

Case Study

Use of the Acumed® Hand Fracture System and Acu-Loc® 2 Wrist Plating System to Treat a Multifragmented Compression Fracture of the Distal Radius



Randy Bindra, MD, FRACS

Gold Coast, Queensland, Australia

Professor Bindra is an orthopaedic surgeon specializing in surgery of the hand, wrist, and peripheral nerve. He has received international training including a Hand Fellowship at the Pulvertaft Hand Center in Derby, England, and at Washington University in St. Louis, Missouri, in the United States. Over the past three decades, he has practiced as a hand surgeon specialist in the UK and the USA, and is currently working in Gold Coast, Queensland, Australia where he is also a professor at the Griffith University School of Medicine and Dentistry.

Professor Bindra has authored over 100 publications and book chapters, and has received numerous awards for teaching students and surgeons. He is recognized internationally as an expert in management of complex hand and wrist trauma.

Case Presentation

The patient was a 58-year-old male truck driver who fell five feet (1.5 m) from his truck while attempting to disembark, landing with his full body weight onto his outstretched left hand. The patient sustained multifragmented metaphysis fractures of the distal radius and ulna. CT scans with 3D reconstruction showed extensive comminution of the volar and dorsal cortex of the distal radius metaphysis with central depression. Open reduction internal fixation (ORIF) was recommended and performed within three days post-injury.

Preoperative Plan

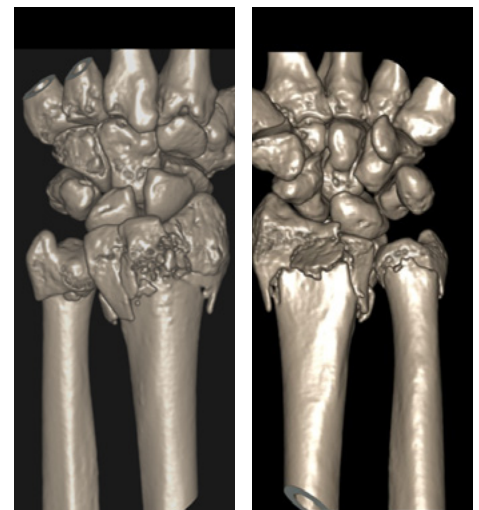
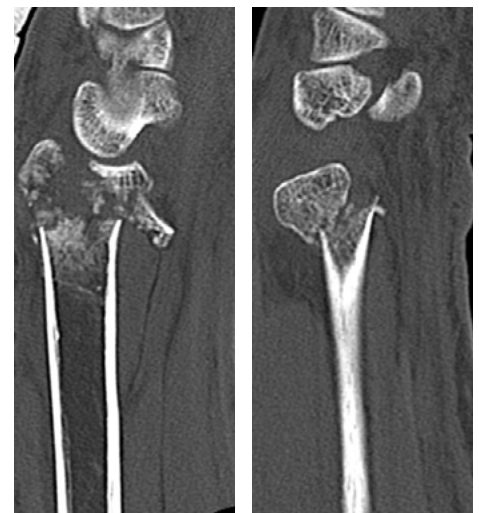
The primary goals of the surgical procedure were to restore radial height and inclination, rebuild the distal radius articular surface, and reestablish distal radioulnar congruity by reduction of both the critical corner and the ulna neck fracture. After close evaluation of both CT and 3D modeling images, Dr. Bindra chose a comprehensive approach using multiple fracture systems within the Acumed portfolio including a Volar Distal Radius (VDR) plate, a Frag-Loc® two-part compression screw, and a Volar Distal Ulna (VDU) plate from the Acu-Loc 2 Wrist Plating System, as well as a Straight Plate from the Hand Fracture System (HFS).

Operative Findings and Approach

Dr. Bindra used a modified Henry approach through the floor of the flexor carpi radialis (FCR) tendon. The volar metaphysis was exposed, and attempts were made to obtain provisional reduction prior to plate application. Due to extensive comminution, the intermediate column could not be adequately supported with a K-wire and needed to be buttressed for preliminary fixation. Dr. Bindra chose to use a 1.3 mm Straight Plate, cut it down to a six-hole configuration, and bent the plate so that it contoured along the distal articular rim. The plate was positioned along the interosseous edge of the distal radius and fixated to the radial metaphysis with a 2.3 mm hexalobe multiscrew. He used the SaveLoc® sleeve from the HFS to apply compression to the 2.3 mm hexalobe multiscrew, utilizing it as a locking screw as he tightened and molded the plate to contour along the volar metaphysis and ulnar corner. After confirming the plate position under fluoroscopy, Dr. Bindra added two additional hexalobe multiscrews to the metaphysis to secure the plate. Additional screws were not placed distally near the articular surface due to comminution and the plate being utilized as a buttress.

