Journal of Physiotherapy Directories,

ISSN: 3107- 6939

Journal of Physiotherapy Directories (JPD)

Comprehensive Physiotherapy Rehabilitation of a Patient Following Transfemoral Amputation: A Case Report

Riya Agrawal[1], Uma Mutta[2]

[1]Assistant Professor, Department of Cardiovascular and Respiratory Physiotherapy, SVSS Latur College of Physiotherapy, Latur, Maharashtra, India

[2] Professor and Head of the Department, Department of Cardiovascular and Respiratory Physiotherapy, MGM Institute of Physiotherapy, Chhatrapati Sambhajinagar, Maharashtra, India.

Corresponding Author:
Vrunda Charkha
vrundacharkha25@gmail.con

Vol 2, Issue 5: Page no. 244 - 251
Received: 10 Sept 2026, Accepted: 6 Oct 2026, Published: 1 Nov 2026

Abstract

Background: Above-knee amputation causes significant functional limitations and requires early rehabilitation to restore mobility and independence. This case report describes a 31-year-old male who underwent a right transfemoral amputation following a road traffic accident. Physical therapy was initiated on postoperative day 2 (POD 2), incorporating pain and edema management, desensitization, contracture prevention, range-of-motion and strengthening exercises, balance and mobility training, and progressive prosthetic rehabilitation. Functional outcomes were evaluated using the Amputee Mobility Predictor (AMP). Following intervention, the patient demonstrated marked improvements in residual limb (RL) function, mobility, balance, and overall functional independence. This case underscores the crucial role of a structured, progressive physical therapy rehabilitation program in optimizing outcomes following transfemoral amputation.

Keywords*: Rehabilitation, Transfemoral amputation, Phantom limb pain, CARE guidelines.*

1. Introduction:

Amputation is the surgical removal of all or a portion of a body part, such as a limb [1, 2]. According to the World Health Organization (WHO) International Classification of Diseases (ICD), there are four primary etiological groups: 1. Trauma, 2. Vascular insufficiency, 3. Diabetes mellitus, and 4. Malignant neoplasia [3]. Research indicates that road traffic accident (RTA)-related fractures account for 78% of all lower extremity traumatic injuries, with motorcyclists comprising 42% of these cases [4].

Lower extremity amputation is a significant life-altering event that substantially impacts a person's functional abilities. Amputations are broadly classified into below-knee (transtibial) and above-knee (transfemoral) amputations [5]. Transfemoral amputations are frequently associated with limited functional independence and a greater challenge for unassisted ambulation [6]. A transfemoral

Copyright © Authors. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

amputation involves the transection of the leg through the femur proximal to the condyles. Soft tissue flaps are created using surrounding musculature to cover the transected bone [7].

A common complication following amputation is phantom limb pain (PLP), defined as painful sensations perceived in the missing portion of the limb. PLP is reported in 42.2% to 78% of cases [9] and presents a major barrier to mobility and prosthetic satisfaction [10]. Physical therapy plays an essential role throughout all stages of recovery, from early acute postoperative management to prosthetic gait training and long-term functional recovery [11]. Achieving optimal functional outcomes requires structured, progressive interventions targeting gait asymmetries, muscle weakness, and balance impairments [13]. This case report outlines the comprehensive physical therapy management and clinical outcomes of a patient following a right transfemoral amputation.

Timeline of Clinical Events (CARE Guideline Framework)

- **Day 0:** Road Traffic Accident (RTA); initial presentation to local center with right lower extremity trauma and vascular compromise (Local Primary Hospital).
- **Day 0 (Night):** Urgent transfer; emergency right primary guillotine transfemoral amputation performed due to severe tissue non-viability (Tertiary Trauma Center, Mumbai).
- **Day 3:** Transfer for definitive care; secondary stump revision with fish-mouth incision & elongated myocutaneous closure performed (Tertiary Hospital / Rehabilitation Unit, Jalgaon).
- **POD 2 (Post-Revision):** Referral to Physiotherapy Department. Initiation of acute bedside therapy (PEACE & LOVE protocol, ROM, contracture prevention).
- **Weeks 1–3:** Active pre-prosthetic phase: Desensitization, strengthening (DeLorme principle), core stability, transfer training.
- **Week 4:** Residual limb shaping completed; custom transfemoral prosthetic prescription and initial fitting.
- **Weeks 5–8:** Structured prosthetic gait training (parallel bars to open ground walking, COG weight-shifting, stair training).
- **Week 8:** Re-evaluation using Amputee Mobility Predictor (AMP); patient achieved functional independent ambulation (K2 level); discharged with home program.

