

Management of Gunshot Injury to Radius with Fibular Strut Graft: A Case Report

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Abstract: *Gunshot injuries to the radius present unique challenges in orthopaedic management, often resulting in significant bone loss and instability. We present a case report of a patient who sustained a gunshot injury to the radius and underwent successful reconstruction using a fibular strut graft. An 18-year-old male presented with a comminuted fracture of the radius following a gunshot injury. The fracture was associated with severe comminution of fragments and instability. Surgical intervention was performed in two stages with initial wound debridement and external fixation and a definitive procedure by removal of avascular bone and utilizing a fibular strut graft harvested from the ipsilateral leg. The graft was fashioned to restore the bony architecture of the radius and provide stability. Postoperative recovery was uneventful, and the patient regained functional use of the affected limb. This case highlights the effectiveness of fibular strut grafts in the management of complex radial injuries, offering a viable solution for reconstruction and restoration of limb function.*

Keywords: gunshot injury, radius, fibular strut graft, reconstruction, orthopaedics, case report

1. Introduction

Gunshot injuries to the radius can lead to extensive bone loss, comminution, and instability, contamination with metallic fragments and gun powder residues and soft tissue injury posing significant challenges in management. Various treatment modalities have been described, including internal fixation, bone grafting, and external fixation. In cases of severe bone loss, reconstruction becomes essential to restore function and stability to the affected limb. Fibular strut grafts have emerged as a valuable option for reconstructive surgery due to their biomechanical properties and ability to restore bone length and alignment. Here, we present a case report

illustrating the successful management of a gunshot injury to the radius using a fibular strut graft.

2. Case Presentation

An 18-year-old male presented to our clinic with a gunshot injury to his left forearm. Examination revealed a comminuted fracture of the middle third of the radius with associated soft tissue damage and contamination. Radiographic evaluation confirmed the extent of the injury, demonstrating significant bone loss and instability and presence of metallic gun powder residues. After thorough discussion of treatment options, surgical intervention was planned.



Image 1: Clinical picture of the forearm when patient was brought into the ER



Image 2: X - ray of Forearm showing comminuted fracture of radius

Surgical Technique:

Surgery was done in two stages

Stage one:

Under Brachial block, the patient was placed in a supine position. A standard volar approach to the radius was utilized,

exposing the fracture site and surrounding soft tissues. Extensive debridement was performed to remove devitalized bone and debris. The fracture was stabilized with external fixator and wound was closed. The patient was monitored for infection and soft tissue healing.



Image 3: Intraoperative picture after stabilization of fracture with External Fixator

