Case Report | Journal of Orthopaedic Case Reports 2025 September:15(9):Page 305-311

Intertrochanteric Femur Fracture in a High-Above-Knee Amputee: Technical Tips for Intraoperative Planning and Implant Selection with Literature Review

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Learning Point of the Article:

Preserving stump length, avoiding prosthesis socket revision, and the chance of returning to the previous activity level should be achievable treatment goals while treating fractures in lower limb amputees. Load-sharing cephalomedullary nail fixation with full-length internal splinting and a minimally invasive surgical approach is preferred to reduce complications.

Abstract

Introduction: Intertrochanteric (IT) fractures are rarely reported in amputation stumps.

Case Report: This report presents the case of an elderly male with a right above-knee amputation who sustained an ipsilateral IT fracture. He had undergone amputation 3 years prior and was mobilizing independently with a prosthetic limb. The current injury occurred due to the rollover of a four-wheeler in which he was traveling. A proximally sized femoral nail was selected for fracture fixation, with the goal of internal splinting across the entire residual femoral length. Postoperatively, the patient resumed use of his previous prosthesis without difficulty.

Conclusion: Treatment goals in such cases should include preservation of stump length, avoidance of prosthesis socket revision, prevention of peri-implant fractures and implant failure, and the use of load-sharing implants in the lower extremity stump. In addition, enabling the patient to return to their prior level of activity should be a key therapeutic objective.

Keywords: Intertrochanteric femur fracture, lower limb amputees, surgical technique, intraoperative planning, implant selection

Introduction

In the geriatric population, intertrochanteric (IT) fractures are among the most common injuries and represent a significant cause of morbidity and mortality. However, they are rarely encountered in amputation stumps. The combination of advanced age and disuse atrophy of the stump's bone and musculature increases the risk of fracture, making even trivial trauma sufficient to cause a stump fracture.

The management of residual limb fractures presents unique challenges for surgeons. Altered hip biomechanics in amputees, atypical stump length, osteoporosis from disuse, associated geriatric comorbidities, and occasional phantom limb pain all complicate the clinical picture. Additional difficulties include diagnosis, immobilisation of the residual limb, intraoperative positioning, fracture reduction, choice of fixation method, and post-operative rehabilitation. Nevertheless, advances in lower limb prosthetics have enabled many amputees to remain functionally active. In the modern era, internal fixation is the mainstay of treatment for such fractures, regardless of patient age or activity level, to preserve quality of life.

Access this article online

Website: www.jocr.co.in

DOI: https://doi.org/10.13107/jocr.2025.v15.i09.6108

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Submitted: 25/06/2025; Review: 16/07/2025; Accepted: August 2025; Published: September 2025

DOI: https://doi.org/10.13107/jocr.2025.v15.i09.6108

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We present the case of a comminuted IT fracture extending into the subtrochanteric region in a high-transfemoral amputee with minimal stump length and associated abdominal and thoracic visceral injuries. After stabilization of the abdominothoracic trauma, the patient underwent closed reduction and internal fixation using a proximal femoral nail (PFN). This report outlines the pre-operative planning, intraoperative technique, and follow-up outcomes.

Case Report

A sexagenarian male with a right-sided above-knee amputation, performed 3 years earlier following a road traffic accident, had been mobilizing independently using an above-knee prosthesis. He sustained another road traffic injury due to the rollover of a four-wheeler vehicle, resulting in trauma to the torso and the amputation stump. He presented to the emergency department with chest and abdominal pain, along with an inability to move his residual right limb. Primary advanced trauma life support protocols were initiated, and the patient was hemodynamically stabilized. He had no known medical comorbidities. Clinical examination revealed swelling and bruising around the right hip and trunk, with no external open injury near the amputation stump. The hip injury was consistent with a dashboard-type mechanism. The amputation scar was well-healed by secondary intention.

Contrast-enhanced computed tomography of the abdomen and thorax revealed multiple right-sided rib fractures, a right-sided hemothorax, and a grade II liver injury. Radiographs of the pelvis and residual limb demonstrated an IT fracture extending into the subtrochanteric region (Arbeitsgemeinschaft fur Osteosynthesefragen – 31A3.3), with comminution and osteoporotic bone quality (Fig. 1).

Management

The hemothorax was managed by intercostal chest tube insertion, while the liver injury was treated conservatively under close observation. Due to the chest trauma, the patient was maintained on high-flow oxygen support during his hospital stay. After optimizing the thoracoabdominal condition, surgical fixation using an intramedullary implant was

Figure 2: Anteroposterior, lateral, and oblique views of the hip with amputation stump showing appropriate, stable and well-fixed fracture with proximal femoral nail-A (12 × 200 mm, 130°, Titanium, DePuy Synthes; Helical Blade-95 mm) supporting the entire length of the femur, reaching precisely up to the distal end of the residual femur.