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Journal homepage: <https://jurnal.javamutiaramedia.org/index.php/fairplay/index>

The Effect of Interval and Fartlek Training on Endurance of Futsal Players at SMA ABBS Surakarta

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ABSTRACT

This study aims to determine: (1) the effect of interval training on the endurance improvement of futsal players at SMA ABBS Surakarta; (2) the effect of fartlek training on the endurance improvement of futsal players at SMA ABBS Surakarta; and (3) the more effective training method between interval training and fartlek training in enhancing the endurance of futsal players at SMA ABBS Surakarta. This research is a quantitative experimental study. The sample consisted of 20 futsal players from SMA ABBS Surakarta. The research method used was an experimental approach with a two-group pretest-posttest design. The study was conducted over 18 sessions with a training frequency of three times per week. The treatments applied were interval training and fartlek training. The research instrument used was the Bleep Test. Data analysis included prerequisite tests (normality test using the Shapiro-Wilk test) and hypothesis testing using the Paired Sample T-Test. The results of data analysis showed that: (1) there was a significant improvement in endurance among futsal players at SMA ABBS Surakarta after undergoing interval training, as evidenced by a Sig. (2-tailed) value of $0.000 < 0.05$; (2) there was a significant improvement in endurance among futsal players at SMA ABBS Surakarta after undergoing fartlek training, also evidenced by a Sig. (2-tailed) value of $0.000 < 0.05$; and (3) both interval and fartlek training methods were equally effective in improving the endurance of futsal players at SMA ABBS Surakarta, as indicated by a non-significant difference with a Sig. (2-tailed) value of $0.622 > 0.05$. The improvement can also be seen from the percentage increase in endurance performance. Based on these findings, it can be concluded that: (1) Interval training has a significant effect on improving the endurance of futsal players at SMA ABBS Surakarta; 2) Fartlek training has a significant effect on improving the endurance of futsal players at SMA ABBS Surakarta; (3) Both interval and fartlek training methods are equally effective in enhancing the endurance of futsal players at SMA ABBS Surakarta, as no significant difference was found between the two training methods.

ARTICLE INFO:

Article History:

Submitted/Received 11 November 2025
First Revised 11 November 2025
Accepted 14 November 2025
First Available online 28 November 2025
Publication Date 28 November 2025

Keyword:

Interval Training; Fartlek Training; Endurance

1. INTRODUCTION

Futsal is a mini soccer game that is played indoors because the size of the field is smaller than a soccer field and has game rules, number of players and a way of playing that is also different from soccer, because it is played indoors, this sport can be played at any time without being hindered by the weather which is always changing.(Fitranzo 2018). Futsal is a sport played by two teams, where in futsal you can hardly make mistakes if you want to win the match.(John 2008), futsal can be defined as a ball game played by two teams, each consisting of five players. In addition to the five main players, each team is also allowed to have reserves.

According to(Lhaksana 2012)Futsal is a team sport consisting of five fast and dynamic players who are capable of scoring many goals with accurate passing.Futsal was first popularized in 1930 in Montevideo, Uruguay, by a player named Juan Carlo Ceriani. Uruguay was also the first country to host the Futsal World Cup held in 1930, and became a popular sport in the United States and Brazil because of its uniqueness. Futsal is a sport that is played in a fast tempo intensity, with small field dimensions, almost all parts of the field are used in the game even though the angle is small to be able to score a goal. Therefore, it requires teamwork as well as good chemistry from each team mate. The most important basic technique in the game of futsal is passing because futsal is more dominant with ball possession(Saryono 2006).

According to(Wicaksono 2021)Practice comes from the English word which means several levels, namely: practice, exercises, and training. Practice is an activity to improve sports skills by using various equipment according to the goals and needs of the sport. This means that during the training process, training to master movement skills in a sport is always assisted by using supporting equipment. Practice is only part of the word exercises, which means that every training process comes from the word exercises, there must be a form of practice. Exercises are the main tools in the daily training process to improve the quality of the function of the human body's organ systems, making it easier for athletes to perfect their movements. The exercises referred to in the word are core exercises and additional exercises.

Interval training is a training that combines running distance, running speed, and rest time. Interval training also uses the principle of adding weight in each exercise.(Suharjana 2013).(Harsono 2016)explains interval training is a training system that uses intervals in the form of rest periods. Interval training does not need to refer to a particular training method. Interval training is highly recommended by coaches because it has a positive impact on the development of athlete endurance. Interval training is highly recommended by famous coaches because of its excellent benefits for endurance and stamina so that it can be applied to all sports that require endurance and stamina, one of which is futsal. In interval training there are several factors that must be met in compiling it, namely the duration of training, the load (Intensity) of training, the rest period (Recovery Interval) after repetition of training, repetition (Repetition) of doing training(Harsono 2016).

