

## Case Report of the Locked Metacarpophalangeal Joint of Middle Finger

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### Abstract

**Objectives:** This article presents one case of a rare disorder known as locked metacarpophalangeal joint of middle finger, review of literature and possible treatment options.

**Case Report:** We treated a patient with locked MCP joint of middle finger representing one major cause of this disorder, an entrapped accessory collateral ligament behind an osteophyte of the third metacarpal head. After clinical and radiological assessment the patient was managed operatively after one failed attempt of gentle closed reduction under general anesthesia. The patient had a satisfactory outcome after surgery.

**Conclusion:** Diagnosis of locked MCP joint is mainly clinical. The radiographs can reveal degenerative changes or abnormal geometry in the metacarpal head/neck as a first clue to the possible etiology. Gentle closed reduction can be attempted. However, surgery is most often required to achieve a satisfactory long term outcome and to avoid recurrences.

**Keywords:** Locking; Metacarpophalangeal; Interphalangeal; Joint

### Introduction

Locked metacarpophalangeal (MCP) joint of long fingers refers to a loss of active and passive extension of the MCP joint without loss of flexion and with a normal mobility of the interphalangeal (IP) joints, as defined by Posner [1]. Locking or catching of the fingers in the flexed position is a common occurrence when caused by stenosing flexor tenosynovitis or "trigger finger". A far less common problem is the locked MCP joint. In locked MCP joint, the loss of extension occurs suddenly, the mobility of the IP joints remaining unaffected, whereas in trigger fingers the IP joints are involved first with a loss of extension of the proximal IP joint.

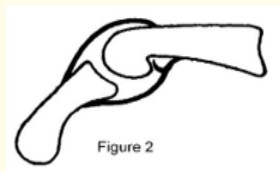
This diagnosis was first described by Langenskiold [2], who reported the cause as radial collateral ligament entrapment by the metacarpal head (Figure 1 and 2). Other causes for locking of the MCP joint have been described, such as volar metacarpal head osteophytes impinging on the collateral ligaments or palmar plate [3], irregularities of the articular surfaces of the MCP joint [4], tears of the collateral ligaments or palmar plate [5], intra-articular loose bodies [6] and abnormal soft tissue bands around the joint [7], and sub-luxation of the extensor tendon to the interdigital cleft [8].

### Case Report

Sixty-year old right handed-female patient, controlled hypertension, married house wife, presented to the outpatient department complaining of pain over the right 3<sup>rd</sup> MCP joint that started suddenly after she was pulling a kitchen table 3 days earlier without a history of trauma, also she complained of inability to extend her right 3<sup>rd</sup> MCP joint that became swollen over the past 3 days prior to her presentation without any prior similar complaint.

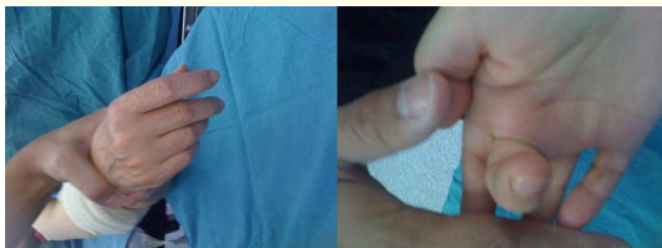


**Figure 1:** Shows tear in the volar plate, with a pocket formed in extension.



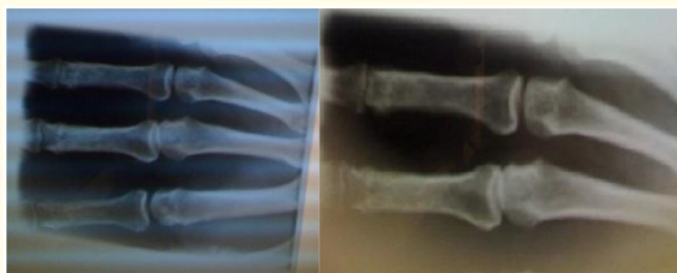
**Figure 2:** Shows locked finger with tear entrapped behind the prominent articular eminence blocking extension.

On examination, there was tenderness over the 3<sup>rd</sup> MCP joint with diffuse swelling and hotness, almost full (90 degrees) but painful flexion over the right 3<sup>rd</sup> MCP joint, extension lag of 40 degrees at the same MCP joint (Figure 3). The IP joints proximally and distally were of full range of motion, without triggering of the finger at any pulley.



**Figure 3:** Clinical exam shows locked right 3<sup>rd</sup> MCP joint in flexion with ability to actively flex MCP joint to 90 degree with active flexion of IP joints.

Radiographs showed degenerative changes over the 3<sup>rd</sup> MCP joint (Figure 4), with obvious small osteophyte at the ulnar side of the 3<sup>rd</sup> metacarpal head.



**Figure 4:** Radiographs show degenerative changes in 3<sup>rd</sup> MCP joint with ulnar-sided small osteophyte.

A provisional diagnosis of locked right 3<sup>rd</sup> MCP joint was taken, and the patient has been operated on the next day after one failed attempt of closed reduction under general anesthesia. A volar approach over the right 3<sup>rd</sup> MCP joint, flexor tendons was retracted radially, then releasing the accessory collateral ligament and opening the joint capsule and exposure of the 3<sup>rd</sup> MCP joint, which cartilage was denuded and degenerated, excision of an ulnar sided osteophyte which was catching behind the accessory collateral ligament followed by reduction and full extension of the MCP joint (Figure 5). On the same day, the patient was discharged home and followed up for 18 months with uneventful recovery, no recurrence, and full range of motion at the 3<sup>rd</sup> MCP joint.



