

Combined Radial Styloid and Scaphoid Fractures with perilunate Dislocation

Rashwan Adel Elmeligy¹, Mustafa Sayed¹

Learning Point of the Article:

Early diagnosis and anatomical reduction are essential to prevent chronic instability and avascular necrosis (AVN).

Abstract

Introduction: Trans-styloid trans-scaphoid perilunate fracture-dislocations (PLFDs) are rare, high-energy wrist injuries involving simultaneous disruption of the radial styloid, scaphoid waist, and perilunate ligamentous structures. Early diagnosis and anatomical reduction are essential to prevent chronic instability and avascular necrosis (AVN).

Case Report: A 27-year-old male sustained a high-energy motor vehicle accident resulting in a displaced scaphoid waist fracture, radial styloid fracture, and perilunate dislocation. Closed reduction was attempted, followed by definitive open reduction through a dorsal approach. The scaphoid was fixed with a Herbert screw, and the radial styloid with a Kirschner wire. Restoration of the radial column resulted in spontaneous reduction of the lunate. At 12-week follow-up, the patient achieved full, pain-free wrist motion with no radiographic evidence of instability or AVN.

Discussion: This injury pattern represents a severe variant of greater-arc perilunate trauma. The dorsal approach provides optimal visualization for reduction and fixation. Rigid internal fixation of the scaphoid and radial styloid restores carpal alignment and stability. Early mobilization after K-wire removal supports excellent functional recovery.

Conclusion: Early recognition, anatomical reduction, and stable internal fixation are key to achieving favorable outcomes in trans-styloid trans-scaphoid PLFDs. This case demonstrates excellent short-term functional recovery following dorsal-approach open reduction and internal fixation.

Keywords: Perilunate dislocation, scaphoid fracture, radial styloid fracture, greater-arc injury, Herbert screw, carpal instability.

Introduction

Perilunate fracture-dislocations (PLFDs) represent severe disruptions of carpal biomechanics, accounting for 5–7% of wrist injuries [1]. The trans-styloid and trans-scaphoid variants involve radial styloid and scaphoid fractures with ligamentous injury, often resulting in carpal instability and median nerve compression [2,3,4]. Despite advancements in surgical

techniques, these injuries remain challenging due to risks of non-union, avascular necrosis, and post-traumatic arthritis [5].

Recent literature highlights the superiority of open reduction and internal fixation (ORIF) with ligament repair [6], while arthroscopic-assisted techniques offer improved visualization [7], though their role in complex fracture-dislocations remains limited [8].

Author's Photo Gallery



Dr. Rashwan Adel Elmeligy



Dr. Mustafa Sayed

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¹Department of orthopaedic surgery, Al-Qurayyat General Hospital, Al Qurayyat, Saudi Arabia.

Address of Correspondence:

Dr. Rashwan Adel Elmeligy,
Al-Qurayyat General Hospital, Al Qurayyat, Saudi Arabia.
E-mail: rashwan_adel@yahoo.com

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Figure 1: Pre-reduction radiographs (a and b). (a) Anteroposterior pre-reduction radiograph showing displaced scaphoid waist fracture with associated volar lunate dislocation. (blue arrow pointing to styloid radius fracture), (b) lateral pre-reduction radiograph demonstrating radial styloid fracture and perilunate dislocation pattern (blue arrow pointing to lunate volar).

This case report describes the successful management of this rare and unstable injury pattern.

Case Report

A 27-year-old right-hand-dominant male presented following a high-energy motor vehicle accident with severe wrist pain, swelling, and obvious deformity. Initial radiographs demonstrated a displaced scaphoid waist fracture, a radial styloid fracture, and perilunate dislocation. (Fig.1)

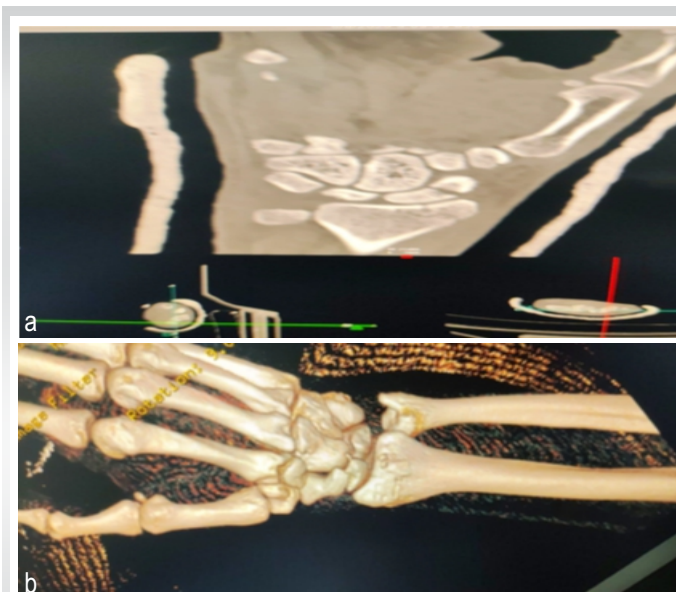


Figure 3: Computed tomography (CT) scan and 3D reconstruction (a and b). (a) Coronal CT scan demonstrating a trans-styloid trans-scaphoid perilunate fracture-dislocation with clear visualization of the scaphoid waist fracture and lunate displacement (red arrow pointing to scaphoid fracture, blue arrow pointing to styloid radius fracture), (b) three-dimensional CT reconstruction confirming the complex fracture pattern and carpal malalignment before surgical fixation.