The Acu-Loc 2 VDR silver plate was next placed alongside the HFS Straight Plate using the radiographic markers in the targeting guide under fluoroscopy. This assisted Dr. Bindra to target two screws into the center of the radial styloid. After plate fixation to the shaft through the positioning hole, the fracture was reduced to the plate by traction, and distal locking screws were inserted. The dorsal ulnar corner of the distal radius remained displaced on fluoroscopy. To stabilize the dorsal comminuted articular surface, Dr Bindra replaced the ulnar-most screw of the VDR plate from the distal row with a Frag-Loc screw, and confirmed stability of the distal radius by passive range of motion (ROM) under fluoroscopy.

Preoperative



Postoperative



Attention was then turned to the distal ulna fracture. Dr. Bindra chose to use the Acu-Loc 2 VDU plate. A subcutaneous ulnar incision was made over the distal ulna, and the volar surface of the bone was exposed. Care was taken to avoid the dorsal sensory branch of the ulnar nerve. The plate was adjusted until it adequately supported the ulnar head and then secured. Forearm rotation was performed to ensure the plate was not impinging with the radius. Four locking cortical screws were placed into the distal ulna unicortically and two locking screws were placed in the shaft. Incisions were approximated with absorbable subcuticular sutures after hemostasis. The surgery went as preoperatively planned and took a total of 2.5 hours.

Follow-up

Postoperatively, the patient was placed in a thermoplastic splint for a total of six weeks. The patient was instructed to remove the splint six times a day for ROM exercises starting two weeks post-ORIF. Radiographic evaluation postoperatively showed normal radial height and angulation, along with satisfactory radiocarpal articular congruity. The patient was able to resume light activities after two weeks and normal activities by six weeks. At the three-month follow-up, despite the complexity of the initial injury, the patient recovered full mobility of the wrist and forearm, except for 30° loss of palmar flexion.

Discussion

For this patient, Dr. Bindra chose to address the severe multifragmentary fractures of the distal radius and ulna with a comprehensive approach. He decided to use the HFS Straight Plate because its low-profile design permitted him to contour the plate for buttressing the ulnar corner. The specialized SaveLoc® sleeve covered the threads on the screw head allowing compression of the plate to the bone during insertion of a locking screw. The precontoured Acu-Loc 2 VDR and VDU plates helped support volar fragments and came with fixed-angle cortical screws placed subchondrally to optimize rafting of the articular surface. The Frag-Loc® compression screw stabilized the dorsal comminuted articular surface while minimizing extensor tendon irritation or stiffness. Ultimately, the combined use of two fixation systems along with the principles of both fragment-specific and volar plating provided Dr. Bindra multiple options to address this complex fracture pattern.



HNW70-61-A

Effective: 2024/06

© 2024 Acumed® LLC

www.acumed.net

Acumed USA Campus
5885 NE Cornelius Pass Road
Hillsboro, OR 97124
+1.888.627.9957

OsteoMed USA Campus
3885 Arapaho Road
Addison, TX 75001
+1.800.456.7779

Acumed Iberica Campus
C. Proción, 1
Edificio Oficor
28023 Madrid, Spain
+34.913.51.63.57

These materials contain information about products that may or may not be available in any particular country or may be available under different trademarks in different countries. The products may be approved or cleared by governmental regulatory organizations for sale or use with different indications or restrictions in different countries. Products may not be approved for use in all countries. Nothing contained on these materials should be construed as a promotion or solicitation for any product or for the use of any product in a particular way which is not authorized under the laws and regulations of the country where the reader is located. Specific questions physicians may have about the availability and use of the products described on these materials should be directed to their particular authorized Acumed distributor. Specific questions patients may have about the use of the products described in these materials or the appropriateness for their own conditions should be directed to their own physician.

Acumed®, Acu-Loc® 2, Frag-Loc® and SaveLoc® are registered trademarks of Acumed LLC.