Leg Press for Accelerating the Recovery of Patient with Reconstruction Anterior Cruciate Ligament Phase 3: A Case Report

by Ferlita Anindya Putri

Submission date: 31-Dec-2025 09:18PM (UTC+0700)
Submission ID: 2852065449
File name: onstruction_Anterior_Cruciate_Ligament_Phase_3_A_Case_Report.pdf (509.02K)
Word count: 3200
Character count: 17625

Journal of Sport Medicine and Physiotherapy
1(2); 51-59 (2025) E-ISSN: -

Journal of Sport Medicine and Physiotherapy (JoSMPt) **Open Access**

Leg Press for Accelerating the Recovery of Patient with Reconstruction Anterior Cruciate Ligament Phase 3: A Case Report

Ferlita Anindya Putri[1*], Rifdatan Nabihah Roudhoh[1], Putri Febriani[1], Sharlyn Agatha[1], Hilya Alifiah Hisanah[1]

[1]Department of Physiotherapy, Universitas Negeri Surabaya, Jl. Raya Kampus Unesa, Lidah Wetan, Kec. Lakarsantri, Surabaya, East Java 60213, Indonesia

*Correspondence: oktabrianiferlita@gmail.com
Department of Physiotherapy, Universitas Negeri Surabaya, Jl. Raya Kampus Unesa, Lidah Wetan, Kec. Lakarsantri, Surabaya, East Java 60213, Indonesia

Submitted : 31 December 2025
Accepted : 31 December 2025
Published : 31 December 2025

Abstract

Background: Anterior Cruciate Ligament (ACL) injuries are a major concern among athletes, often requiring surgical intervention followed by comprehensive rehabilitation. One of the recommended exercises during the strengthening phase (phase 3) of post-ACL reconstruction rehabilitation is the leg press.
Objectives: This case report aims to evaluate the effectiveness of leg press exercises as part of a rehabilitation program in a 22-year-old male football athlete following ACL reconstruction.
Methods: The method involved progressive leg press training (30 kg, 3–4 times per week, 3 sets of 10–15 repetitions) and monitoring using Y Balance Test, agility t-test, and IKDC questionnaire
Results: The results showed improvements in dynamic balance, agility, muscle strength, and overall knee function. These findings indicate that leg press exercise is effective in accelerating recovery, enhancing functional readiness, and reducing the risk of re-injury during the strengthening phase of ACL rehabilitation. Therefore, leg press exercises are recommended as part of a structured and individualized phase 3 rehabilitation program, particularly for athletes aiming to return to sports activities.
Conclusion: Leg press exercise during phase 3 rehabilitation after ACL reconstruction effectively improves muscle strength, dynamic balance, agility, and knee function. Therefore, leg press can be recommended as a key component of a structured and progressive rehabilitation program to support functional recovery and return to sport.

Keywords: ACL; leg press; rehabilitation; knee stability; dynamic balance

INTRODUCTION

Anterior cruciate ligament (ACL) injuries affect approximately 68.6 per 100,000 person-years in the general population, with higher rates among athletes in high-impact sports like soccer, football, and skiing. In the U.S., around 400,000 ACL reconstruction surgeries occur annually, underscoring their prevalence and clinical burden. Among athletes, incidence proportions reach 2.8% overall (1 in 36 athletes), with females at greater risk (3.5% or 1 in 29) compared to males (2.0% or 1 in 50). One important component of postoperative care is structured physiotherapy, especially during Phase 3 of rehabilitation, which emphasizes the restoration of muscle strength, joint stability, and overall functional performance (Hafizh, 2022).

The ACL ligament is one of the four main ligaments in the knee joint that serves to stabilize the connection between the thigh bone (femur) and the shin bone (tibia), especially in preventing anterior displacement of the tibia and controlling knee rotation. ACL tears commonly occur as a result of sudden stopping movements, rapid changes in direction, or incorrect landings often encountered in high- intensity sports. When the ACL is torn, patients usually experience joint instability, swelling, pain, and decreased ability to perform functional activities such as running or jumping. If not treated appropriately, this injury can lead to damage to other knee structures and increase the risk of early osteoarthritis. Treatment of ACL injuries must be addressed immediately in the form of both non- operative and operative therapies. In certain cases ACL tears require reconstruction or require surgery. Reconstruction is the main action because ACL ligament suturing often fails. This is because the ACL ligament does not have fibrin so any tear that occurs cannot heal itself. Reconstruction is an operative method to replace the ACL ligament with another material (graft). Generally, the material is taken from the hamstring tendon (Hafizh, BA. 2022).

