

# Scaphoid and Lunate Dislocation as a Unit—A Rare Variant of Perilunate Injury: Case Report and Literature Review for Management Recommendations

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## ABSTRACT

**Background:** Volar dislocation of the scaphoid and lunate represents a rare and complex wrist injury, with significant diagnostic and therapeutic implications.

**Case description:** We report a unique case involving a 50-year-old male who experienced a high-energy motorbike accident, leading to acute pain and swelling in his left wrist. His clinical examination was significant for localized swelling and tenderness, wrist deformity, and restricted painful range of motion, but without sensory loss in the median and ulnar nerve distribution areas. Radiographic evaluations including X-rays, revealed a rare volar dislocation of the scaphoid and lunate. The patient was managed by open reduction of the scapholunate (SL) dislocation and K-wire stabilization of the intercarpal and radiocarpal joints, and it resulted in a good functional outcome.

**Conclusion:** In summary, this case presents a rare scenario of volar SL dislocation as a unit, emphasizing the importance of meticulous evaluation and customized surgical planning.

**Clinical significance:** This case underscores the importance of early identification and management of such rare injuries to maximize patient outcomes and minimize potential complications such as persistent carpal instability, reduced wrist movements, and early wrist arthritis.

**Keywords:** Carpal dislocation, Perilunate dislocation, Simultaneous scaphoid and lunate dislocation, Unitary scaphoid and lunate dislocation, Wrist trauma.

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## INTRODUCTION

Fractures and disruption of carpal ligaments in the wrist joint can occur in many possible combinations; however, a closed palmar dislocation of the scaphoid and lunate as a single unit is one of the most uncommon varieties of dislocations in the carpal region.<sup>1,2</sup> Except for the fact that the scaphoid does not fracture but dislocates intact together with the lunate, this injury may be considered a variant of the more frequent transscaphoid-perilunate fracture–dislocation or the corresponding transscaphoid-lunate dislocation.<sup>3</sup> We could find only seven cases of unitary closed dislocation of scaphoid and lunate as a unit in English literature (Table 1). Interestingly, even these seven cases have been managed in very variable ways in the literature, and many with suboptimal outcomes.

We herein present a case of scaphoid and lunate volar dislocation as a single unit following a fall on an outstretched hand from a two-wheeler that was managed by open reduction and anatomical reconstruction in the acute setting. He achieved excellent functional outcome at 20 months follow-up with a near-normal range of motion without any pain. In addition to this unique case presentation, we aimed to provide a comprehensive review of the relevant literature. The literature review strikingly revealed a high incidence of missing these uncommon injuries and the diverse methods of treatments that have been applied to them with suboptimal results. A robust understanding of previous cases and management strategies would allow the reader to avoid missing such injuries and help them manage them more effectively.

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## CASE DESCRIPTION

### Patient Presentation and History

A 50-year-old right-handed male, presented with complaints of pain and swelling over his left wrist, following a road traffic accident (RTA) wherein he fell from a motorbike. He had no other associated injuries.

### Clinical Examination

Upon examination, the patient demonstrated localized tenderness and a notable swelling over his left wrist. There were no open wounds. The radial pulse was palpable, and the range of motion in his wrist was restricted and painful. The patient showed no sensory loss over the areas of distribution for the median and ulnar nerves.

**Investigations and Management**

An X-ray (Fig. 1) of the left wrist was taken which showed a volar dislocation of the scaphoid and lunate at his left wrist. The patient underwent open reduction of the scapholunate (SL) dislocation with intercarpal and radiocarpal stabilization. After a brachial plexus block anesthesia, a trial of closed reduction was done which was unsuccessful. Hence, an incision was made over the volar aspect of the left wrist. A layered dissection was performed, followed by the reduction of the scaphoid and lunate (Fig. 2). The SL complex was lying subcutaneously with only the volar lunate ligaments attached to the complex. Reduction was tried without further division of the joint capsule and the ligaments. Reduction through the rent in the capsule was difficult but once achieved it looked stable with no tendency of the bones to redislocate.

