi 22,951 > 2,20 z tabeli t, a wartość p = 0,000, co oznacza, że istnieje istotna różnica. Biorąc pod uwagę średnią wartość zdolności wytrzymałości beztlenowej, średnia wartość pretestu wynosi 305,16, a średnia wartość posttestu 416,03, ponieważ średnia wartość pretestu jest < średniej wartości posttestu, co oznacza wzrost wytrzymałości beztlenowej o 110,87/6,33%. W związku z tym można stwierdzić, że metoda treningu fartlek wpływa na zwiększenie wytrzymałości kardiopulmonarnej i beztlenowej u męskich hokeistów halowych Uniwersytetu Stanowego w Yogyakarta. przestrzennego widzenia uzyskała najniższą ocenę, ze średnią 3,42 (wysoka). Drugą najniższą jest inteligencja muzyczna z średnią oceną 3,56. Inteligencja logiczno-matematyczna, werbalno-językowa i intrapersonalna uzyskały oceny podobne do wysokiej kategorii, odpowiednio 4,00, 3,84 i 3,91.

Wnioski. Wyniki badań mogą być wykorzystane przez sektor programów nauczania, dyrektorów szkół oraz inne organizacje powiązane, by wspierać nauczycieli wychowania fizycznego, szczególnie w integracji inteligencji przestrzenno-wizualnej i muzycznej, w szkoleniach dotyczących wdrażania różnorodnych inteligencji w procesie nauczania. Na podstawie wyników badań zaleca się dalsze badania nad integracją różnorodnych inteligencji w edukacji fizycznej.

Słowa kluczowe

metoda ćwiczeń fartlek, wytrzymałość serca i płuc, wytrzymałość beztlenowa

Introduction

Sport is regular and planned physical activity performed deliberately by individuals to enhance functional capacity and fitness. Hockey is a sport played between two teams where each player using a curved stick to hit, control, and guide the ball into the opponent's goal [1]. In Indonesia, the sport of hockey is divided into two categories, namely indoor hockey and field hockey. Indoor hockey is a game consisting of two teams played indoors, where each team consists of six players and each player uses a stick to dribble the ball. The development of the sport of indoor hockey can be seen from the holding of various indoor hockey championships both domestically and abroad. Likewise, Yogyakarta State University has always actively participated in various hockey championships, such as the DIY Hockey Championship, between universities throughout Indonesia, and succeeded in winning 1st place in the National Championship (KEJURNAS) for indoor hockey, KEMENPORA Jakarta Cup 2008, 2009, and 3rd place in field hockey. between universities in Indonesia in 2010, but from 2013 until now the Yogyakarta State University men's indoor hockey team failed to win. Based on the results of observations made in the field, this is due to the lack of physical condition training provided, the lack of awareness of UNY men's room hockey athletes regarding the importance of physical condition training, especially heart lung endurance and anaerobic endurance, and the lack of attendance at training by UNY men's indoor hockey athletes when they are not competing, meaning that UNY men's indoor hockey athletes practice diligently only before competitions. Judging from the length of the match, endurance and concentration are very necessary in indoor hockey, especially cardio-pulmonary endurance and anaerobic endurance. This research refers to research conducted by Aditya and Eko, namely the influence of fartlek and cross country training on Vo2Max in Indonesian Technocrat University Futsal Athletes. This research aims to determine the effect of fartlek and cross country training on the VO₂Max of Indonesian Technocrat University Futsal Athletes. The technique used is a test [2]. Endurance and concentration are very necessary in outdoor hockey, especially cardio-pulmonary endurance and anaerobic endurance. This research refers to research conducted by Aditya and Eko, namely the influence of fartlek and cross country training on Vo2Max in Indonesian Technocrat University Futsal Athletes. This research aims to determine the effect of fartlek and cross country training on the VO₂Max of Indonesian Technocrat University Futsal Athletes. The technique used is a test [2]. Endurance and concentration are very necessary in outdoor hockey, especially cardio-pulmonary endurance and anaerobic endurance.