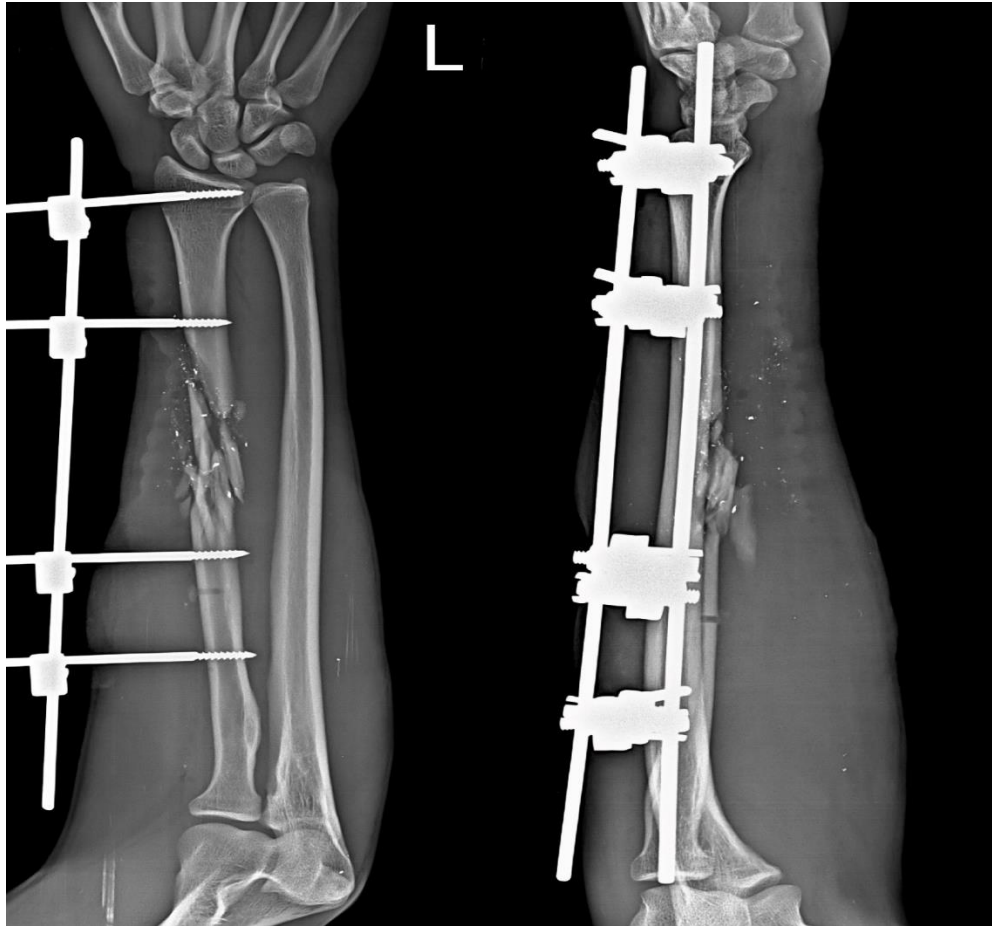


Image 4: X - ray showing fracture stabilized with External Fixator



Image 5: Clinical image of forearm showing External fixator insitu

Once soft tissue was healed the external fixator was removed and the limb was immobilized with an above elbow cast for two weeks for the pin tracks to heal.



Image 6: X - ray of forearm following External Fixator removal

Stage two:

Once the pin tracks healed the patient was taken into the operating room. Under general anaesthesia patient in supine position the radius was exposed with Henry's approach and the devitalized bone fragments were removed. The fracture ends were freshened and prepared for the bone graft. A fibular

strut graft of appropriate length and diameter was fashioned to fit the defect in the radius. Care was taken to ensure precise alignment and stability. The graft was secured using a combination of locking plates and screws, providing rigid fixation. Soft tissue coverage was achieved, and wound closure was performed in layers.

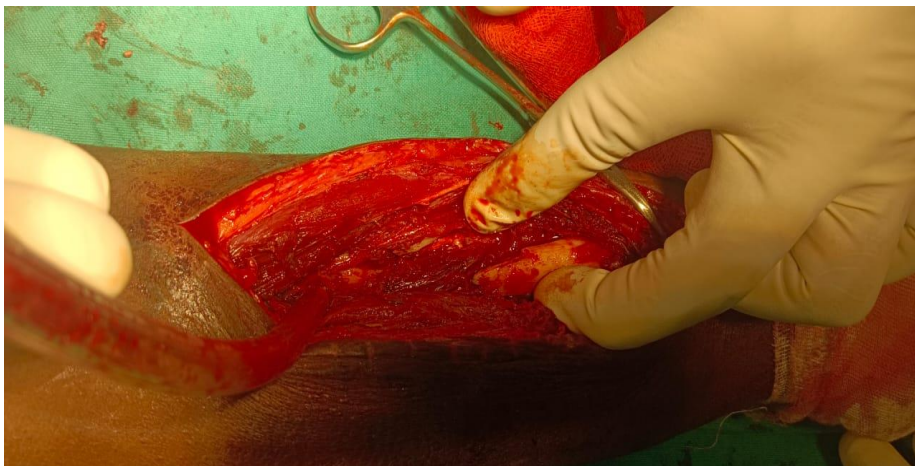


Image 7: Intraoperative image showing freshened fracture site after removal of devitalized bone



Image 8: Picture showing removed devitalized bone



Image 9: Image showing graft harvested from fibula



Image 10: Intraoperative picture showing graft placement in the fracture site

Postoperative Course:

The patient was placed in a well - padded splint to protect the limb postoperatively. Active and passive range of motion exercises were initiated early to prevent stiffness and promote healing. Serial radiographs were obtained to monitor graft integration and fracture healing.

