

## MULTIPLE DORSAL CARPOMETACARPAL JOINT DISLOCATION: CASE REPORT

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### ABSTRACT

Carpometacarpal joint dislocation extending from the second to fifth metacarpal is a rare injury. It usually follows high energy trauma but may be seen in low energy trauma. The diagnosis can easily be missed because of severe swelling of the hand at presentation and overlapping of the bones on radiograph of the wrist and hand. The dorsal dislocation is the commonest pattern of injury. We present a case of right dorsal carpometacarpal joint dislocation. The diagnosis was made with radiograph of the right wrist. It was managed with closed reduction and percutaneous K-wire fixation under image intensifier control. He had intensive physiotherapy and functional assessment was done using quick DASH score at regular interval on follow up. On the last follow up, 2 years later, the quick DASH score was 9.1%. The right hand was pain-free. A high index of suspicion and meticulous hand examination is important to avoid missed diagnosis of a carpometacarpal joint dislocation. Prompt reduction and fixation followed by intensive physiotherapy are necessary to achieve excellent hand function.

**Key words:** Carpometacarpal joint dislocation, Closed reduction, K-wire fixation

### INTRODUCTION

Dislocations of carpometacarpal joints are rare injuries. They represent 1% of all hand trauma (1). This injury is often missed because of the gross swelling of the hand at presentation and inadequately studied radiographs (1,2). They are frequently underdiagnosed because of other distracting injuries in a polytraumatized patient (1,3). There are different patterns of presentation but management principle remains the same (4). Management is aimed at anatomical reduction, adequate stabilization and early mobilization of the joints of the hand. This case report describes this pattern of injury occurring following a road traffic accident.

### CASE REPORT

This is a case of a 47 year old man, trader who was driving a car and ran into a stationary lorry. He presented to our Emergency Department in August 2019, 4 hours after the accident, following initial care at another hospital. He was assessed according to the ATLS protocol. Secondary survey revealed the following injuries: painful and swollen right dominant hand, asymmetrical face and malocclusion of the jaw. His right hand was deformed and tender at the wrist area, wrist range of motion was limited, distal neurovascular status was intact and there was no evidence of tendon rupture. X-rays of the wrist and hand showed multiple dorsal carpometacarpal joint dislocation of ulnar four joints without obvious

**Figure 1**

*Pre-operative X-ray*



fracture (Figure 1). CT scan of the brain showed subdural haematoma and mandibular fracture.

Following resuscitation, under the same general anaesthesia used to treat the subdural haematoma,

closed reduction and percutaneous K-wire fixation of the carpometacarpal joints was done. The K-wires were inserted centrally through the metacarpal heads (Figure 2).

**Figure 2**

*Immediate post-operative X-ray*



The hand was stabilized with a POP volar slab, K-wires and slab were removed after 6 weeks. Intensive physiotherapy was started. On the last follow up, 2

years later in August 2021, the quick DASH score was 9.1% and the right hand was pain-free. X-ray at 2 years of follow up is depicted in Figure 3.

**Figure 3**

*X-ray at 2 years on follow-up*



## DISCUSSION

The carpometacarpal joints are all of the modified saddle type (2,3). Stability at the carpometacarpal joints of the fingers is provided by dorsal and volar metacarpal ligaments, long flexors and extensor tendons and intrinsic muscles (2,3). The third carpometacarpal joint is more stable. It is more proximal and provides a key stone phenomenon with other carpometacarpal joints (3).

The commoner patterns of dislocation is either volar or dorsal and the direction usually depending on the direction of force during the injury. The dorsal dislocation has been described as the more frequent pattern (5,6). Other patterns described include dorsal radial, volar radial and divergent (4). The mechanism of injury is direct violence which may be from high energy trauma such as motor vehicle accident, fall from height or low energy trauma like fist fight (5,7,8). Our patient had a high energy trauma and also sustained other injuries which could have easily led to a missed diagnosis.

Carpometacarpal joint dislocation are uncommon and constitute less than 1% of hand injuries (1). It is an easily missed diagnosis because of gross swelling of the hand (2). A radiograph of the hand showing the anteroposterior and oblique views should be performed in suspected cases. On anteroposterior view, is suspected when there is loss of parallelism between the carpometacarpal joints or when there is an apparent shortening of the metacarpals. It is usually diagnosed with a true lateral view of the hand (9).

There is no consensus on the modality of treatment (10). It may include close reduction and splintage, close reduction and K-wire fixation or open reduction and K-wire fixation. The choice of treatment depends upon severity, stability of carpometacarpal joint and experience of the attending physician (3). Non operative treatment or percutaneous fixation is preferred for acute stable injuries without extensive fractures or comminution. Open surgical treatment is most often used in cases of unstable or sub-acute fractures and fracture-dislocations. Open surgical approach is also advocated for those with delayed presentation (9,10).

Close reduction with or without percutaneous pinning is achieved by longitudinal traction and pressure at metacarpal base with direction of

pressure determined by direction of dislocation. It is usually successful if dislocation is less than 10 days old (9). It is critical to first reduce and stabilize the 3<sup>rd</sup> metacarpal joint to guide subsequent reduction of the other carpometacarpal joints (1). The disadvantage of this technique include non-anatomical reduction, difficulty in pinning and risk of tendon transfixation (3). Good outcome has been reported with closed reduction and splint immobilization only (6,11). Gulabi *et al.* (8) in a mid-term review of 15 patients reported favorable Visual Analogue Score (VAS), quick – Disability of Arm, Shoulder and Hand (Q-DASH) and grip strength values in patients treated with closed reduction and percutaneous pinning. In order to prevent injuries to the extensor tendons by K-wires, Bhardwaj *et al.* (4) has suggested a modified method of K-wire fixation. They have advised that the dislocated carpometacarpal joint should be fixed by inserting K-wires from the radial and ulnar borders of the hand. Wire fixation in the central part of the hand should be avoided. We had fixed the K-wires centrally through the metacarpal head and this could have accounted for the residual near normal function of the fingers on the last follow up. Open reduction and internal fixation is done through dorsal approach and the K-wires should remain in place for at least 6 weeks (3,9,12).

Patients with carpometacarpal joint dislocation may have complications but a good number of them have favorable outcome following early intervention and intensive physiotherapy. On follow up, most patients report excellent use of the hand without grip strength or motion deficit (4,6,13). Frequently reported complications in the case of imprecise reduction include post traumatic arthritis, metacarpophalangeal stiffness, median nerve dysfunction, carpal instability, complex regional pain syndrome and tendon problems (1,4,10). Our patient had intensive physiotherapy post operatively over a long period of time, a favourable outcome with a quick DASH score of 9.1% with no carpal instability.

## CONCLUSIONS

The sequelae of poorly treated carpometacarpal joint dislocation are debilitating. Early intervention, adequate reduction of the dislocated joint, optimal physiotherapy are absolutely necessary in achieving good outcome.

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