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### PHYSIOTHERAPY MANAGEMENT FOR CRUCIATUM LIGAMENTS INJURY IN PHASE 1 : A CASE STUDY

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#### Abstract

**Introduction :** ACL injuries represented more than 50% of injuries in the knee and affected more than 200,000 peoples in the United States each year. The ratio of the incidence of ACL injuries in men and women was 66.7% versus 33.3%. The first phase is a key in post operative rehabilitation of cruciate ligament injury. Rehabilitation in the first phase aims to control inflammation, assist the process of tissue formation, protect injury, reduced pain, and muscle activation with isometric. The Problem at the inflammatory stage (phase 1) are usually in the form of uncontrolled inflammation characterized by redness, heat, pain, swelling, and impaired knee function.

**Case Presentation:** Based on the ACL Reconstruction Guidelines Rehabilitation protocol in Skeletally Mature Athletes. A 30-years-old man is a footballer with a weight of 55 kg and a height of 175 cm, complaining of pain and stiffness in his right knee when performing daily activities. On March 25, 2021 the patient experienced a wrong movement in a pivoting position and a collision occurred with another player on the lateral side of the right knee.

**Management and Outcome :**The Patient received physiotherapy program with exercises focusing on swelling and pain management, increasing the range of motion and muscle strength of the right knee and providing a home exercise program according to phase 1 (0-4 weeks). Measurement of swelling with midline, measurement of pain with Numeric Rating Scale and measurement of Range of Motion with Goniometer.

**Discussion :** The patient did physiotherapy sessions twice a week for four weeks. The measurement results showed an increased in the range of motion, a decreased swelling and pain in the right knee. Factors that affected tissue healing including the location of the graft used, management of the preparation of the rehabilitation program, awareness of the patient doing home exercise programs and avoiding contraindications of therapy.

**Conclusion :** The first phase in management of the ligament injury rehabilitation program is very important to accelerate the tissue healing process as well as the requirements for the next phase. If the first phase is not managed properly, there will be a risk of various problems occurring in the subsequent phases and will slow down the tissue healing process and functional activity.

**Keyword:** ACL, Inflammation, Rehabilitation,



## Introduction

Cruciate ligament are the two major ligaments in the knee joint, cruciate name means the cross, and the anatomically that these two ligaments cross each other to bind the femur and tibia. An ACL rupture should always be suspected if the patient reports (1) an injury mechanism that involves deceleration/acceleration in combination with a knee valgus load, (2) hearing or feeling a "pop" at the time of injury, or (3) hemarthrosis within 2 h of injury. PCL injury is an injury that occurs due to an error in supporting and landing using the knee joint during exercise. However, the most common mechanism of posterior cruciate ligament injury is due to motor vehicle accidents (Brophy,2016).

ACL injuries represented more than 50% of injuries to the knee and affected more than 200,000 people in the United States each year. In a recent systematic review and meta analysis, ACL injuries reported an incidence of 0.08 in female athletes and 0.05 in male athletes per 1000 exposures, with soccer being the greatest risk of ACL in female athletes (1.1%) and male athletes (0.8%) (Musahl MD & Karlsson MD, 2019). The ratio of the incidence of ACL injury in men and women was 66.7% versus 33.3%. ACL sprains are common in soccer, 13.1%.

Establishing a proper exercise program during the recovery period is very important. In the first phase is the key of rehabilitation during postoperative cruciate ligament injury reconstruction. Rehabilitation in the first phase aims to control inflammation, assist the process of tissue formation, protect injury, reduce pain, and isometric muscle activation. If rehabilitation is not carried out, there will be disturbances at various stages of this rehabilitation. Disturbances in the inflammatory stage are usually in the form of uncontrolled inflammation characterized by redness, heat, pain, swelling, and impaired knee function. If this stage lasts too long, the next stage will be delayed. An uncontrolled inflammation will cause a person to be reluctant to move his knee and there will be atrophy, interfere with flexibility, and can interfere with daily activities.

## Case Presentation

This A 30-years-old man is a footballer with a weight of 55 kg and a height of 175 cm. He complaining of pain and stiffness in his right knee when performing daily activities. The pain are primarily in the right knee and he felt difficulty when he tried to flex the knee. The patient describes the pain as having an intensity of up to 5 out of ten. This problem began on March 25, 2021 when the patient was practicing with his football team, he experienced a wrong movement, exactly turning his leg (pivoting) and a collision with another player occurred on the lateral side of

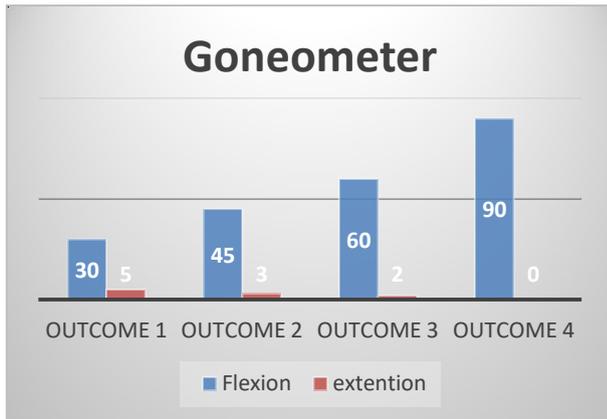
the right knee. The patient felt pain and then the patient was checked by a physiotherapist and recommended for an MRI. The patient did an MRI at the New Brain Clinic and the result was a complete tear of the ACL. On March 30, 2021 the patient underwent an arthroscopy surgery for ACL dextra reconstruction at Dr Ramelan Hospital Surabaya. Then the patient had done physiotherapy twice a week at RSAL Surabaya. The pain seems to be worse when he tried knee flexion. Asame fenamat provides some relieve. he has not sought any other treatment. Otherwise the patient reports that he is in good health. There is no family history of ACL injury. Examination Static inspection of the patient showed an incision in the right knee and swelling of the right knee, as well as a brace on the right knee. On dynamic inspection, abnormal walking disorders was found and limited range of joint motion on active motion examination. On palpation, there was a warm temperature in the right knee and pain on active knee dextra motion and weakness in the right quadriceps muscle. Physiotherapists perform specific examinations to determine clinically the problems that occur such as anterior drawer test, pivot test, and lachman test with positive results (the presence of instability in the right knee).



