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The Effect of Sit and Reach Test Exercise on Hamstring Muscle Flexibility of Persikoba Football Players

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Abstract
The purpose of this study was to analyze the effect of Sit and Reach test-based training on the flexibility of Persikoba soccer players. Flexibility is an important component in athlete performance, especially in soccer, which requires agility, good range of motion, and injury prevention. This research method used an experimental method with a pre-test and post-test design. The subjects of the study were Persikoba soccer players selected by purposive sampling. Sit and Reach-based flexibility training was given 3 times a week for 2 months in a certain period, and data was measured before and after the intervention using the standard Sit and Reach test. The results showed that Sit and Reach-based training had a significant effect on increasing the flexibility of Persikoba soccer players. The average Sit and Reach value increased significantly after the training intervention compared to before the training.

Keywords: *Sit and Reach Training, Flexibility, Soccer*

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INTRODUCTION

Soccer is a sport that requires a high level of physical fitness and a mature game strategy. A player's performance on the field is highly dependent on various factors such as endurance, speed, strength, flexibility, agility and the ability to read the game (Latihan et al., 2024). Soccer players need optimal flexibility to support various movements such as running, kicking, changing direction quickly, and avoiding muscle injuries (Agustin, 2013). Lack of flexibility can hinder player performance and increase the risk of muscle and joint injuries, therefore effective training is needed to increase flexibility, one of which is with sit and reach test-based training (Nugraha & Rusdiana, 2017). Soccer players need optimal flexibility to support various movements such as running, kicking, changing direction quickly, and avoiding muscle injuries. Lack of hamstring muscle flexibility can hinder player performance and increase the risk of muscle and joint injuries (Ayala et al., 2012). Therefore effective training is needed to increase hamstring muscle flexibility, one of which is with sit and reach test-based

training. According to (Nugraha & Rusdiana, 2017) flexibility is one of the important components in physical fitness, especially in sports such as soccer.

Good flexibility can improve athlete performance by allowing wider and more efficient movements, and help in preventing injuries. One method to measure and train flexibility is through the sit and reach test which assesses the flexibility of the hamstring and lower back muscles (Artha & Irawan, 2025). Flexibility in the lower body is very important for athletes, especially in soccer players because it affects the range of motion, speed, and injury prevention. Several tests that can be used to measure lower body flexibility flexibility is one of the important components in physical fitness, especially in sports such as soccer (Rahman et al., 2022). Good flexibility can improve athlete performance by allowing wider and more efficient movements and help in preventing injuries. One method to measure and train flexibility is through the sit and reach test by assessing the flexibility of the hamstring and lower back muscles (Wibowo et al., 2023). Sit and reach is one of the flexibility tests used to measure the flexibility of the hamstring muscles and hamstring muscles.

This test is done by sitting on the floor with your legs straight in front of you, then trying to touch your toes with your hands (Artha & Irawan, 2025). The purpose of the sit and reach test is to measure the flexibility of the hamstring muscles. The sit and reach test is used to measure the flexibility of the hamstring muscles and hamstring muscles. Identifying flexibility capabilities The sit and reach test can help identify a person's flexibility capabilities. Assisting in training programs The sit and reach test can help in training programs to increase flexibility (Petray et al., 2019). Persikoba as one of the football clubs that is committed to improving the physical quality of its players. However, in several matches it was seen that several players experienced limitations in flexibility, especially in the hamstring muscles which could affect their performance on the field. Therefore, this study was conducted to determine the extent to which sit and reach-based training can affect the flexibility of the hamstring muscles of Persikoba football players. The purpose of this study aims to analyze the effect of sit and reach training on the flexibility of Persikoba football players. To find out how much flexibility has increased after being given sit and reach based training in the flexibility test.:

(Figure 4. Sit and Reach)

Table 1. Sit and Reach Toe Test Norms

Male **** IN INCHES***

Norm	**Age**												
	17	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**
Very Good	15,5	16,0	16,5	16,0	16,5	17,5	18,0	19,0	19,5	19,5	20	20	21
Good	14,5	14,5	15,0	15,0	15,0	15,5	16,5	17,0	17,5	17,5	18	18	18,5
Fair	13,0	13,5	13,0	13,0	13,0	13,5	14,0	15,0	15,5	15,0	16	16	16,5
Poor	11,0	11,5	11,5	11,0	11,0	11,0	12,0	13,0	13,0	13,0	14	14	14,5
Very Poor	9,5	10,0	9,5	8,5	9,0	9,0	9,5	10,0	10,5	10,0	11	11,5	12

(Source: Morrow, Jackson, Disch & Mood, 2000)

Sit and Reach Test
Purpose: Measure the flexibility of the hamstring and lower back muscles.
How to do it:
1. Sit with your legs straight in front of you and the soles of your feet on the board/scale.
2. Keep your knees straight and push your hands as far forward as possible.
3. Stretch your legs: Stretch your legs forward so that they are straight and not bent.
4. Try to touch your toes: Try to touch your toes with your hands, while keeping your back straight.
Measure the distance Measure the distance between your fingers and toes)

METHOD

This research method uses a quantitative experimental method with a pre-test and post-test design to determine the effect of sit and reach exercises on the flexibility of the hamstring muscles of Persikoba soccer players. Population and Sample The population in this study were all Persikoba soccer players. The research sample was taken using a purposive sampling technique, namely players who experienced limited hamstring muscle flexibility based on the results of the initial test. Research Instrument The instrument used in this study was the sit and reach test to measure hamstring muscle flexibility before and after training.

