

PHYSIOTHERAPY MANAGEMENT OF POST OPERATING ACHILLES TENDON RUPTURAL (PHASE III): A CASE STUDY

Siti Khadijah¹, Hakny Maulana¹, Nur Afni Agustyaningsih¹, Dika Tiara Salsabila¹, Nur Annisa¹

¹Physiotherapy study program Faculty of Health Sciences, Universitas Muhammadiyah Surakarta, Indonesia

*Corresponding author: Siti Khadijah, Email: sk990@ums.ac.id

Abstract

Introduction: Physical injuries can disrupt the musculoskeletal system which includes muscles, bones, joints, tendons, ligaments, and the connective tissue that supports and binds tissues and organs together. The incidence of achilles tendon rupture has increased due to increased physical activity and sports, especially at the age of 30 and 40 years. Physiotherapy is a form of health service aimed at individuals and/or groups to develop, maintain and restore body movement and function throughout the life span by using manual handling, increased movement, equipment (physics, electrotherapeutic and mechanical), function training, and communication.

Case Presentation: The patient was diagnosed with Achilles tendon rupture. The course of the disease was that the patient was playing mini soccer, when the patient ran sprints then his left foot stepped on it and a clicking sound was heard, after the injury the patient was still forced to walk, starting from there the patient felt quite disturbing pain, followed by edema in the left ankle and loss of joint stability. The physiotherapist performed a static inspection with the result that there was an incision along the left Achilles tendon, the patient's postural condition was good, there was visible edema of the left lateral malleolus. The results of a dynamic inspection check are that it can be seen that the running time is still based on the right side of the axle.

Management and Outcome: The physiotherapy modality used is to provide cold compresses for 5 minutes. Before being given an exercise program, do a warm-up first. Then proceed with a static cycle for 15 minutes, closed chain exercise, lunges (3 sets), squad (3 sets), calf rises (3 sets), balance exercise, the single-leg brige (3 sets). When finished proceed with cool down. The results of this study were a decrease in edema which was evaluated by a figure of eight, but there was no change in muscle strength which was evaluated by MMT and functional ability which was evaluated by the FADI scale.

Discussion: A decrease in edema can occur due to the icing modality or it can also be called a cold compress. Cryotherapy can show a decrease in edema, because cryotherapy can cause cold stimulation to skin tissue which can cause local vasoconstriction causing a decrease in edema fluid and lymph fluid production which can release inflammatory mediators through decreasing the permeability of blood vessel walls resulting in decreased edema. Close Chain Kinetic exercises provide activation of antagonistic groups of several joint group. Examples of closed chain exercises include pushups, pullups, squats, and lunges. All types of closed chain exercises can be performed whether using weights or not. Kinetic Closed Chain training focuses on eccentric muscle work, as it is known that eccentric training can develop higher muscle contractions in the muscles so that a greater training effect can be obtained and followed by increased functional performance.

Conclusion: Management of physiotherapy programs given for 2 times resulted in the results that the initial therapy to the final therapy had not shown significant results. So it can be concluded that the left ankle edema has decreased, there is still muscle weakness, and there is no change in the patient's functional ability.

Keyword: Achilles Tendon Rupture, Balance exercise, CKC, Cryotherapy.

Introduction

In productive times, we will encounter a lot of solid and busy activities either because of work or because of other activities such as sports activities. Not infrequently some of the activities of physical exercise and sports hobbies that are carried out regularly every day can cause physical injury. Physical injuries can disrupt the musculoskeletal system which includes muscles, bones, joints, tendons, ligaments, and the connective tissue that supports and binds tissues and organs together. One of the injuries resulting from a series of these activities is the rupture of the Achilles tendon (Afafah and Kumaat, 2018). The Achilles tendon is the strongest tendon in the human body. Even so, this tendon is under constant pressure so that it is at risk of rupture when running, jumping, or sudden acceleration or deceleration. Achilles tendon rupture most often occurs in sports activists, both recreational and professional sports (Anggiat and Rahmansyah, 2021).

Although this condition can be diagnosed clinically easily, up to 20-25% of cases of Achilles tendon rupture are misdiagnosed at initial presentation. Whereas delay in treatment can lead to worse outcomes and require more complicated operative management which has a high risk of complications (Greenstein *et al*, 2011).

