

## Volar Subluxation of the Thumb MCP Joint: A Subtle, Yet Significant Rare Problem

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### Abstract:

Thumb metacarpophalangeal (MCP) joint subluxation is rare, with dorsal displacement being the most common type. Volar subluxations are exceptionally uncommon and frequently overlooked due to their subtle presentation and inconclusive imaging findings.

We report a rare case of type B volar subluxation of the thumb MCP joint associated with complete ulnar collateral ligament (UCL) injury, initially missed on clinical and radiological evaluation. This case highlights the importance of maintaining a high index of suspicion, careful assessment, and timely surgical intervention to restore stability and function.

**Keywords:** Thumb MCP joint, Volar subluxation, Ulnar collateral ligament, Ligamentous instability, Hand trauma

### Introduction

The thumb MCP joint plays a critical role in precision grip and pinch strength. Joint stability depends on the volar plate, flexor tendons, sesamoid bones, dorsal capsule reinforced by the extensor pollicis longus and brevis tendons, and the radial and ulnar collateral ligaments.

Traumatic MCP subluxation most commonly affects the index and little fingers, with the thumb being less frequently involved. Dorsal subluxations predominate, whereas volar subluxations are exceedingly rare and can easily be misdiagnosed or neglected.

Senda and Okamoto classified MCP volar subluxations into three types: stable (Type A) - manageable conservatively, blocked (Type B) - usually requiring surgical intervention, and unstable (Type C) - definitely requiring open surgical stabilization.

This report presents an overlooked Type B thumb MCP volar subluxation associated with complete UCL disruption and dorsal capsular interposition.

### Case Report

A 34-year-old right-handed male presented with persistent pain and restricted thumb motion four weeks after a fall from approximately one meter. Initially evaluated at a rural clinic, radiographs excluded fracture, and the injury was treated conservatively as an MCP sprain with compression bandaging and analgesia.

Due to unresolved pain and swelling, he was later referred to an orthopedic clinic. Examination revealed tenderness around the MCP joint, mild edema, and limited motion without obvious deformity. Repeat radiographs were again inconclusive. A volar thumb slab was applied for immobilization.

At a two-week follow-up, pain and swelling had improved, but thumb motion remained restricted. Repeat radiographs revealed volar subluxation of the MCP joint on the lateral view. Two attempts at closed reduction under local and regional anesthesia failed to maintain reduction.

Upon referral to a hand surgery clinic, examination demonstrated volar sagging of the proximal phalanx (Figure 1), extension lag, weakened pinch and grip strength compared to the contralateral side, localized tenderness, and a positive thumb extension test. Stress testing was inconclusive due to pain.



(Figure 1)

Radiographs confirmed volar subluxation with reduced joint space (Figures 2 and 3).



(Figure 2,3)

Ultrasound imaging revealed UCL disruption, and MRI confirmed complete UCL tear with dorsal capsular interposition consistent with unstable volar subluxation (Type B) (Figure 4, 5).



(Figure 4) US.



(Figure 5), MRI.

Surgery was performed eight days later via a dorsolateral approach. Intraoperatively, the dorsal capsule was found interposed between joint surfaces, and the UCL was completely avulsed from its insertion.

(Figure 6,7)



(Figure 6)



(Figure 7)

After excising the interposed capsule, reduction was easily achieved. Stabilization was obtained using an oblique K-wire with the MCP joint in extension. (Figure 8,9)



(Figure 8)



(Figure 9)

The UCL was reattached using bone tunnels, and the dorsal capsule was repaired (Figures 10,11).



.(Figure 10)



.(Figure 11)

Postoperatively the thumb immobilization in a volar slab incorporating the interphalangeal (IP) joint in extension.

Sutures were removed after two weeks, the K-wire after four weeks, followed by night splinting for an additional two weeks. At eight weeks, the patient achieved a near-normal range of motion. At four months, he demonstrated full pain-free mobility with restored grip and pinch strength, and radiographs confirmed normal joint congruity.

### **Discussion**

MCP joint subluxations are rare, with an estimated incidence of 1 per 100,000 annually. Dorsal dislocations are the most common, while volar subluxations of the thumb MCP joint remain exceedingly uncommon. Since Singhal's first report in 1974, fewer than 30 cases have been published in English literature up to 2014.

Senda and Okamoto's classification (Types A–C) remains clinically relevant for determining management strategy. Type B lesions, as in our case, are typically associated with ligamentous disruption and dorsal capsular interposition, both necessitating open reduction and repair.

The mechanism of volar subluxation involves hyperflexion or hyperextension trauma, often accompanied by UCL rupture.

UCL involvement is seen in approximately 77% of cases, with radial collateral ligament injuries comprising the remaining 23%.

Diagnosis can be challenging because pain may be mild, deformity subtle, and range of motion partially preserved due to intact flexors. Edema may further obscure clinical findings, and standard radiographs may not reveal displacement unless carefully positioned. Advanced imaging particularly MRI is invaluable in detecting associated soft tissue injuries and confirming joint instability.

Closed reduction should be performed cautiously, avoiding longitudinal traction to prevent further soft-tissue interposition or conversion to a blocked type. When closed reduction fails or instability persists, open reduction with ligament repair and temporary fixation is indicated.

Early recognition and surgical management are key prognostic factors. Cases treated within four weeks of trauma generally achieve excellent outcomes, while delays increase the risk of stiffness, chronic instability, arthritis, and deformity.

In this case, timely surgical intervention led to full recovery without residual instability or deformity at four-month follow-up.

### **Conclusion**

Volar subluxation of the thumb MCP joint is an extremely rare and easily overlooked injury. Awareness of this condition, careful clinical and radiological evaluation, and timely surgical repair of associated ligamentous injuries are crucial to prevent chronic instability and functional impairment.

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