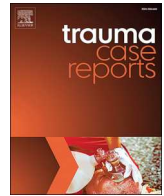


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# Trauma Case Reports

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## Case Report

# A rare case of floating fifth metacarpal and review of literature

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### ABSTRACT

**Background:** Floating metacarpal is a rare concurrent bipolar dislocation of metacarpal at both ends. Isolated dislocations of Carpo-metacarpal (CMC) or Metacarpo-phalangeal (MCP) have been previously reported, simultaneous dislocations of both joints is scarcely reported in literature and bares high chance of diagnosis being missed on presentation.

**Patient:** A 29-year-old male presented with pain, swelling in left hand and loss of movement in fifth and fourth finger following a motorcycle fall injury. Radiography showed floating metacarpal of fifth ray along with fracture dislocation of at base of fourth metacarpal.

**Diagnosis:** The patient was diagnosed with floating fifth metacarpal along with fracture dislocation at base of fourth metacarpal.

**Intervention:** Open reduction and K-wire fixation was performed across CMC for fifth and fourth metacarpal along with MCP fixation for fifth metacarpal joint.

**Outcomes:** The patient had excellent outcome after one year with normal Range of motion and grip.

**Lessons:** Early recognition and prompt management of these injuries are considered as hallmark of prognosis. Ideal treatment for such dislocation is controversial. However, we have noted from earlier case reports that with acute dislocation and minimal swelling closed reduction and cast immobilization could be sufficient. In case of delayed presentation or swelling along with fracture, open reduction is favorable choice of treatment.

## Introduction

Floating metacarpal refers to simultaneous dislocation of metacarpo-phalangeal (MCP) and carpo-metacarpal (CMC) joints. It signifies double dislocation of same metacarpal [1]. Volar dislocation of MCP and dorsal displacement of CMC joint, this is the usual pattern in floating metacarpal dislocation [2]. Although isolated dislocations of MCP or CMC have been previously reported in literature a number of times [1–3]. Merely handful of case reports describe the concurrent dislocation of both joints.

In review of literature we have found around nine case reports regarding floating metacarpal and only three about floating fifth metacarpal [3,4]. It has been reported as rare closed dislocation occurring mostly due to direct or indirect trauma to involved hand. [5] Early recognition and prompt management of these injuries are considered as hallmark of better prognosis [6]. Ideal treatment for such dislocation are controversial however, open reduction and fixation is advocated owing to unstable nature and difficult reduction by closed means [7].

### Case report

A 29-year-old male presented to department of emergency following a motorcycle fall injury. He complained of pain and swelling

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Fig. 1. A:Anteroposterior(AP) & B: Lateral view of initial radiography.

in left hand and loss of movement in fifth and fourth finger. On examination patient had deformity, tenderness and restriction of movements on ulnar side of the hand. Wrist and other movements were normal and no open wound noted. Patient had no previous history of trauma to left hand. Capillary filling and sensation was normal and suggestive of intact neurovascular bundle. Plain series of radiograph of hand performed, which revealed dorsal dislocation of CMC and volar dislocated MCP of fifth ray. Furthermore, dislocation at the base of fourth metacarpal was noted (Fig. 1). CT scan showed simultaneous fracture of the fourth metacarpal base (Fig. 2). Due to massive swelling and fracture of adjacent metacarpal closed reduction of fifth ray was not attempted.

Patient was scheduled for open reduction and fixation under regional anesthesia. K-wire pinning was executed after open reduction via dorsal approach. For fifth metacarpal Carpo-metacarpal fixation was done at CMC joint and Metacarpophalangeal fixation was achieved at MCP joint. Cross fracture oblique fixation and CMC fixation was done for fourth metacarpal. K-wire 1.5 mm was used for all fixation. Post fixation hand was immobilized in volar splint. Immediate post-operative X-ray showed good reduction and fixation (Fig. 3). Patient was discharged 48 h later, after no surgical complications were noted. Four weeks post-op X-ray revealed good healing, splint was discarded and all pins were removed. Gentle passive Range of Motion (ROM) of fingers was initiated. Patient was regularly followed up and showed good improvement in ROM and strength. One-year later patient has complete ROM of all fingers and normal grip (Figs. 4 & 5). Lone complain is that he feels pain while lifting heavy objects or with strong grip.