Therefore, a proper rehabilitation approach is a very important component to restore knee function after ACL reconstruction (Sari & Pratama, 2022). The goal of the third phase in rehabilitation is for recovery back to sport. Among the various exercises used in the rehabilitation process, the leg press has emerged as a basic strength exercise that targets major muscle groups such as the

quadriceps, hamstrings, and gluteals. This exercise plays an important role in rebuilding lower limb strength, improving knee joint support, and facilitating the return to physical activity (Wahyuni & Kurniawan, 2022; Rizki, 2023). Strengthening exercises significantly improve knee joint stability and reduce the risk of re-injury by 50% (Buckthorpe et al., 2024).

This case report discusses the use of leg press exercises as part of a rehabilitation program for a 22-year-old male athlete recovering from ACL reconstruction. The implications of using leg press during Phase 3 are discussed in terms of its effectiveness in addressing muscle atrophy, improving dynamic balance and agility (Setiawan & Putra, 2023; Mashreghi et al., 2024), and contributing to better functional outcomes. Objective evaluation through tools such as the Y Balance Test, agility test, and IKDC assessment support the clinical relevance of this intervention in accelerating postoperative recovery and return to sport readiness. This case report aims to evaluate the effectiveness of leg press exercises as part of a phase 3 rehabilitation program in patients post ACL reconstruction surgery.

CASE DESCRIPTION

Male patient aged 22 years, soccer athlete in Semarang. The injury occurred during a soccer fun game in October 2022. The left knee had traumatic pivot and flexion of the sinistra knee accompanied by a "click" sound as the first time of his injury. The patient did not feel pain or limitation of motion, but felt that the knee was unstable and decided to go to Kariadi General Hospital and received a diagnosis of ACL rupture.

ACL reconstruction surgery was performed on February 14, 2023 at Kariadi General Hospital. After surgery, a slap and bandage was placed for 2 weeks and physiotherapy was continued at KRMT Wongsonegoro Hospital. The patient has been undergoing physiotherapy for about two and a half months, there is atrophy in m. quadriceps, m. gastrocnemius sinistra, there was an incision scar on the left knee. The patient walked without assistive devices with balanced weight distribution between the right and left sides.

DISCUSSION

After obtaining consent from the patient, we conducted a physical examination which included Vital Sign. based on this examination, the Vital sign results were normal, in the aspects of blood pressure, respiration, pulse and temperature. In addition, the patient was examined for basic active, passive and isometric movements. we found minimal resistance on isometric examination. The purpose of the isometric test is to confirm that the patient's muscle strength is still lacking. This is corroborated by the examination of a sphygmomanometer that has been pumped and placed under the knee like a quadset position, then the patient is instructed to press the sphygmomanometer with all his strength. Another supporting examination is anthropometric measurements of the quadriceps, gastrocnemius and vastus medialis oblique, and it can be concluded that there is a 1cm difference in atrophy in the sinistra limb.

Leg press exercise is used as part of the rehabilitation program after anterior cruciate ligament (ACL) reconstruction to strengthen the quadriceps and hamstring muscles which play an important role in knee stability, thus helping the recovery of knee function after ACL reconstruction. Exercise leg press is performed with progressive loads that are adjusted to the patient's condition, starting from light loads and increasing gradually to avoid excessive stress on the ligaments that are in the healing process. The leg press technique includes a seated position on the leg press machine with the feet pressing the weight plate slowly and in a controlled manner, paying attention so that the knee does not go through a risky flexion position.

