Carpal dislocations and fracture dislocations are common wrist injuries. Perilunate injuries, as described by Mayfield,1 are most common and perhaps best understood. Disruption of the carpal ligaments or fractures of the carpal bones can occur in almost any combination. The injury occurs as a result of extreme hyperextension, ulnar deviation, and internal carpal supination. As the deforming force increases, the ligaments and bones are disrupted in a stereotyped sequence proceeding circumferentially around the lunate in a radial-to-ulnar direction.

Most authors recommend open ligament repair for acute carpal dislocations to prevent late carpal collapse and joint degeneration.2-7 This article presents the first reported case of a scaphoid and lunate palmer dislocation treated by closed reduction and percutaneous pinning with 3-year follow-up.

Case Report
A 33-year-old right-handed man presented to the emergency room with left wrist pain and swelling after an assault. He sustained a blow to the dorsum of the left wrist and then fell to the ground onto his left side. He was unable to recall any more specific details; hence, the exact mechanism of injury is unknown. He reported no numbness, tingling, or loss of sensation in the left hand.

On examination, the lunate and scaphoid could be palpated on the palmer surface of the wrist. Sensory and motor function remained intact except for a slight loss of two-point discrimination in the median nerve distribution. Radiographs of the wrist revealed a volar dislocation of the scaphoid-lunate unit (Figure 1). The wrist was reduced easily under intravenous sedation. The reduction involved traction with slight flexion and ulnar deviation completed by upward pressure over the scaphoid-lunate complex, which completed the reduction. A sugar tong splint was applied. Reduction radiographs showed anatomic alignment of the radiolunatocapitate and scapholunate axes.

Radiographs at 5 days post-injury verified maintenance of reduction. The PA radiograph

Figure 1: PA (A) and lateral (B) radiographs of the left wrist at the time of injury.

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however, suggested slight ulnar translocation of the carpus (Figure 2). Percutaneous pinning was performed 12 days post-injury to maintain alignment and prevent carpal displacement during the ligamentous healing stage. Two 0.045 wires were placed through the lunatotriquetral joint and two others across the scaphocapitate joint. No attempts were made to place pins across the radiocarpal joint to correct the ulnar translocation of the corpus. A short-arm thumb spica cast was applied. The pins were removed at 9 weeks and a removable plastic splint was worn for an additional 3 weeks, followed by range of motion and strengthening exercises after splint removal.

The patient was pain free at 40 months. Range of motion at that time measured 55° flexion, 65° extension, 45° ulnar deviation, and 25° radial deviation. Grip strength was 89 pounds (84% of his dominant, uninvolved side). Radiographs showed a lunocapitate angle of 14° and scapholunate angle of 62° and no increase in the ulnar translocation of the carpus as compared to the preoperative radiographs (55% lunate overhang ulnar to the lunate fossa). No arthritic changes were noted (Figure 2).

**DISCUSSION**

The literature contains 10 cases of volar dislocation of the scapholunate complex. In 1982, Taleisnik et al\(^8\) reported a dislocation of the scaphoid and lunate as a unit treated with closed reduction and casting. Radiographs at 6 weeks demonstrated a volar intercalated segmental instability pattern, however the patient was lost to follow-up. Their report cited five previous cases in the literature of similar injuries.

Kupfer\(^9\) reported a case in 1986. A closed reduction was performed; however, redislocation occurred 8 days later. Radiographs at that time revealed an additional disruption of the scapholunate complex with dorsal intercalated segmental instability. Open reduction with K-wire fixation was done through palmar and dorsal approaches. Though the lunate and scaphoid were reduced, atomic alignment
was not possible. The case was complicated by postoperative reflex sympathetic dystrophy and avascular necrosis of both the lunate and scaphoid. At 3.5-year follow-up, the scaphoid and lunate remained sclerotic, but there was no evidence of collapse. A dorsal intercalated segmental instability deformity and arthritic changes were evident. Despite this and severely impaired range of motion, the patient (a farmer) had pain-free function. As a result of the complications, Kupfer advocated open treatment of similar cases. His case differs from the current report, however, because of the scapholunate dissociation.

Coll reported an eighth case in 1987 that presented five weeks after injury. Open reduction and K-wire fixation was successful. Despite an apparently intact scapholunate complex, the case was complicated by avascular necrosis of the lunate. Unlike Kupfer’s case, though, the lunate revascularized, and there was no radiographic evidence of instability. At 2.5 years postoperatively the patient reported only minimal arthritic-type symptoms related to weather changes.

Sarrafian and Breihan reported a ninth case that was treated with cast immobilization only. Despite persistent volar intercalated segmental instability deformity, the patient had excellent range of motion and was pain free at one year. No evidence of avascular necrosis was observed.

Healey et al. most recently described a case of a periscaphoid perilunate dislocation which, unlike the other reports, included a complete disruption of the scaphotrapezial joint capsule. The patient presented 10 days after injury, and the wrist deformity could only be reduced by a combined volar and dorsal approach stabilized with K-wire fixation and included a reconstruction of the scaphotrapezial joint. At 21-month follow-up, the patient reported good function without pain, with near normal motion.

Dislocation of the scaphoid and lunate represents the most extreme lunotriquetral ligament injury. Reagan et al. surgically treated 9 of 11 lunotriquetral ligament injuries associated with static volar intercalated segmental instability deformities. All 9 patients did well, although their postoperative radiographs showed recurrent volar intercalated segmental instability deformities. The 2 patients treated without surgery did poorly. It is difficult to draw any conclusions from their results as the treatment varied from open reduction and K-wire fixation to repair or reconstruction of the lunotriquetral ligament. Time to surgery also varied from immediate to 6 years post-injury.

In the present case, immediate closed reduction was achieved and the reduction was further secured with percutaneous K-wires through the lunotriquetral and scaphocapitate joints. Despite a lunocapitate angle of 14° suggesting a volar intercalated segmental instability deformity on radiographs and slight residual ulnar translocation of the carpus, the patient was asymptomatic and exhibited excellent range of motion and strength at 40-month follow-up.

Sarrafian and Breihan’s case is the next longest reported follow-up after closed treatment of a similar type of injury. The result was similar without K-wire fixation and they suggest that the volar intercalated segmental instability pattern was of little clinical significance. The series reported by Reagan et al. also shows excellent results despite a volar intercalated segmental instability pattern, further suggesting that the true significance of volar intercalated segmental instability has yet to be elucidated. The significance of the slight ulnar carpal translocation seen here is also unknown. Cast immobilization alone of the radiocarpal joint appeared sufficient to allow the radiocarpal ligaments to heal and prevent further deformity.

**Immediate closed reduction was achieved and the reduction was further secured through the lunotriquetral and scaphocapitate joints.**

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**REFERENCES**