



Acute Effect Of Ultrasound Therapy And Active Stretching In Cases Of Calcaneus Spur

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ABSTRACT

Calcaneus spur is a cartilage disease that occurs in the heel area so it can affect the sufferer's activities. The symptoms felt are pain, limited range of joint movement, and decreased muscle strength. The physiotherapy examination carried out in this case included pain examination with the Visual Analogue Scale, range of motion with a goniometer, muscle strength with Manual Muscle Testing and functional activity with the Foot Ankle Disability Index. The modalities used are ultrasound (US) therapy and exercise therapy. The aim of this study was to determine the effect of physiotherapy management on the condition of left calcaneal spurs using Ultrasound (US) and Exercise Therapy modalities. The research was conducted at the Kajen General Hospital, Pekalongan Regency with a descriptive analytical research design. The research subjects were patients with left calcaneus spur conditions with Ultrasound (US) and Exercise Therapy modalities. Data collection and analysis methods use the autoanamnesis method, as well as pain examination instruments, examination of joint range of motion, and functional activities. The results of the study were 4 treatments: (1) pain decreased (2) there was an increase in range of motion (3) there was no increase in muscle strength. (4) there is an increase in daily functional activities. The research concludes that physiotherapy intervention using Ultrasound (US) and Exercise Therapy can reduce the problems caused by the condition of the left calcaneus spur, namely reducing pain, increasing joint range of motion, and increasing functional activity.

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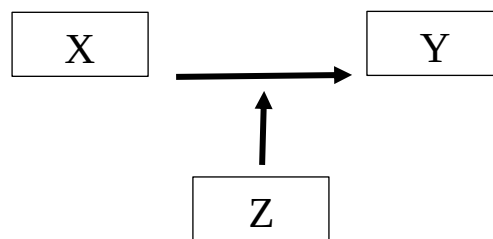
INTRODUCTION

Calcaneus spur is an abnormal bone growth on the inferior part of the calcaneus or heel from the attachment site of fibrocartilaginous, specifically the plantar fasciitis ligament, which is a deformity of the foot in the form of a lump appearing on the heel, which is a common cause of calcaneus spur.(Alatassi et al., 2018). The cause of calcaneus spur is that the number of calcaneus spur cases is spread across various ethnicities; around 55.1% occur in Australia, 26.5% in India, 15.5% in Thailand, and 15.7% in Europe. From these data, it can be concluded that the incidence of calcaneus spur is quite common in the community. (Nasution et al., 2020).

From data on the incidence of calcaneus spur, which is quite high in the community, problems arise in cases of calcaneus spur, namely pain, limited range of motion of the joint, weakness of muscle strength, and decreased functional activity. Problems that can be handled by physiotherapy in calcaneus spur conditions include using ultrasound modalities and exercise therapy as physiotherapy intervention technology, which aims to reduce pain, increase joint range of motion, increase muscle strength, and increase functional activity. One of the modalities used is ultrasound, which produces a micromassage effect so that it can increase blood circulation, relax muscles, increase membrane permeability, speed up the tissue healing process, and reduce pain. (Dianingtyas & Prasetyo, 2020). Apart from ultrasound, exercise therapy aims to increase the patient's physical capacity, such as by increasing muscle strength and increasing the range of motion of joints, and can improve daily functional activities without the help of other people or independently. The exercise therapy used for calcaneus spur conditions is active stretching.

METHOD

The research method used in this study was a case study. Carried out at the RSUD Kajen, Pekalongan Regency, on a patient, Mrs. C, 55 years old, Muslim, works as a teacher. The research design is described as follows:



Information :

- X: Patient's condition before administration
physiotherapy program
- Y: Patient's condition after administration
physiotherapy program
- Z: Physiotherapy Program

Research Instrument

Pain with Visual Analogue Scale (VAS) The pain asked includes pain during activities with pain assessments, namely: 0 cm = no pain , 10 m = unbearable pain (Mardiman, 1994).

