



Effect of Exercise Therapy, Electrical Therapy, and Heat Therapy on Hamstring Injury Pain Levels of SPFA Athlete

Original Article

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Abstract

Hamstring muscle injuries often occur in athletes, especially in soccer, athletes who are injured on average experience pain in their muscles. Therefore, proper treatment can speed up the rehabilitation process for hamstring muscle injuries in the form of exercise therapy, electrical therapy, and heat therapy. This type of research is a quantitative experiment. Data collection techniques using Numeric Rating Scale sheet. Using purposive sampling which collected 30 people, namely soccer athletes from Safin Pati Football Academy aged 12-16 years. The data analysis technique used nonparametric statistical tests because the data distribution was not normal, namely using the Wilcoxon test. The results of this study obtained the lowest value for the calculation of the Numeric Rating Scale pre-test was 3 and the highest value was 6 with an average of 4.7. While the lowest value of the post-test Numeric Rating Scale calculation is 1 and the highest value is 3 with an average of 1.8. In the analysis test with the Wilcoxon test, a p value of 0.000 was obtained. It can be said that $p < 0.05$ which means that there is a difference in meaning between the calculation of the Numeric Rating Scale pre-test and post-test or H_0 is accepted. Conclusion from the results of research and discussion, it can be said that exercise therapy, electrical therapy, and heat therapy affect hamstring injuries in soccer athletes at the Safin Pati Football Academy.

Keywords: *hamstring injury, injury rehabilitation, pain level*

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INTRODUCTION

Injury is an abnormality in the body that results in pain, heat, redness, swelling, and inability to function. Normally in muscles, tendons, ligaments, joints, or bones due to excessive motion activity or accidents. Sports injuries are often responded by the body with signs of inflammation consisting of rubor, tumor, calor, dolor and functiolaesa [1], [2].

In sports such as soccer, Australian Rules Football, Rugby, injuries to the hamstring muscles are injuries that often occur, in the German league, namely the Bundesliga, there are also muscle contractures, muscle strains, and tendon problems in the hamstring muscles. In American Football, the percentage of athletes with hamstring injuries is 41% of the total injuries. And in Australian Rules Football it generally occurs 16%. Injuries to the hamstring muscle complex are common in athletes, accounting for between: 12% and 26% of all injuries sustained during sporting activities. Acute hamstring injuries often occur during sports that involve repeated kicking or high-speed sprinting, such as: American football, soccer, rugby and track and field [3], [4].

The hamstrings are muscles that become anti-gravity muscles, help the body support posture, hold the pelvic position, and perform torso movements related to the lower extremities. The hamstring muscle is a group of muscles in the hip joint where the position is mixed, which is

composed of type one, namely the Semitendinosus, when a pathology occurs, the muscle shortens or is also known as a contracture and experiences tension, the second type is the semimembranosus and biceps femoris, which if there is pathology, atrophy will appear or known as muscle weakness. Weakness and muscle strength have to do with the length of the hamstring muscle. If there is shortening of the muscle, then automatically the muscle will also experience a decrease in muscle strength [5], [6].

Hamstring injuries are injuries that are often experienced by athletes in sports that use their legs a lot and more precisely running movements such as athletics, football, futsal or even sports that require movements such as splits, stretching due to trauma and sudden movements or sudden stop movements. In hamstring injuries, it is the hamstring muscles that are disturbed, namely the semitendinosus, semimembranosus, and biceps femoris muscles which are located on the back of the thigh. Disorders of the hamstring muscles can be in the form of tears or muscle strain which can result in displacement of the knee and hip joints.

In the initial or acute phase, the body part affected by the injury should not be given heat therapy such as hot water, ultrasound, and other heat-based because in the initial phase the main goal is to control inflammation or bruising in the injury. If there is an incorrect first aid action, it will result in a long process of healing the injury. Efforts are being made to deal with early injuries, using the principles of First Aid in Accidents with the Protect, Rest, Ice, Compression, Elevation (PRICE) method [7].

Treatment of hamstring injuries can use physiotherapy to relieve pain from injuries, while the types of physiotherapy used include exercise therapy, electrical therapy, and heat therapy. Stated that the provision of TENS interventions was proven to reduce pain intensity in urological surgery patients in the Marwah Inpatient Room of RSU Haji Surabaya. The combination of ultrasound therapy and caudal shoulder traction has been shown to be as effective as ultrasound therapy and Codman's Pendulum exercises in reducing pain and increasing functional activity in subacromial impingement syndrome [8], [9].

The purpose of this study was to determine the effect of exercise therapy, electrical therapy, and heat therapy on complaints of hamstring injury pain in Safin Pati Football Academy soccer athletes aged 12-16 years. Therefore, researchers want to conduct research with the title "The effect of exercise therapy, electrical therapy, and heat therapy on the recovery of hamstring injuries in soccer athletes at Safin Pati Football Academy".

