

# Arthroscopic Management of Ulnocarpal Impaction Syndrome and Ulnar Styloid Impaction Syndrome



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## KEYWORDS

• Ulnar impaction • Wrist arthroscopy • Ulnar styloid • Management

## KEY POINTS

- Ulnocarpal impaction syndrome consists of the triad of a triangular fibrocartilage complex (TFCC) tear, a lunotriquetral ligament tear, and an ulnar positive variance. There is often chondromalacia of the proximal ulnar aspect of the lunate and chondromalacia of the ulnar head.
- Wrist arthroscopy and an ulnar shortening procedure is indicated in the patient with a neutral to positive ulnar variance and persistent ulnar-sided wrist pain despite conservative treatment, aiming to unload the ulnocarpal joint.
- Ulnar styloid impaction syndrome is characterized by the impaction of the triquetrum against the ulnar styloid, causing chondromalacia, synovitis, and ulnar-sided wrist pain. In the presence of a long styloid, an excision of the ulnar styloid suffices. When it is the result of a combination of factors, surgical treatment varies and a simple excision of the ulnar styloid is no longer the only procedure necessary.
- Symptomatic nonunions of the ulnar styloid are uncommon and may occur in isolation or be associated with a TFCC tear. If the deep foveal ligaments are intact, a simple excision will suffice. If there is distal radioulnar joint instability or a TFCC tear, an arthroscopic or open TFCC repair may be necessary.

## ULNOCARPAL IMPACTION SYNDROME

### *Relevant Anatomy and Biomechanics*

Ulnar impaction can produce ulnar-sided wrist pain and can be related to ulnocarpal impaction (UCI) due to an ulnar positive variance (**Fig. 1**). Palmer and colleagues<sup>1</sup> demonstrated that there was an inverse relationship between the thickness of the triangular fibrocartilage and the ulnar variance. The more positive the ulnar variance, the thinner the triangular fibrocartilage. Hara and colleagues<sup>2</sup> found that the force-transmission ratio was 50%

through the scaphoid fossa, 35% through the lunate fossa, and 15% through the triangular fibrocartilage in the neutral position. Werner and colleagues<sup>3</sup> demonstrated that lengthening the ulna by 2.5 mm increased the force borne by the ulna from 18.4% to 41.9% of the total axial load. Shortening of the ulna by 2.5 mm decreased the axial load borne by the ulna to 4.3%. Removal of the articular disc portion of the triangular fibrocartilage complex (TFCC) decreased the load on the intact ulna from 18.4% to 6.2%. The peak pressure at the ulnolunate articulation increased from

The author has no conflicts or disclosures.

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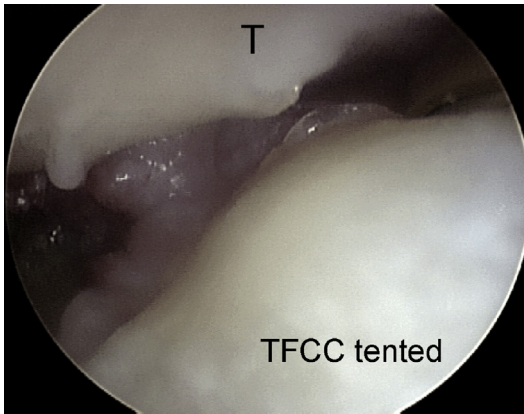
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Hand Clin 33 (2017) 639–650