#### Discussion & review of literature

Dislocations of metacarpals are rare and double dislocations resulting in floating metacarpal is even rarer [8]. Floating metacarpal has been previously reported, more commonly in thumb [7,9] and fifth finger [3,4,6]. Dislocations of metacarpal bones are caused by high-energy trauma with direct or indirect blow to involved hand [10]. Our patient sustained a direct blow on ulnar aspect of the palm as a result of the fall on outstretched hand. Traumatic forces lead to volar dislocation of MCP and the forces continued along the shaft, dorsally levering the base of metacarpal.

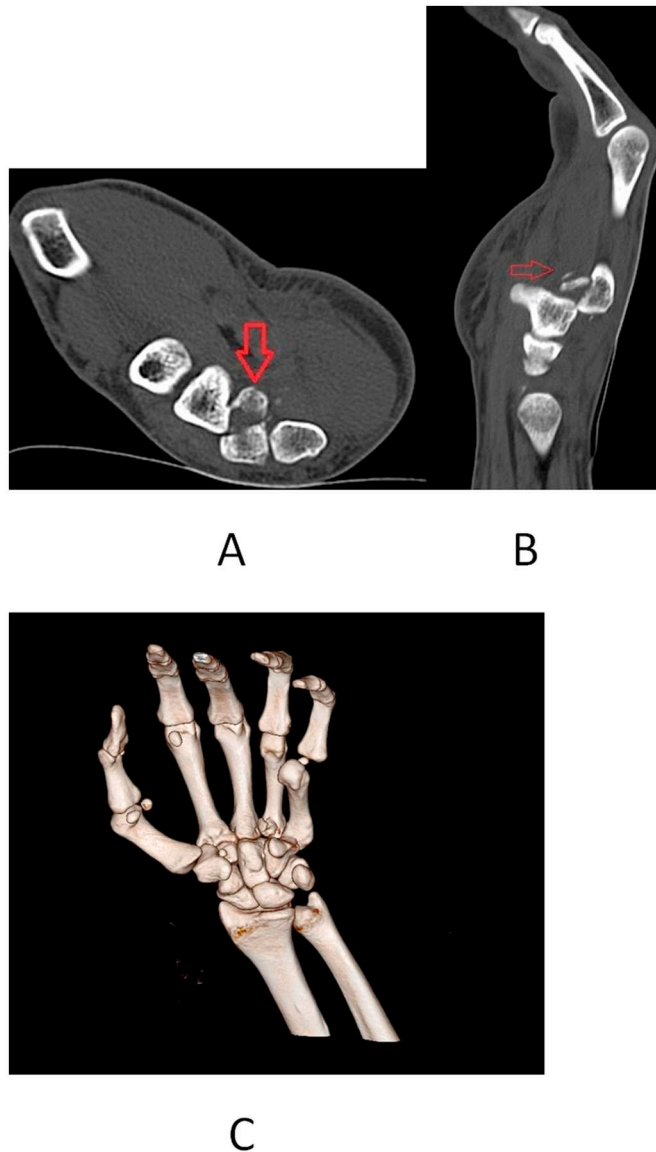
Management goal of any dislocated joint is congruent relocation and stability, as described by Kasse et al. in their case series report [11]. This is as well true for such double dislocation injuries.

Nagmani et al. reported a case of isolated fifth floating metacarpal [3]. They advocated an attempt at closed reduction if the patient presented early with no other injuries or fractures in the involved hand. Their patient showed good outcome with no residual deformity after closed reduction and casting.

Singh et al. reported another similar case of old floating fifth metacarpal, which was neglected for two months and owing to delayed presentation closed reduction was not considered. Open reduction and fixation was performed and achieved good results [4]. Here again emphasis on time of presentation directed the plan of treatment.

Another case report by Tyagi et al., on floating first metacarpal in 14-year-old boy is the youngest patient reported in literature. Their patient had isolated dislocation of first metacarpal and presented early after trauma. He was treated with closed reduction and cast immobilization. Satisfactory outcome was attained.