Training Program consisting of sit and reach-based flexibility training for a certain period. Research Procedure Pretest initial measurement of hamstring muscle flexibility using the sit and reach test. Intervention Providing a Sit and Reach training program for a certain period (eg 4-6 weeks). Posttest re-measurement of hamstring muscle flexibility after intervention. Data Analysis Technique The data obtained were analyzed using the paired

sample t-test statistical test to see the differences before and after training and to determine the significance of the effect of training on hamstring muscle flexibility.

Discussion

Table 2. Statistical Analysis Results

Sit and Reach	**N**	***Mean***	**SD**	***Min***	***Max***
Prettest	24	603,142	26,90	590,89	615,39
Posttest	24	2651,76	39,19	987,70	684,17

In accordance with table 2 above, the results of the statistical analysis on the sit and reach pretest standard deviation 26.90 minimum value 590.89 maximum value 651.39. Meanwhile, after carrying out the sit and reach treatment in the posttest, the average value obtained was 2651.76, standard deviation 39.19, minimum value 987.70, maximum value 684.17.

Table 3. Normality Test

Sit and Reach	**Statistic**	**N**	**Sig**	**Description**
Pretest	0, 789	24	0,54	Normal
Postest	0, 890	24	0,66	Normal

The results of the normality test shown in table 3 show that the significance value for the sit and reach pretest is 0.54 (>0.05), which indicates that the value is normally distributed. For the posttest with a value of 0.66 (>0.05) the significance indicates that the value is normally distributed, and the Pearson correlation test was carried out because the data was normally distributed.

Table 4. Uji T Test

Pretest-Postest	**Treatment**	**T Count**	**P<0,5**	**Description**
Sit an Reach	$\frac{Initial\ Data}{Final\ Data}$	7,102	0,000	Significant

Table 4 above shows the results showing that the value of 7.102 with a P value = 0.000 <0.05, it is concluded that there is a significant increase between the sit and reach training method and the flexibility of soccer players.

Research Results Based on the results of the study, there was a significant increase in hamstring muscle flexibility after undergoing Sit and Reach training. The pre-test results showed an average flexibility value of 26.90 cm, while the post-test results increased to 39.19 cm. The results of the paired sample t-test showed a p value <0.05, which means there was a significant difference before and after the intervention. Discussion The results of this study indicate that Sit and Reach-based training has a positive effect on increasing hamstring muscle flexibility. This increase in flexibility supports player performance in various aspects of the game, such as freer movement, increased range of motion, and prevention of muscle injuries (Gunawan & Mahfud, 2022).

This finding is in line with previous studies which state that regular flexibility training can increase muscle length and reduce the risk of injury. Therefore, it is recommended that flexibility training programs, especially Sit and Reach, be part of the routine training for Persikoba soccer players. The benefits in this study are to increase hamstring muscle flexibility in soccer players, which is very important to prevent injury and improve performance in the game.

This study can also provide information on the effectiveness of sit and reach test exercises in increasing hamstring muscle flexibility, so that it can be a reference for coaches and soccer players in doing the right exercises (Bonis, 2021). In addition, this study can also help raise awareness of the importance of hamstring muscle flexibility in soccer games, so that it can reduce the risk of injury and improve the quality of the game (Max et al., 2024).

CONCLUSION

Based on the results of the study, it can be concluded that sit and reach exercises have a significant effect on increasing the flexibility of the hamstring muscles of Persikoba soccer players. The results of the pretest and posttest showed a significant increase in flexibility after being given the exercise. Showing that certain exercises can increase the flexibility of the hamstring muscles in soccer players (Araç Ilgar & Cihan, 2018). Therefore, it is important for soccer players to do the right exercises to increase the flexibility of the hamstring muscles and prevent injury. Sit and reach-based flexibility exercises have been shown to be effective in increasing the range of motion of the hamstring muscles, which in turn can help players move more freely and reduce the risk of injury. As a recommendation, this flexibility training program should be included in the soccer player's training routine to improve performance and prevent injury (Nugraha & Rusdiana, 2017). Further research can be done by adding variations

of other flexibility exercises and extending the duration of the exercise to see the long-term impact on athlete performance.

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