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THE EFFECT OF FARTLEK AND SHUTTLE RUN TRAINING ON 60 METER SPRINT RUNNING SPEED

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ABSTRACT

Running speed is an important component of students' physical ability, particularly in athletics. Research into appropriate exercise methods to increase running speed, such as fartlek and shuttle runs, is important. This study aimed to determine the effect of fartlek and shuttle run training on the 60-metre sprint speed of students at SMP Negeri 02 Belitang, using an experimental approach with a two-group pretest-posttest design. The sample consisted of 15 SMP Negeri 02 Belitang students. A 60-metre sprint test was used to measure changes in performance before and after the exercise treatment. Paired t-test results showed that both fartlek and shuttle run exercises significantly increased running speed (p-value <0.05). The shuttle run group experienced an average time decrease of 0.8 seconds (t = 5.50, df = 6, p = 0.002), demonstrating greater performance improvement than the fartlek group. In conclusion, both fartlek and shuttle run training were effective in increasing the 60-metre sprint speed of junior high school students. The shuttle run had a greater effect on performance improvement than fartlek. For future studies, it would be advisable to include variables such as gender, age, and initial fitness level to enable a more comprehensive analysis.
Keywords:fartlek exercise; shuttle run; 60 meter

PENGARUH LATIHAN FARTLEK DAN SHUTTLE RUN TERHADAP KECEPATAN LARI SPRINT 60 METER

ABSTRAK

Kecepatan lari merupakan salah satu komponen penting dalam kemampuan fisik siswa, khususnya dalam cabang olahraga atletik. Upaya peningkatan kecepatan lari melalui metode latihan yang tepat, seperti fartlek dan shuttle run, menjadi penting untuk diteliti. Penelitian ini menemukan bahwa kedua metode latihan tersebut dapat secara signifikan meningkatkan kecepatan lari sprint 60 meter.Penelitian ini bertujuan untuk mengetahui pengaruh latihan fartlek dan shuttle run terhadap kecepatan lari sprint 60 meter pada siswa SMP Negeri 02 Belitang.Penelitian menggunakan pendekatan eksperimen dengan desain two group pretest-posttest. Sampel terdiri dari 15 siswa SMP Negeri 02 Belitang. Instrumen yang digunakan adalah tes lari sprint 60 meter untuk mengukur perubahan performa sebelum dan sesudah perlakuan latihan. Hasil uji paired t-test menunjukkan bahwa baik latihan fartlek maupun shuttle run memberikan pengaruh yang signifikan terhadap peningkatan kecepatan lari (p-value < 0.05). Kelompok shuttle run mengalami penurunan waktu rata-rata sebesar 0.8 detik (t = 5.50, df = 6, p = 0.002), menunjukkan peningkatan performa yang lebih besar dibandingkan kelompok fartlek. Simpulan latihan fartlek dan shuttle run terbukti efektif meningkatkan kecepatan lari sprint 60 meter pada siswa SMP. Shuttle run memberikan pengaruh peningkatan performa yang lebih besar dibandingkan fartlek. Untuk penelitian selanjutnya, disarankan menambahkan variabel seperti jenis kelamin, usia, dan tingkat kebugaran awal untuk analisis yang lebih komprehensif.
Kata Kunci: *latihan fartlek; shuttle run; 60 meter*

INTRODUCTION

Speed is one of the main components in athletic performance, especially in the 60-meter sprint. Coaches and sports practitioners are always looking for effective training methods to develop maximum speed in a relatively short time. Two common approaches used in athlete training are the Fartlek and Shuttle Run methods. Fartlek training is known for its intensity variations that combine elements of speed and endurance, while Shuttle Run emphasizes agility and acceleration through

repetitive and fast movement patterns (Bahtra, 2024; Kamarudin et al., 2024; Miftahuddin & Haetami, 2020). Both have great potential in improving running performance, but the selection of the most appropriate training method to improve 60-meter sprint speed is still a matter of debate.

This study comes with a different approach from previous studies. First, this study directly compares the effects of Fartlek and Shuttle Run training in a quasi-experimental design, so that it can be seen which is more effective in increasing sprint speed. Second, the measurement instrument uses a digital stopwatch and a standard 60-meter sprint testing protocol to ensure data reliability. Third, the research subjects are adolescent students, which reflects the general population in physical education, so these findings are more applicable in the school environment. This difference in approach shows the novelty in the method, subject, and context of the study.