The incidence of achilles tendon rupture has increased due to increased physical activity and sports, especially at the age of 30 and 40 years. Statistically, 18 out of 100,000 Achilles tendon ruptures occur each year. Acute achilles tendon rupture generally occurs in men in their 3rd and 4th decades who do intermittent physical activity and sports (Lee and Park, 2013). In the professional athlete group, the incidence of tendon rupture was 8.3%. Professional athletes with a high lifetime incidence of Achilles rupture are sprinters 18%, decathletes 17%, footballers 17%, track and field jumpers 12%, basketball players 12%, and ice hockey players 9% (Murtiyani and Suidah, 2019).

Physiotherapy is a form of health service aimed at individuals and/or groups to develop, maintain and restore body movement and function throughout the life span by using manual handling, increased movement, equipment (physics, electrotherapeutic and mechanical), function training, and communication (Moeloek, 2015).

Case Presentation

The patient was diagnosed with Achilles tendon rupture. The course of the disease was that the patient was playing mini soccer, when the patient ran sprints then his left foot stepped on it and a clicking sound was heard, after the injury the patient was still forced to walk, starting from there the patient felt quite disturbing pain, followed by edema in the left ankle and loss of joint stability. On March 28, 2023 the patient underwent surgery. The patient underwent physiotherapy on April 18, 2023. The patient started walking without crutches after 6 weeks of physiotherapy.

The physiotherapist performed a static inspection with the result that there was an incision along the left Achilles tendon, the patient's postural condition was good, there was visible edema of the left lateral malleolus. The results of a dynamic inspection check are that it can be seen that the running time is still based on the right side of the axle. Palpation examination with the results of no tenderness and no muscle spasms.

The results of examining muscle strength by Manual Muscle Testing (MMT) with results of 4 in the flexor, extensor, evertor, and invertor ankle joint muscle groups (Table 1). The results of ankle anthropometry with a figure of eight are 58 cm (dextra ankle) and 60 cm (left ankle) (Table 2). Physiotherapy also performs special tests for the patient's functional abilities, namely the Foot and Disability Index (FADI) scale, which is 102 (no difficulty) (Table 3). Enforcement of physiotherapy diagnoses based on the International Classification of Functioning, Disability and Health (ICF). The results obtained were (1) body structure: there was an incision wound along the left Achilles tendon due to an achilles tendon rupture operation and there was a difference in the structure of the left and right ankle due to an achilles tendon rupture operation. (2) body function: there is edema in the left ankle, there is weakness in the gastrocnemius, soleus, tibialis anterior, tibialis posterior, and m. peroneus longus & brevis, passive stabilization of the left ankle is not good (weakness in the ligaments), and there are changes in gait patterns. Functional limitation is that the patient still has difficulty in standing on one leg and squatting on one leg at the left ankle. Participation restriction is that the patient is not able to play mini soccer for now, but there are no obstacles in daily activities.

Table 1. MMT

Muscle	Result
<i>Dorsi Flexi (m. tibialis anterior)</i>	4
<i>Plantar Flexi (m. gastrocnemius)</i>	4
<i>Inversi (m. tibialis posterior)</i>	4
<i>Eversi (m. peroneuslongus & brevis)</i>	4

Table 2. Ankle Anthropometry

Figure of Eight	Result
Ankle Dextra	58 cm
Ankle Sinistra	60 cm

Table 3. FADI

Measurement	Result
FADI	102 (no difficulty)

Management and Outcome

The physiotherapy modality used is to provide cold compresses for 5 minutes. Before being given an exercise program, do a warm-up first. Then proceed with a static cycle for 15 minutes, closed chain exercise, lunges (3 sets), squad (3 sets), calf rises (3 sets), balance exercise, the single-leg brige (3 sets). When finished proceed with cool down.



Picture 1. Physiotherapy Management

After giving the exercise program 2 times, the evaluation plan is to reduce edema in the left ankle, muscle strength with MMT, and functional ability with the FADI scale explained by the table below.

