acumed®

Hand Fracture System

Curved Medial/Lateral Plate

Open Reduction & Internal Fixation of the Proximal Phalanx

Case Study

Mark J. Richard, MD

A 62-year-old man sustained a proximal phalanx fracture in Iraq. After initial external fixation, he was treated with open reduction and internal fixation using a Curved Medial/Lateral Plate from the Acumed Hand Fracture System.

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We are dedicated to developing products, service methods, and approaches that improve patient care.

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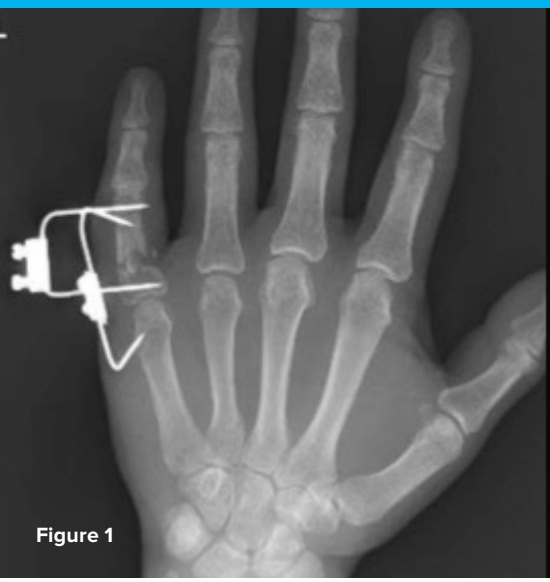
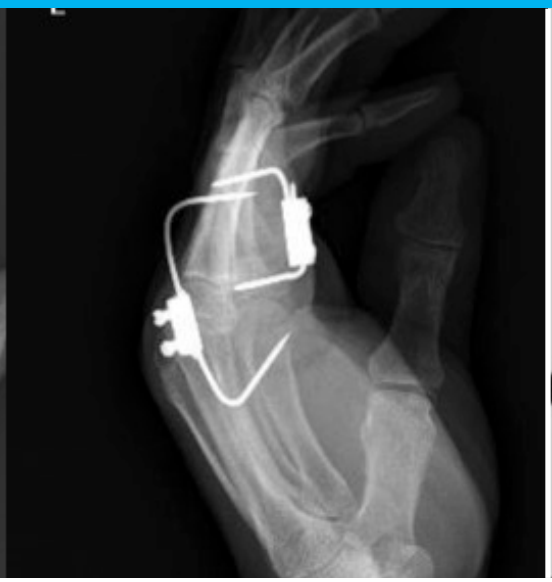


Figure 1



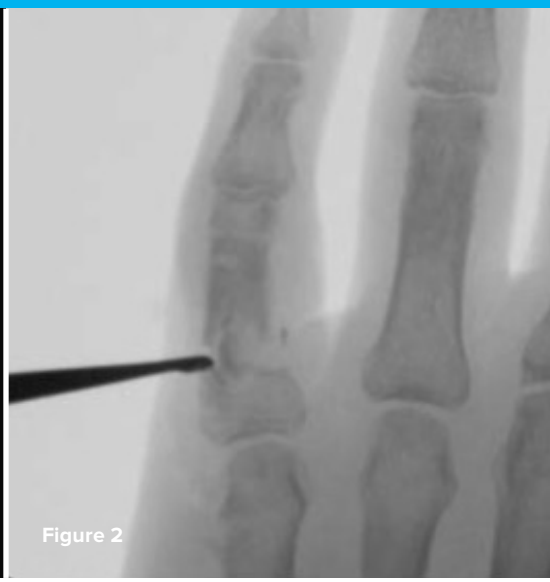


Figure 2

Open Reduction & Internal Fixation of the Proximal Phalanx

Patient History

A 62-year-old, right-hand dominant male sustained a proximal phalanx fracture in Iraq that was treated with application of an external fixator. The patient was instructed to follow up in 6 weeks when he was back in the United States for removal. He presented to the clinic 6 weeks after application of the external fixator for evaluation and management. Radiographs at that time demonstrated a comminuted, extra-articular fracture of the base of the small finger proximal phalanx (Figure 1). There was no radiographic evidence of healing. Pin sites were clean and dry and there was no evidence of infection. PIP flexion was limited to a very short arc of motion secondary to the external fixator tethering the extensor mechanism.