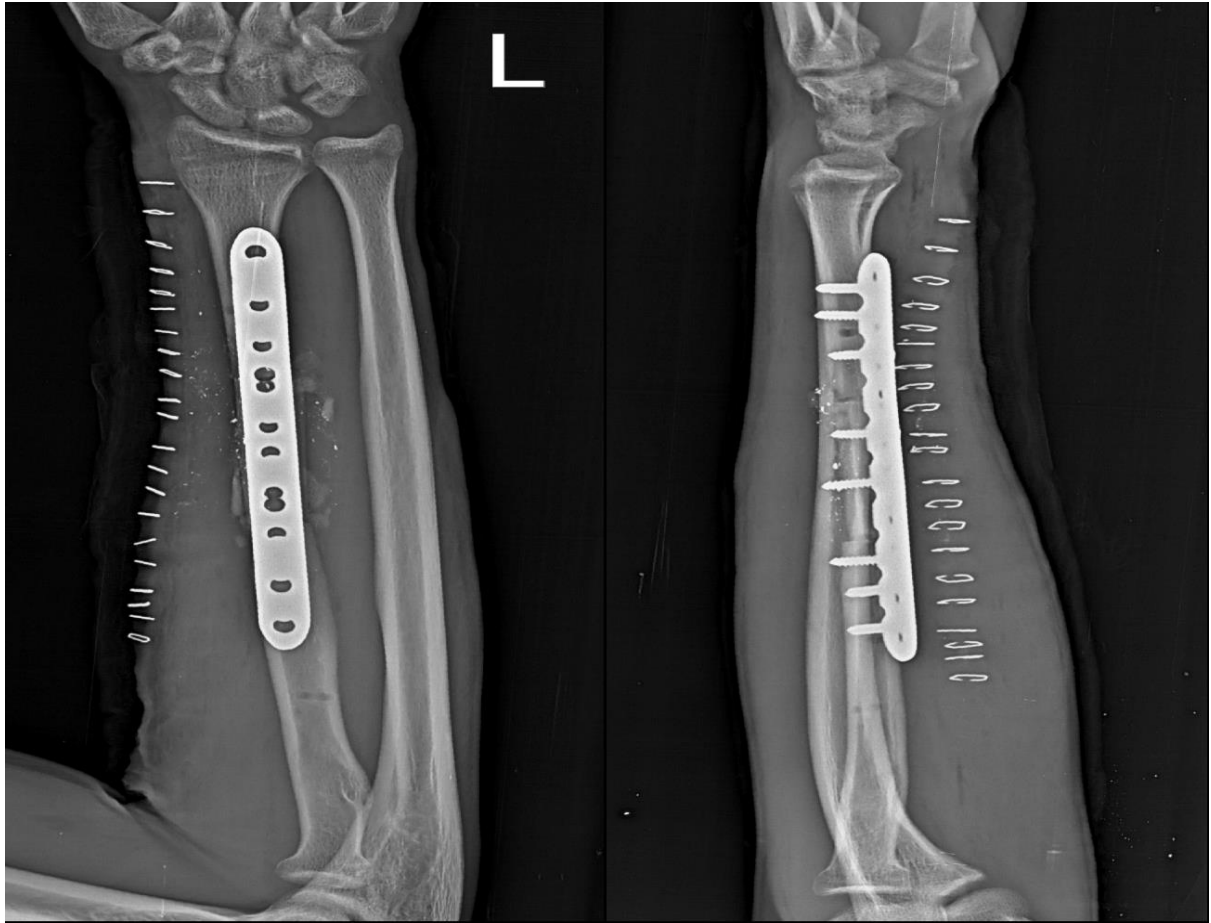


Image 11: Immediate Post OP X - ray



Image12: X - ray of graft site

Outcome:

At three months follow - up, the patient demonstrated excellent functional recovery, with restoration of wrist and forearm motion. Radiographs showed solid union of the fracture with incorporation of the fibular strut graft. The patient reported no pain or instability and was able to resume activities of daily living without limitation.