<http://dx.doi.org/10.1016/j.hcl.2017.07.002>

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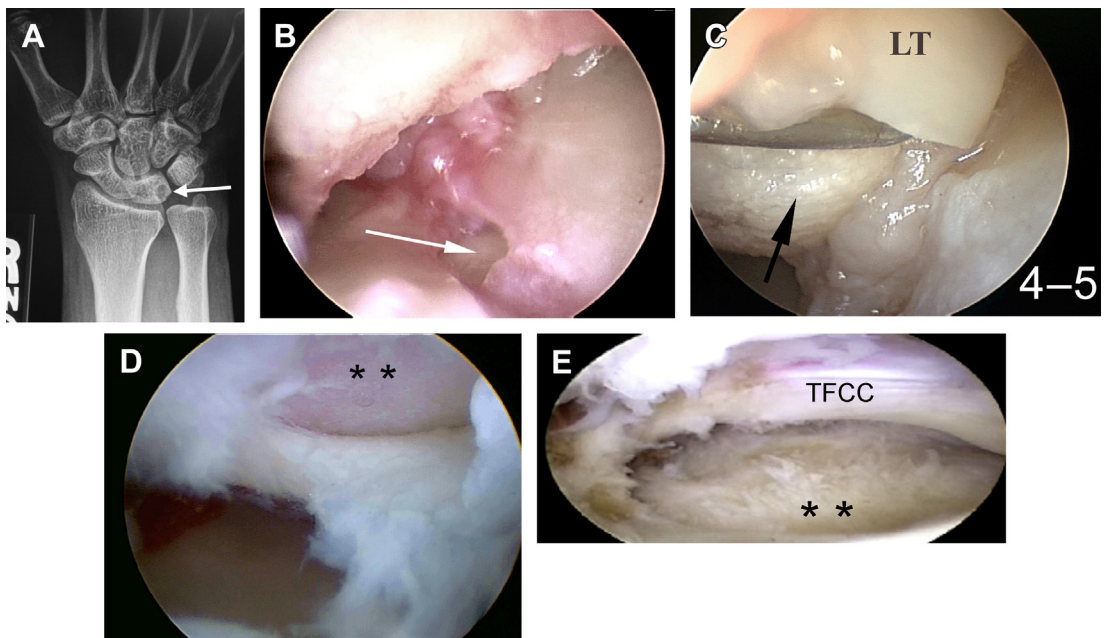


**Fig. 1.** Arthroscopic view of tenting up of the triangular fibrocartilage complex (TFCC) in a patient with an ulnar positive variance. T, triquetrum. (© 2017 David J. Slutsky)

1.4 N/mm<sup>2</sup> for the unaltered wrist to 3.3 N/mm<sup>2</sup> when the ulna was lengthened by 2.5 mm.

Degenerative central tears of the articular disk occur more frequently with advancing age. In a cadaver study of 180 wrist joints, Mikic<sup>4</sup> noted an incidence of 53% in those older than age 60 years compared with 7% in the third decade. Clinical experience has shown, however, that not all of these tears are symptomatic. Most symptomatic

degenerative tears of the TFCC are related to chronic overloading of the ulnocarpal joint. Primary ulnar impaction is related to an increased ulnar variance. Viegas and Ballantyne<sup>5</sup> dissected 100 cadaver wrists and found a 73% incidence of TFCC tears in specimens with an ulnar positive variance versus 17% when there was a negative ulnar variance. Acquired ulna positive deformities can occur with distal radius fractures that heal with radial shortening, distal radial growth arrest, and Essex-Lopresti and Galeazzi fractures. This can also occur following a radial head excision; with congenital causes of ulnar positive variance, such as Madelung deformity or a premature closure of the distal radius growth plate; and following a wrist fusion. Ulnar impaction may also be dynamic and even occur in patients with an ulna neutral or negative variance during power grip in the pronated position.<sup>6</sup> This is because of the approximate 1.95 cm of radial shortening that occurs as the radius rotates across the ulna during pronation, which leads to a dynamic impingement.<sup>7</sup> UCI syndrome consists of the triad of a TFCC tear, a lunotriquetral (LT) ligament tear, and an ulnar positive variance. There is often chondromalacia of the proximal ulnar aspect of the lunate, a so-called kissing lesion, and there may be chondromalacia of the ulnar head (Fig. 2).



**Fig. 2.** UCI. (A) AP view demonstrating a bone cyst (arrow) along the proximal medial aspect of the lunate. (B) View from the 4 to 5 portal of a central TFCC tear with exposure of the ulnar head (arrow). (C) Elevator is placed underneath a LT ligament tear. Note the fibrillated cartilage on the proximal lunate (arrow). (D) View from the 4 to 5 portal of an area of exposed subchondral bone (asterisks) with a full-thickness cartilage tear along the proximal aspect of the lunate. (E) Debrided TFCC tear exposing an area of chondromalacia (asterisks) on the ulnar head. (© 2017 David J. Slutsky)

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