- a. Scope of joint movement with a Goniometer
- b. Assessment criteria :

Assessment of joint range of motion measurements in accordance with ISOM (International Standard Orthopedic Measurement). Writing using the STFR system with three groups of numbers starting from movements away from the body, then the initial position and movements approaching the body. Dorso-Plantar measuring point on the lateral malleolus of the fibula = S.20° - 0° - 45°. Eversion-inversion of the



measuring point on the center line of the second finger = $R.30^{\circ} - 0^{\circ} - 20^{\circ}$. Muscle Strength with Manual Muscle Testing (MMT) S.o Disability Index (FADI) Kriteria penilaian FADI, yaitu: 40%- 50%: Disabilitas berat 50%–80%:: Disabilitas sedang: 80%–100%:: Disabilitas ringan accelerates the tissue healing process and reduces pain (Dianingtyas & Prasetyo, 2020). The program for administering ultrasound therapy in pulse mode is 50% at a frequency of 1 MHz and an intensity of 1.2 W/cm², with a duration of 6 minutes. The intervention program is given twice a week. According to research by Onu Ilie, Cristea Florentina, Gheorghiu Aurelian, and Gherghel Robert, Department of Biomedical Sciences, Faculty of Medical Bioengineering, University of Medicine and Pharmacy, ultrasound therapy using a power of 0.3–0.4 W/cm² for 4–6 minutes produces slow but effective regression and reduces pain from the final value on the VAS scale (ONU et al., 2020).

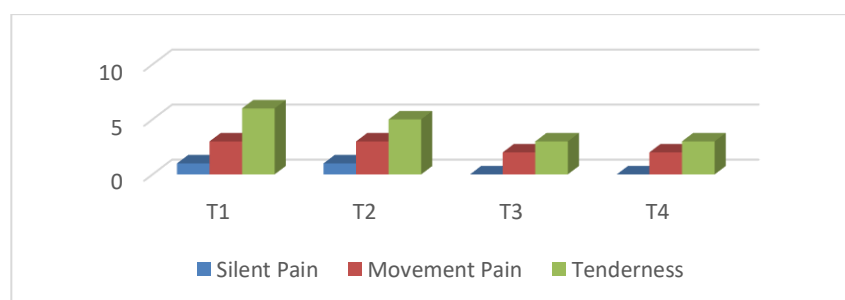
Exercise Therapy

Exercise therapy is one of the treatments for implementing physiotherapy exercises using body movements, both active and passive. Exercise therapy aims to increase the patient's physical capacity, such as by increasing muscle strength and joint range of motion, as well as being able to improve daily functional activities without the help of others.(Jehaman & Alamsyah, 2019). Exercise therapy that can be used for calcaneus-spur conditions includes active stretching. Stretching can improve basic functional activities due to stretching techniques in the soft tissue to reduce muscle tension physiologically so that the muscles relax. (Milenia Sekti & Budi Prasetyo, 2021).

RESULT

1. Pain

Evaluation results obtained after the first to fourth therapy in patients with left calcaneus spur conditions include



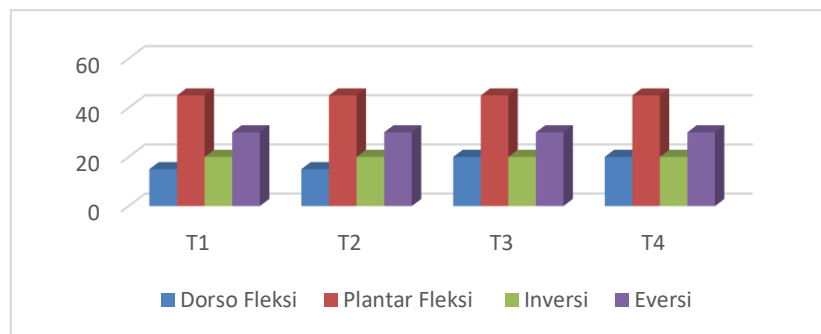
Picture 1. Condition of Varicose Veins of the Lower Limbs

From the graph above, the T1 to T4 silent pain data results are marked with a blue graph, with the T1 pain reduction result being a value of 1 (mild pain) and the T4 result being a value of 0 (no pain). Movement pain is marked with a brown graph with a T1 pain reduction result of 3 (mild pain) and a T4 result of 2 (mild pain).