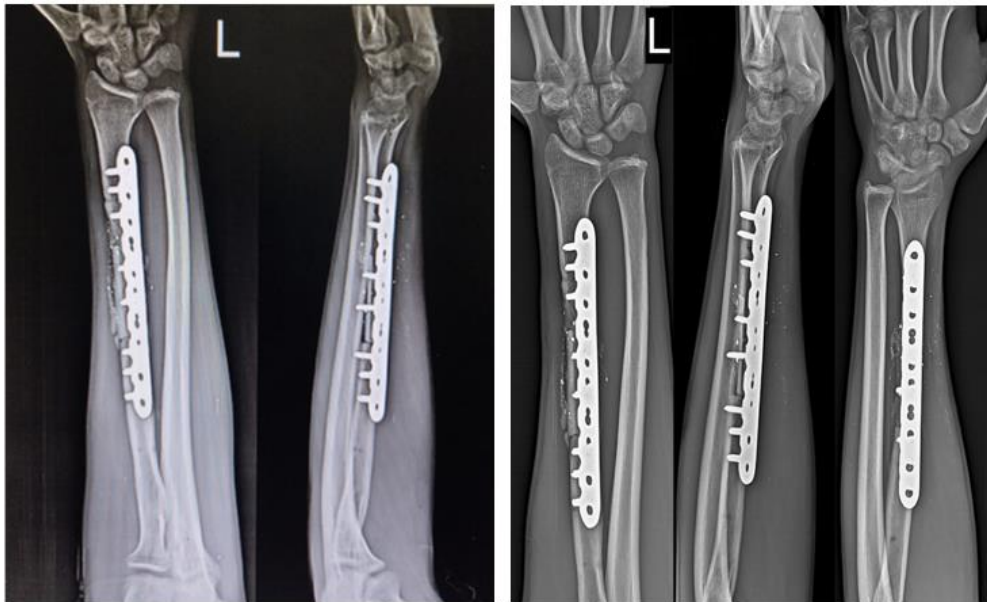


Image 13: X - ray of the forearm two months and three after surgery

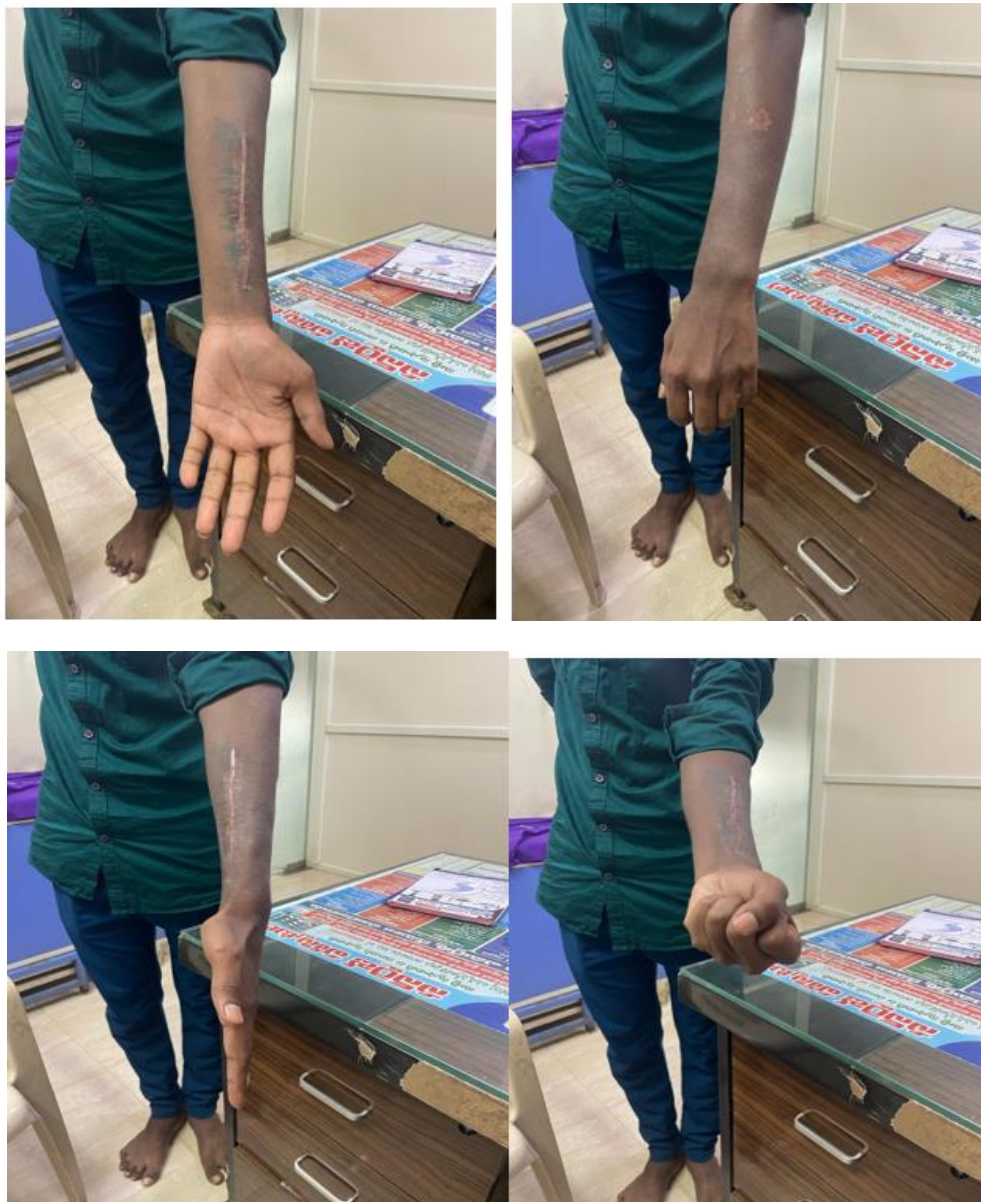


Image 14: Clinical image showing healed surgical scar, Pronation and supination of forearm and patient ability to make a tight fist three months after surgery

3. Discussion

Gunshot injuries to the radius present complex orthopaedic challenges, often requiring meticulous surgical planning and reconstruction. Fibular strut grafts offer a viable solution for cases involving significant bone loss, providing structural support and promoting healing. This case underscores the importance of a multidisciplinary approach in the management of complex orthopaedic trauma, with favourable outcomes achievable through meticulous surgical technique and postoperative rehabilitation.

4. Conclusion

The use of fibular strut grafts in the management of gunshot injuries to the radius can lead to successful outcomes, with restoration of limb function and stability. Early intervention, careful surgical planning, and comprehensive rehabilitation are crucial in achieving optimal results. Further studies are warranted to evaluate long - term outcomes and refine surgical techniques in this challenging patient population.

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