

"Finessing Fixation: Harnessing the Non-Vascularized Fibular Strut Graft for Proximal Humerus Stability"

¹Amiruddin, Amirul Shaiful; ²Hafiz D; ¹Che-Hamzah, Fahrudin

¹Orthopaedic, HPUPM, ²Orthopaedic, HKL, Malaysia

INTRODUCTION:

Effective management of bone defects is crucial in fracture care, with autologous bone grafts considered the optimal choice. Our center presents a case report on utilizing a non-vascularized fibula strut graft for addressing a comminuted proximal humerus fracture.

REPORT:

A 26-year-old man, previously healthy, experienced a motor vehicle accident resulting in a closed fracture of the proximal left humerus. CT scan revealed a comminuted fracture involving four parts of the proximal humerus, with loss of the medial calcar. Treatment involved Proximal Humerus Internal Locking System (PHILOS) plating with a non-vascularized fibular strut graft, performed 15 days post-trauma.

A deltopectoral approach exposed the comminuted fracture. A 5 cm non-vascularized fibular strut graft was harvested from the ipsilateral side, preserving 10 cm of the distal fibula to prevent ankle instability. A 3.5 proximal humerus locking plate with 5 holes was used after graft placement, along with biceps tenodesis. The surgical site was closed, and a shoulder immobilizer applied.

Postoperatively, the patient was allowed full weight bearing and could ambulate without assistance. Functional scoring of the lower limb was normal.

CONCLUSION

Proximal humerus fractures, accounting for 4-5% of all fractures, often require surgical intervention for displaced Neer 2-4 fractures, particularly in younger, active patients. Adequate bone stock is crucial for stable fixation, addressing bone loss and comminuted fractures. Non-vascularized fibular strut grafts, used with open reduction and internal fixation (ORIF), enhance construct stiffness and minimize movement at the interface.

Intraoperative reduction and stable fixation are essential, with restoring medial calcar continuity vital to prevent complications like varus collapse and avascular necrosis (up to 29% incidence). The fibular strut graft maintains fracture stability without affecting ankle stability. Vijay Shankar et al. reported complications like weakness of the extensor hallucis longus (EHL) and neuropraxia, with no graft site pain and ankle instability, supporting the procedure's viability.

In conclusion, fibular strut grafting is valuable in managing bone loss in proximal humerus fractures, enhancing stiffness, reducing screw penetration risk, and improving clinical outcomes while ensuring donor site safety and maintaining lower limb function.



Figure 1: Postoperative images



Figure 2: Postoperative patient was able to ambulate without aid

REFERENCES:

1. Saltzman BM, et al. Fibular Strut Graft Augmentation for Open Reduction and Internal Fixation of Proximal Humerus Fractures, 2016;4(7)
2. Dr. Vijay S S, et al Comparison of non-vascularized fibular graft as an intramedullary strut v/s conventional bone grafting for management of nonunion of long bones.