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## Ulnar angular deformity leading to distal radioulnar joint instability: a case report

Dear Sir,

An active 55-year-old lady presented to an orthopaedic hand clinic for persistent left wrist pain. Her wrist pain began 2 years earlier following a motor-vehicle collision in which her left hand was caught 'between the airbag and steering wheel'. Her history included mild rheumatoid arthritis, fibromyalgia, and bilateral 'elbow fractures' when she was 20 years old treated in a cast. Following unsuccessful nonoperative management, an orthopaedic hand surgeon performed a wrist arthroscopy, TFCC debridement, and synovectomy; 7 months later she underwent a matched distal ulnar resection with interposition arthroplasty followed by a posterior interosseous neurotomy 8 months later for persistent symptoms.

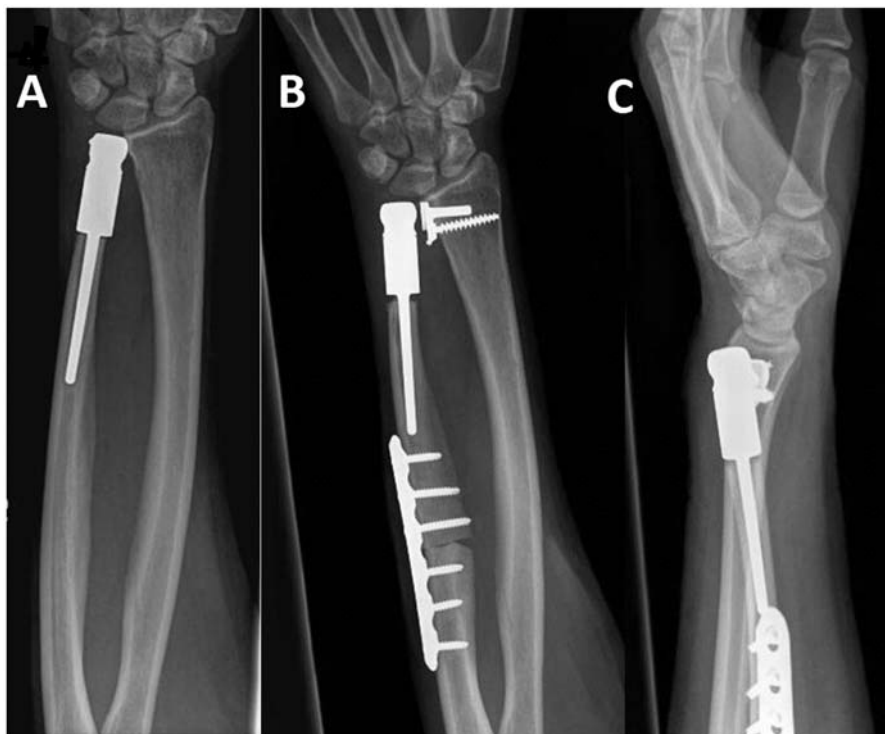
She then presented to our clinic with 9/10 aching pain over the ulnar aspect of her wrist, difficulty lifting 1-2 pound objects, and popping on forearm rotation. She was tender over the distal ulna, had crepitus on movement and had slightly decreased left wrist flexion. Radiographs demonstrated a matched ulnar resection. She was provided with an Orthoplast custom splint and given a steroid injection in the area of the matched resection with little relief. She then had a distal ulnar head replacement using a uHead endoprosthesis (Small Bone Innovations, New York, USA) with care taken to stabilize the ulnar subsheath and the remaining triangular fibrocartilage complex. Eight weeks later she complained of clunking with rotation and had dorsal subluxation of the distal ulna on pronation. She was placed in a supination splint, but continued to have dorsal subluxation on pronation.

At 14 weeks after the operation, dorsal sigmoid notch insufficiency leading to painful instability was diagnosed. A sigmoid notch arthroplasty was performed by another orthopaedic surgeon but 1 week later radiographs showed dorsal dislocation of the ulna. Open surgery revealed the ulnar head had button-holed through the dorsal capsule; a reduction and capsulorrhaphy were performed with the

forearm then splinted in supination. At her first post-operative visit, radiographs demonstrated a palmar ulnar head dislocation. We then recognized an apex ulnar angulation in the mid ulnar shaft, best seen on forearm radiographs (Figure 1A), and speculated that the bow contributed to her instability. The patient had an ulnar straightening osteotomy and open reduction of the DRUJ with reconstruction of the DRUJ capsule using allograft fascia lata (Figure 1B,C). Seventeen months after the osteotomy her DRUJ remained stable and pain free. She complained of slight scar sensitivity and rated her wrist pain as 0/10. Her flexion/extension was 80°/90°, radioulnar deviation was 5°/40°, and she had full forearm rotation.

There is little literature on how bony deformities influence DRUJ instability, and the common deformity is sigmoid notch deficiency or malalignment of a distal radius fracture (Trousdale and Linscheid, 1995). In our case, we did not initially recognize instability as a problem since we attributed the patient's symptoms to an unsuccessful matched distal ulnar head resection; however, symptoms persisted after the ulnar head replacement. We believe the patient did not have dorsal sigmoid notch insufficiency until after the ulnar head implant because the sigmoid notch did not appear to be insufficient when the prosthesis was placed. Bony abnormality, including that of the ulnar and radial shafts, can be an overlooked component of DRUJ biomechanics. In our case, an apex ulnar bow accounted for the patient's clinical findings. In the neutral position, the DRUJ remained reduced. However, as the radius rotated around the ulnar head into pronation, it displaced palmarwards with the ulnar head lying dorsal relative to the radius. Similarly, because the ulna does not move during forearm rotation, as the forearm supinated the radius moved dorsal to the ulna, and the ulnar head lay palmar to the radius.

Painful distal radioulnar joint (DRUJ) arthrosis can result from trauma, instability, inflammatory or degenerative arthritis. Stabilizers of the DRUJ are intrinsic or extrinsic (Kleinman, 2007), and of the intrinsic ones, the TFCC is responsible for 80% of DRUJ stability (Stuart et al., 2000). Prior case reports



**Figure 1.** Forearm views demonstrate the ulnar apex bow, best seen in the AP view (A). Immediate postoperative films in the AP (B) and lateral (C) orientations after a straightening osteotomy of the ulnar shaft.

have noted the importance of bony anatomy as an extrinsic stabilizer, specifically sigmoid notch deficiency (Stuart et al., 2000; Thomas et al., 2006), yet normal bony anatomy is sometimes underappreciated as an important mechanical stabilizer of the DRUJ. A thorough history with suspicion for abnormal bony anatomy combined with forearm radiographic views may have led to an earlier diagnosis in our patient.

#### Conflict of interests

None declared.

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