PHYSIOTHERAPY MANAGEMENT OF POST OP RECONTRUCTION ANTERIOR CRUCIATE LIGAMENT (ACL) KNEE SINISTRA PHASE I CASE STUDY OF SILAT ATHLETES IN BOEANA *PHYSIOTHERAPY* SOLO

Mahendra Wahyu Dewangga[1], Sigit Saputro[1], Dessy Fitriani[1], Maisaroh[1]

[1]*Physiotherapy study program faculty of health sciences, Universitas Muhammadiyah Surakarta, Indonesia*

*Corresponding author: Dessy Fitriani, Email:j120221269@student.ums.ac.id
Maisaroh, Email:j120221267@student.ums.ac.id

Abstract

Introduction: Sports injuries refer to injuries that occur as a result of sporting activities, either directly or indirectly. Sports injuries that occur to a person will cause a sensation of pain caused by damage to the structure or function of the body, such as bones, joints, ligaments and muscles. One type of sports injury that often occurs is rupture of the anterior cruciate ligament (ACL). The ACL ligament is an important component in the knee. The main function of the ACL is to maintain stability when anterior tibial movement and internal rotation occur. Rupture is a condition when tissue is damaged or torn due to trauma.

Case Presentation: The patient experienced limited movement and pain when flexing and extending the left knee accompanied by pain which made it difficult for the patient to carry out daily activities. The patient suffered an injury caused by an opponent's attack during a silat competition which resulted in a "pop" sound which made his knee ache and made it difficult to bend his knee. The patient was medically diagnosed with left knee ACL rupture. The patient complained of motion pain and tenderness in the left knee area, flexor and extensor muscle weakness, hamstring muscle spasm, decreased joint range of motion, and muscle atrophy.

Management and Outcomes: Patients are given intervention in the form of phase I exercise including: quadriceps set, hamstring sets, clump sell, SLR, ankle theraband, slide heels, weight training. Before the exercise, the patient is given tens and given an ice pack after the therapy.After being given the intervention once, the results showed that there was no significant decrease in motion pain, there was no significant increase in muscle strength, there was an increase in the range of motion of the joints, there was no increase in muscle mass.

Discussion: Tens aims to help reduce pain, stimulate muscle activity, and reduce swelling, phase 1 exercise therapy, namely strengthening exercises quadriceps set performed to increase strength in the quadriceps muscles, hamstring sets done to increase strength in the hamstring muscles, clump sell performed to increase strength in the gluteus muscles and stabilization of the hips, SLR to strengthen the abductor, adductor, gluteus, and hamstring muscles, ankle theraband to increase the strength of the ankle muscles (m. tibialis anterior, m. gastrocnemius, m. peroneus), slide heels performed to increase knee joint ROM and stretch leg muscles, weight training to add LGS to the knee extension movement and to reduce pain, and ice packs to reduce pain and swelling, so that it can help increase range of motion (ROM).

Keyword: Post Op reconstruction, Anterior cruciate ligament (ACL), Phase 1, strengthening exercise

Introduction

For an athlete, health is an absolute prerequisite and cannot be ignored. However, athletes often face physical injuries that interfere with their health, physical injuries to athletes are also interpreted as sports injuries. This physical injury can cause disturbances in the musculoskeletal system, which includes muscles, bones, joints, tendons, ligaments and connective tissue which play an important role in maintaining balance between tissues and organs in the body.

Sports injuries refer to injuries that occur as a result of sporting activities, either directly or indirectly. Such injuries may affect the musculoskeletal system and various other systems or organs, resulting in impaired function of these systems.[1]. Sports injuries that occur to a person will cause a sensation of pain caused by damage to the structure or function of the body, such as bones, joints, ligaments and muscles. The injury can be a closed injury or an open injury[2]. One type of sports injury that often occurs is rupture of the anterior cruciate ligament (ACL).

The ACL ligament is an important component in the knee. The main function of the ACL is to maintain stability when anterior tibial movement and internal rotation occur[3]. Rupture is a condition when tissue is damaged or torn due to trauma. The ACL is one of the main ligaments in the knee which plays a role in preventing the tibia from shifting forward from the femur and controlling the rotational movement of the knee.[4].

Each year, approximately 200,000 ACL-related injuries occur in the United States, with approximately 95,000 cases of ACL rupture. In addition, approximately 100,000 ACL reconstruction operations are performed annually[4]. According to Canale in 2007, ACL reconstruction surgery is a surgical procedure that aims to replace the damaged anterior cruciate ligament with tissue grafts to restore normal function.[5].Physiotherapy performed in treating knee injuries in patients who have undergone ACL reconstruction aims to reduce pain and swelling, prevent a decrease in muscle mass, restore and increase muscle strength, increase knee stability, and restore confidence in patients who have suffered ACL injuries**.**[6].