Figure 1. Patient's Leg Press Activity

Leg press is performed with a weight of 30 kg, frequency 3-4 times per week for 3 sets, 10- 15 repetitions per session. Exercise is adjusted to the patient's condition with gradual addition according to the progress of muscle strength and knee function. In addition to leg presses, there are several other exercises that can be done, such as glute bridges, straight leg raises, wall sits or squats. Exercise leg press is given because it has the advantage of increasing the strength of m. quadriceps and lower leg muscles which are very important to support knee stability and function after ACL reconstruction surgery. The leg press demonstrated high reliability in measuring maximum squat strength after 10 weeks of training, with better transfer to free squats than leg press alone, as well as a positive effect on countermovement jumps (greater effect size for the squat - leg press combination). Compared to squats, leg presses are safer for ACL patients due to low axial load, although both are equivalent in functional outcomes such as dynamic balance. In post-ACL RCTs, leg press are effective for quadriceps hypertrophy and strength, superior to conventional eccentric exercises and safe for early rehabilitation without risk of instability. Compared to straight leg raises (SLR) or mini squats the leg press is more valid for overall quad strength (including extension of the healthy leg), while SLR/mini squats are better for OA pain but less effective for hypertrophy the Aspetar guidelines recommend exercises lik the leg press as the core of ACL rehabilitation with moderate GRADE evidence.

Monitoring parameter by Y Balance Test, Agility t-test, Metline AND IKDC (International Knee Documentation Committee). Y Balance test to assess the patient's ability to maintain stability and postural control during dynamic movements. The patient is asked to stand on one leg while reaching out in 3 different directions with the other lower extremity. These are anterior, posteromedial, and posterolateral. When using the Y-Balance test kit, the 3 reaches result in a "composite reach distance" or composite score which is used to predict injury. Agility t-test to measure the patient's ability to make rapid and controlled changes in direction. the procedure is performed with the subject sprinting forward 9.14 m from the starting line to the first cone and touching the tip of the cone with the right hand, moving 4.57 m to the left to the second cone and touching the cone with the left hand, then moving 9.14 m to the right to the

third cone and touching the cone with the right hand, moving 4.57 m back to the left to the center cone and touching the cone with the left hand before finally pedaling back to the starting line. Time started counting when the subject passed through the timing gate and stopped when passing through it on the return. Metline to measure muscle circumference of m. quadriceps, m. gastrocnemius sinistra compared to dextra, to assess muscle mass development during rehabilitation. IKDC (International Knee Documentation Committee) questionnaire, an international standardized questionnaire to subjectively assess knee function from the patient's perspective. The IKDC is a subjective assessment consisting of three (3) questionnaire categories: symptoms, athletic activity, and knee function. The symptom subscale helps in evaluating issues such as pain, stiffness, edema, and unstable knee.

Balance evaluation using Y Balance

The results of balance measurements presented on Table 1. The right and left sides showed relatively stable values during the three evaluations (T1, T2, T3). The balance values on the right leg ranged from 97.0 to 97.4; while those on the left leg were slightly lower at 91.0 to 92.9. This showed a difference in balance between the right and left legs, but the values remained consistent during the evaluation phase indicating good balance stability in patients after the leg press intervention. Based on the research that has been conducted, leg press exercises show a significant contribution in accelerating the recovery process of patients after Anterior Cruciate Ligament (ACL) reconstruction in phase 3 of rehabilitation. The results of balance measurements using the Y Balance Test showed stable values and tended to increase on the side that underwent reconstruction. This indicates that leg press exercises can help patients restore neuromuscular control and knee joint stability. Good balance is essential to prevent the risk of re-injury and support daily functional activities.

Table 1. List of balance evaluation using Y Balance Test

	Value		
	T1	**T2**	T3
Dextra	97,4	97,0	97,3
Sinistra	92,9	91,6	91,0

Evaluation of agility using agility t-test

The agility value measured through the agility t-test showed a decrease in value from 10.57 seconds at T1 to 10.00 seconds at T3. This decrease in time indicates an increase in the patient's agility ability which is categorized as "good" in the last two evaluations (T2 and T3). This indicates that the leg press exercise had a positive impact in improving the patient's agility during the recovery process. The improvement in time on the agility t-test from the initial evaluation to the final evaluation indicates an increase in the patient's agility ability. Leg press exercises that involve flexible movements and strengthening of the major leg muscles play a role in improving motor responses and coordination of movements, so that patients can move more quickly and efficiently.

