Case Study

Intra-articular Distal Radius Malunion with Nerve Dysfunction: Fixation with Narrow Wrist Spanning Plate

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Dr. William Pientka II received his medical degree from the University of Texas Health Science Center at San Antonio and is fellowship trained in Hand & Microvascular Surgery from the University of Texas Southwestern Medical Center in Dallas, TX. He is Chief of Hand Surgery at the JPS Health Network and is an Assistant Professor of Orthopaedics at the TCU Burnett School of Medicine and the University of North Texas HSC. Dr. Pientka is a published leading expert in Kienbock's Disease and hand/wrist trauma reconstruction.

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Case Presentation

A 34-year-old right-handed male presented to the clinic four months after sustaining an intra-articular distal radius fracture in a firework blast-type injury. He reported pain, stiffness, and decreased sensation in the median nerve distribution, consistent with carpal tunnel syndrome. The injury significantly limited his ability to perform daily activities. Radiographs revealed a displaced intra-articular distal radius malunion. Dr. Pientka discussed both surgical and non-surgical treatment options. Given the notable articular disruption the patient elected to proceed with a distal radius osteotomy.

Pre-op Plan

Preoperative treatment options included open-reduction internal fixation using either fragment-specific fixation, a dorsal distal radius plate, or a wrist spanning plate with supplementary K-wire fixation. Additionally, a carpal tunnel release was planned to alleviate the persistent median nerve sensory deficits.

Given the significant articular displacement, Dr. Pientka anticipated the presence of a bone void following the osteotomy and restoration of the articular surface. Therefore, Montage® bone void filler was made available intraoperatively. The Acumed Narrow Wrist Spanning Plate was selected to provide fixation and stabilization for the complex intra-articular pathology. Its narrow design facilitates both plate placement and removal, while ensuring stable fixation of the wrist. The primary treatment goal was to achieve stable fixation for solid bony union and, ultimately, improve the patient's functional recovery.

Operative Findings and Approach

A mini-open carpal tunnel release was performed due to clinical findings consistent with carpal tunnel syndrome. The transverse carpal ligament was fully released, with no evidence of overt nerve injury.

A dorsal approach to the distal radius followed. The extensor pollicis longus tendon was transposed radially to Lister's tubercle. The posterior interosseous nerve was identified and a neurectomy performed. The wrist capsulotomy revealed a small partial scapholunate ligament laceration, though ligament continuity was intact. After confirming no diastasis and good scapholunate linkage through the range of motion, a 3-0 PDS suture was used for repair.

Attention then shifted to the intra-articular distal radius malunion. Under direct and fluoroscopic guidance, an intra-articular osteotomy was performed. The scaphoid facet and radial styloid were realigned and secured with two 0.063 K-wires. A bone void under the subchondral bone was filled with 2 cc of Montage bone void filler. The dorsal cortical fragment was reduced and stabilized with an additional K-wire.

Given the fragment size post-osteotomy, definitive fixation was achieved using an Acumed Narrow Wrist Spanning Plate and cobalt chrome screws. Distal fixation to the third metacarpal was accomplished using a combination of locking and nonlocking screws.

Preoperative

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Postoperative

Operative Findings and Approach [continued]

The wrist was positioned neutrally, and the plate was clamped to the radius shaft prior to proximal screw insertion and fixation. Fluoroscopy confirmed alignment, as well as proximal and distal fixation.

Final imaging demonstrated good fracture reduction, proper plate placement, and appropriate implant lengths. The distal radioulnar joint (DRUJ) was stable upon stress testing. Pins were trimmed, bent, and secured with pin balls. The patient's arm was placed in a short arm splint. Total case duration: 2.5 hours.

Follow-up

The patient retained the K-wires for six weeks before they were removed in the office. He remained in a short arm cast for six weeks postoperatively and was then transitioned to a removable wrist brace.

Twelve weeks after the index surgery, the wrist spanning plate was surgically removed without incident. A gentle manipulation of the wrist was performed at the time of the removal. The patient was subsequently referred to hand therapy to enhance functional recovery.

Four weeks following removal of the wrist spanning plate, the patient reported no pain, full passive digital motion, and 50 degrees of active flexion and extension. The median nerve sensation was fully restored.

Discussion

Dr. Pientka has been highly satisfied with the Acumed Narrow Wrist Spanning Plate, which he now considers his first choice for treating complex distal radius injuries. The plate's narrow design significantly enhances the ease of both insertion and removal, while the use of cobalt chrome screws improves handling and reduces the risk of implant-related complications.

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