

Surgical Treatment of a Dorsal Fifth Carpometacarpal Dislocation Associated with a Fourth Metacarpal Base Fracture: A Case Report

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Abstract

Case Report

Background: Carpometacarpal dislocations are uncommon, frequently overlooked injuries that may cause substantial functional impairment when diagnosis and stabilisation are delayed. **Case presentation:** A 19-year-old man sustained a closed injury to the right hand after a heavy metal object fell on it. Radiographs demonstrated a dorsal dislocation of the fifth carpometacarpal joint associated with a fracture of the fourth metacarpal base. The initial closed reduction was unstable. Reduction under regional anaesthesia and percutaneous Kirschner-wire fixation to the distal carpal row were therefore performed, while the fourth metacarpal fracture was treated conservatively. The wires were removed after 45 days, and active rehabilitation began during the fourth postoperative week. **Outcome:** At three months, carpometacarpal alignment was maintained and the patient had returned to work. At six months, muscle strength was good and wrist and finger motion had almost completely recovered. **Conclusion:** Systematic radiographic assessment and stable fixation of unstable injuries can provide a favourable functional outcome.

Keywords: carpometacarpal dislocation; fifth ray; fracture-dislocation; Kirschner wires; case report.

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INTRODUCTION

Carpometacarpal dislocations of the long fingers account for less than 1% of wrist and carpal trauma. Their rarity, initial swelling and superimposition of bony structures on standard radiographs explain why they may be overlooked during the initial assessment [1]. They are nevertheless encountered as fracture-dislocations and represent a diagnostic and therapeutic emergency because of the risk of functional sequelae. We report a dorsal dislocation of the fifth carpometacarpal joint associated with a fracture of the fourth metacarpal base, treated by reduction and percutaneous Kirschner-wire fixation.

CASE PRESENTATION

A 19-year-old man with no relevant medical history sustained an occupational injury when a heavy metal object fell onto his right hand. The injury was closed and caused pain and functional impairment. He presented immediately to the emergency department; the final follow-up period was six months.

Clinical examination showed oedema and a dorsal deformity of the right hand, with a skin abrasion

over the third metacarpophalangeal joint. Both active and passive movements were painful. No distal sensorimotor deficit was identified (Figure 1).

Anteroposterior, lateral and three-quarter oblique radiographs demonstrated a dorsal dislocation of the fifth carpometacarpal joint associated with a fracture of the fourth metacarpal base (Figure 2).

Closed reduction was initially achieved by applying pressure over the base of the fifth metacarpal, after which an intrinsic-plus splint was applied. Post-reduction radiographs nevertheless confirmed persistent instability.

The patient was therefore taken to the operating theatre. Under regional anaesthesia, the dislocation was reduced and stabilised by percutaneous Kirschner-wire fixation from the fifth metacarpal to the distal carpal row. The fourth metacarpal base fracture was treated conservatively. Postoperative radiographs confirmed satisfactory reduction and a stable fixation construct (Figure 3).

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Figure 1: Dorsal clinical appearance of the right hand on admission, showing oedema, dorsal swelling and a skin abrasion over the third metacarpophalangeal joint.



Figure 2: Preoperative anteroposterior, lateral and three-quarter oblique radiographs of the right hand, showing a dorsal dislocation of the fifth carpometacarpal joint associated with a fracture of the fourth metacarpal base



Figure 3: Postoperative anteroposterior, lateral and three-quarter oblique radiographs of the right hand, showing satisfactory reduction and stabilisation with Kirschner wires

The intrinsic-plus splint was maintained for six weeks, and the Kirschner wires were removed after 45 days. Active rehabilitation was initiated during the fourth postoperative week, with the splint reapplied between rehabilitation sessions.

At three months, follow-up radiographs obtained after wire removal showed maintained carpometacarpal alignment (Figure 4), and the patient had returned to work. At the six-month follow-up, the functional result was highly satisfactory, with good muscle strength and near-complete recovery of wrist and finger range of motion.



Figure 4: Three-month follow-up anteroposterior and oblique radiographs of the right hand after removal of the Kirschner wires, showing maintained carpometacarpal alignment

DISCUSSION

The carpometacarpal joints are particularly stable because the intermetacarpal, volar carpometacarpal and dorsal carpometacarpal ligaments converge at the metacarpal bases [2]. Dislocations generally follow high-energy trauma in young adults. A direct blow to the metacarpal base may cause either dorsal or volar displacement according to the direction of the force vector. In an indirect mechanism, a longitudinal force applied to the metacarpal head produces axial compression, dorsal displacement of the base and disruption of the stabilising ligaments [3].

The greater mobility of the fourth and fifth rays, compared with the relative immobility of the third ray, explains their preferential involvement. Diagnosis remains challenging because clinical findings are often non-specific, swelling may conceal the deformity, and standard radiographs may be difficult to interpret because of bony overlap or suboptimal image quality [4]. Carpal or metacarpal fractures are associated in approximately 80% of cases, further complicating assessment and management [5].

Radiographic assessment should be systematic. On the anteroposterior view, loss of joint spaces, reduced height of the medial carpus and disruption of Gilula's third arc should be sought [6]. The lateral view is assessed for malalignment between the metacarpals and the distal carpal row. Oblique projections improve detection: 30° pronation profiles the fifth carpometacarpal joint, 45° pronation facilitates identification of fourth metacarpal base injuries, and 20° supination provides a better view of the second carpometacarpal joint [7].

There is no single therapeutic consensus. Closed reduction may be attempted urgently, but residual instability requires fixation. Open reduction is indicated when an anatomical reduction cannot be achieved by closed means. Prompt management reduces the risks of irreducibility, skin compromise and neurovascular compression [8]. In the cited series, percutaneous Kirschner-wire fixation was associated with better DASH scores than some open surgical strategies [9,10]. In the present case, instability after closed reduction led to percutaneous fixation, with maintained alignment at follow-up.

Early diagnosis and treatment are the main prognostic factors. Excellent or good functional outcomes have been reported in approximately 80% of cases, with return to work after an average of three months [11]. Conversely, delayed diagnosis or inadequate treatment may lead to pain, reduced grip strength, limited finger motion and post-traumatic osteoarthritis caused by residual carpometacarpal malalignment [12]. Our patient's return to work at three months and near-complete functional recovery at six

months are consistent with the favourable prognosis of injuries treated promptly and stabilised adequately.

CONCLUSION

Dislocation of the fifth carpometacarpal joint is an uncommon injury that may be missed on initial radiographs, particularly in the presence of substantial swelling or an associated fracture. Methodical assessment with anteroposterior, lateral and oblique projections is essential. When closed reduction is unstable, percutaneous Kirschner-wire fixation can restore and maintain carpometacarpal alignment. Early treatment followed by appropriate rehabilitation may provide a satisfactory functional recovery.

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