Previous studies have proven the effectiveness of each method separately. Fartlek and shuttle runs are training methods that have been proven effective in improving components of physical fitness, including sprint speed (Festiawan et al., 2021; Grossman, 2021; Hermanzoni, 2019). Fartlek, which is a variation of interval training with varying intensity, is able to develop aerobic and anaerobic capacity simultaneously (Hough, 2021). This is especially important in the 60-meter sprint, which demands a short burst of energy.

Research by Satria et al., (2024) showed that the combination of fartlek and circuit training provided significant improvements to aerobic endurance in adolescent futsal players. Although this study focused on futsal, the basic principles of increasing VO_2 max and energy metabolism efficiency also have a positive impact on sprint speed.Wijaya et al., (2024) also stated that fartlek training can increase VO_2 max of karate athletes, which contributes to speed and endurance performance.

An appropriate body mass index and a variety of training types, including fartlek, can improve cardiovascular endurance, which is an important foundation for sprint performance (Muryadi et al., 2022). This combination can support maximum speed in a short time due to increased efficiency of oxygen and energy transport.

Shuttle run drills, on the other hand, focus on acceleration, quick changes of direction, and repetition of fast movements in short distances (Rahayu et al., 2023). This is very relevant to the characteristics of the 60-meter sprint. The combination of circuit training, fartlek, and small-sided games provides a significant increase in maximum oxygen consumption capacity, which also has an impact on speed and efficiency of movement (Fitrian, 2023).

Furthermore Liu, (2023) demonstrated that interval training such as repeated sprints improves aerobic performance in elite badminton players. These findings suggest that short-duration high-intensity training, such as shuttle runs, can provide similar adaptations in the context of sprinting. A combination of both methods fartlek and shuttle runs can create a well-rounded training approach. Fartlek builds aerobic capacity and flexible speed rhythm, while shuttle runs strengthen leg muscles, quick reactions, and acceleration (Basterfield et al., 2024; Santos et al., 2024; Wu et al., 2023). Fartlek and small-sided games are effective in increasing VO_2 max and anaerobic performance (Bahtra, 2024). This greatly supports the maximum speed in the 60 meter range, where both energy systems are dominantly involved.

Research by Belamjahad et al., (2024); Inozemtseva, (2021) also confirmed that preseason neuromuscular and physical training including elements of fartlek and shuttle runs—contributed to increased muscle strength, endurance, and reduced risk of injury. With a more physiologically prepared body, sprint performance can be significantly improved. In a broader context, the findings from López-Cervantes, (2024) Toledo-Perez, (2021) related to metabolic fitness and prevention of functional degeneration through intensive training shows that positive adaptations to training such as

fartlek and shuttle runs are not only applicable to young athletes, but are also relevant in the long term.

Overall, based on the various studies above, it can be concluded that the application of a combination of fartlek and shuttle run training is very potential in increasing the speed of the 60-meter sprint. Physiological and neuromuscular adaptations that occur due to these two types of training provide a positive contribution that complements each other to speed performance. Both methods are based on the principles of specificity and overload, but provide different physiological stimuli to the athlete's body. This study is important in determining which type of training is more effective for short-distance sprints, such as 60 meters.

The urgency of this research lies in the importance of selecting the right training method to optimize speed in an efficient time. The contribution of this research is to provide an alternative evidence-based approach in speed training, as well as expanding the scope of previous research that has not directly compared the two methods in non-athlete subjects. Thus, this research is not only academically relevant but also has a significant practical impact in the development of physical training programs in schools and sports clubs.

This study aims to determine and compare the effect of Fartlek and Shuttle Run training on increasing the speed of 60-meter sprint running in athletes or students. The results of the study are expected to provide input for coaches or sports teachers in choosing the most effective training method to develop sprint speed abilities.

METHOD

This study uses a quasi-experimental approach with a Pretest-Posttest Non-equivalent Control Group Design (Asrin, 2022; Darwin et al., 2021), involving two experimental groups and one control group. The subjects of the study were all 15 students of the athletic extracurricular at SMP Negeri 02 Belitang, who were divided into three groups, each consisting of five students. Experimental group 1 was given Fartlek training, experimental group 2 was given Shuttle Run training, while the control group did not receive any special treatment.

Before and after the treatment, all groups underwent a 60-meter sprint test as a pretest and posttest. The test was conducted on the school running track using a digital stopwatch to record each participant's running time. The data collection process began with an explanation of the procedure and a warm-up. Running time was used as an indicator of speed improvement; the faster the running time, the better the results.