**Figure 5:** Excision of metacarpal head osteophyte through a palmar approach resulting in immediate unlocking of the joint.

### Methods of Literature Review

PubMed and Google Scholar research was performed using the term “locked metacarpophalangeal joint”. Articles treating the locked metacarpophalangeal joint of the thumb were excluded. Relevant articles written between 1950 and 2007 in English and French were reviewed. Case reports treating the same etiologies were selected based on their novelty compared to the previous ones.

### Discussion

Harvey [9] described two cases of locking of the MCP joint and with the twenty-two cases reviewed by Honner [6] suggested a simple classification of three types: spontaneous, degenerative, and miscellaneous. The degenerative group comprised ten patients reported by Aston [10] and Goodfellow and Weaver [11], where osteophytes around the front of the metacarpal head caught the collateral ligament or volar plate. The middle finger as in our patient, was by far the most likely to be affected. Kessler [12] has noted that the MCP joints seldom participate in a generalized degenerative arthritis and almost never in its early stages. He described a series of seven patients where the clinical signs and symptoms and the radiological changes were confined to the MCP joint of the middle finger. He could not explain this but noted that all seven were engaged in manual work and only one was aged under fifty-years old.

In the spontaneous group, the index finger was most often affected. The average age was thirty-three years and females were more likely to be affected. The pathological descriptions in this group are variable but the common factor in the etiology seems to be presence of an abnormally prominent ridge on the radial side of the metacarpal head which may catch in the structures around the metacarpal head [13]. Langenskiold [2] and Harvey [9] each described two cases where the intact capsule or accessory collateral ligament was caught on the prominence and it is probable that the bilateral case described by Yamauchi [14] was similar. In the patients described by Bruner [7], the accessory collateral ligament was caught behind the prominence and split from its attachment to the true collateral ligament. Yancey [5] reported a case where there was a tear in the substance of the volar plate itself catching on the eminence and two cases described by Flatt [15] demonstrated that the sesamoid bone normally present in the volar plate of the index finger could cause locking in a similar fashion.

Since Harvey’s review of the literature, Charendoff [16] has reported locking of the index finger in a forty-six year old woman due to an exostosis on the radial side of the metacarpal head which had eroded through the capsule entrapping the tendon of the first dorsal interosseous muscle and limiting extension. In a third group, due to miscellaneous causes were three cases reported by Flatt [17] where

the locking was due to an irregularity of the articular surface of the metacarpal head and Honner [6] described a case where a loose body was causing the locking.

Stewart and Dandy [18] described nine cases of locking of the MCP joint where two were spontaneously reduced and the other seven cases needed surgical intervention with the presence of degenerative changes in all cases. On the other hand, others reported cases of locked MCP joints due to abnormalities in the shape of metacarpal head [12], Renton [19] reported abnormal metacarpal heads in brachymesophalangy causing locking. Tani [3] reported locking of MCP joints in a patient with acromegaly, and also Hamada [20] reported locking of the MCP joint as a result of the shape of the metacarpal head in achondroplasia. Inoue [21] reported an intra-articular fracture of the metacarpal head causing locking of the index finger due to forced passive extension. A benign chondroma precipitating MCP joint locking was documented by Cavanagh and Birch [22] and Vinnars [23]. In fact, any modification of the metacarpal head geometry is likely to be the cause of a locking based on this mechanism (intra-articular fracture, malunion, bone tumour, etc).

Most authors recommend surgical management because it provides definitive cure and good outcomes. Nevertheless, closed reduction is mentioned in the literature with variable outcomes [1,3,6,9,18,21,24,25]. There is no overall agreement in which cases it should be applied. Yagi [26] described a four-step technique of closed reduction to unlock an entrapped accessory collateral ligament. He successfully treated twelve cases (all females) with this method, without iatrogenic injury but with a recurrence rate of 50%.

However, Langeskiold [2] reported two cases of iatrogenic fractures due to closed reduction. Nonetheless, most authors do not recommend the closed reduction because of iatrogenic injury and the high recurrence rate. In our opinion this technique can be tried if the reason for the locking is evidently caused by the catching of the accessory collateral ligament on a bony prominence of the metacarpal head. When one attempt at closed reduction has failed, good to excellent outcomes can be achieved by surgical treatment. We recommend the palmar approach for central rays (long and ring fingers) and the lateral approach for lateral rays (index and little fingers) in case the etiology is volar as guided by clinical findings (pain, swelling) and radiological investigations. Dorsal approach can be favoured only in the event that the cause is dorsal such as the subluxation of the extensor tendon (rare).

### Conclusion

Diagnosis of the rare clinical disorder "Locked MCP Joint" is mainly clinical in nature. Simple radiography can be very helpful in recognizing the etiology of this disorder. Gentle closed reduction can be attempted but if successful have a high recurrence rate. Therefore, surgical open intervention is considered the definitive treatment to achieve cure in the short and long term. Choice of surgical approach should be guided by the cause of locking revealed by clinical finding and pre-operative radiography.

### Disclosure of Interest

The authors declare that they have no conflicts of interest concerning this article.

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