Literature revealed one exactly similar case to ours with floating fifth metacarpal and fracture of fourth metacarpal by Minf et al. [8]. Open reduction and K-wire fixation in their patient exhibited good outcome.



**Fig. 2.** A: Axial CT shows fracture of 4th metacarpal base (thick red arrow) B: sagittal CT indicates fracture and dislocation of 4th metacarpal base (thin red arrow) C: 3D reconstruction of hand CT scan. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

According to findings, performing CT scan in such complex cases of hand injury will give more information than plain radiography specially in small fractures of the metacarpal base. This finding confirmed in several previous study [12].

Management of these injuries can be notoriously challenging [13]. Owing to the unstable nature of these dislocations, literature has favored open reduction and fixation over closed reduction and immobilization [8,10]. Some authors have even advocated ligament reconstruction procedure at CMC due to high instability [14]. These patients were subjected to MRI scan after ligament disruption was suspected.

## Conclusion

Time of presentation is an important factor in management of floating metacarpal (Fig. 6.). On early presentation with no massive swelling, closed reduction can be attempted and if congruency of both joints is attained cast immobilization can be done. Patient

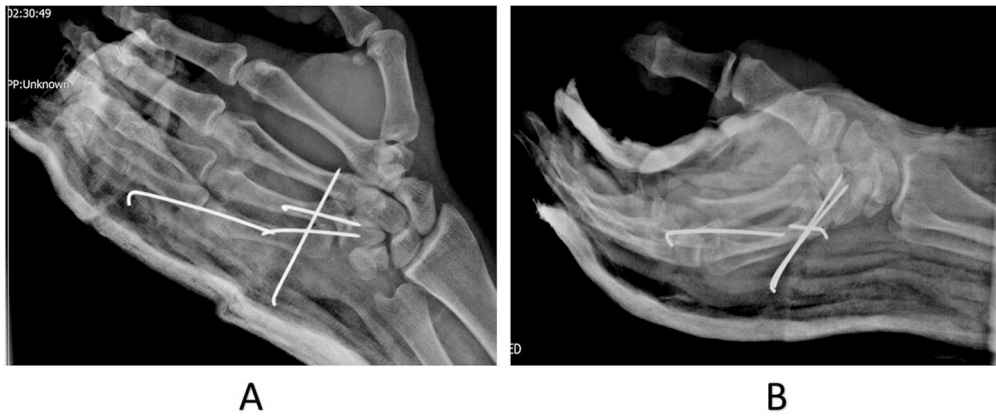


Fig. 3. A: AP & B: Lateral view of immediate post-operative X-ray.

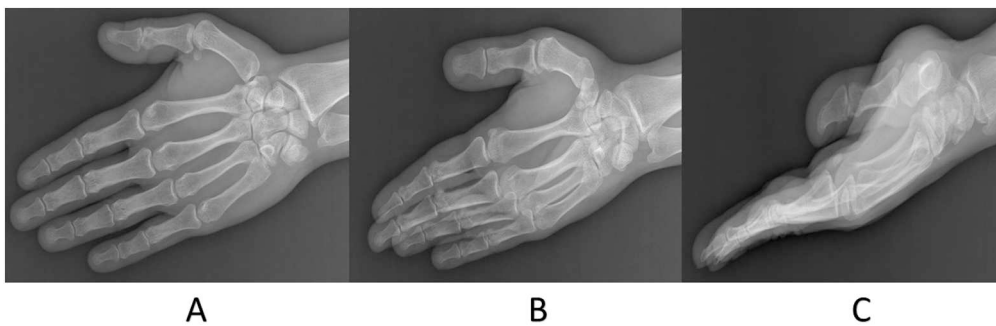


Fig. 4. A: Ap, B: Oblique, C: Lateral view of 1 year follow up.



Fig. 5. ROM after 1 year shows no difference with contra-lateral side.

should be reviewed weekly for re-dislocation, which indicate ligament injury and better be subjected to MRI scan and ligament repair can be planned. Patients who present late after injury or with substantial swelling or open injuries should be considered for open reduction and K-wire fixation. Closed reduction in such patients is often ineffective.