Table 2. List of agility evaluations using the agility t-test

	Value	
T1	**T2**	**T3**
10.57	10.30	10.00
Standart	Good	good

Evaluation of atrophy using metline

Measurement of muscle atrophy in the three main muscle groups (Quadriceps, Gastrocnemius, and Vastus Medialis Oblique) showed a consistent size difference of 1 cm at all three evaluation points (T1, T2, T3). This indicates that there was no significant change in the measured muscle size, which can be interpreted that leg press training is able to maintain muscle mass during the recovery phase. The relatively stable muscle atrophy measurements during the rehabilitation phase suggest that leg press training is effective in maintaining muscle mass, particularly in the quadriceps, gastrocnemius, and vastus medialis oblique muscles. This is important as muscle atrophy is common post ACL surgery and can slow down the recovery process of knee function.

Table 3. List of atrophy evaluation using metline

Muscle measured	Difference		
	T1	**T2**	**T3**
Quadriceps	**1 cm**	**1 cm**	**1 cm**
Gastrocnemius	**1 cm**	**1 cm**	**1 cm**
Vastus medialis oblique	**1 cm**	**1 cm**	**1 cm**

Functional ability evaluation using IKDC

The ability evaluation measured using IKDC showed an improvement from 82.1% at T1 to 86.2% at T3. This increase in score indicates an improvement in the functional ability of the patient's knee during phase 3 of recovery after anterior cruciate ligament reconstruction. This corroborates that leg press exercises are effective in accelerating the recovery of knee function. A significant increase in IKDC score indicates an overall improvement in knee function. Leg press exercises help strengthen the knee support muscles and improve joint stability, so that patients can return to better activities and reduce complaints of pain or discomfort. Overall, leg press training is an effective and safe exercise intervention for phase 3 rehabilitation following ACL reconstruction. It not only accelerates recovery by improving balance and agility, but also helps maintain muscle mass and improve overall knee function. Therefore, leg press can be recommended as an integral part of the rehabilitation program for patients with Anterior Cruciate Ligament reconstruction.

Table 4. Functional ability evaluation list using IKDC

Treatment	*Disability Score*
T1	82.1 %
T2	83.0 %
T3	86.2 %.

CONCLUSION

Leg press exercise during the third stage of recovery after ACL reconstruction surgery has been shown to be successful in strengthening the lower leg muscles, improving knee joint stability, dynamic balance and reaction speed. It also plays a role in muscle mass growth and the patient's personal outlook on their knee function. Through an organized, gradual, and safe protocol, the leg press is one of the main exercises suggested in ACL recovery plans, especially for athletes looking to return to sports. The advantages of this exercise are to increase knee joint stability, decrease the chance of bone injury, and improve functional abilities such as walking, climbing stairs, and changing direction. While the disadvantages of leg press training are that not all patients can immediately do leg presses with the same load; adaptation of each individual is very important, and training progress needs to be adjusted according to the

tolerance and physical condition of each patient. Leg press training is a very beneficial intervention in the strengthening phase of rehabilitation after ACL surgery, but must be done carefully, structured, and combined with other exercises for optimal results. Individualized monitoring and program adjustments are key to successful rehabilitation.

CONFLICT OF INTEREST

The author hereby declares that this research is free from conflicts of interest with any party

AUTHOR'S CONTRIBUTION

Ferlita Anindya Putri, Rifdatan Nabihah Roudhoh, Putri Febriani, and Sharlyn Agatha were responsible for writing the manuscript based on the results of the case study, including data analysis and interpretation of the clinical outcomes. Hilya Alifiah Hisanah was directly involved in patient management and treatment according to the presented case.

FUNDING/SPONSORSHIP

This paper does not receive external funding

References

Buckthorpe, M., et al. (2024). Latihan penguatan secara signifikan meningkatkan stabilitas sendi lutut dan mengurangi risiko cedera ulang hingga 50%. Journal of Innovation Research and Knowledge, 3(4), 1- 10.

Mashreghi, A., et al. (2024). Effectiveness of agility training in patients with ACL reconstruction: A comprehensive review. Jurnal Terapi Habilitasi, 2(1), 45-52.

Rizki, A. (2023). Upaya pemulihan pasien pasca rekonstruksi anterior cruciate ligament (ACL) melalui program rehabilitasi latihan beban. Jurnal Kesehatan Olahraga, 11(2), 120-130.