Month 3 Follow-up: Review of home exercise compliance, residual limb skin integrity, and gait parameters.

2. Case Presentation:

A 31-year-old male presented following a high-energy road traffic accident (RTA) in which his motorcycle collided with a four-wheeled vehicle. Initial radiographic evaluations revealed a Grade 3B open proximal tibia and fibula fracture accompanied by an ipsilateral distal femur fracture. Physical examination at the acute facility revealed absent distal arterial pulses (dorsalis pedis) and complete neurovascular compromise in the right lower extremity.

Due to the multi-center nature of the patient's acute care, management was performed across three distinct facilities:

1. **Local Primary Hospital:** Provided emergency stabilization, primary wound dressing, and splinting.

2. **Tertiary Center in Mumbai:** Due to severe vascular devastation and non-viable distal tissue, an emergency primary guillotine-type right transfemoral amputation was performed at the mid-thigh level.
3. **Definitive Tertiary Care Facility (Jalgaon):** The patient was transferred for definitive surgical and rehabilitative management. Here, a secondary stump revision was performed using a fish-mouth incision technique with elongated myocutaneous flaps for primary closure. No internal fixation hardware remained in the residual limb (RL) following the definitive stump closure.

On postoperative day 2 (POD 2) following stump revision, the patient was referred to the physiotherapy department for comprehensive postoperative management and prosthetic rehabilitation

3. Clinical Findings

General Examination: Written informed consent was obtained prior to assessment on POD 2. The patient was conscious, cooperative, and oriented. Vital signs were within normal limits.
Pain Evaluation: Baseline pain at the residual limb (RL) suture site was evaluated using the Visual Analogue Scale (VAS), scoring 6/10 during movement and 5/10 at rest. The patient reported phantom sensations described as a burning, persistent awareness of the missing distal limb.
Inspection and Palpation: The patient was evaluated in the supine position; the RL rested in mild abduction. The stump appeared moderately bulbous with active suture lines, clean dressings, and no signs of infection or purulent discharge. Grade 2 tenderness was present along the incision site. Sensation across the distal RL was altered (hyperesthesia), while proximal femoral arterial pulses remained intact.
Anthropometric Measurements:

- **True Stump Length:** 25 cm (Greater trochanter to distal bony end)
- **Total Soft Tissue Length:** 27 cm (Greater trochanter to distal soft tissue flap end)
- **Scar Length:** 11 cm

Range of Motion (ROM) & Manual Muscle Testing (MMT)

Joint / Movement	Active ROM (Degrees)	Passive ROM (Degrees)
Hip Flexion	Right 0-40, Left 0-120	Right 0-45, Left 0-125
Hip Extension	Right 0-10, Left 0-20	Right 0-10, Left 0-20
Hip Abduction	Right 0-25, Left 0-54	Right 0-30, Left 0-60
Knee Flexion/Extension	Right N/A, Left 0-135	Right N/A, Left 0-135
Ankle Dorsi/Plantarflexion	Right N/A, Left 0-40 / 0-67	Right N/A, Left 0-40 / 0-67

Table 1: Joint Range of Motion (Degrees)

Muscle Group	Right (RL)	Left
Hip Flexors	3-	3+
Hip Extensors	3-	3+
Hip Abductors	2-	3+
Hip Rotators (Int/Ext)	N/A	4
Knee Flexors/Extensors	N/A	5
Ankle Dorsi/Plantarflexors	N/A	2

Table 2: Manual Muscle Testing (MMT)