Fartlek training is free training where distance is not too important, and athletes are free to determine their own distance and speed through existing coaches. The intensity of training must be increased progressively from one stage to the next. Training consists of walking, jogging and sprinting, and after finishing it continues from the start again(Almy and Sukadiyanto 2014). Fartlek training is a form of running activity that is carried out by walking, jogging, sprinting and walking continuously. Fartlek training is an endurance system to build, develop, or maintain an athlete's body condition(Festiawan et al. 2020). The principle of fartlek training is to run with variations, this means that we can adjust the desired running speed during training according to the athlete's preferences and conditions/abilities.(Pratama and Kushartanti 2019).

According to(Indrayana 2012)Endurance is the state or condition of the body that is able to work for a long time, without experiencing excessive fatigue after completing the work.(Muhammad 2019)Endurance is the slowness of fatigue felt by the body which is related to the aerobic capacity possessed. The importance of the endurance component in futsal games makes coaches continue to develop training models that aim to maintain the physical condition of endurance in order to achieve maximum training results. The endurance component in futsal is certainly the main reference for coaches in improving it(Vedas 2021). Endurance is divided into two, namely; General Endurance, known as heart and lung power or aerobic endurance, which involves extensive muscle activity, and is directed at heart and respiratory endurance. Maximum aerobic capacity is closely related to the function of the lung-heart system consisting of the lungs, heart, blood vessel system and blood which are interconnected and mutually supportive in delivering oxygen to working muscles and transporting waste from the muscles. Specific endurance is known as muscle endurance or anaerobic endurance. Anaerobic endurance as "the ability to maintain muscle contractions by providing energy through anaerobic mechanisms"(Widiyanto 2015).

Based on observations made in the training of the SMA ABBS Surakarta futsal team to be used as the object of research, the researcher found that there were physical endurance problems which were the main problems. The results of the training program survey with several SMA ABBS Surakarta futsal players were shown, namely with the conclusion that each training session only

focused on technique and strategy. This was because of the limited training time of only 2 times a week. So that the coach's choice in providing a training session program was more dominant in technique and strategy, thereby reducing the intensity of physical training.

Researchers proved the endurance condition with the MultiStage Fitness Test (MFT) on July 15, 2024 which was carried out at the Budi Langgeng Sports Hall with data obtained that the average endurance ability of SMA ABBS Surakarta futsal players was relatively low, namely VOMax (ml / kg / min) was 37.663% of the 24 futsal players who took the observation test. Therefore, researchers conducted research and designed an endurance program using the interval and fartlek training methods to increase the endurance of SMA ABBS Surakarta futsal players.

The low endurance condition is due to the lack of sufficient physical condition training. The training method that does not provide enough physical material in futsal is a factor in low physical condition of players. Based on the opinion above regarding the importance of endurance for futsal players, for that reason, coaches need to choose a physical training method that increases player endurance. So the researcher chose the interval and fartlek training methods which have been proven to increase player endurance.

Based on these problems, the author wants to conduct research with the aim of finding out whether there is an influence of interval training and fartlek training methods in increasing endurance and a more effective method for increasing the endurance of SMA ABBS Surakarta futsal players, this is realized in the form of scientific research entitled "The Effect of Interval and Fartlek Training on Increasing the Endurance of SMA ABBS Surakarta Futsal Players".

2. METHODS

The research method used in this study is research with a quantitative approach. The design used in this study is the Two Groups Pretest-Posttest Design, namely an experiment divided into two comparison groups. This research has been carried out in Budi Langgeng Futsal Sports Hall, Sawahan Village, Ngemplak District, Boyolali Regency, Central Java 57375. This research was conducted on the date January 6 – February 14, 2025, meetings were conducted as many as 18 meetings with 16 meetings for treatment, 1 meeting for pretest, 1 meeting for posttest. Training sessions were conducted 3 times a week.

The research subjects used in this study were the total number of futsal players at SMA ABBS Surakarta, which amounted to 24 people. The data collection technique in this study was the Bleep Test Instrument with the aim of measuring physical endurance. (Widiastuti and Pd 2018) by using test techniques, namely pre-test and post-test. The data analysis used is the prerequisite analysis test, and t-test. The prerequisite test of this study uses the normality test, while for the hypothesis test this study uses the paired sample t-test and independent sample t-test. After conducting a normality test to determine whether the data is normally distributed, the t-test is used to test the hypothesis. The paired sample t-test is used to compare the average results of interval and fartlek training endurance before and after training. An the independent sample test to determine which exercise is more effective between interval training and fartlek training.

