Arthroscopic Treatment of Ulnar Impaction Syndrome

Kyle D. Bickel, MD

Ulnar impaction syndrome occurs in the setting of a central traumatic or degenerative defect in the triangular fibrocartilage complex in patients with ulnar positive variance. Chondral and subchondral edema, mechanical impingement of the articular disc, and chondromalacia of the distal ulna, proximal lunate, and proximal triquetrum produce symptoms with activity that do not improve with rest. Decreasing ulnocarpal load-sharing across the wrist with recession of the distal ulna is necessary to relieve symptoms in the majority of patients. Arthroscopic treatment with triangular fibrocartilage complex debridement and arthroscopic ulnar wafer resection is an effective treatment for ulnar impaction syndrome. It affords a single-stage, minimally invasive approach, with similar efficacy and fewer complications than open wafer resection or ulnar shortening osteotomy. *(J Hand Surg 2008;33A:1420–1423. Copyright © 2008 Published by Elsevier Inc. on behalf of the ASSH.)*

Key words Ulnar impaction, TFCC, arthroscopic wafer.

ULNAR IMPACTION SYNDROME, also known as ulnar abutment syndrome or ulnocarpal abutment syndrome, is characterized by painful compression between the distal osteochondral surface of the ulna and the proximal lunate and triquetrum.[1–4] A majority of patients with ulnar impaction syndrome have ulnar positive variance. This can be static, seen on neutral-rotation posteroanterior (PA) radiographs of the wrist, or dynamic, created by pronation of the forearm and/or forceful gripping.[5] Both degenerative (Palmer 2C, 2D, and 2E classifications) and traumatic (Palmer 1A classification) lesions of the triangular fibrocartilage complex (TFCC) are typically seen with ulnar impaction syndrome. In patients with ulnar impaction symptoms who are ulnar positive, decreasing load-sharing through the ulnar carpus by ulnar recession is necessary to relieve symptoms.[4] Combined arthroscopic debridement of TFCC tears and arthroscopic ulnar wafer resection allows for single-stage treatment of ulnar impaction syndrome with a similar degree of successful pain relief and fewer complications than ulnar shortening osteotomy with or without TFCC debridement.[2,5,6]

From the Division of Plastic Surgery, UCSF School of Medicine, The Hand Center of San Francisco, San Francisco, CA.

Received for publication July 14, 2008; accepted July 22, 2008.

No benefits in any form have been received or will be received related directly or indirectly to the subject of this article.

Corresponding author: Kyle D. Bickel, MD, The Hand Center of San Francisco, 1700 California St., Suite 450, San Francisco, CA 94109; e-mail: kbickel@sfhand.com.

0363-5023/08/33A08-0028$34.00/0
doi:10.1016/j.jhsa.2008.07.014

INDICATIONS AND CONTRAINDICATIONS

Patients with ulnar-sided wrist pain with activities, static or dynamic ulnar positive variance, and Palmer 1A, 2C, 2D, or 2E TFCC lesions who do not respond to conservative treatment are candidates for arthroscopic ulnar wafer resection. An appropriate period (6–12 weeks) of rest and immobilization of the wrist should be provided before considering arthroscopic treatment. Patients should be assessed with clinical examination, confirming tenderness to palpation in the ulnocarpal space dorsally or in the ulnocarpal fovea. A positive ulnar impaction test producing pain with the wrist passively and forcefully brought into full ulnar deviation is frequently seen on examination. Neutral-rotation PA, clenched-fist PA, and fully pronated PA radiographs of the wrist should confirm ulnar positive variance and will often reveal subchondral lucency in the proximal ulnar border of the lunate and the proximal triquetrum (Fig. 1). Wrist arthrography, magnetic resonance imaging, and magnetic resonance arthrography are routinely used in diagnosing ulnar impaction syndrome and should confirm a signal change, edema, or a communicating defect in the central avascular zone of the TFCC. Magnetic resonance imaging often reveals considerable signal change in the proximal lunate and distal ulna, confirming ulnar impaction (Fig. 2).

Other causes of ulnar-sided wrist pain should be

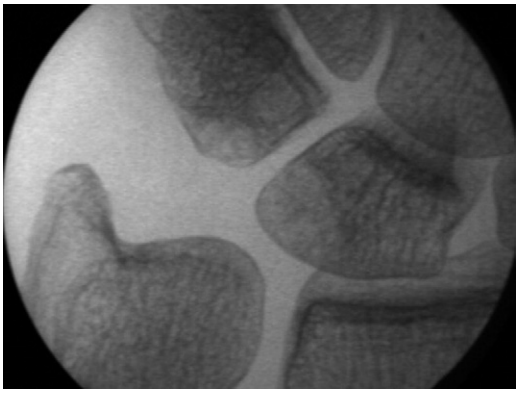

FIGURE 1: Posteroanterior radiograph of the wrist with subchondral lucency in the proximal ulnar corner of the lunate and the proximal corner of the triquetrum due to ulnar positive variance and ulnar impaction.