Physiotherapy plays a very important role in the recovery process after ACL reconstruction with the aim of reducing pain, reducing edema, increasing joint range of motion, increasing muscle strength, and returning the patient's functional ability to normal levels. This preclinical activity report discusses how phase one exercise therapy affects the problems that arise in physiotherapy after ACL reconstruction surgery.

Case Presentation

The patient experienced limited movement and pain when flexing and extending the left knee accompanied by pain which made it difficult for the patient to carry out daily activities. In May 2023, the patient suffered an injury caused by an opponent's attack during a silat competition which

resulted in a "pop" sound which made his knee hurt and made it difficult to bend his knee. The patient then examined his condition and was advised to do an MRI and was medically diagnosed with left knee ACL rupture. The patient underwent surgery after 1 month of experiencing an injury with an incision in the medial part of the patella and a graft was taken from the lateral part around the ankle, to be precise on June 16 2023 due to school exams. After surgery the patient underwent therapy in the hospital and 3 weeks after that the patient underwent clinical therapy. Prior to therapy the patient complained of motion pain and tenderness in the left knee area, flexor and extensor muscle weakness, hamstring muscle spasm, decreased joint range of motion, and muscle atrophy. The patient has a normal blood pressure of 120/90 mmHg and respirations 20x/minute. Previously the patient had no history of the same injury to his knee

Tabel 5. Pain

Pain	NRS
Pain at rest	0
Pain upon pressure	3
Pain during movement	7

Tabel 6. Muscle Strenght

Movement	MMT
Flexi-ekstensi	-2

Tabel 7. ROM

Movement	ROM
Ekstensi-flexi	12 – 0 - 55

Tabel 8. Muscle Atropy

	Dextra	Sinistra	Discrepancy
Mid patella	34,5	36,5	2
-5	33,5	34	0,5
-10	35,8	34,8	1
+5	37,5	38,2	0,7
+10	40,7	39,7	1
+15	47,5	43,6	3,9
+20	53	47,3	5,7

Management and Outcomes

Patients are given intervention in the form of phase I exercise including:Quadriceps Set,Hamstring Sets,Clum sell,SLRs,Ankle theraband,Heels slides,Weighttraining. Prior to exercise, the patient is given tens to stimulate muscle activity and reduce swelling. Also given an ice pack after

therapy to block pain after therapy.Patients are asked to do exercises that have been invited at home. The patient continues to apply ice packs to the knee area above and below the patella. After being given the intervention once, the results showed that there was no significant decrease in motion pain, there was no significant increase in muscle strength, there was an increase in the range of motion of the joints, there was no increase in muscle mass.

Picture 1. Physiotherapy management

Tabel 5. Evaluasion of Pain

Pain	NRS
Pain at rest	0
Pain upon pressure	3
Pain during movement	7

Tabel 6. Evaluasion of Muscle Strenght

Movement	MMT
Flexi-ekstensi	-2

Tabel 7. Evaluasion of ROM

Movement	ROM
Ekstensi-flexi	12 – 0 - 65

Tabel 8. Evaluasi of Muscle Atropy

	Dextra	Sinistra	Discrepancy
Mid patella	34,5	36,5	2
-5	33,5	34	0,5
-10	35,8	34,8	1
+5	37,5	38,2	0,7
+10	40,7	39,7	1
+15	47,5	43,6	3,9
+20	53	47,3	5,7

Discussion

The therapy given is in the form of:

a. TENS

The application of modalities such as TENS can reduce pain after ACL reconstruction. TENS (Transcutaneous Electrical Nerve Stimulation) aims to help reduce pain, stimulate muscle activity, and reduce swelling by using a duration setting of 10 minutes with an adjusted intensity[7].

b. Strengthening Exercises

Strengthening exercisesis one of the methods performed on ACL reconstruction post op patients in order to restore the neuromuscular function of the knee extensors and the muscles around them[7]. After ACL reconstruction usually causes problems such as decreased muscle strength, so isometric exercises can be given. Providing exercise therapy can be in the form of:

1) Quadriceps setting

Quadriceps settingis an isometric exercise performed to increase strength in the quadriceps muscles. This exercise is carried out by activating the quadriceps muscle group which is done in a sitting position leaning back by straightening the legs, then placing a pad under the thigh and asking the patient to press the maximum padding down so that the quadriceps muscle contracts.[9]. This exercise is done 10x/set, 3 sets.

2) Hamstring Settings

Hamstring settingdone to increase strength in the hamstring muscles. This movement is performed in a sitting position leaning back with a knee flexion position of 90°, then ask the patient to do the maximum dorsal flexion of the ankle so that the hamstring muscles contract.[9]. Exercise is done 10x/set, 3 sets.

3) Clumpshell

The clampshell exercise is an exercise performed to increase strength in the gluteus muscles and stabilize the hips. Done in the slide lying position then knee flexion 90°. Place the resistance band on the thigh and ask the patient to stretch the knee outward while keeping the ankle engaged and slowly lower it[8]. This exercise is done 10x/set, 3 sets.