4. Rehabilitation Protocol:

Intervention Goal	Therapeutic Technique / Protocol	Dosage / Frequency
Patient Education & Support	Counseling on RL care, positioning, hygiene, and setting functional goals.	15 minutes daily before therapy sessions.
Pain & Edema Control	PEACE & LOVE Protocol (Protection, Elevation, Compression, Avoidance of anti-inflammatories, Education, Load, Optimism, Vascularization, Exercise).	Figure-of-eight compression applied continuously; re-wrapped 3–4 times daily.
Scar Mobility & Desensitization	Gentle massage, tapping, friction techniques, and varied texture exposure over the RL.	10–15 minutes, 2–3 times daily.
Contracture Prevention	Prone positioning to prevent hip flexion contracture; avoidance of prolonged sitting or pillow placement under RL.	Prone lying for at least 30 minutes, 3 times daily.
Cardiothoracic Care	Deep breathing exercises, segmental expansion, and huffing.	10 repetitions per set, 3 sets daily.
Restoring Mobility & ROM	Active-assisted and active ROM exercises for bilateral hips; Proprioceptive Neuromuscular Facilitation (PNF) hold-relax techniques.	10 repetitions, 5–10 second hold, 3 sets daily.
Muscle Strengthening	Progressive resistance exercises targeting hip abductors, extensors, and upper extremities utilizing the DeLorme principle (10-RM framework). RL pushing against bolsters.	3 sets of 10 repetitions, 4–5 days per week.
Mobility & Transfers	Bed mobility drills, sitting balance, lateral transfers, and sit-to-stand training.	20 minutes daily, progressing intensity as tolerated.
Balance & Coordination	Static and dynamic single-leg stance balance training, weight-shifting exercises.	20-minute sessions, 4–5 days per week.
Prosthetic Training	Stance balance with prosthesis, Center of Gravity (COG) shifts, stepping drills, parallel bar walking, progressing to walker ambulation.	20–30 minutes, 4–5 days per week.
Independence in ADLs	Dress/undress training, grooming, transfer training, and home environmental modification guidance.	Integrated into daily 30-minute OT/PT sessions.
Home Program	Continued RL bandaging, prone lying, hip strengthening, and gait practice post-discharge.	2 times daily (10 repetitions per exercise).

Table 3: Structured Rehabilitation Protocol and Intervention Dosage

5. Discussion:

This case illustrates the comprehensive physical therapy management of a 31-year-old male following a traumatic right transfemoral amputation. Traumatic high-energy collisions often cause severe bony and soft tissue disruption; in this patient, a distal femur fracture combined with a Grade 3B open proximal tibia and fibula fracture created severe neurovascular compromise. Following emergency guillotine amputation in Mumbai and secondary revision surgery in Jalgaon, early physical therapy

intervention was paramount to prevent contractures and prepare the residual limb (RL) for prosthetic fitting.

Rehabilitation was structured across pre-prosthetic and prosthetic training phases. In the early phase, management transitioned from traditional acute soft-tissue protocols to the updated PEACE and LOVE protocol, which emphasizes active recovery, optimal loading, and tissue repair. Desensitization techniques played a critical role in alleviating hyperesthesia and reducing phantom limb pain, allowing the patient to tolerate compression wrapping and socket fitment within 4 weeks.

Strengthening was systematically prescribed using the DeLorme principle, focusing heavily on the hip abductors, hip extensors, and core stabilizers to optimize pelvic alignment and minimize gait energy expenditure. Gait retraining deconstructed the gait cycle into component tasks—including weight transfer, Center of Gravity (COG) shifts, and single-leg balance drills.

Objective functional outcomes measured via the Amputee Mobility Predictor (AMP) demonstrated significant functional gains, elevating the patient to a K2 functional level (capable of low-level environmental barrier traversal). This success highlights the effectiveness of an early, multidisciplinary approach spanning surgical revision through structured physical therapy.