3. RESULT AND DISCUSSION

a. Data Description

Table 1. Pretest and posttest results in the form of data interval training group

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest	20	33.2	43.9	38.2	2.63
Posttest	20	36.5	48.4	41.5	3.4

The data obtained shows that the average pretest value is 38.2 with a minimum value of 33.2, a maximum value of 43.9, and a mean value of 38.2. The std.deviation value is 2.63. Meanwhile, the value of the posttest is the average test result of 41.5 with minimum value 36.5, maximum value 48.4 and the std.deviation value is 3.4. With these results, it can be seen that there was an increase in the test results which were initially on average of 38.2 then increased to 41.5.

Table 2. The results of the pretest and posttest are in the form of data fartlek training group.

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest	20	34.6	41.1	38.05	2.15
Posttest	20	36.7	46.5	39.65	3.2

The data obtained shows that the average pretest value is 38.05 with minimum value 34.6, maximum value 41.1 and the std.deviation value is 2.15. Meanwhile, the value of the posttest is the average test result of 39.65 with minimum value 36.7, maximum value 46.5 and the std.deviation value

is 3.2. With these results, it can be seen that there was an increase in the test results which were initially on average of 38.05 then increased to 39.65.

Table 3. Percentage of Increase in the Effect of Interval Training and Fartlek

Variables	Pretest	Posttest	Difference different	/	Mean	Percentage Increase
The Effects of Interval Training	38.2	41.5	3.3			8.63%
The Effects of Fartlek Training	38.05	40.83	2.78			7.31%

Based on the results of the study in the table above, the percentage of increased endurance at SMA ABBS Surakarta with interval training was 8.63%. While the results of the study in the table above obtained a percentage increase in endurance at SMA ABBS Surakarta with fartlek training of 7.31%.

b. Prerequisite Analysis Test

Table 4. Normality Test

Tests of Normality		Shapiro Wilk		
	Group	Statistics	df	Sig.
Pre Test	Interval Group	.933	12	.414
	Fartlek Group	.905	12	.184
Post Test	Interval Group	.864	12	.055
	Fartlek Group	.900	12	.158

Based on the results of data testing with the Shapiro Wilk technique, it can be seen that the p value (sig) on each variable has a value greater than 0.05. These results indicate that the data is normally distributed.

c. Homogeneous Test

Table 5. Normality Test

Test of Homogeneity of Variance		Levene Statistics	df1	df2	Sig.
Based on Mean		.025	1	22	.876
Based on Median		.018	1	22	.894
Based on Median and with adjusted df		.018	1	20,026	.894
Based on trimmed mean		.015	1	22	.902

Based on the results of the homogeneity test, it is known that the sig value using the Lavene homogeneity test is greater than 0.05, indicating that the variances of the two groups are homogeneous.

d. Hypothesis Testing

Table 6. The effect of interval training on increasing endurance

Paired Samples t-test		Mean	df	Std. Deviation	Std. Mean	Error	t	Sig. (2-tailed)
Pretest	Interval-Posttest	3,291	11	1,125	,361		9,111	.000

Based on the hypothesis test table with paired sample t-test above, the Sig.(2-tailed) value is 0.000 < 0.05. Then in the t-test results, t count > t table = 9.111 > 4.024. With these data, it can be concluded that H0 is rejected and Ha is accepted, which means that there is an influence that has a difference in the average results of the endurance test of SMA ABBS Surakarta futsal players between before and after being given interval training treatment.

Table 7. Results of the Paired Sample T-Test for Fartlek Exercise

Paired Samples t-test		Mean	df	Std. Deviation	Std. Mean	Error	t	Sig. (2-tailed)	(2-tailed)
Pretest Fartlek	-Posttest Fartlek	2.77	11	1,271	,367		7,561	.000	

Based on the hypothesis test table with paired sample t-test above, the Sig.(2-tailed) value is 0.000 <0.05. Then in the t-test results, $t > t \text{ table} = 7.561 > 4.024$. With these data, it can be concluded that H_0 is rejected and H_a is accepted, which means that there is an influence that has a difference in the average results of the endurance test of SMA ABBS Surakarta futsal players between before and after being given fartlek training treatment.