This research refers to research conducted by Aditya and Eko, namely the influence of fartlek and cross country training on VO₂Max in Indonesian Technocrat University Futsal Athletes. This research aims to determine the effect of fartlek and cross country training on the VO₂Max of Indonesian Technocrat University Futsal Athletes. The technique used is a test [2]. This research aims to determine the effect of fartlek and cross country training on the VO₂Max of Indonesian Technocrat University Futsal Athletes. The technique used is a test [2]. This study aims to determine the effect of fartlek and cross-country training on VO₂Max Futsal Athletes at the Indonesian Technocrat University. The technique used is a test [2].

Materials and methods

This study is an experimental research, which aims to validate theories and underlying methods through creation and manipulation by researchers [3]. This research was carried out on the FIK UNY hockey field. The study's population consisted of 12 male outdoor hockey athletes from UNY. The design of this research is one group pretest-posttest design [11]. The design form is as follows:

$$A1 - B - A2$$

Information

A1: Initial tests include cardiac pulmonary endurance and anaerobic endurance

B: Fartlek training treatment

A2: The final tests include cardiac pulmonary endurance and anaerobic endurance

From the research design above, all populations were given an initial test to measure heart lung endurance and anaerobic endurance, then given the fartlek training method for eight weeks with a training frequency of three times a week. Then a final test of cardiac pulmonary endurance and anaerobic endurance is carried out to find out the results.

Research result and discussion

The results of research regarding the fartlek training method to increase heart lung endurance and anaerobic endurance in men's indoor hockey athletes at Yogyakarta State University, the data of which was taken on Monday, Wednesday and Friday from 13 October 2022 - 08 December 2022 at the FIK Hockey field UNY with a population of 12 people. The results can be summarized as follows:

Table 1. T-test

Variable	T-test				Ket
	count	df	table	Sig	
Pretest-posttest pulmonary and cardiac	4.007	11	2.20	0.002	Significant
Pretest-anaerobic endurance posttest	22.951	11	2.20	0.000	Significant

Based on the results of the statistical tests above, the t-test value between the pretest and posttest of the heart lung endurance variable was obtained which had a calculated t value of 4.007 and a t table value with df equal to 11 at the 5% significance level of 2.20. P value = 0.002, where $p < 0.05$ so there is a significant difference. Judging from the average value of heart lung endurance capacity, the pretest average value was 12.58 and the posttest average value was 11.31, because the pretest average value > the posttest average value, there was an increase in endurance. heart lung of 1.27 or 10.09%. Meanwhile, the statistical test results of the t-test between the pretest and posttest of the anaerobic endurance variable have a calculated t value of 22.951 and a t table value with df equal to 11 at the 5% significance level of 2.20. P = 0, 000, where $p < 0.05$ so there is a significant difference. Judging from the average value of anaerobic endurance ability, the pretest average value was 305.16 and the posttest average value was 416.03, because the pretest average value > posttest average value, there was an increase in anaerobic endurance ability. amounting to 110.87 or 36.33%. The conclusion of this research is that there is an influence of the fartlek training method on increasing heart lung endurance and anaerobic endurance. because the average pretest value > the average posttest value, there is an increase in anaerobic endurance ability of 110.87 or 36.33%. The conclusion of this research is that there is an influence of the fartlek training method on increasing heart lung endurance and anaerobic endurance. because the average pretest value > the average posttest value, there is an increase in anaerobic endurance ability of 110.87 or 36.33%. The conclusion of this research is that there is an influence of the fartlek training method on increasing heart lung endurance and anaerobic endurance.

Discussion

There was an increase in the physical condition of cardiopulmonary endurance and anaerobic endurance in men's indoor hockey athletes at Yogyakarta State University after being given the fartlek training method. Fartlek training can increase the endurance of the lungs and the heart to work more optimally because programmed fartlek training will form stronger heart walls, so that the amount of air becomes greater and the stroke volume of blood per beat becomes greater. stated that fartlek training is an advanced training method to increase speed and endurance. Fartlek training consists of running using the repetition method, which is one way to train anaerobic endurance [4]. The physical conditions required in the sport of hockey include heart lung endurance, anaerobic endurance, speed, agility, strength, muscular endurance, and flexibility. Indoor hockey the energy required is aerobic and