Meanwhile, pressure pain is marked with a green graph with a T1 pain reduction result of 6 (moderate pain) and a T4 result of 3 (mild pain). From the results of the intervention given, the results were a reduction in silent pain, tender pain and movement pain.

2. Scope of Joint Motion

LGS measurement with a goniometer. The reference point for measuring the joint's range of motion in the calcaneus spur condition is the lateral malleolus for dorsoflexion and plantarflexion movements. Meanwhile, for inversion and eversion movements, the measuring point is on the center line of the second finger.

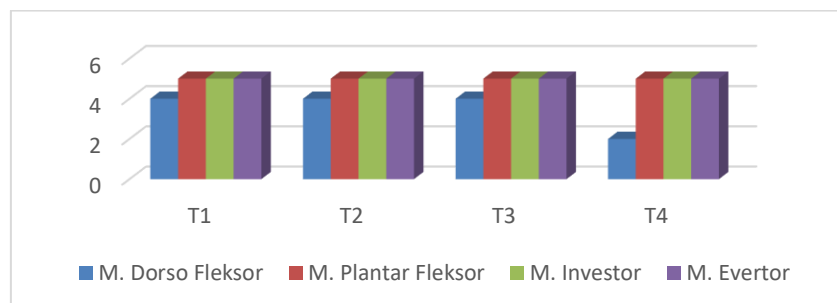


Picture 2. LGS measurement with a goniometer

Based on the graph above, the results show that the range of motion of the ankle joint includes dorso flexion at T1 = 15°, T2 = 15°, T3 = 20°, and T4 = 20°; there is an increase, while plantar flexion at T1 = 45°, T2 = 45°, T3 and T4 = 45°. In the inversion movement, there is no disturbance in the range of motion of the joints because the values obtained are normal, namely T1 = 20°, T2 = 20°, T3 = 20°, and T4 = 20°, whereas in the eversion movement, there is also no disturbance in the range of joint motion because the values obtained are normal, namely T1 = 30°, T2 = 30°, T3 = 30°, and T4 = 30°.

3. Muscle Strength

Muscle strength examination is done using Manual Muscle Testing (MMT).



Picture 3. Muscle strength examination is done using Manual Muscle Testing (MMT).

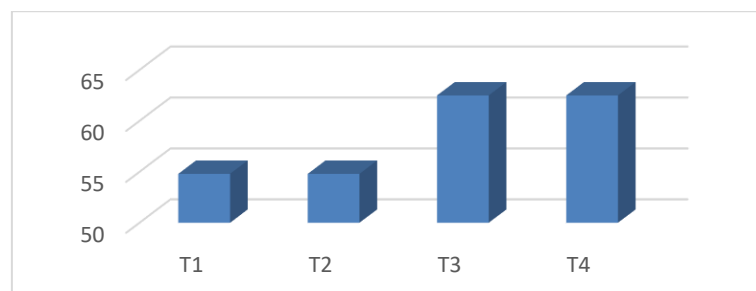
Based on the graph above, the results obtained for muscle strength in the left ankle include m. dorso flexors at T1 = 4 (minimal resistance), m. plantar flexors at T1 =



5 (maximum resistance), m. investors at T1 = 5 (maximum resistance), and m. evertors at T1 = 5 (maximum resistance). In the graph above, it is stated that there has been no increase in muscle strength at T2, T3, and T4 in m. dorso flexors, namely with a minimum resistance value of 4.

4. Functional Activities

The functional activity assessment of patients with calcaneus spur uses the FADI index, which includes several questions related to ankle activities.