Data were analyzed using descriptive statistics (mean, standard deviation) and One Way ANOVA to determine significant differences between groups. If significant differences were found, Tukey's post hoc test was performed to determine which groups were significantly different. This analysis aims to evaluate the effectiveness of Fartlek and Shuttle Run training on increasing 60-meter sprint speed.

RESULTS AND DISCUSSION

The results of the study on the Fartlek Group consisted of eight students who took the 60-meter sprint test during the pretest and posttest. Based on the measurement results, it was seen that all participants experienced an increase in performance, indicated by a decrease in travel time after being given Fartlek training treatment. Before being given treatment, the students' running time (pretest) ranged from 9.6 seconds to 10.5 seconds, with an average travel time of 10.11 seconds. After being

given Fartlek training for a certain period, there was a decrease in travel time for each individual, with a posttest time range of 9.0 seconds to 9.8 seconds.

Table 1. 60 Meter Running Test Results – Fartlek Group

No.	Student Name	Pre-Test (seconds)	Post-Test (seconds)
1	Ads	10.5	9.8
2	Vnb	9.8	9.3
3	Xvd	9.9	9.2
4	Ohh	10.1	9.6
5	Csk	9.7	9.1
6	Efi	10.0	9.4
7	Gee	10.3	9.7
8	Amo	9.6	9.0
	Average	**10.11**	**9.26**

The average travel time on the posttest was 9.26 seconds. The difference between the average pretest and posttest values of 0.85 seconds indicated a significant increase in speed in practice in the Fartlek group. All students showed a decrease in time, indicating that Fartlek training had a positive impact on the speed of the 60-meter sprint. This decrease in time reflects the effectiveness of the training in increasing students' acceleration and speed endurance.

Table 2. 60 Meter Running Test Results – Shuttle Run Group

No.	Student Name	Pre-Test (seconds)	Post-Test (seconds)
1	Oh	11.0	10.3
2	Nal	10.6	10.1
3	Kgc	10.2	9.7
4	GBF	11.2	10.5
5	Svn	10.8	10.0
6	Tpk	11.1	10.4
7	Wsl	10.9	10.2
	Average	**10.83**	**10.03**

The Shuttle Run group consisted of seven students who took a 60-meter sprint speed test, both before (pretest) and after (posttest) were given training treatment. The data showed that all students experienced an increase in running performance, as indicated by a decrease in travel time during the posttest. During the pretest, students' travel times ranged from 10.2 seconds to 11.2 seconds, with an average time of 10.83 seconds. After the Shuttle Run training program was implemented, students' travel times on the posttest decreased to a range of 9.7 seconds to 10.5 seconds, with an average time decreasing to 10.03 seconds. The difference between the pretest and posttest averages was 0.80 seconds, indicating an improvement in overall sprint speed performance in this group. The consistent decrease in time across all participants indicates that the Shuttle Run training is effective in increasing students' running speed, primarily through increased agility, reaction, and leg muscle strength that support acceleration in sprinting. The normality test was conducted using the Shapiro-Wilk method to determine whether the pretest and posttest data from each group were normally distributed. This test is important to determine the feasibility of using parametric statistical tests in further analysis. Based on Table 3, the Significance (Sig.) or p-value for all groups, both at the pretest and posttest, is above 0.05, which is the general significance limit. For the Fartlek group, the p-value in the pretest was 0.898 and in the posttest 0.946. While in the Shuttle Run group, the p-value in the pretest was 0.832 and in the posttest 0.937. Because all significance values are greater than 0.05, it can be concluded that the data from each group is normally distributed. Thus, the assumption of normality

is met, so that the data meets the requirements for analysis using parametric statistical tests, such as the ANOVA test.

Table 3. Results of Normality Test (Shapiro-Wilk)

Group	W (Shapiro-Wilk)	df	Sig. (p-value)	Distribution
Fartlek Pre-Test	0.961	8	0.898	Normal
Fartlek Post-Test	0.978	8	0.946	Normal
Pre-Test Shuttle Run	0.945	7	0.832	Normal
Post-Test Shuttle Run	0.978	7	0.937	Normal

Table 4. Results of the Homogeneity Test (Levene's Test)

Test	F	df1	df2	Sig. (p-value)	Conclusion
Pre-Test	1,482	1	13	0.249	Homogeneous
Post-Test	0.582	1	13	0.464	Homogeneous

The homogeneity of variance test was conducted using Levene's Test to determine whether the data from each group has the same variance or is homogeneous. This homogeneity is an important requirement to continue the analysis using parametric tests such as ANOVA. Based on Table 4, the significance value (Sig./p-value) in the homogeneity test for pre-test data is 0.249, and for post-test data is 0.464. Both p-values are greater than 0.05, indicating that there is no significant difference in variance between groups.