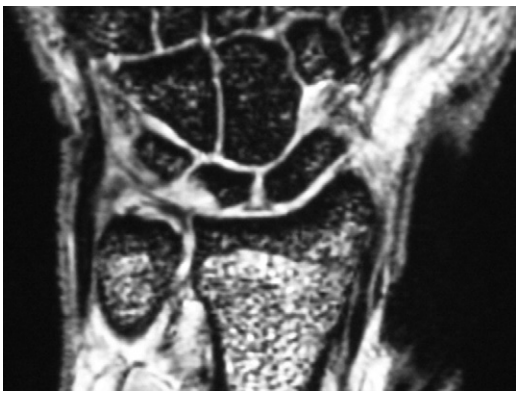

FIGURE 2: Magnetic resonance image with findings of disruption of the TFCC and subchondral edema in the proximal ulnar border of the lunate in ulnar impaction syndrome.

excluded. These include distal radioulnar joint arthritis or instability, pisotriquetral arthritis, and carpal ligament tears and instability. Lunotriquetral ligament tears associated with central TFCC defects and ulnar positive variance are still candidates for arthroscopic ulnar wafer resection. Peripheral tears of the TFCC outside the central articular disk are not appropriate for arthroscopic ulnar resection. Many of these lesions are reparable, and open wafer resection or ulnar shortening osteotomy may be included in the repair if ulnar positive variance is also present. Patients with severe ulnar positive variance of >5 mm caused by distal radius malunion are not candidates for arthroscopic ulnar resection and are better treated with radial osteotomy and bone grafting or ulnar shortening osteotomy.

SURGICAL ANATOMY

The TFCC consists of 2 limbs arising from the ulnar border of the radius and attaching to the ulnar styloid, as well as a central articular disk.[7] A deep limb inserts at the fovea at the base of the styloid. A superficial limb inserts on the styloid itself. The central disk is an avascular fibrocartilaginous zone responsible for force transfer between the ulnar carpus and the distal ulnar head. Central defects of the articular disk of the TFCC expose the cartilaginous cap of the ulnar head to the proximal cartilaginous surfaces of the lunate and triquetrum (Fig. 3). This exposure is accentuated in ulnar positive patients, resulting in cartilaginous impaction, subchondral edema, and erosions of the cartilaginous surfaces, producing painful ulnar impaction.

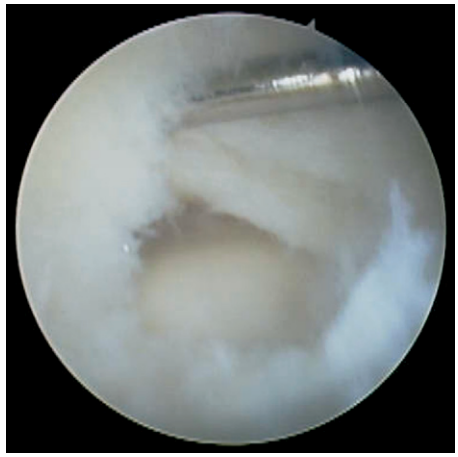

FIGURE 3: Arthroscopic view of a large, central Palmer 2D lesion exposing the ulnar head through the defect in the articular disk.

SURGICAL TECHNIQUE

Under general anesthesia or an upper extremity anesthetic block and upper arm tourniquet exsanguination, the wrist is distracted with 10 to 15 pounds (20 kg to 35 kg) of distal traction via finger traps applied to the index and long fingers with the upper arm secured to a padded arm board. The standard 3-4, 4-5, and 6U arthroscopy portals are used for the procedure (Figs. 4, 5). The radiocarpal and ulnocarpal joints are distended with sterile saline inflow via gravity through a catheter in the 6U portal. A 2.4 mm arthroscope is inserted into the 3-4 portal for visualization, with outflow through the arthroscopic sleeve. A small-joint mechanical shaver is introduced through the 4-5 portal after the TFCC defect is confirmed. Scar tissue and border flaps are debrided from the central TFCC tear, as well as any irregularities in the lunotriquetral ligament if it is found to be torn. Following thorough debridement, the prominent ulnar head is visible through the defect in the central disk (Fig. 3). The shaver is replaced with a small-joint motorized burr, and the articular cartilage and 2–4 mm of