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### PHYSIOTHERAPY MANAGEMENT OF ANKLE SPRAIN IN THE ACUTE PHASE: A CASE STUDY

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#### ABSTRACT

**Introduction:** Ankle sprain is a condition in which the ligaments in the ankle are injured due to sprains. According to research, injuries to the ankle are less than 10% due to PTFL and CFL, and injuries in an inversion state or to the lateral ligaments of the foot occur in 85% of cases. The meta-analysis found that 13.6 occurred in female athletes and 6.94 occurred in male athletes per 1000 exposures to soccer, basketball, hockey, tennis, and other sports. In the problem of acute ankle sprains will cause symptoms of pain and swelling.

**Case Presentation:** a case study of three databases (PubMed, Pedro, Science Direct) with the aim of knowing the effect of ultra sound, ice packs, exercise therapy and kinesio tape in The purpose of this paper is to influence the effect of giving ice, ultrasound, exercise, and kinesio tape in the acute phase of the right lateral ankle sprain patients.. The keyword used in the search was ankle sprain related to "acute phase exercise". Inclusion criteria were athletes who had a grade 1 ankle sprain and had no fractures.

**Management and Results:** The use of ultrasound and ice packs can reduce pain intensity and can reduce edema, as well as the implementation of exercise therapy prescriptions and the use of kinesio taping can increase functional activity.

**Discussion:** the study showed a decrease in silent pain from 5 to 3, tenderness from 8 to 6, and motion pain from 8 to 6. a decrease in edema from a difference of 3cm to 2cm, an increase in the functional activity of the FADI index, a decrease in the level of limitation after physiotherapy actions from 41.3% to 36.3%.

**Conclusion:** physiotherapy management in the acute phase of ankle sprain cases uses a therapeutic program twice. Ultrasound, ice packs, exercise therapy, and kinesio tape are used to treat pain and swelling in ankle sprains.

Keywords: Sprain Ankle, Ultra Sound, Ice Compress, Exercise, Kinesio Tape.



## Introduction

Every sport activity will be faced with the risk of injury. This injury will affect physical activity, psychological, and achievement. The ankle is one of the most frequently injured limbs. Injury to the ankle due to a sudden sprain can occur both medially and laterally which can result in tearing of ligament fibers in the joint (Sumartiningsih, 2012). Ankle sprains can cause local joint disturbances that affect the entire musculoskeletal and sensory system. This is what causes disability, repetitive injuries, and a decrease in a person's quality of life (Abdelmonem et al., 2018). The ankle joint is formed by the ends of the distal bones of the tibia malleoli, fibula, and dome of the talus. There are supporting ligaments such as the medial collateral ligament and the lateral collateral ligament which consist of the Anterior Talofibular Ligament (ATFL), Posterior Talofibular Ligament (PTFL) and Calcane Fibular Ligament (CFL). ATFL stretches towards inversion and plantar, CFL is injured when resisting excessive inversion, and PTFL is the strongest and is rarely injured. PTFL itself serves to limit excessive external rotation (A. Attia et al., 2018).

According to research, injuries to the ankle are less than 10% due to PTFL and CFL, and injuries in an inversion state or to the lateral ligaments of the foot occur in 85% of cases. From the meta-analysis, it was found that 13.6 occurred in female athletes and 6.94 occurred in male athletes per 1000 exposures to soccer, basketball, hockey, tennis, and other sports (Haque, 2019). In the problem of acute ankle sprains will cause symptoms of pain and swelling. The standard treatment commonly used is RICE which consists of Rest, Ice, Compression, and Elevation. One of the physiotherapy modalities used to relieve pain, reduce edema, and increase joint space is ultrasound (Bekerom et al., 2012). The kinesio tape modality in ankle sprain cases can provide injury protection and rehabilitation (Yuliawan & Setiawan, 2019). Exercise therapy is also given to reduce the prevalence of repetitive injuries and ankle instability (Halabchi & Hassabi, 2020). Based on the background of the problem, the purpose of this paper is to influence the effect of giving ice, ultrasound, exercise, and kinesio tape in the acute phase of ankle sprain.

## Case Presentation

The author takes a sample of the basketball player Mr. H, a 19-year-old basketball athlete at the Sport Injury Life Clinic in Surakarta, came after an injury while playing basketball. The main complaint felt by the patient was pain in the right ankle when walking and lifting the leg, and the presence of edema because it was still in the acute phase. The patient complained of pain in the

ankle due to an injury while playing basketball. This is the first time the patient has had a sprain. Pain increases with inversion and dorsal flexion and then swelling is present, limiting ROM. The patient received positive scores for the application of the specific talar tilt test, and negative results



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for the anterior drawer test and heel tap test. Limited range of motion is seen in dorso and plantar flexion of the ankle. The ankle inversion is also seen to be limited. The patient has not been able to carry out his activities as a basketball player.

### Management and Outcome

The patient underwent physiotherapy and was given education in the form of ice packs and light exercises on the ankle to maintain muscle activation. Physiotherapy technology used is ultra sound, ice compression, exercise therapy and kinesio tape. Ultrasound is a device of a generator and a transducer. This generator will produce electromagnetic energy with a frequency of 0.5 to 3.5 MHz and then converted by a transducer into mechanical energy with the same intensity up to 3.5 W/Cm<sup>2</sup>. From US laboratory-based research it is used in physiotherapy to reduce pain, reduce edema, and increase joint space in various musculoskeletal disorders including the ankle (Bekerom et al., 2012). Ice therapy may be used to represent cryotherapy in general. Ice is used to limit inflammation by reducing local temperature in the injured area so that it is expected to reduce metabolic demands, induce vasoconstriction, and limit bleeding (Bekerom et al., 2012). Then exercise therapy can be used as a rehabilitation program for ankle sprains. The purpose of this exercise therapy is to restore the range of motion of the joint, as well as the reduced sensory strength due to injury. One of these exercise therapy programs is proprioceptive exercise, which is an exercise in the ability of the sensory functional to feel the presence of stimuli both active and passive movements and the movement and direction of forces in the joints. This therapy is important to prevent repeated injuries (Wiharja & Nilawati, 2018). In the case of ankle sprains, the application of kinesio tape can be used to increase proprioceptive feed back so that the body can position itself correctly, this is what is used as a basis in exercises to restore the function of the extremity that is being installed (Yuliawan & Setiawan, 2019).

