

# Management of Comminuted Distal Femur Fracture with Fibular Strut Graft: A Case Report

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**Abstract:** *Comminuted distal femur fractures present a challenging scenario in orthopedic trauma management due to the complexity of fracture patterns and compromised bone stock. Various surgical techniques have been employed to achieve stable fixation and promote fracture healing. This case report presents the management of a comminuted distal femur fracture using a fibular strut graft as an adjunct to fixation. A 42-year-old male presented with a fracture of the distal femur following a motor vehicle accident. The surgical intervention involved open reduction and internal fixation (ORIF) using a locking compression plate (LCP) supplemented with a fibular strut graft harvested from the ipsilateral fibula. Radiographic and clinical assessments demonstrated successful fracture union and functional recovery at six-month follow-up. This case highlights the efficacy of fibular strut grafts in managing comminuted distal femur fractures, providing structural support, and promoting osseous healing.*

**Keywords:** Comminuted distal femur fracture, fibular strut graft, open reduction and internal fixation, orthopedic trauma, case report

## 1. Introduction

Comminuted distal femur fractures are complex injuries often resulting from high-energy trauma such as motor vehicle accidents or falls from height. The management of these fractures poses significant challenges to orthopedic surgeons due to the compromised bone stock and potential for instability. Open reduction and internal fixation (ORIF) using plates and screws have been the standard of care for many years. However, in cases of severe comminution or bone loss, additional measures may be required to achieve stable fixation and promote fracture healing<sup>(1, 2, 3, 4)</sup>.

Fibular strut grafts have emerged as a valuable adjunct in managing complex distal femur fractures. The fibula provides an autologous source of cortical bone with structural integrity, which can be fashioned into a strut graft to support the fracture site<sup>(3, 5)</sup>. This case report illustrates the successful use of a fibular strut graft in conjunction with ORIF for the management of a comminuted distal femur fracture.

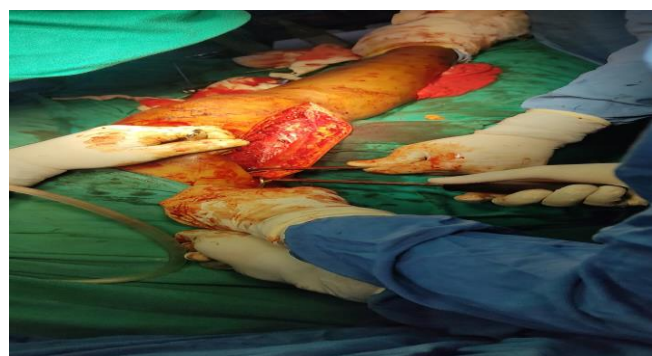
## 2. Case Report

A 42-year-old male presented to the emergency department following a motor vehicle accident. Initial evaluation revealed a comminuted fracture of the distal femur. After thorough assessment and stabilization, surgical intervention was planned<sup>(1, 2)</sup>.



**Image 1:** X-ray of Distal end of femur showing comminuted fracture

Under general anesthesia and with the patient in the supine position, a lateral approach to the distal femur was performed. Reduction of the fracture was achieved, and provisional fixation was obtained using Kirschner wires<sup>(1)</sup>.



**Image 2:** Intra-operative picture showing exposed fracture site

Next, a fibular strut graft was harvested from the ipsilateral fibula. Care was taken to obtain an adequate length of graft.

The fibular graft was shaped to match the contour of the distal femur and was secured in place using Kirschner wires (3, 5).



**Image 3:** Intra-Operative Picture of fibular graft harvest site

Following graft placement, a locking compression plate (LCP) was applied to the lateral aspect of the distal femur. The plate was contoured to achieve optimal fixation while avoiding interference with the fibular graft. Final fluoroscopic imaging confirmed satisfactory alignment and fixation of the fracture<sup>(1)</sup>.



**Image 4:** Intraoperative picture showing fracture fixation with LCP



**Image 5:** X-ray showing an immediate post-op picture with graft in place and graft harvest site

Postoperatively, the patient was managed with a structured rehabilitation protocol focusing on range of motion exercises and partial weight-bearing ambulation. Serial radiographs were obtained to monitor fracture healing and graft incorporation. At the one-year follow-up, the patient demonstrated radiographic evidence of fracture union and had returned to pre-injury functional status<sup>(2, 4)</sup>.







**Image:** Images showing 1-month and 6 month Post Op Xrays



**Image:** Post op clinical image showing healed surgical scar and complete flexion and extension of knee joint.

### 3. Discussion

Comminuted distal femur fractures present a therapeutic challenge due to the severity of the injury and potential for complications such as nonunion and malunion. The management approach must address both the fracture stability and the restoration of bone stock to facilitate healing. In cases where traditional fixation methods are insufficient, adjunctive techniques such as fibular strut grafting can provide additional support and promote biological healing (3, 5).

The use of fibular strut grafts offers several advantages in the management of distal femur fractures. Firstly, the autologous nature of the graft minimizes the risk of immunological reactions or disease transmission associated with allografts. Secondly, the cancellous bone provides an excellent scaffold for osteogenesis and promotes biological healing at the fracture site. Additionally, the structural integrity of the fibula allows for load-bearing support, enhancing fracture stability.

### 4. Conclusion

Managing comminuted distal femur fractures requires a multidisciplinary approach and consideration of various surgical techniques. In this case report, the utilization of a fibular strut graft in conjunction with ORIF proved to be an effective strategy for achieving stable fixation and promoting fracture healing. Further studies and long-term follow-up are warranted to validate the outcomes and durability of this approach in the management of complex distal femur fractures.

### References

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