Table 4. Evaluation of Muscle Strength

Muscle	T1	T2
<i>Dorsi Flexi (m. tibialis anterior)</i>	4	4
<i>Plantar Flexi (m. gastrocnemius)</i>	4	4
<i>Inversi (m. tibialis posterior)</i>	4	4
<i>Eversi (m. peroneuslongus & brevis)</i>	4	4

Table 5. Evaluation of Edema

Figure of Eight	T1	T2
Ankle Dextra	58 cm	58 cm
Ankle Sinistra	60 cm	59 cm

Table 6. Functional Ability Evaluation

Measurement	T1	T2
FADI	102 (no difficulty)	102 (no difficulty)

Discussion

Based on figure of eight anthropometric measurements on the ankle, the results obtained were edema of the lateral malleolus, namely the left ankle of 59 cm and the right ankle of 58 cm. A decrease in edema can occur due to the icing modality or it can also be called a cold compress. Cryotherapy can show a decrease in edema, because cryotherapy can cause cold stimulation to skin tissue which can cause local vasoconstriction causing a decrease in edema fluid and lymph fluid production which can release inflammatory mediators through decreasing the permeability of blood

vessel walls resulting in decreased edema (Indriastuti & Pristiano, 2022).

In cold compresses, the transfer of pain perception to a more dominant feeling of cold is one type of transcendence that has been achieved so that respondents feel more comfortable. Meanwhile, warm compresses do not have the same effect as cold compresses. Warm compresses only relieve pain by removing inflammatory products, such as bradykinin, histamine, and prostaglandins that cause localized pain. Warm compresses also do not have a local anesthetic effect which can reduce local pain. Cold compresses are also believed to reduce muscle tension (longer than warm compresses). Therefore, based on existing theories and facts, it can be concluded that cold compresses are more effective in reducing pain perception and increasing comfort than warm compresses (Utami, 2014).

Good balance comes from good muscle strength (Aoyama, Suzuki, & Kuzuya, 2015). Research conducted by Lee and Park (2013) found that, balance can be explained by tolerance for instability, increased resistance at the level of muscle fatigue. This tolerance is obtained from increased muscle strength, especially lower limb muscle strength (Lee & Park, 2013). Important parameters for balance performance are range of motion, muscle strength, and somatosensory function. Muscle work performance can be improved with a resistance or strengthening exercise program that is divided into Open Kinetic Chain (OKC) and Close Kinetic Chain (CKC). Based on research conducted, this exercise is more effective for increasing muscle strength than the Open Kinetic Chain exercise. Closed Kinetic Chain exercises can train muscle groups simultaneously in one exercise (Kwon, Park, Jefferson, & Kim, 2013). Close Chain Kinetic exercises provide activation of antagonistic groups of several joint groups (Greenstein, Bishop, Edward, & Topp, 2011). Examples of closed chain exercises include pushups, pullups, squats, and lunges. All types of closed chain exercises can be performed whether using weights or not. Kinetic Closed Chain training focuses on eccentric muscle work, as it is known that eccentric training can develop higher muscle contractions in the muscles so that a greater training effect can be obtained and followed by increased functional performance (Yarlagadda, 2013).

Balance is the key the capacity to respond quickly and effectively to maintain balance and postural stability before, during, after movement and in response to external disturbances. Balance is maintained by the dynamic integration of internal and external factors involving the environment (Afafah & Kumaat, 2018). Balance exercise is a complex integration of the somatosensory (visual, vestibular, proprioceptive) and motor (musculoskeletal, muscles, joints, soft tissue) systems whose entire work is regulated by the brain against internal and external responses or influences of the body (Rawe, Hidayah, &

RC, 2017). The benefits to be obtained from balance exercise training can increase functional stability limits, improve motor systems, improve postural control, as well as increase dynamic stability, balance, coordination and increase core muscle exertion (Murtiyani & Suidah, 2019).

Conclusion

The author discusses the provision of Close Chain Kinetic and Balance exercise programs that are applied to patients with Post Operation Achilles Tendon Rupture (Phase III). The therapy given aims to increase muscle atrophy, increase the strength of the left ankle driving muscles, and improve stability, balance and coordination. The implementation of therapy will greatly help the patient's independence if it is carried out according to the implementation procedure. The administration of therapy given for 2 times resulted in the results that the initial therapy to the final therapy had not shown significant results. So it can be concluded that the left ankle edema has decreased, there is still muscle weakness, and there is no change in the patient's functional ability.

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