Locking of the index finger metacarpophalangeal joint due to a chronic osteochondral fracture fragment of the metacarpal head: a case report

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Introduction

Locking of the metacarpophalangeal (MCP) joint is a rarely reported condition in the English literature, although cases of locking are probably not rare. A locked MCP joint of the finger is characterized by loss of full extension of the MCP joint with no loss of flexion [22, 24, 27, 28]. The affected finger is painful and cannot be fully extended either actively or passively and, thus, appears “fallen” compared with the other fingers, which can all be completely extended. A locked thumb MCP joint exhibits a mild hyperextension deformity with loss of flexion at the joint [19, 25]. Most cases of locking have been related to impingement of normal gliding of the volar plate or the accessory collateral ligament on either an osteophyte or bony prominence on the metacarpal condyle head [2, 4, 12, 22, 24], but intra-articular fracture of the metacarpal head [30], sesamoid entrapment [4, 5, 9, 13, 18, 23, 32–35], first dorsal interosseous muscle [8], loose bodies [17], and chondroma [7, 37] have also been reported.

A locked MCP joint due to a chronic osteochondral fracture fragment from the metacarpal head has only been reported once previously [30], although two other cases

have resulted iatrogenically from closed manipulation [21, 24].

Case Report

A 37-year-old woman sustained minor trauma to her left index finger when she was 13 years old and subsequently experienced occasional episodes when the finger would lock in flexion so that she was unable to extend the final 20°. These episodes would spontaneously resolve.

However, 18 months prior to her referral, she developed complete locking of the MCP joint of her index finger which prevented her from performing her usual job. She was diagnosed by two hand surgeons as having a trigger finger, but did not improve with two steroid injections. Her history and examination were consistent with a diagnosis of a locked MCP joint in that she was able to fully flex the finger from the extended position but with some crepitation, but she was unable to actively extend the MCP joint beyond 15° of flexion. Passive range of motion was identical. Plain X-rays revealed a loose body, and MRI suggested an avulsion fracture at the volar and radial aspects of the metacarpal head, at the origin of the radial collateral ligament (Figs. 1 and 2). The ulnar collateral ligament and volar plate were intact. Initial treatment involved buddy taping the index finger to the middle finger for a week followed by hand therapy for a month. No forceful manipulation was attempted. However, her symptoms did not improve.

Surgical exploration was performed through a dorsal approach. The radial sagittal fibers were incised, and the joint capsule was incised longitudinally. An osteochondral fracture fragment from the volar and radial aspects of the

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Fig. 1 **a** Preoperative view and **b** X-rays

metacarpal head was revealed when the finger was fully extended (Fig. 3). Both collateral ligaments were intact. The osteochondral fracture fragment measuring $7 \times 5 \times 3$ mm was removed completely (Fig. 4). The index finger was immobilized in the intrinsic plus position for 10 days, and early active range of motion was begun with buddy taping the index finger to the middle finger.

Three months after surgery, she had no pain and had regained full range of motion of the metacarpophalangeal joint (Fig. 5). She returned to her usual work without any problems.

Discussion

Poirier [27] first described locking of the MCP joint in 1889, and Langenskiöld [24] reported two cases in 1949, one of which was due to an intra-articular fracture of the metacarpal head caused by attempted closed manipulation.

The most common cause of locking of the MCP joint is mechanical blockage due to the radial or ulnar accessory collateral ligament gliding over a prominence of the condyle or an osteophyte of the metacarpal head [1, 2, 22, 24, 27]. Other causes of locking include an abnormally shaped metacarpal head [29], lateral exostosis [27], tearing of the collateral ligament or volar plate [40], intra-articular loose bodies [17], osteophytes [14], rupture of the extensor mechanism [26], and sesamoid entrapment by the volar plate or MCP ligament [4, 5, 18, 35]. Although incarceration of the sesamoid in the joint is anatomically impossible [38], Terrill [32], Thomsen [33], Gilligan [13], Desai [9], Tsuge [34], Kojima [23], and Flatt [11] all reported locked thumb MCP joints caused by sesamoid entrapment. A benign chondroma and hemangioma as the causes of locking have also been documented [7, 10, 37]. Schuind [30] described an intra-articular fracture of the metacarpal head, and Honner [17] described loose bodies within the MCP joint causing locking.

Locking of the MCP joint of a finger should be distinguished from the trigger finger, which affects the interphalangeal joints and is associated with stenosing tenosynovitis and a gradual onset [3, 6].

Because locking of the MCP joint is rarely encountered, these are few reported cases, and no consensus has been

Fig. 2 MRI shows the osteochondral fracture of the metacarpal head at the proximal attachment site of the radial collateral ligament

Fig. 3 **a, b** Intraoperative views

Fig. 4 Osteochondral fracture fragment

Fig. 5 Postoperative **a** flexion and **b** extension of the index finger

reached on treatment. If this diagnosis is suspected, aggressive closed manipulation should be avoided. Although some authors have warned of the risk of fracture during manipulation of the MCP joint [14, 21], others recommend that gentle manipulation should be attempted [15, 19, 23, 39]. Schuind [31] suggested that an MRI scan be used to establish a diagnosis before manipulation or surgical operation, but it is only indicated if there is doubt regarding the cause of locking. Hoenig [16] proposed 2–3 weeks of observation prior to surgical exploration for initial episodes of locking. If manipulation fails or if there is recurrent locking, surgical exploration should be performed through an approach dependent on the mechanism of locking. Rankin [29] and Inoue [20] recommended a palmar approach followed by collateral ligament release and removal of any bony exostosis, but a dorsolateral approach has also been proposed [29, 30]. If a locked MCP joint is left untreated, a fixed flexion contracture results with permanent disability as described by Vernet [36]. Therefore, definitive diagnosis and appropriate management are required for any locking of the MCP joint.

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