

CASE REPORT: TREATMENT OF A COMMINUTED SUPRACONDYLAR FEMUR FRACTURE USING A FEMORAL STRUT ALLOGRAFT AND DEMINERALIZED BONE MATRIX

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Patient Presentation:

A sixty-two year old female presented to the emergency department with a closed Grade C3 supracondylar femoral fracture and a closed distal radius fracture following a fall (Figure 1). These fractures were likely associated with underlying osteoporosis as subsequently confirmed by an endocrine evaluation that included bone densitometry. The patient consumed clinically significant quantities of caffeine (i.e., 4-6 cups coffee per day) and cigarettes (i.e., 45 packs per year). Pharmacologic treatment at the time of injury consisted of conjugated estrogen/progestin therapy. This intervention was subsequently supplemented with calcium and etidronate disodium.



Figure 1: Preoperative x-ray

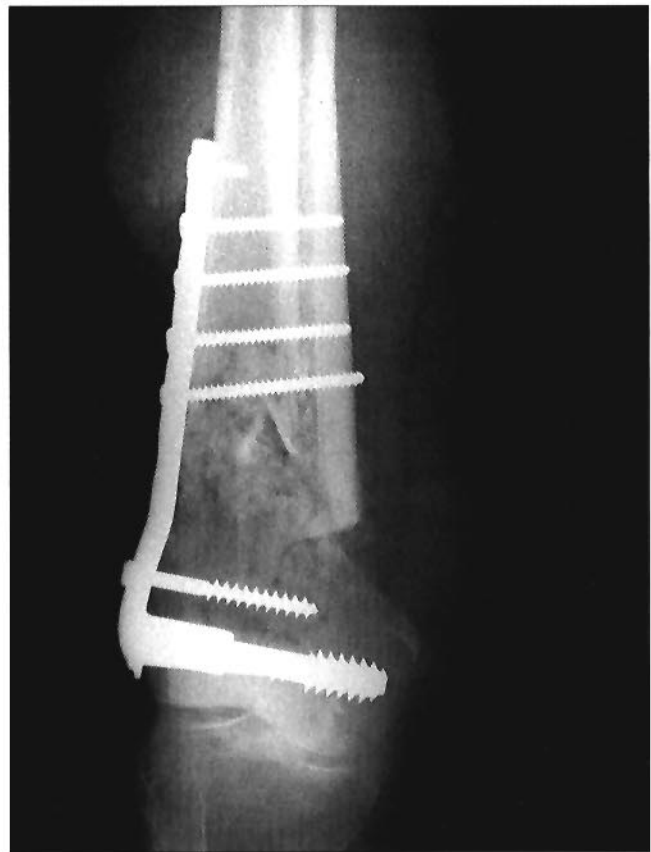


Figure 2: Immediate post operative x-ray

Surgical Management:

Treatment of the distal radius fracture consisted of closed reduction and casting. The femoral fracture was managed operatively with an intracondylar compression screw and supracondylar compression plate and screw. Internal fixation was augmented with bone grafting to facilitate bony union. First, a femoral cortical strut graft was implanted to buttress a medial cortical defect; the strut graft was affixed to the plate directly by taping 4.5 mm cortical lag screws into the cortex of the graft (Figure 2). This allowed the strut graft to be compressed against areas of intact proximal and distal medial femoral cortices. Additionally, a combination graft consisting of approximately 60 cc frozen iliac crest allograft and 20 cc demineralized bone matrix (Grafton® Demineralized Bone Matrix [DBM] Gel) was used liberally to fill residual bony

defects and areas of marked comminution. Postoperatively, the patient was restricted from weight-bearing for about two months; aggressive range of motion therapy was initiated as tolerated.



Figure 3: Follow-up x-rays at 12 months showing satisfactory incorporation

Results:

Radiographic evaluation showed callous formation as early as six weeks postoperatively. By nine months, the medial defect had evidence of healing with extensive new bone formation and cortical bridging around the strut graft. At one year, the graft showed satisfactory incorporation into adjacent host bone with normal bone remodeling (Figures 3 & 4).

Clinically, the patient initiated physical therapy at approximately one month after surgery and continued for two months. Flexion increased from 95° at six weeks to 130° at two months. Assisted ambulation (i.e., single crutch) commenced at three months and proceeded to full unassisted weight bearing by four months, postoperatively. Full range of motion (i.e., 135° flexion) was maintained at the one year follow up with minimal pain.



Figure 4: Follow-up x-rays at 12 months showing satisfactory incorporation

Conclusion:

Augmentation of internal fixation of a supracondylar femoral fracture with a cortical strut graft and a combination graft that included demineralized bone matrix (Grafton® DBM Gel) provided satisfactory radiographic and clinical outcome in a patient with confirmed osteoporosis and a marked medial defect. Early callous formation, cortical bridging and graft incorporation coupled with the ability to regain unassisted ambulation at an early postoperative time interval warrants the usage of this surgical approach for similar skeletal injuries.