Stabilization of the carpus was achieved using K-wires—one wire was placed from the radius through the lunate to the hamate

in the reduced position (to stabilize the radiocarpal joint), two wires were placed from the triquetrum to the lunate (to stabilize the lunotriquetral joint), one wire was passed from the scaphoid through the capitate to the hamate, and one from the triquetrum to the hamate (to stabilize the midcarpal joint) (Fig. 3). The volar radio-SL ligament, which was found ruptured, was repaired using an Ethibond 3-0 suture. The reduction was confirmed under C-arm imaging. The surgical site was closed in layers, and a below-elbow plaster of Paris (POP) slab was applied.

**Follow-up and Outcome**

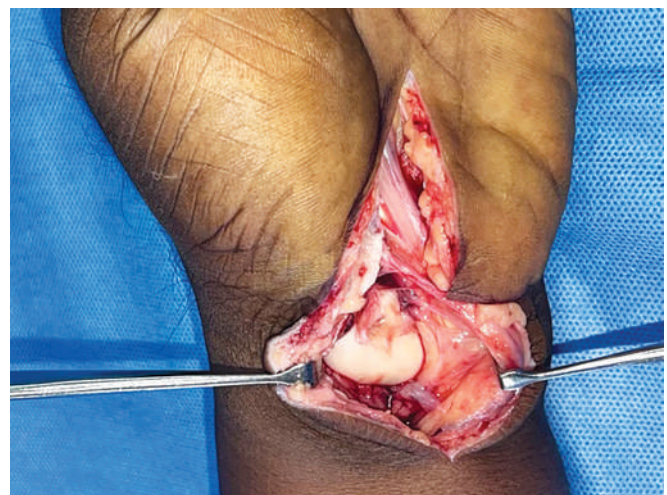
At 20 months follow-up he reported a quick disability of the arm, shoulder, and hand (DASH) score of 2.3 and was back to normal preinjury level of activities (Fig. 4). The radiographs revealed a good carpal alignment with no instability (Fig. 5). The loss of grip strength was only 15% with wrist score 90/100.

**Table 1:** Review of previous articles with unitary dislocation of the scaphoid and lunate

Serial number	Author	Number of cases	Age/sex	Side	Mode of injury	Presentation	Management	Follow-up
1	Hessert <sup>7</sup>	1	25/male	Left	Fall from height	1 month	Scaphoid and lunate enucleation	
2	Dunn <sup>9</sup>	1					Open reduction and internal fixation with K-wire fixation	2 years, near normal ROM
3	Taleisnik et al. <sup>1</sup>	1	42/male	Left	RTA	1 day	Closed reduction and cast application	6 weeks, VISI deformity
4	Kupfer <sup>10</sup>	1	Male	Right	Fall from height	1 day	Closed reduction and cast application	3.5 years, redislocates after 8 days, wrist flexion nil, extension 25°
5	Coll <sup>11</sup>	1	24/male	Right	Fall from height	33 days	Open reduction and internal fixation with K-wire fixation	2.5 years, Wrist flexion 15°, extension 50°
6	Sarrafi and Breihan <sup>12</sup>	1	24/male	Right	Fall from height	1 day	Closed reduction and cast application	1 year, wrist flexion 80°, extension 70°
7	Raemisich and Rotman <sup>2</sup>	1	33/male	Left	Fall after assault	1 day	Closed reduction and K-wire fixation	3 years, reasonably good ROM
8	Our study—2023	1	50/male	Left	RTA	1 day	Open reduction and internal fixation with K-wire fixation	1 year, wrist flexion 80°, extension 80°