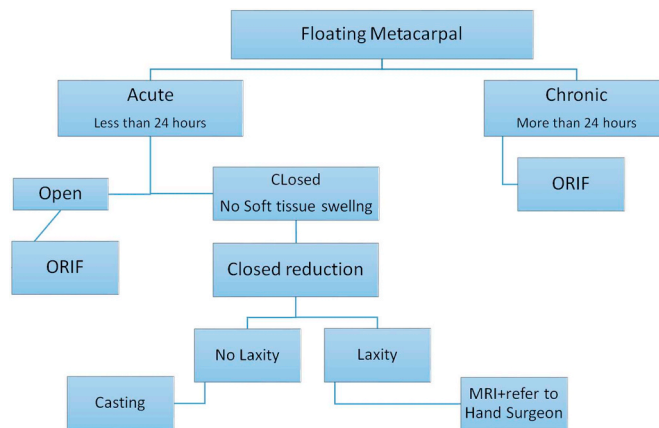


Fig. 6. Suggested algorithm for treatment of floating metacarpal injuries.

## References

- [1] M.V. Stevanovic, H.H. Stark, Dorsal dislocation of the fourth and fifth carpometacarpal joints and simultaneous dislocation of the metacarpophalangeal joint of the small finger: a case report, *J. Hand Surg. Am.* 9 (5) (1984) 714–716.
- [2] C. Rex, M. Morris, P. Dunkow, Floating index metacarpal from double dislocation, *Ind. J. Orthop.* 36 (2) (2002) 15.
- [3] N. Singh, S. Agrawal, P. Rajbhandari, B. Tamang, Floating fifth metacarpal: give conservative management a try!, *Int. J. Surg. Case Rep.* 2018 (3) (2018) rjy042.
- [4] A.P. Singh, I.K. Dhammi, A.K. Jain, M.P. Singh, Neglected floating fifth metacarpal: a case report, *Acta Orthop. Traumatol. Turc.* 46 (2) (2012) 136–138.
- [5] M. Sakuma, G. Inoue, Simultaneous dorsal dislocation of the metacarpophalangeal and carpometacarpal joints of a finger, *Arch. Orthop. Trauma Surg.* 117 (4–5) (1998) 286–287.
- [6] C. Khodadadyan, R. Hoffmann, Y. Moazami-Goudarzi, N. Südkamp, Double dislocation of the fifth metacarpal, *J. Hand Surg. Am.* 20 (2) (1995) 253–254.
- [7] B. Bosmans, M. Verhofstad, T. Gossens, Traumatic thumb carpometacarpal joint dislocations, *J. Hand Surg. Am.* 33 (3) (2008) 438–441.
- [8] H. Mnif, M. Zrig, M. Koubaa, R. Jawahdou, I. Hammouda, A. Abid, “Floating fifth metacarpal”. A case report, *Chir. Main* 28 (5) (2009) 310–313.
- [9] H.R. Tyagi, N. Kamat, S. Wajekar, S.H. Mandalia, Traumatic floating 1st metacarpal in a 14-year-old boy managed by close reduction and thumb spica immobilization: a rare case report, *J. Orthop. Case Rep.* 4 (4) (2014) 44.
- [10] I.K. Dhammi, A.K. Jain, A. Arora, Isolated dislocation of the second metacarpal at both ends, *J. Orthop. Trauma* 15 (2) (2001) 143–145.
- [11] A.N. Kasse, M. Diallo, S. Diao, J.C. Sane, A. Bousso, A.R. Ndiaye, et al., Traumatic floating bone. About cases and a literature review, *Open J. Orthop.* 7 (12) (2017) 383.
- [12] C. Büren, S. Gehrman, R. Kaufmann, J. Windolf, T. Lögters, Management algorithm for index through small finger carpometacarpal fracture dislocations, *Eur. J. Trauma Emerg. Surg.* 42 (1) (2016 Feb) 37–42.
- [13] J.R. Moore, C.A. Webb, R. Thompson, A complete dislocation of the thumb metacarpal, *J. Hand Surg. Am.* 3 (6) (1978) 547–549.
- [14] A.-R. Afshar, F. Mirzatoloei, I. Abdi-Rad, Concurrent dislocations of carpometacarpal and metacarpophalangeal joints of the thumb, *Arch. Iran. Med.* 8 (3) (2005) 221–222.