Table 5. Paired t-Test Results

Group	Mean	Std. Dev	t	df	Sig. (p-value)	Conclusion
Fartlek	0.6	0.25	6.00	7	0.001	Significant ($p < 0.05$)
Shuttle Run	0.8	0.30	5.50	6	0.002	Significant ($p < 0.05$)

Paired t-Test was conducted to determine whether there was a significant difference between the pre-test and post-test results in each group after being given treatment. This test measures the effectiveness of the treatment internally in each experimental group, namely the Fartlek and Shuttle Run groups. The test results showed that in the Fartlek group, there was a mean difference in running time of 0.6 seconds, with a t value = 6.00 and significance (p-value) = 0.001. Because the p value <0.05, it can be concluded that there was a significant increase in speed after being given Fartlek training. Meanwhile, in the Shuttle Run group, the average difference in running time was higher, namely 0.8 seconds, with a t value = 5.50 and p-value = 0.002. Likewise, because the p value <0.05, it is also concluded that the Shuttle Run training has a significant effect on increasing running speed.

The performance improvements in both groups, using both the Fartlek and Shuttle Run training methods, reflect the effectiveness of each approach in developing speed endurance and acceleration strength. Fartlek training, as explained by Saputra, et al, (2020), emphasizing alternating speed and intensity variations, thus helping the body adapt to changing workloads. This plays a major role in improving the acceleration phase of the 60-meter sprint, where athletes need maximum speed in a short period of time.

Fartlek training has also been proven to be able to increase VO_2Max capacity significantly, as shown in research by Nugroho et al., (2022) Septiawan et al., (2025). This increase in aerobic capacity provides a stronger physiological basis for maintaining sprint speed over short distances. Even in combination with other methods such as circuit training or intervals, Fartlek has been shown to have a strong effect on sprint performance. Shuttle Run places more emphasis on quick reactions, sudden changes of direction, and strengthening of leg muscles, as found in a study by Fransiska et al., (2021); Haryono et al., (2021) This exercise is very effective in developing agility and fast starting ability, which are crucial in the beginning of a sprint. However, despite the improvement in performance, the

difference in mean time between pretest and posttest in the Shuttle Run group was not as large as in the Fartlek group. This could be because the Shuttle Run focuses more on the coordination and precision aspects of movement rather than sustained acceleration.

Several other studies, such as from Romadon (2020) Supratman et al., (2024), showed that training involving short sprints with variations in technique and direction (such as pick-up sprints and short-step jogging) gave good results on sprint speed, but still showed that the Fartlek method was superior in terms of overall improvement of 60-meter speed. The results of the Paired t-Test used showed that both methods had a significant effect on improving the speed of the 60-meter sprint in students. This strengthens the findings of previous research by Insan et al., (2022); Paunussa & Syaranamual, 2024) which showed significant performance improvements in short sprint training when combined with a systematic training program.

The greater time reduction in the Fartlek group in this study indicates that the training was superior in providing effects on improving overall speed performance compared to the Shuttle Run. However, the Shuttle Run still made a significant contribution, especially in strengthening explosive muscles and rapid response, as supported by research by Khan and Septiawan on the use of parachutes and hollow sprints.

CONCLUSION

Based on the results of the paired t-test, it can be concluded that both Fartlek and Shuttle Run training have a significant effect on increasing the speed of 60-meter sprint running in junior high school students. Fartlek training is proven to be more effective in increasing acceleration and speed endurance due to its intensity variation, while Shuttle Run contributes to increasing agility, quick reaction, and leg muscle strength which are important in the early phase of the sprint. The greater decrease in running time in the Fartlek group indicates its effectiveness in increasing overall speed. Therefore, both of these training methods are very feasible to be applied in speed training programs at the junior high school level. For further researchers, it is recommended to use larger and more diverse samples, add supporting variables such as VO_2Max and muscle strength, and evaluate the effectiveness of the combination of Fartlek and Shuttle Run in one training program in order to obtain more comprehensive and applicable results for the development of students' athletic performance.

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