

Traumatic Dorsal Dislocation of the Four Ulnar Metacarpals

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ABSTRACT

The swollen, painful hand is a familiar sight in the emergency department (ED), and often is seen in the context of alcohol intake, following a fight or in association with multiple trauma, all of which can make accurate assessment challenging. We report a case of complete dorsal dislocation of the four ulnar metacarpals and highlight the importance of early diagnosis and treatment for this unusual injury.

Keywords: Dislocation, emergency, metacarpals, orthopaedic, trauma

La luxación dorsal traumática de los cuatro metacarpianos cubitales

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RESUMEN

La mano hinchada y dolorosa es un espectáculo familiar en los departamentos de emergencia (DE), a menudo en relación con un contexto de consumo de alcohol, después de una pelea, o asociada con traumas múltiples, todo lo cual hace difícil una evaluación precisa. Reportamos el caso de una dislocación dorsal completa de los cuatro metacarpianos cubitales y destacamos la importancia del diagnóstico precoz y el tratamiento de esta lesión inusual.

Palabras claves: dislocación, emergencia, metacarpianos, ortopedia, trauma

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CASE REPORT

A right handed dominant baker in his twenties presented to the emergency department (ED) with severe swelling and pain in his right hand. He gave a history of an altercation 24 hours previously during which he punched a steel elevator door with his right fist fully clenched. He had no previous medical or surgical history, and was not on any medications. Concerned by his inability to perform routine tasks at work the following day, he was advised by colleagues to attend the ED.

Physical examination of his right hand demonstrated massive swelling, with tenderness to palpation of the mid-dorsum of his hand, with a palpable step just distal to the carpus. Skin and neurovascular structures remained intact. There were no other injuries. Radiological imaging confirmed complete dorsal dislocation with overlap of second to fifth carpometacarpal

(CMC) joints. An avulsion fracture of his right trapezium was also identified on plain films (Fig. 1).



Fig. 1: Radiographs of right hand on admission showing dorsally dislocated four ulnar metacarpals.

Primary treatment consisted of high elevation of the right upper limb with a hanging pillow-case and use of analgesia with anti-inflammatory agents. Computed tomography imaging was obtained to identify other bony injuries and to assist surgical planning (Fig. 2).

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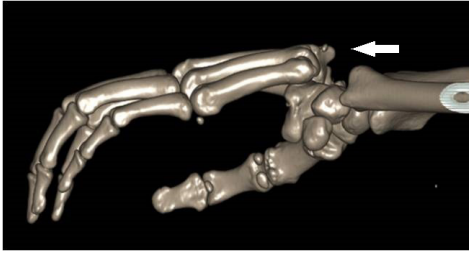


Fig. 2: Three-dimensional computed tomograph reconstruction of dorsally dislocated metacarpals.

Definitive treatment consisted of manipulation under general anaesthesia with closed reduction under longitudinal traction, and stabilization with two 1.6 mm K-wires applied under fluoroscopy; the first through the second metacarpal into the capitate and the second K-wire through the base of fourth metacarpal into the hamate (Fig. 3).

Dressings and a backslab were applied and elevation maintained following surgery. The patient was discharged the following day and seen in the outpatients department for clinical and radiological follow-up at regular intervals. Postoperative course was uncomplicated. After five weeks, the two K-wires were removed under aseptic technique and the patient started rehabilitation of his right hand with the physiotherapy and occupational therapy services. Ten weeks after the injury, interval radiograph was satisfactory (Fig. 4), grip strength had returned to 90% of that of his contralateral hand and he successfully returned work.

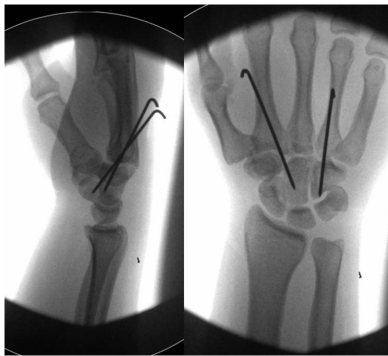


Fig. 3: Post-reduction images with K-wires *in situ*.



Fig. 4: Lateral radiograph eight weeks postoperatively showing normal dorsal contour.

DISCUSSION

Multiple dislocation of all carpometacarpals is a rare injury (1), although it is being reported with increasing frequency (2). It frequently results from high velocity injuries, and can be easily missed in the presence of more serious injuries (3), resulting in a delay in final treatment. The most common mechanism of injury is direct violence (2, 4) and the direction of the force determines whether the dislocation is volar or dorsal.

The inherent stability of the volar aspect of the CMC joint is the buttressing effect of the transverse carpal ligament on the distal carpal row. The bony stability is aided by the wedged articulation of the index metacarpal with the trapezium and trapezoid, and the ‘keystone’ articulation of the middle metacarpal with the capitate, while compressive stability of the CMC joints is provided by the binding effect of tendinous insertions, CMC ligaments and intercarpal ligaments (5).

The vector of force for this pattern of injury was likely, as hypothesised by Pankaj *et al* directed volarly and proximally along the longitudinal axis of the metacarpals, where “the resistance of bone to fracture was greater than the resistance of the dorsal joint capsule and volar ligament complex, causing dislocation of the four ulnar MCP joints” (5).

Key to diagnosis is awareness of this injury, and obtaining a true lateral radiograph. A poly-traumatized or inebriated patient must not distract the clinician from assessing the swollen hand. Computed tomography imaging is helpful with preoperative preparations and assessing for occult carpal fractures. A closed reduction should be attempted first in the ED – although many cases will require open reduction with internal fixation (4, 6). Screening intra-operatively allows assessment of stability. Maintenance of stable reduction – with K-wire fixation or open reduction and plating is crucial in order to prevent muscle imbalance, weakness of grasp and eventually, traumatic arthritis (7). Early diagnosis, with satisfactory reduction and internal fixation, and early physiotherapy are essential for ensuring a good long-term outcome.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interests regarding the publication of this manuscript.

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