Figure 2 — Post-reduction Radiographs (A/B)



Figure 2A



Figure 2B

Figure 2: Post-reduction radiographs (a and b). (a) Anteroposterior post-reduction radiograph demonstrating restoration of lunate alignment with improved carpal congruity following closed reduction, (b) lateral post-reduction radiograph showing satisfactory realignment of the radial styloid and reduction of the perilunate interval.

Closed reduction was attempted under conscious sedation using traction-counter-traction and volar-to-dorsal pressure on the lunate. A thumb spica splint was applied. Post-reduction assessment showed good distal vascularity, normal capillary refill, and full finger motion without numbness. Post-reduction radiographs confirmed satisfactory alignment of the radial styloid and lunate. (Fig.2)

A computed tomography scan was subsequently performed to confirm reduction and assist in operative planning. (Fig.3)

Definitive ORIF was performed through a dorsal approach. The scaphoid fracture was anatomically reduced and fixed with a Herbert screw, while the radial styloid fragment was stabilized with a Kirschner wire. Carpal stability was assessed intraoperatively, followed by repair of the injured dorsal ligaments, capsular closure, retinacular repair, and layered wound closure. A thumb spica splint was reapplied postoperatively. (Fig.4)

The wrist remained immobilized until the 6-week follow-up, at which time the K-wire was removed, and physiotherapy was initiated – initially focusing on edema control, followed by progressive range-of-motion exercises. (Fig.5)



Figure 4: Post-operative radiographs (a and b). (a) Anteroposterior post-operative radiograph showing anatomical reduction of the scaphoid and restoration of carpal alignment following internal fixation using Herbert screw and Kirschner wires, (b) lateral post-operative radiograph demonstrating stable fixation of the radial styloid and scaphoid with maintained carpal congruity.

By 12 weeks from the time of injury, the patient had regained full, pain-free wrist motion with no radiographic evidence of instability. By 8 months after injury, complete healing on styloid radius and scaphoid. (Fig. 6)

Figure 6 — Eight-month Post operative Follow up Radiographs (A/B)



Figure 6A



Figure 6B

Figure 6: Eight months after injury, complete healing on styloid radius and scaphoid.



Figure 5: Six-week post-operative follow-up radiographs (a and b). (a) Anteroposterior radiograph taken 6 weeks postoperatively showing maintained reduction and stable fixation of the scaphoid and radial styloid with Herbert screw and Kirschner wires in situ, demonstrating progressive callus formation and early bone union, (b) lateral radiograph at 6-week follow-up confirming preserved carpal alignment, intact fixation, and satisfactory healing progression without secondary displacement.

Discussion

PLFDs are high-energy injuries produced by wrist hyperextension. Early recognition is essential for optimal outcomes [9]. Mayfield and Johnson described progressive perilunate instability through four stages, beginning radially and propagating ulnarly [10].

The trans-styloid trans-scapoid variant is rare, previously reported only in isolated case reports and small series [2,4], making the 2026 study by Mazhar et al. the largest series to date [11].

Closed reduction alone has been associated with worse outcomes [12,13], while conservative treatment of trans-scapoid PLFDs produced poor results [14]. The dorsal approach provides excellent visualization for scaphoid and lunate reduction [12]. Fixation with a Herbert screw remains the gold standard for scaphoid fractures, while K-wire fixation of the radial styloid restores radial column stability.

Arthroscopic techniques offer improved visualization and minimally invasive advantages [5,11], but open approaches remain preferred for complex fracture-dislocations.

Conclusion

Trans-styloid trans-scapoid PLFDs are highly unstable injuries requiring urgent surgical intervention. Early anatomical reduction and rigid internal fixation restore carpal alignment and stability, providing excellent functional recovery and minimizing long-term complications.

Clinical Message

Trans-styloid trans-scaphoid perilunate fracture-dislocations (PLFDs) represent complex, high-energy wrist injuries that are easily missed on initial radiographic evaluation. This case highlights the pivotal role of advanced imaging, such as CT scans, in delayed or ambiguous presentations to ensure accurate diagnosis. Achieving optimal clinical outcomes and preserving wrist function depend on prompt open reduction, precise internal fixation of the radial column using Herbert screws and Kirschner wires, which subsequently facilitates spontaneous lunate reduction and mitigates the risk of avascular necrosis (AVN)."

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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