MATERIAL AND METHODS

This research is a type of experimental research. This study used an experimental method to determine whether there is a relationship between the independent variables and the dependent variable, namely exercise therapy, electrical therapy, and heat therapy as independent variables and the level of pain in hamstring injuries as the dependent variable. The designs in this study are pretest and post-test designs. This research will be carried out at the Safin Pati Football Academy located in Mojoagung, Trangkil, Pati, Central Java from 13 August to 13 September 2022. The population in this study were all academy athletes from Safin Pati Football Academy, with 156 children. The sample in this study was athlete Safin Pati Football Academy who had a hamstring injury aged 12-16 years. The sampling technique for the sample in this study used a purposive sampling technique, namely the technique of determining the sample with certain considerations. The research procedure carried out was to give questionnaires to athletes who had hamstring injuries before and after being given treatment. The treatments given were exercise therapy, electric therapy, and heat therapy. Treatment of each athlete was carried out 2 times a week with the same frequency intensity for athletes.

The research procedure is carried out as follows:

- a. The pre-test (initial test) is to measure pain with the Numeric Rating Scale (NSR) using the questionnaire that has been given.

- b. The research subjects were given treatments, namely exercise therapy, electric therapy, and heat therapy, namely exercise therapy in the form of Hamstring Bridge, Lunges, Squats, Nordic Hamstring, Single Leg Raise, TENS and Ultrasound.
- c. Exercise therapy is carried out by physiotherapists from Safin Pati Football Academy and carried out in the gym provided.
- d. The set number of reps and sets will increase according to the time spent rehabilitating the injury.
- e. Pause for 2 minutes between each change of type of exercise therapy and 40 seconds for each set.
- f. Electrical therapy treatment using TENS is carried out by a physiotherapist from Safin Pati Football Academy with an intensity and frequency that has been determined for each child.
- g. Heat therapy treatment using Ultrasound is carried out by a physiotherapist from Safin Pati Football Academy with an intensity and frequency that has been determined for each child.
- h. After one month the athletes were given a final test (post-test) to find out the difference after the treatment.

The technique used in this study is to test the normality of the data using the Kolmogorov-Smirnov and statistical tests using SPSS version 25 using the Wilcoxon Test menu.

RESULTS

The main objective of this study was to determine the effect of exercise therapy, electrical therapy, and heat therapy on reducing pain in hamstring injuries in soccer athletes at Safin Pati Football Academy. The results of data analysis using non-parametric statistics, namely the Wilcoxon test, show that exercise therapy, electrical therapy, and heat therapy have a significant success rate for pain relief in hamstring injuries in soccer athletes at the Safin Pati Football Academy. The success rate is shown by decreasing pain in hamstring injuries. The Wilcoxon test results showed ($p < 0.05$) or there was a significant difference between the pretest and post-test. Thus, exercise therapy, electrical therapy, and heat therapy affect the recovery of pain in injuries. Hamstring in soccer athletes at Safin Pati Football Academy.

This research was conducted for one month with a period from 13 August 2022 to 13 September 2022. The sample in this study was 30 people. This research was conducted at the Safin Pati Football Academy located in Mojoagung, Trangkil, Pati, Central Java.

Sample research data was obtained from a completed questionnaire. The questionnaire contained age and pain level scale. The following description of research data can be seen in the table below:

Table 1. Pretest and Posttest Statistical Description of Pain Level Scale in Hamstring Injuries

	Statistic	Pretest	Posttest
Numeric Rating Scale	Mean	4,7	1,8
	Min	3	1
	Max	6	3

Table 1 shows that the data for the pretest minimum value of the pain level scale is at number 3 while the maximum value of the pain level scale is at number 6 with an average value of 4,7. The minimum value for the post-test pain level scale is at number 1 and the maximum

value for the pain level scale is at number 3 with an average value of 1,8.

Table 2. Wilcoxon test

Variabel n=30	Rata-Rata	P	Keterangan
Skala Tingkat Nyeri (Skor)			
Pretest	4,7		
Posttest	1,8	0,000	Signifikan

The results of the Wilcoxon test in table 2, pretest and post-test have a significant value less than 0.05 ($p < 0.05$), so the hypothesis can be accepted, or it can be concluded that there is a significant difference between pretest and post-test. This exercise therapy, electrical therapy, and heat therapy reduce pain in hamstring injuries in soccer athletes at Safin Pati Football Academy.

DISCUSSION

Complaints that are often felt by athletes or sportsmen after doing exercises or matches are pain, injuries, and decreased function so that it is possible because of the pain the movement of organs is limited. This situation shows that sports activities have effects that are sometimes felt by athletes through fatigue and damage to certain organs.

In the initial or acute phase, the body part affected by the injury should not be given heat therapy such as hot water, ultrasound, and other heat-based because in the initial phase the main goal is to control inflammation or bruising in the injury.

The modality therapy and exercise therapy are believed can reduce pain in Cervical Root Syndrome patients at RSUD Dr. Moewardi Surakarta. From the explanation of the table above, we can conclude that post-test Numeric Rating Scale calculations tend to decrease compared to pretest Numeric Rating Scale calculations or there are significant differences between pretest and post-test Numeric Rating Scale calculations [10].

CONCLUSION

The conclusions that can be written based on the research conducted are, exercise therapy, electrical therapy, and heat therapy affect the level of pain in hamstring injuries in soccer athletes at Safin Pati Football Academy. The researcher would like to thank the CEO of Safin Pati Football Academy who has granted research permission and to all Safin Pati Football Academy football athletes who have agreed to become research samples.

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CONFLICTS OF INTEREST

Conflict of interest : Authors state no conflict of interest.

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