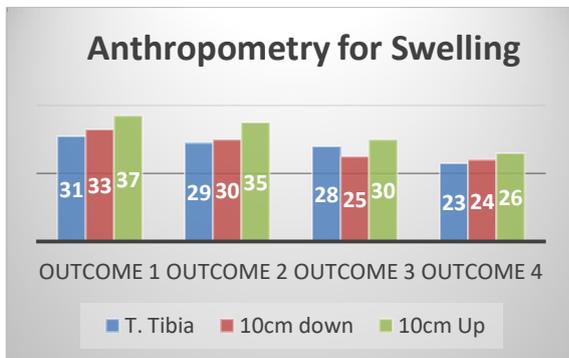
### **Management and Outcome**

The patients was received physiotherapy twice a week for four weeks with exercises focused on swelling and pain management, increasing the range of motion of the joints and muscle strength of the right leg and also providing a home exercise program according to the first phase (0-4 weeks). The patient performed ROM exercises such as wall slides, heel slides, knee extension range of motion, pattelar mobilization to reach a target of 90° knee flexion. For swelling management, the patient applied ice packs for 10 minutes, elevation of the right leg, pumping the ankle with resistance. To increase the strength of the quadriceps muscles, the patient performed quadriceps setting exercises (10 seconds), single leg raises, supine wall pushes, mini squad and weight shifting drills and does not forget to put a brace on the right knee to protect the right knee. The target after 4 weeks is that the patient can walk normally without pain using a brace without crutches, good quad set and open chain leg control, full knee extension, minimal swelling of the knee.

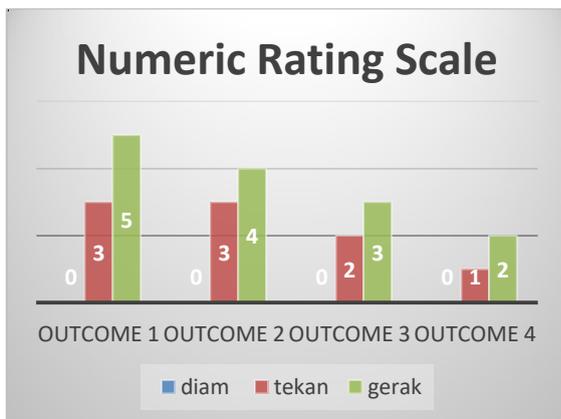
The patient measured the Range of Motion with a Goniometer.



Measurement of swelling with anthropometry using the midline



Pain measurement with NRS (numeric rating scale).





## Discussion

The purpose of this article is to determine the management of ligament injury in the first phase (inflammatory phase), ligament injuries are common in sports athletes, especially soccer and basketball. Factors causing ligament injury usually occur due to traumatic injury or errors in knee biomechanics (pivoting). To establish the diagnosis of ligament injury requires specific tests from a physiotherapist or doctor and an imaging examination using MRI is required. Management or postoperative rehabilitation is important to accelerate the tissue healing process, maintain muscle function and achieve functional activities according to the patient's initial condition. In treating ligament injuries, it is necessary to pay attention to the basic principles of exercise such as individual, specific, progressive, overload and reversibility. Patients are advised to use a brace or knee protector for use in the first phase of the injury (Filbay, Grindem. 2019).

In the first phase, the patient received range of motion exercise therapy, cryotherapy, and strength training exercises. Range of motion exercise is an exercise in the human body with the basic concept of motion that aims to maintain and increase the range of motion of the joints in each region of the body (Rahman Farid, 2018). Cryotherapy is the use of cold to relieve pain or other conditions. In sports injuries, this type of therapy is performed in the acute phase. Cryotherapy can be done by various methods such as ice packs, and sprays at a dose of 10 minutes during the acute phase. Strength exercise is a type of exercise with minimal load that is used to reduce pain, increase relaxation and increase circulation after sports injuries and minimize the risk of atrophy. The intensity of pressure or muscle contraction that can be used is 60-80% of the maximum force and is adjusted to the position of the joint. Contractions are increased slowly by looking at the condition of the muscles (Arovah N I, 2016).

The patient did eight physiotherapy sessions over four weeks with the results of significant reduction in swelling, reduction in pain, and increased range of motion in the right knee joint. The results of the measurements showed an increase in the range of motion of the right knee, a decrease in the swelling of the right knee and a decrease in pain. Many factors affect tissue healing, including the location of the graft used, the management or strategy of preparing for a rehabilitation program, patient awareness when performing home exercise programs and

understanding the patient to avoid contraindications of treatment.

## **Conclusion**

Managing the ligament injury rehabilitation program in the first phase is very important to speed up the tissue healing process and is very important for the next phase. If the first phase is not managed properly, there will be a risk that various problems will arise in the next phase and will slow down the process of tissue healing and functional activities will be delayed.

## **Acknowledgments**

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