### Result

This research was conducted in May 2020 at the Sport Injury Life Clinic, Surakarta. The results for the examination of pain using the Numerical Rating Scale (NRS). Examination of this ankle sprain uses the NRS with a value of 0 (no pain), 5 (moderate pain), and 10 (very severe pain). Then the results are obtained as shown in Figure 1. In Figure 1 there is a decrease in silent pain, motion and pressure in the right ankle area. The use of ultrasound, ice compresses, exercise therapy and kinesio taping can reduce silent pain from 5 to 3, tenderness from 8 to 6, and motion pain from 8 to 6.

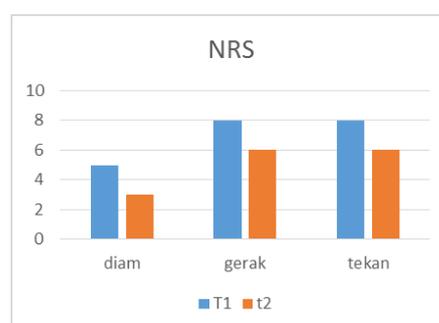


Figure 1. Pain Examination Using NRS



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In edema using a meterline and a decrease from 3cm to 2cm after physiotherapy intervention. For functional ability checks using FADI (Foot and Ankle Disability Index) get in Figure 2:

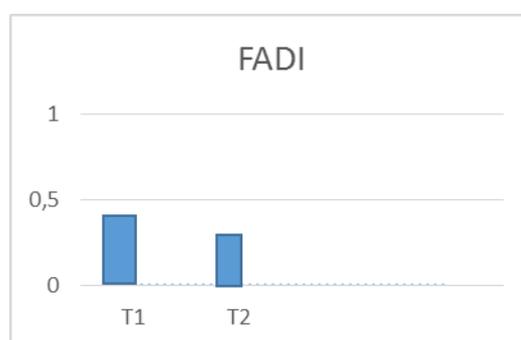


Figure 2. Physical and Functional Activity Examination with FADI Index

From the graph above, it can be seen that the patient experienced a decrease in the level of activity limitation after physiotherapy actions from the level of limitation of 41.3%, showing improvement to 36.3%.

### Discussion

The use of ultra sound according to the results of research that has been carried out, there is a decrease in pain described in Figure 1, namely reduced silent pain from 5 to 3, tenderness from 8 to 6, and motion pain from 8 to 6. In addition, there was a decrease in edema from a difference of 3 cm to 2 cm. Decreased pain due to the effects of using ultrasound. According to research, exposure to 1MHz at 50 joules/cm<sup>2</sup> can increase tissue temperature which is considered a mediator in tissue repair mechanisms, increase extensibility in soft tissues, relax muscles, augment blood flow, and reduce inflammation in tissues. soft. With this research, it can be used as therapy in relieving pain, reducing edema, and increasing the range of motion of joints in musculoskeletal disorders including ankle sprains (M. P.J. Bekero et al., 2012). The decrease in pain pain to 3, tenderness to 6, and motion pain to 6, as well as a decrease in edema from a difference of 3 cm to 2 cm also because cold therapy was given in the first week of injury can help reduce pain in the short term and reduce the presence of edema. This is due to the occurrence of vasoconstriction (especially applied in the first hours. Cold therapy can also be used before exercise therapy without disturbing sensory perception (Michel P.J. et al., 2012). At the

beginning of the treatment the limitation of the patient was 41.3% but after the second treatment there was a decrease in limitations to 36.3% as described in Figure 2. The provision of exercise therapy is expected to increase activity and functional ability. One of the recommended exercise therapies in this phase is proprioceptive exercise. Proprioceptive exercise can improve functional instability, gait abnormalities, and prevent re-injury. In the first week of injury there is pain. Proprioception has a role in providing feedback to the nervous system. This is known as the ability to recognize the position of our joints. So proprioceptive exercises are expected to increase joint stability and affect



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balance dynamically (Yong & Lee, 2017). The increase in limitations as measured by the FADI index of 41.3% to 36.3% is also due to the installation of kinesio tape. The use of kinesio tape is done to prevent injury during injury rehabilitation, this is because the installation of kinesio tape will limit or slow down the inversion motion. In addition to preventing movement towards inversion to minimize repeated injury, kinesio tape has also been shown to have a placebo effect. The elastic properties of the kinesio tape will also increase the functional stability of the ankle joint (Mohamed et al., 2016).

## Conclusion

After carrying out a physiotherapy program in the case of right lateral ankle sprain 2 times using ultrasound, ice packs, exercise therapy, and kinesio tape on a patient named Mr. H gets the following results:

1. Physiotherapy treatment with ultrasound, ice packs, exercise therapy, and kinesio tape can reduce pain in the right lateral ankle sprain.
2. Physiotherapy treatment with ultrasound, ice packs, exercise therapy, and kinesio tape can reduce edema in the right lateral ankle sprain.
3. Physiotherapy treatment with ultrasound, ice packs, exercise therapy, and kinesio tape can improve the functional ability of the right lateral ankle sprain.

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