# Arthroscopic Management of Perilunate Injuries

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**KEYWORDS**

• Perilunate dislocation • Scaphoid fracture • Minimally invasive surgery • Wrist arthroscopy

**KEY POINTS**

- Perilunate injuries are rare but devastating injuries, often the result of high-energy trauma.
- The key to successful treatment of perilunate injuries is to achieve early anatomic reduction and maintain the carpal alignment.
- Arthroscopic management may encourage healing with less stiffness and is a favorable alternative in the treatment of perilunate injuries.

Perilunate injuries are severe wrist injuries, often the result of high-energy trauma. The pathway of injury may be strictly perilunar in so-called pure ligamentous perilunate dislocations (PLDs) through the lesser arc, or the injury may cause perilunate fracture dislocations (PLFDs) through the greater arc, which is commonly through the scaphoid (trans-scaphoid PLFDs).[1–3]

It is essential to identify these injuries acutely, because neglected injuries or late treatment usually leads to poor outcomes. The key to successful treatment of perilunate injuries is to achieve early anatomic reduction and maintain normal carpal alignment. Closed reduction and cast treatment have been shown to have unacceptable outcomes.[4] Surgical treatment with open reduction of the carpal bones, repair or reconstruction of the ligaments, and internal fixation of the fractures has been generally accepted for PLDs-PLFDs.[3–12] Open surgery, however, involves dissection of the important capsuloligamentous structures of the wrist, which may lead to capsular scarring and joint stiffness. Open dissection could jeopardize the tenuous blood supply to scaphoid and the torn ligaments.

Recently, arthroscopic-assisted minimally invasive management of PLDs-PLFDs has been suggested by several investigators.[3,4,13–19] Combined with fluoroscopy, wrist arthroscopy allows anatomic reduction and precise percutaneous internal fixation of the carpal bones with minimal tissue dissection. This technique may encourage healing with less stiffness, and recent series have shown encouraging outcomes.[17–19] The purpose of this study is to review the technique and outcome of arthroscopic reduction and percutaneous fixation of a series of patients with acute PLD-PFLDs.[17]

## PATIENTS

Of 40 consecutive patients with acute dorsal PLDs-PLFDs who were treated with arthroscopic-assisted

Disclosure Statement: The authors have nothing to disclose.
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Hand Clin 33 (2017) 709–715
http://dx.doi.org/10.1016/j.hcl.2017.06.002

reduction and percutaneous fixation between 2012 and 2015, 31 patients have been followed-up for at least 1 year; 26 had trans-scaphoid dorsal PLFDs, and 5 had dorsal PLDs. The mean follow-up was 14.8 months (range 12–32 months). The mean age at the time of injury was 29 years (range 17–55 years). Dominant wrists were injured in 11 patients. The average time from injury to surgery was 8 days (range 2–20 days).

## SURGICAL TECHNIQUE

### *Reduction of the Capitolunate Dislocation*

Closed reduction of the dislocations of capitolunate joint had been attempted for all patients at the time of initial presentation. More than half (17 of 31) of the dislocations were reduced. For the remaining 14 dislocations, close reduction was tried again in the operation room under brachial plexus block before arthroscopy was performed; 8 dislocations were reduced under anesthesia but still failed in 6. Arthroscopic-assisted reduction of the capitolunate joint was then conducted when traction was applied by the arthroscopic traction tower. The 3-4 portal was used for initial inspection. Failure of close reduction was due to the volarly tilted lunate (along with proximal scaphoid fragment in trans-scaphoid PLFDs), which got stuck by the capitate or interposed torn palmar capsular ligaments. With finger-trap traction, a Freer elevator or a shoulder arthroscopic probe was used to reduce the dislocation arthroscopically by a shoehorn maneuver (Fig. 1). The authors found the 4-5 portal was convenient to apply this maneuver because the instrument was directly facing the subluxated lunate. All the 6 dislocations were arthroscopically reduced successfully by this technique.

### *Reduction and Fixation for Perilunate Dislocations*

The 3-4 and 4-5 portals were used to examine and débride the radiocarpal joint. The initial view was usually obscured by the traumatic synovitis and capsuloligamentous edema. The authors used wet arthroscopy for articular distension, which facilitated synovectomy and débridement of intra-articular hematoma, torn ligament flaps, and bony or chondral debris and helped to establish a visual and working field. Fluid insufflation compressed the capillaries within the joint and synovitis and helped control the bleeding. Triangular fibrocartilage complex (TFCC) and volar intercarpal ligaments were examined by direct inspection and manual testing with an arthroscopic probe.

The midcarpal joint was examined through radial and ulnar midcarpal portals. Scapholunate (SL) and lunotriquetral (LT) ligaments were assessed with a probe. Any soft tissue or bony fragments interposed between SL and LT interval were débrided or removed to facilitate the reduction of the intercarpal joint.

Two Kirschner (K)-wires were placed toward lunate from scaphoid and triquetrum, respectively, under the guidance of fluoroscopy, without crossing the intercarpal interval (Fig. 2A–D). If the lunate was not in neutral position (ie, in volar or dorsal tilting), passively extended or flexed the wrist to restore the normal radiolunate angle and transfixed the radiolunate joint temporarily with a percutaneous K-wire inserted from dorsal distal radius (see Fig. 2E). Under direct visualization through midcarpal portal, reduction of the SL and LT intervals was conducted by manipulating the K-wires of the scaphoid and the triquetrum,

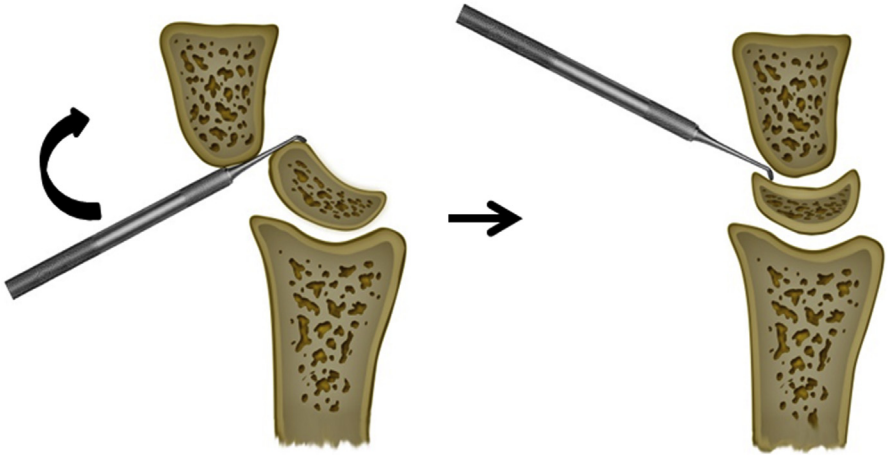

**Fig. 1.** Arthroscopic reduction of the capitolunate joint by a shoehorn maneuver.