Picture 4. Functional Activity Assessment

From the graph above, the results show that T1 has a value of 54.8, T2 has a value of 54.8, T3 has a value of 62.5, and T4 has a value of 62.5. There is an increase in functional activity as measured using the FADI index (Foot Ankle Disability Index).

DISCUSSION

Evaluate pain with the Visual Analog Scale (VAS). The effect of ultrasound therapy on the condition of the left calcaneus spur produces micromassage on the tissue, which will cause a warm "friction" effect. The heat generated by the tissue varies depending on the value of acoustic independence, the choice of waveform, the intensity used, and the duration of treatment. The area that gets the most heat is the interface tissue between the skin and muscles and the periosteum. This is caused by absorbed and reflected waves. Another effect of micromassage is a biological effect, which is physiological from mechanical and heat influences. The biological effects caused by ultrasound include increasing blood circulation, muscle relaxation, increasing membrane permeability, accelerating the tissue healing process, and reducing pain. In the research of Onu Ilie, Cristea Florentina, Gheorghiu Aurelian, and Gherghel Robert Department of Biomedical Sciences, Faculty of Medical Bioengineering, University of Medicine and Pharmacy "Grigore T. Popa" Iasi, Romania "Cristofor Simionescu" Faculty of Chemical Engineering and Environmental Protection, from "Gheorghe Asachi" Technical University of Iasi, Romania "Dunărea de Jos" University of Galați, Faculty of Physical Education and Sports Micromedica Medical Clinic, departments of orthopedics and physiotherapy, Piatra Neamt entitled "The Effects Of Physiotherapy Programs In The Recovery Of Calcaneal Spurs" that the recovery program set for 10 physiotherapy sessions, one of which was ultrasound and exercise therapy, resulted in a slow but effective regression in reducing pain from the final value on the VAS scale.

Evaluasi Range Of Motion dengan Goniometer

Exercise therapy with active stretching is a stretching technique that can reduce muscle tension and stiffness in the joints so that it can increase the range of motion of the joints. In research conducted by Fitri Milenia Sekti and Eko Budi Prasetyo, Physiotherapy Study Program, Faculty of Health Sciences, Pekalongan University, entitled "Physiotherapy Management of Plantar Fasciitis Using Tens, IR, and Exercise Therapy Modalities at Kajen Regional Hospital, Pekalongan Regency," it was found that providing exercise therapy in the form of active stretching can increase the range of motion of joints so that functional activity can increase.

Evaluate muscle strength with Manual Muscle Testing (MMT).

In research conducted by Isidorus Jehaman and Indra Alamsyah, Physiotherapy Study Program, Faculty of Nursing and Physiotherapy, Lubuk Pakam Medistra Health Institute, entitled "Differences in Pain Scale when Giving Shortwave Diathermy Therapy with the Addition of Exercise Therapy to Calcaneus Spurs Patients in Hospitals," Grandmed Lubuk Pakam, 2018, "exercise therapy can increase muscle strength and power, improve muscle balance, improve movement coordination, improve the general condition of sufferers, and then reduce symptoms by making nerves move freely, reducing adhesions, facilitating venous return, and eliminating edema.

Evaluation of Functional Activities with the FADI index.

In the research of Selvina Lindarti, Roikhatul Jannah, and Yusuf Nasiruddin, Bachelor of Applied Physiotherapy Program, Jakarta III Health Polytechnic, entitled "The Effect of Active Stretching Exercises on the Functional Ability of the Feet in Long Distance Runners with Plantar Fasciitis in the Bekasi Runners Community," it was found that providing active stretching exercises had an effect, which is significant for increasing functional activity.

CONCLUSION

After doing the therapy four times, the results were: a) There is a decrease in pain, b) There is an increase in the range of motion of the joint, c) There has been no increase in muscle strength, d) There is an increase in functional activity.

SUGGESTION

Patients are expected to be diligent in carrying out therapy and exercise therapy at home to produce optimal therapy.

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