Table 8. Results of the Independent Sample T-Test

T	df	Sig.(2-tailed)	Mean Different	Std. Error Different
Posttest	,500	22	,622	,675

Based on the table of independent sample t-test results, it is known that the sig. (2-tailed) value is $0.622 > 0.05$. Then the calculated t value is $0.500 < t \text{ table } 2.073$. So it can be concluded that there is no significant difference between interval and fartlek training. The following table shows the percentage increase in training results from interval and fartlek training.

Table 9. Percentage Increase Results

Group	Percentage Increase
Interval Training	8.63%
Fartlek Workout	7.31%

Based on the percentage increase in interval training of 8.63% and fartlek training of 7.31%. It can be concluded that interval training and fartlek training are equally effective in increasing the endurance of futsal players at SMA ABBS Surakarta. Which means that the 3rd hypothesis which states "interval training is better for increasing endurance in futsal players at SMA ABBS Surakarta is rejected.

DISCUSSION

Interval training is one of the training methods to increase endurance, especially aerobic endurance. Interval training is done in open or closed places according to individual needs. Interval training is done with a program that has been arranged progressively, namely by increasing the load periodically, both increasing the intensity of training so that players can adapt well.(Festiwani et al. 2020). Based on the results of the t-test in the study on increasing endurance (VO₂max) in futsal players at ABBS Surakarta High School with interval training, the calculated t value (9,111) > t table (4.024), thus it can be interpreted that there is an influence of interval training on increasing endurance in futsal players at SMA ABBS Surakarta.

Fartlek training is an exercise method to increase endurance, especially aerobic endurance. Fartlek training is training that varies the form of exercise or training that varies the speed from walking, jogging, and sprinting. Fartlek training can be done alone or with a trainer program(Hussain 2013). Fartlek training is done in open or closed places according to individual needs. Fartlek training is done with a program that has been arranged progressively, namely by increasing the load periodically, both increasing the intensity of training so that players can adapt well. Based on the results of the t test in the table. on increasing endurance (VO₂max) in futsal players at SMA ABBS Surakarta with fartlek training, the calculated t value (7,561) > t table (4.024), thus it can be interpreted that there is an influence of fartlek training on increasing endurance in futsal players at ABBS Surakarta High School.

(Almy and Sukadiyanto 2014)examined the effect of fartlek training on increasing VO₂max in high school students. The results showed that fartlek training can significantly increase students' aerobic endurance, as seen from the increase in VO₂max values after following a six-week training program. However, this study only used one training method and did not make a direct comparison with other methods such as interval training. In addition, the study was conducted on students in general, not on athletes with specific sports such as futsal.

Another study was conducted by(Adityatama et al. 2018), which examined the effect of interval and fartlek training on the physical endurance of futsal extracurricular students. In their study, subjects

were given an interval training program for four weeks. The results showed a significant increase in students' cardiorespiratory endurance, as indicated by the Bleep Test results. Interval and fartlek training have been shown to increase aerobic capacity through repetition of high-intensity activities interspersed with active rest periods. However, this study only used a single-group design and did not compare the interval method with other methods, so conclusions about the relative effectiveness of other methods cannot be obtained in full.

Based on the results of the study in the table above, the percentage of increased endurance in futsal players with interval training was 8.63%. While the results of the study in the table above obtained the percentage of increased endurance with fartlek training of 7.31%. These results indicate that interval and fartlek training are both good for increasing endurance and there is no significant difference. Interval training and fartlek training methods have been proven to increase endurance. Interval training is the most appropriate method to improve the physical quality of endurance, because the interval training method prioritizes providing rest time between sets, so that the body's condition is required to recover faster. With the implementation of a relatively short distance but carried out at maximum running speed. While fartlek training is a training method by changing speed. The implementation of the fartlek method is a variation of jogging, walking, and sprinting activities. The intensity of fartlek training is formulated as the longer the distance or the longer the time to do a sprint, the higher the intensity.

4. CONCLUSION

- a. There is a significant influence of interval training on increasing the endurance of futsal players at SMA ABBS Surakarta.
- b. There is a significant influence of fartlek training on increasing the endurance of futsal players at SMA ABBS Surakarta.
- c. Interval training and fartlek training are equally good for increasing endurance in futsal players at SMA ABBS Surakarta because there is no significant difference in the results of the two training methods.

AUTHOR'S STATEMENT

Thank you to SMA ABBS Surakarta for providing permission and assistance during this research and to Dr. Fadilah Umar, S.Pd., M.Or. and Dr. Satria Yudi Gontara, S.Pd., M.Or., Ph.D. who have guided and directed so that this research can be completed.

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