anaerobic [6]. This is in accordance with the opinion of who state that endurance is divided into two, namely aerobic endurance and anaerobic endurance [7]. Cardiopulmonary endurance is the ability of the heart and lungs as well as the circulatory system to function efficiently at a fairly high tempo during a certain period [8]. Meanwhile, anaerobic endurance is the process of meeting the body's energy needs to utilize glycogen to become a source of energy without the help of oxygen from outside the body. So, in order to improve the physical condition of cardiorespiratory endurance and anaerobic endurance in indoor hockey athletes, it is necessary to carry out endurance training, namely the fartlek training method. In accordance with [1] opinion, one of the best forms of physical training for hockey is fartlek training. Stated that the fartlek training method is a form of running activity carried out by walking, jogging, sprinting and walking continuously for a specified time [9]. The fartlek training method aims to increase the athlete's power and aerobic space [3]. This method is the best form of training to increase endurance in almost all sports. Stated that fartlek training should be done during the preparation period, because heart and lung endurance training is the initial foundation for facing heavier training in the following season. This is in accordance with the opinion of that the form of fartlek training can be applied to sports that are undergoing preparation for competition and is a long-term training plan because it can make the body's organ systems, especially the heart, work optimally [10]. It is stated that programmed fartlek training increases an athlete's heart and long endurance. This is because fartlek training, while enjoyable, adheres to proper principles and training patterns [11, 12].

Conclusion

Based on the results of the above research it can be concluded as follows:

1. There is an effect of the fartlek training method on increasing cardiopulmonary endurance in men's indoor hockey athletes at Yogyakarta State University.
2. There is an effect of the fartlek training method on increasing anaerobic endurance in men's indoor hockey athletes at Yogyakarta State University.

Adres do korespondencji / Corresponding author

Agus Pribadi

aguspribadi@upy.ac.id

Piśmiennictwo / References

1. Ridlo Dwi. (2019). Hockey Sports Game Textbook. Malang: FIK UM
2. Aditya Gumantan and Eko Bagus. (2020). The Influence of Fartlek and Cross Country Training on Vo2Max of Futsal Athletes, Indonesian Technocrat University. Journal of Sport-Mu Sports Education UM Jember. Vol.1 No.1. p-ISSN: 2716-1900.
3. Almy, muh akmal. 2014. Differences in the Effects of Circuit Training and FartleTraining on Increasing VO2max and Body Mass Index. Sports Journal Vol.2 (1): p.59-68.
4. Educate Joko Tri Purnomo.(2009). The Effect of Interval Training and Fartlek Exercises on the Aerobic Endurance of Basketball Players at SMA N 1 Prambanan. Thesis. Yogyakarta: FIK UNY.
5. Jokay Purwanto. (2004). Hockey. Yogyakarta: FIK UNY.
6. Kusnanik, NW, Rahayu, YS, & Rattray, B. (2018). Physiological demands of playing field hockey games at sub elite players. In IOP Conference Series: Materials Science and Engineering (Vol. 288, No. 1, p. 012112). IOP Publishing.
7. Husein Argasasmita, et al. (2007). Basic Coaching Theory. Jakarta: Institution National Sports Accreditation.
8. Zulheri and Septi (2020). Correlation between Cardiac Pulmonary Endurance and Futsal Playing Skills at the Satoe Atjeh Futsal Academy Club. Penjaskesrek Journal Volume 7, Number 1, April. P-ISSN 2355-0058 E-ISSN 2502-6879.
9. Sukadiyanto. (2011). Introduction to Theory and Methodology of Physical Training.
10. Sugiyono. (2012). Statistics for Research. Bandung: CV. Alvabet.
11. Suharsimi Arikunto. (2002). Research Management. Jakarta: PT. Rineka Cipta. Bandung:
12. Lhubuk Agung.Ilmiyanto, Fajar and Budiwanto. (2017). Differences in the Effect of the Fartlek Training Method and the Continuous Tempo Running Training Method on the Improvement of Cardiovascular Endurance in Long Distance Running Trainees. Indonesian Performance Journal. IPJ 1 (2) (2017), ISSN 2597-3624.