4) SLR practice

This exercise is done to strengthen the abductor, adductor, gluteus, and hamstring muscles. The SLR training position is lying on your back, flexing the uninjured knee and then asking the patient to raise the leg straight as high as the flexed knee. Performed 10x/set, 3 sets.

5) Ankle Theraband

Theraband ankle exercise is an exercise using a resistance band that is done actively and passively. This exercise serves to increase the strength of the ankle muscles (m. tibialis anterior, m. gastrocnemius, m. peroneus)[8]. Strengthening at high intensity can increase muscle mass compared to exercise at low intensity, but the intensity of the exercise must be adjusted to the patient's condition[7].

6) Heel Slides

The heel slide exercise is an exercise performed to increase knee joint ROM and stretch leg muscles. This exercise is performed with the patient lying supine and legs straight, then do the flexion movement slowly until the patient's tolerance for pain[9].

7) Weight Training

This exercise is done to add LGS to the knee extension motion and can reduce pain. This exercise is done by giving weight to the upper knee and providing cushioning to the ankle. The load given is 3.5 kg or as much as the patient can afford.

c. Ice Compress

Ice compresses are a therapeutic method applied to acute injuries with the aim of reducing pain and swelling, so as to help increase range of motion (ROM).[8].

Conclusion

The author discusses the administration of an exercise therapy program to patients with Anterior Cruciate Ligament (ACL) Reconstruction Phase I. The therapy given aims to reduce pain, increase LGS and muscle strength, and reduce muscle atrophy.

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 which was carried out for 1 times obtained the result that the initial therapy to the final therapy had not shown significant results. So it can be concluded that:

1. Muscle strength can not be maximized
2. There has been no significant improvement on LGS
3. There is still pain
4. There has been no reduction in muscle atrophy.

Acknowledgments

In completing this paper, we would like to thank the physiotherapy study program, the Faculty of Health Sciences, University of Muhammadiyah Surakarta and the Boeana Physiotherapy Solo, as well as the supervisor

References

[1] E. B. Fahrizqi, R. M. Aguss, and R. Yuliandra, "Pelatihan Penanganan Cidera Olahraga Di Sma Negeri 1 Pringsewu," *J. Soc. Sci. Technol. Community Serv.*, vol. 2, no. 1, p. 11, 2021, doi: 10.33365/jsstcs.v2i1.876.

[2] N. Simatupang, "Pengetahuan Cedera Olahraga Pada Mahasiswa Fakultas Ilmu Keolahrgaan UNIMED," *J. Pedagog. Keolahragaan*, vol. 02, no. 01, pp. 31–34, 2016.

[3] C. Domnick, M. J. Raschke, and M. Herbort, "Biomechanics of the anterior cruciate ligament: Physiology, rupture and reconstruction techniques," *World J. Orthop.*, vol. 7, no. 2, pp. 82–93, 2016, doi: 10.5312/wjo.v7.i2.82.

[4] I. Santoso, I. D. K. Sari, M. Noviana, and R. Pahlawi, "Penatalaksanaan Fisioterapi Pada Post Op Rekonstruksi Anterior Cruciate Ligament Sinistra Grade III Akibat Ruptur Di RSPAD Gatot Soebroto," *J. Vokasi Indones.*, vol. 6, no. 1, pp. 66–80, 2018, doi: 10.7454/jvi.v6i1.117.

[5] A. D. Maralisa *et al.*, "Penatalaksanaan Fisioterapi Rekonstruksi Acl Knee Dextra Hamstring," *Indones. J. Physiother. Res. Educ.*, vol. 1, no. 1, pp. 4–17, 2020.

[6] F. Syafaat, "Upaya Pemulihan Pasien Pasca Rekonstruksi Anterior Cruciate Ligament (Acl) Dengan Latihan Beban," *J. Kesehat. Olahraga*, vol. 8, no. 1, pp. 67–72, 2019.

[7] M. Herman and D. R. Komalasari, "Penatalaksanaan Fisioterapi Post Operative AnHerman, M., & Komalasari, D. R. (2022). Penatalaksanaan Fisioterapi Post Operative Anterior Cruciate Ligament : Studi Kasus. PhysioHS, 4(Juni), 1–6.terior Cruciate Ligament : Studi Kasus," *PhysioHS*, vol. 4, no. Juni, pp. 1–6, 2022.

[8] Oktavia, A. Supriyadi, and Monalisa, "Intervensi Fisioterapi Pada Kasus Pasca Operasi Recontruction Anterior Cruciate Ligament Dexstra Fase 1: Study Case," *JIRK*, vol. 3, no. 1, pp. 4771–4778, 2023.

[9] A. Indriastuti & Pristianto, "Program Fisioterapi pada Kondisi Pasca Rekonstruksi Anterior Cruciate Ligament (ACL) Fase I : A Case Report," *Physio J.*, vol. 1, no. 2, pp. 1–9, 2021.