Treatment

The patient was taken to the operating room for removal of the external fixator and open reduction and internal fixation of the proximal phalanx fracture. The patient was also asked to consent to an autogenous bone grafting from the ipsilateral distal radius due to the absence of radiographic healing since the time of the index procedure.

The patient was placed supine on the operating table with a hand table attachment. The external fixator was easily removed prior to draping the surgical site. The left upper extremity was prepped and draped in the usual sterile fashion. The surgical incision was then made over the ulnar aspect of the proximal phalanx in the mid-axial line.

Sharp dissection was carried down to the bone and the ulnar lateral band was excised. The extensor tendon was bluntly elevated off of the phalanx and was noted to be adherent to the early callus formation. There was some early bony callus present on the ulnar side of the fracture but fibrous tissue was present at the entire mid- and radial aspects of the fracture site (Figure 2). This was sharply removed and the fracture ends were debrided back to bleeding bone. Based upon these findings, cancellous autograft bone was harvested from the distal radius. An incision was made just ulnar and proximal to Lister's tubercle (Figure 3). The dorsal aspect of the distal radius was exposed. The Acumed 7 mm Bone Graft Harvester was used and an appropriate amount of bone graft was collected for the surgical site.

Attention was then turned back to the proximal phalanx. A Curved Medial/Lateral Plate from the Acumed Hand Fracture System was selected and was provisionally aligned to the ulnar aspect of the proximal phalanx (Figure 4). Using fluoroscopic guidance, the appropriate length of the plate required for fixation was determined and the plate was cut to size using the plate cutter (Figure 5). The plate was then secured to the ulnar aspect of the proximal phalanx by placing two Acumed Hexalobe MultiScrews into the base of the phalanx and a MultiScrew distally into the diaphysis. Fluoroscopy was used again to confirm position of the plate and alignment of the fracture. The previously harvested bone graft was then used to fill the defect and the remaining MultiScrews were placed (Figure 6). The incisions were closed with interrupted nylon sutures and the patient was placed into an ulnar gutter splint in the intrinsic plus position.

Postoperative Care

With the rigid fixation obtained in the operating room, the patient was seen in clinic on post-op day 6 for fabrication of a removable orthosis and initiation of range of motion exercises. A hand-based orthosis was made with the MCP joint in 70 degrees of flexion and a dorsal hood extending over the PIP and DIP joints. The volar aspect of the splint ended just distal to the MCP joint such that PIP blocking exercises could be initiated. Velcro straps attached to the dorsal hood allowed the patient to maintain his IP joints in full extension at rest.

The patient worked on progressive range of motion and edema control. Serial clinical examination and radiographs documented progressive functional improvement and fracture union (Figure 7). By 12 weeks postoperatively, the patient demonstrated range of motion at the MCP joint from 0-90 degrees, PIP joint from 20–100 degrees, and DIP joint from 0–60 degrees.

Discussion

Extra-articular proximal phalanx fractures are common injuries. Fracture patterns with comminution as seen here benefit from open reduction and internal fixation. In this setting, the surgeon has the option of placing the plate dorsal or lateral. Potential benefits of lateral plate placement include minimizing the plate's contact with the extensor tendon. This minimal contact helps decrease the likelihood of tendon adhesions. Furthermore, the lateral plate allows for the surgery to be performed through a mid-axial incision. Mid-axial incisions are isometric with finger motion and therefore have minimal tension on the wound, assisting with post-operative range of motion. The Curved Medial/Lateral Plate allows for anatomic reduction of the fracture. Equally as important, this plate allows the surgeon to utilize appropriate soft-tissue handling techniques to facilitate rehabilitation.