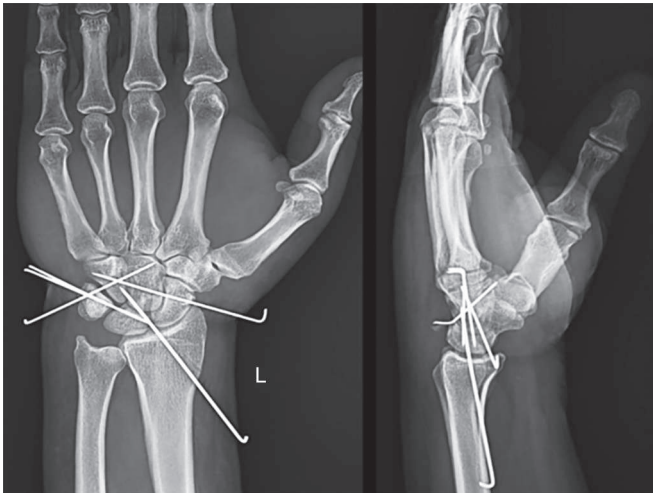


**Fig. 1:** Preoperative radiograph showing volar and proximal dislocation of scaphoid and lunate as a unit; (A) posteroanterior view; (B) lateral view



**Fig. 2:** Intraoperative image of the volar aspect of left wrist showing volar dislocation of scaphoid and lunate as a unit with intact SL ligament





**Fig. 3:** Postoperative radiograph showing reduction of dislocation of scaphoid and lunate with K-wire in situ; (A) posteroanterior view; (B) lateral view



**Fig. 4:** Clinical picture of bilateral wrist showing near normal range of motion after 20 months

## DISCUSSION

Simultaneous dislocation of the scaphoid and lunate is an exceptional injury.<sup>4</sup> It can dislocate either as a unit or divergent based on the intactness of the SL ligament and is referred to as “unitary” or “divergent” dislocation, respectively.<sup>5</sup> Historically, both unitary and dissociative SL dislocations have been managed with either closed or open reduction of the carpal bones, excision of the extruded bones, or proximal row carpectomy (PRC).<sup>6</sup> We could find only seven cases of unitary SL dislocation in the English literature. The first details of such a case were mentioned in the article by Hessert in 1903.<sup>7</sup> In this article the author reports one case of scaphoid and lunate dislocation as a unit and did a review of the literature and cited five more cases. But of those five, two cases were compound injuries and one was a fracture dislocation. The other two were closed scaphoid and lunate dislocation but no details regarding whether it was unitary or dissociative were mentioned. Hence, those two cases were also excluded from the literature review count. Taleisnik reported a case involving the dislocation of both scaphoid and lunate as a unit and in his article, he mentioned Cambell et al. having a similar case.<sup>1</sup> However, Cambell’s original



**Fig. 5:** Postoperative radiograph showing reduction of dislocation of scaphoid and lunate after 20 months; (A) posteroanterior view; (B) lateral view

article reveals that all three cases were of proximal row dislocation.<sup>8</sup> Table 1 mentions the details of the publications reporting unitary dislocation of the scaphoid and lunate.<sup>1,2,7,9–12</sup>

The mechanism of this usual injury is thought to be an extreme hyperextension of the wrist with ulnar deviation and intercarpal supination.<sup>13</sup> There should be a complete rupture of palmar and dorsal radiocarpal ligaments, scaphocapitate ligament, dorsal and volar lunate triquetral ligament, and scapho-trapezio-trapezoidal (STT) ligament complex for the palmar dislocation of scaphoid and lunate to happen.<sup>12</sup> The mechanism and pattern of the injury may be similar to the well-described progressive perilunate pattern described by Mayfield.<sup>13</sup> The forces applied to the wrist may travel in a different pathway resulting in scaphoid and lunate dislocation.<sup>1</sup> The classical path of trauma dislocates the SL, capitate, and lunotriquetral joints. In variants, an STT dislocation may replace the SL dislocation resulting in an SL combined dislocation.<sup>3</sup> Since it is a more complex dislocation than a Mayfield stage-IV, Afshar and Tabrizi<sup>5</sup> suggested that palmar dislocation of scaphoid and lunate could be considered a Mayfield type-5 injury. However, this addition seems inappropriate as the Mayfield classification is based on the sequential stages of perilunate injuries rather than the final variation in dislocation. We suggest that this combined dislocation could be just considered a variant of type-4 injury wherein the lunate and scaphoid are dislocated together (instead of lunate alone dislocating) with the described ligament disruption line traversing through the STT joint rather than the usual SL joint. So, we would like to propose a minor addition to the existing Mayfield classification to put things in better order. The lunate dislocation can be termed as stage-IVA and combined SL dislocation can be referred to as stage-IVB.