Patient Perspective

"The structured physiotherapy program gave me back my mobility and confidence. Learning how to manage my residual limb pain and walk with the prosthesis allowed me to regain my independence in daily activities.″

6. Declarations:

1. **Informed Consent:** Written informed consent was obtained from the patient for publication of this case report and all accompanying anonymized images.
2. **Ethical Approval:** The study protocol was formally reviewed and approved by the Institutional Ethics Committee of Dr. Ulhas Patil College of Physiotherapy, Jalgaon. Ethical oversight was maintained by this institution as all primary physical evaluations, definitive secondary surgical recovery, and long-term physical therapy interventions were conducted at its affiliated tertiary teaching hospital.
3. **Conflict of Interest:** The authors declare no competing interests.
4. **Data Availability:** Clinical data and evaluation records are available from the corresponding author upon reasonable request.

FIGURE 1: Initial radiographic view showing a distal femur fracture and a Grade 3B open proximal tibia and fibula fracture



FIGURE 2: Patient undergoing progressive prosthetic gait training using a walker under physical therapist supervision



7. References

1. Lange R, Ljøstad U. Benamputasjon og rehabilitering [Lower limb amputations and rehabilitation]. Tidsskr Nor Laegeforen. 2017;137(9):624-628.
2. Chouhan D, Phansopkar P, Chitale NV, et al. Physiotherapy rehabilitation in an above-knee amputee following compartment syndrome in post-tibial plateau fracture: a case report. Cureus. 2022;14(12):e32855.
3. Saini UC, Hooda A, Aggarwal S, et al. Patient profiles of below knee amputation following road traffic accidents – An observational study from a level 1 trauma centre in India. J Clin Orthop Trauma. 2021;12(1):83-87.

4. Clelland SJ, Chauhan P, Mandari FN. The epidemiology and management of tibia and fibula fractures at Kilimanjaro Christian Medical Centre (KCMC) in Northern Tanzania. Pan Afr Med J. 2016;25:51.
5. Mahulkar SS, Telang PA, Arora SP. Rehabilitation of a patient after a transtibial amputation: a case report. Cureus. 2022;14(10):e30122.
6. George J, Newman JM, Caravella GS, et al. Predicting functional outcomes after above knee amputation for infected total knee arthroplasty. J Arthroplasty. 2017;32(2):532-536.
7. Woodburn K, Lindsay B. Above knee amputation. In: Hallett JW, Mills JL, Earnshaw J, Reekers JA, Rooke T, editors. Comprehensive Vascular and Endovascular Surgery. 2nd ed. Philadelphia: Mosby Elsevier; 2009. p. 229-239.
8. Gholizadeh H, Osman NAA, Eshraghi A, et al. Transfemoral prosthesis suspension systems: a systematic review of the literature. Am J Phys Med Rehabil. 2014;93(9):809-823.
9. Zaheer A, Malik AN, Masood T, et al. Effects of phantom exercises on pain, mobility, and quality of life among lower limb amputees: a randomized controlled trial. BMC Neurol. 2021;21:1-8.
10. Dillingham TR, Pezzin LE, MacKenzie EJ, et al. Use and satisfaction with prosthetic devices among persons with trauma-related amputations: a long-term outcome study. Am J Phys Med Rehabil. 2001;80(8):563-567.
11. Raj GS. Physiotherapy in Neuro-conditions. New Delhi: Jaypee Brothers Medical Publishers; 2006.
12. DeLorme TL. Restoration of muscle power by heavy-resistance exercise. J Bone Joint Surg Am. 1945;27(4):645-667.
13. Yang L, Driver PS, Carson RJ, et al. Utilization of a lower extremity ambulatory feedback system to reduce gait asymmetry in transtibial amputation gait. Gait Posture. 2012;36(3):631-634.
14. Grevengoed K. Physical therapist management of an above knee amputee: a case report [dissertation]. Iowa City: University of Iowa; 2022.
15. Highsmith MJ, Andrews CR, Millman C, et al. Gait training interventions for lower extremity amputees: a systematic literature review. Technol Innov. 2016;18(2-3):99-111.
16. Maucort SJ. Physical therapy and above-knee amputation pre-prosthetic rehabilitation: a case report. Grand Forks: University of North Dakota; 2016.