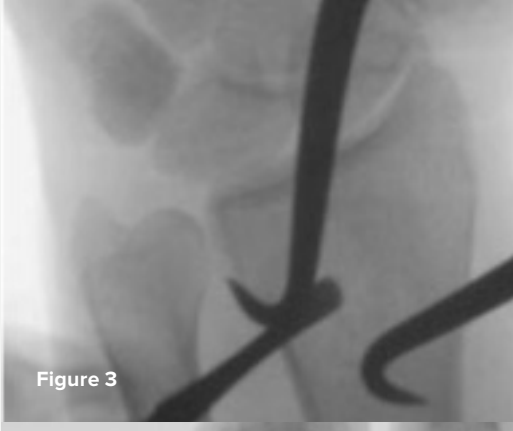
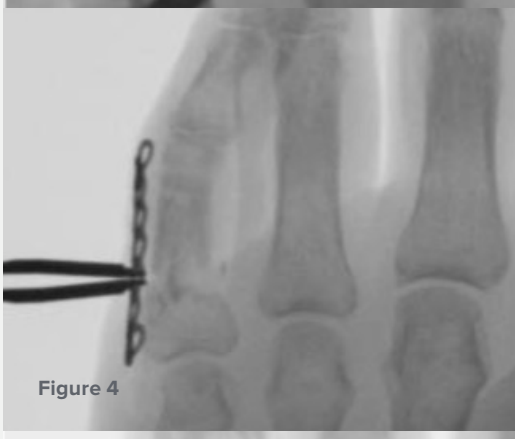


Figure 3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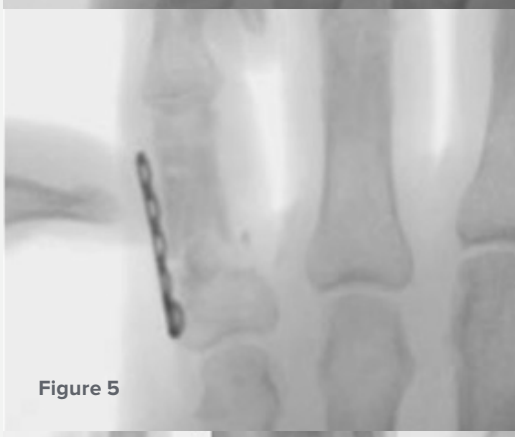
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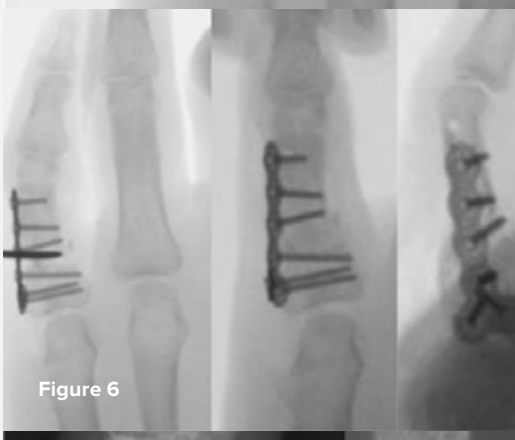
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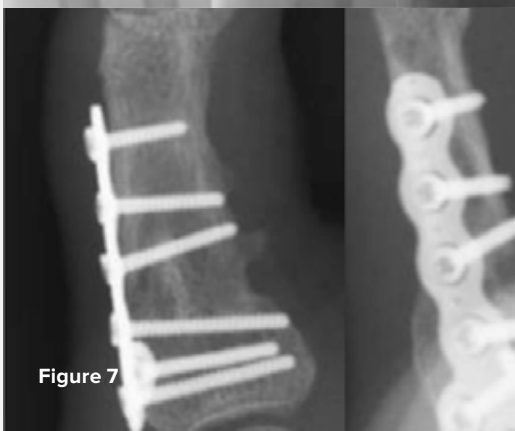
Figure 7

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