Sari, D. A., & Pratama, Y. (2022). Program fisioterapi dalam peningkatan keseimbangan dinamis pada pasien pasca operasi ACL dan LCL reconstruction. PhysioHS Journal, 5(1), 34-40.

Setiawan, R., & Putra, D. (2023). Efektivitas latihan penguatan otot tungkai bawah pada rehabilitasi cedera ACL bagi atlet di Pekanbaru. Indonesian Journal of Community Empowerment, 4(2), 55-62.

Wahyuni, S., & Kurniawan, H. (2022). Efektivitas intervensi fisioterapi berupa leg press dan latihan penguatan lainnya pada pasien pasca operasi ACLR. Journal of Innovation Research and Knowledge, 3(3), 100- 110.

Vidmar, M. F., Baroni, B. M., Michelin, A. F., Mezzomo, M., Lugokenski, R., Pimentel, G. L., & Silva, M. F. (2020). Isokinetic eccentric training is more effective than constant load eccentric training for quadriceps rehabilitation following anterior cruciate ligament reconstruction: a randomized controlled trial. Brazilian journal of physical therapy, 24(5), 424-432.

Escamilla RF, Zheng N, Macleod TD, Edwards WB, Imamura R, Hreljac A, Fleisig GS, Wilk KE, Moorman CT 3rd, Andrews JR. Patellofemoral joint force and stress during the wall squat and one-leg squat. Med Sci Sports Exerc. 2009 Apr;41(4):879-88. doi: 10.1249/MSS.0b013e31818e7ead. PMID: 19276845.

Leg Press for Accelerating the Recovery of Patient with Reconstruction Anterior Cruciate Ligament Phase 3: A Case Report

ORIGINALITY REPORT

14%	6%	9%	10%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Universitas Negeri Surabaya Student Paper	3%
2	Submitted to University of Malaya Student Paper	3%
3	Submitted to Leeds Beckett University Student Paper	1%
4	jse.rezkimedia.org Internet Source	1%
5	Submitted to Universitas Negeri Surabaya The State University of Surabaya Student Paper	1%
6	Hamid Reza Beiki, Raheb Ghorbani, Jamileh Moghimi. "Comparison of intra-articular platelet-rich plasma injection versus placebo for clinical outcomes in patients with knee osteoarthritis; a double-blind, randomized trial", Journal of Preventive Epidemiology, 2024 Publication	1%
7	ijor.co.uk Internet Source	1%
8	www.gvoon.de Internet Source	1%
9	"Return to Sport after ACL Reconstruction and Other Knee Operations", Springer Science and	1%

Business Media LLC, 2019
Publication

10	Submitted to University of Lancaster Student Paper	1 %
11	www.thieme-connect.de Internet Source	<1 %
12	pubmed.ncbi.nlm.nih.gov Internet Source	<1 %
13	J A Feller. "Effect of physiotherapy attendance on outcome after anterior cruciate ligament reconstruction: a pilot study", British Journal of Sports Medicine, 2004 Publication	<1 %
14	foodly.tn Internet Source	<1 %
15	Kun Wang, Liang Cheng, Bingcheng Wang, Benxiang He. "Effect of isokinetic muscle strength training on knee muscle strength, proprioception, and balance ability in athletes with anterior cruciate ligament reconstruction: a randomised control trial", Frontiers in Physiology, 2023 Publication	<1 %
16	Zeevi Dvir. "Isokinetics - Muscle Testing, Interpretation and Clinical Applications", Routledge, 2025 Publication	<1 %
17	Antonino Patti, Valerio Giustino, Stefania Cataldi, Vito Stoppa et al. "Effects of 5-Week of FIFA 11+ Warm-Up Program on Explosive Strength, Speed, and Perception of Physical Exertion in Elite Female Futsal Athletes", Sports, 2022 Publication	<1 %

18	Karina Octaviani, Siti Nurrochmah. "The relationship between limb length and lower-limb explosive power on squat-style long jump performance in junior secondary students", Physical Education and Sports: Studies and Research, 2025 Publication	<1%

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	On		

Leg Press for Accelerating the Recovery of Patient with Reconstruction Anterior Cruciate Ligament Phase 3: A Case Report

GRADEMARK REPORT

FINAL GRADE

/0

GENERAL COMMENTS

PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8

PAGE 9

PAGE 10