

CASE REPORT

Volar plate osteosynthesis of an intraarticular base fracture of the middle phalanx

The Surgeon

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Introduction

Fractures involving the volar lip or the volar portion of the base of the middle phalanx typically result from hyperextension or axial trauma. These lesions represent intra-articular fractures of the volar base and are often associated with avulsion of the volar plate, sometimes accompanied by rotational displacement or subluxation of the PIP joint.¹⁻³

The fracture fragment may involve a substantial portion of the articular surface, approximately 30% in some reports. PIP joint instability is common, particularly when larger fragments (>30–50%) or displacement are present.³ These injuries may present as isolated avulsion fractures or as components of more complex fracture–dislocations, potentially resulting in loss of volar stability, hyperextension deformity, and—if left untreated—chronic dysfunction or arthrosis.³⁻⁷

Computed tomography (CT) is essential to accurately assess the fracture pattern.

The Case



Patient History / Profile

A 61-year-old, right-hand-dominant, physically active man sustained a hyperextension injury following a fall.



Preoperative Clinical Findings

Inspection revealed swelling and functional impairment of the middle finger. A volar hematoma at the PIP joint was noticed, with maximal tenderness in this area. Both the superficial and deep flexor tendons were intact, and sensation was preserved.

Conventional radiographs demonstrated a fracture of the volar base of the middle phalanx involving more than 30% of the articular surface, accompanied by dorsal subluxation (Figure 1). Additional CT imaging identified a volar fracture fragment as well as an impacted articular fragment (Figure 2).



Figure 1: Preoperative X-rays



Figure 2: Sagittal CT-scan



Surgical Treatment

Volar plate osteosynthesis was selected to manage this unstable, intra-articular fracture and to enable early, stable mobilization.

Through a volar approach the A2 and A4 pulleys were preserved. An ulnarly based flexor tendon sheath flap was elevated to expose the PIP joint. The fragment was anatomically reduced. After appropriate bending and cutting, the plate was temporarily secured with an olive K-wire, allowing fluoroscopic verification of fracture reduction and implant position (Figure 3). Final stabilization was achieved by inserting locking screws (Figure 4).

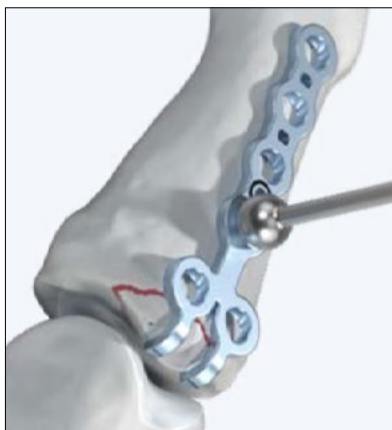


Figure 3: Example of an olive K-wire applied to the dorsal aspect (left). Intraoperative view of the present case (right).



Figure 4: Final intraoperative view



Postoperative Treatment

Active and passive finger motion was initiated on the first postoperative day under the supervision of our hand therapy team. After radiographic confirmation of bony union at six weeks postoperatively, weight bearing exceeding 5 kg was permitted. Full finger flexion was achieved by twelve weeks (Figure 5). Owing to a residual 20° deficit in active extension, plate removal with concomitant tenolysis was performed at six months. Subsequently, the patient regained an almost full range of motion.



Figure 5: Bony healing after 3 months



Conclusion

Volar plating represents a treatment option for unstable, comminuted, or centrally depressed intra-articular base fractures of the middle phalanx, providing a reliable fixation and favorable functional outcomes. Early mobilization is critical for optimal recovery. However, hardware-related complications and degenerative changes may occur. Implant removal is recommended.



References

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