

## Introduction

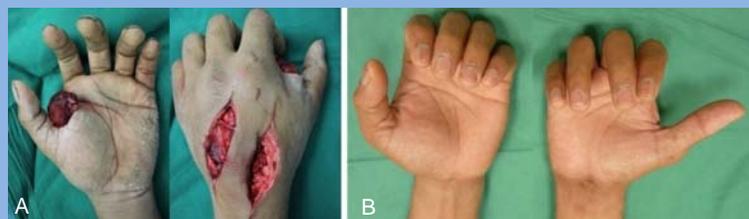
Axial disruptions of the carpus are rare injuries and have been previously classified into axial-ulnar, axial-radial and axial-radial-ulnar types. 3 patients with dorso-palmar crushing injury to the carpus resulting in axial-ulnar carpal dislocations are presented here.

## Case Series

Details of the patients, treatment and outcome at 6 months are summarized here:

No	Age	Gender	Diagnosis	Associated injuries	Treatment	Grip (%)	ROM (%)	Pain (At rest)	Pain (Activity)	Return to work
1	36	M	Peri-hamate, peritriquetral	Burst laceration over dorsum of the hand and 1st webspace with protruding adductor muscles	K-wire fixation, free flap coverage. <b>No fusion done.</b>	33%	88%	2/10	7/10	Light duties at 1 year
2	33	M	Peri-hamate, peripisiform	Burst laceration over 1st webspace with protruding adductor muscles	Initial K-wire fixation. <b>*Fusion of capitolunate joint 6 months later.</b>	72%	87%	0/10	0/10	Light duties at 6 weeks, normal duties at 4.5 months
3	40	M	Trans-hamate, peripisiform	Ulnar styloid fracture; comminuted, intra-articular distal radius fracture	Fasciotomy; <b>Primary fusion of 3rd and 4th MC base and capitolunate joint, ORIF distal radius and ulnar styloid</b>	46%	90%	0/10	1/10	Light duties at 6 weeks, normal duties at 3 months

**Table 1** – \* Patient 2 had persistent pain at the triquetral-hamate joint with divergent 3<sup>rd</sup> and 4<sup>th</sup> ray after the primary fixation. The patient was unable to return to his original work 6 months post-injury. He underwent capitolunate arthrodesis subsequently.



**Figure 1** – Clinical photos. A: Left hand of patient 1 showing burst laceration over dorsum of hand and protruding thenar muscles as well as divergent 3<sup>rd</sup> and 4<sup>th</sup> ray; B: Divergence of 3<sup>rd</sup> and 4<sup>th</sup> ray of the injured hand of patient 2, which was present in all 3 patients.



**Figure 2** – Radiographs of Patient 1. A: Injury film; B: Post-reduction and fixation; C: At 6 months post-surgery



**Figure 3** – Radiographs of Patient 2. A: Injury film; B: Post-reduction and fixation; C: At 6 months post-fusion procedure



**Figure 4** – Radiographs of Patient 3. A: Injury film; B: At 6 months post-reduction and fusion procedure, with fixation of the distal radius and ulnar styloid

## Discussion

Axial- ulnar carpal dislocations can present in a spectrum of clinical condition, from closed, dynamic axial-ulnar instability to open injuries with vascular compromise. X-ray features of this condition can be very subtle. In patient 1, widening of the joint space between the capitate and hamate and between 3<sup>rd</sup> and 4<sup>th</sup> metacarpal base was not seen. Instead, there was an overlap of the capitate and hamate bones, which was missed on the initial evaluation. The clue that led to the clinician suspecting a more severe bony injury was the divergence of the 3<sup>rd</sup> and 4<sup>th</sup> ray. This sign, which we termed the pincer sign, was found in all 3 patients.

Historically, treatment of axial carpal dislocation involves reduction and casting or pinning with Kirschner wires, and results from these patients are variable (1). We carried out fusion of the capitolunate joint in patients 2 and 3 using cannulated, headless compression screws. The distal carpal row moves as a single unit and there is minimal motion between the capitate and hamate. Primary fusion allows better apposition of the dissociated joint surfaces, restores the distal carpal arch, permits earlier loading across the CMCJs and avoids the potential situation of dynamic axial instability. In addition to good wrist motion and grip strength, we have shown that these 2 patients were able to return to their original duties early, as a machinery repairman and a welder, respectively.

## Conclusion

The pincer sign is a useful sign in picking up axial-ulnar dislocations. In addition, the results from fusion of the capitolunate joint was promising. Primary capitolunate arthrodesis is an attractive option in the treatment of axial-ulnar carpal as it provides predictable and good early functional outcomes and allows faster return to work.

## References

- (1) M Garcia-Elias, JH Dobyns, WP Cooney III, RL Linscheid. Traumatic axial dislocations of the carpus. J Hand Surg 1989; 14A: 46-57