These injuries are known to be common in young males. Our patient was a male, as were six of the seven cases reported in the literature; however, for one case the details were not available in the corresponding text. The reported age in various cases ranged from 24 to 42 years with our case being the oldest (50 years). Mode of trauma in previous reports varied, with three having a fall from height, two cases sustaining an RTA, one case of fall after an assault, and one after a fall from a horse.

The optimal treatment for these uncommon and severe types of injuries is not standardized and options vary widely from closed

reduction and casting,<sup>1,10</sup> closed reduction percutaneous pinning,<sup>2</sup> open reduction and K-wire fixation,<sup>9,11</sup> enucleation of scaphoid and lunate,<sup>7</sup> and PRC.<sup>6</sup> The case reported by Hessert was diagnosed after 1 month and they have performed enucleation of scaphoid and lunate.<sup>7</sup> Long-term follow-up details of their case are not mentioned. The case reported by Coll was also diagnosed 1 month after the injury;<sup>11</sup> it was however managed by open reduction and K-wire fixation and at 2.5 years follow-up had 50° extension and 15° flexion without pain. Of the remaining five cases, four cases presented within days of injury, and in one case the duration was not clear. Taleisnik managed their case by closed reduction and POP cast.<sup>1</sup> However, they noted that the radiographs at 6 weeks demonstrated a volar intercalated segmental instability (VISI) deformity, indicating persistent carpal instability, even while the patient was on POP, and the patient was later lost to follow-up. Similarly, Kupfer also noted a loss of reduction in the check X-ray taken on the 8th postoperative day after a successful closed reduction and cast application for their case.<sup>10</sup> It was then managed by open reduction and stabilization was done with K-wires. At 3 years of follow-up patient attained 25° of extension but there was no wrist flexion. However, Sarrafian and Breihan reported good outcomes with closed reduction and cast application, and at a 2-year follow-up patient had about 80% range of movement (ROM) with no pain.<sup>12</sup> Raemisch and Rotman had managed his case with closed reduction and percutaneous K-wire stabilization and at 3 years he had a “reasonably good” range of motion.<sup>2</sup> Dunn in his article on “fractures and dislocation of carpus” describes a case which, like our case, was managed by open reduction and K-wire stabilization and POP cast for 4 weeks<sup>9</sup>; the patient achieved painless near normal range of motion of wrist at 2 years. From these studies, we can conclude that, when there is a delay in the reduction of the dislocation, like all other dislocations, the final ROM may be poor. Closed reduction and POP application are associated with a high-risk of loss of reduction; hence, it be better avoided.<sup>1,10</sup> Immediate open reduction and K-wire fixation have given better outcomes.<sup>9</sup> Since the total number of cases is extremely low, we cannot be sure about the treatment guidelines, as it requires more cases of similar variety. However, as with other perilunate injuries presenting acutely, the aim of surgical intervention remains to be “restoration of the normal anatomy.” Awareness about these injuries to prevent any missed injuries and early and appropriate intervention is pivotal.

## CONCLUSION


In summary, this case presents a rare scenario of volar SL dislocation as a unit, emphasizing the importance of meticulous evaluation and customized surgical planning. This comprehensive review of this unusual injury provides insight into its pathogenesis and states an ideal management strategy. Missing these unusual injuries remains a challenge that can only be tackled by increasing awareness and

education among emergency caregivers. Early diagnosis and anatomical reconstruction provide the best chance to get a good functional outcome.

## Clinical Significance

This case underscores the importance of early identification and management of such rare injuries to maximize patient outcomes and minimize potential complications such as persistent carpal instability, reduced wrist movements, and early wrist arthritis.

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