

DELAYED ATTRITION OF EXTENSOR POLLICIS LONGUS AND EXTENSOR INDICIS PROPRIUS TENDONS FOLLOWING VOLAR LOCKING PLATE FIXATION OF A DISTAL END RADIUS FRACTURE

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ABSTRACT

Background: Volar locking plate fixation is widely accepted for the management of distal radius fractures because it provides stable fixation with a lower incidence of extensor tendon complications compared to dorsal plating techniques. Despite this, delayed extensor tendon ruptures—most commonly involving the extensor pollicis longus (EPL)—continue to be reported. Concomitant involvement of the extensor indicis proprius (EIP) tendon is exceptionally rare and presents a significant reconstructive challenge. We report a rare case of delayed simultaneous attritional rupture of the EPL and EIP tendons occurring eleven months after volar locking plate fixation of a distal radius fracture. The patient was successfully managed using a modified reconstructive strategy involving partial EIP-to-EPL transfer combined with Pulvertaft weave repair of the residual EIP to the extensor digitorum communis. Functional recovery of thumb and index finger extension was achieved. This case highlights the importance of recognizing late extensor tendon complications following volar plating and emphasizes the need for meticulous surgical technique and long-term follow-up.

Keywords: Distal radius fracture; Volar locking plate; Extensor pollicis longus; Extensor indicis proprius; Tendon transfer

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Introduction

Distal radius fractures represent one of the most common fractures encountered in orthopaedic practice worldwide, accounting for a significant proportion of upper limb injuries across all age groups. The global incidence continues to rise due to increased life expectancy and higher rates of trauma, particularly falls among the elderly and high-energy injuries in younger individuals.¹

Over the last two decades, volar locking plate fixation has emerged as the preferred surgical method for unstable distal radius fractures. Its advantages include angular stability, maintenance of anatomical reduction, early mobilization, and reduced extensor tendon complications when compared to dorsal plating techniques.² Consequently, volar plating has become the standard of care in both developed and developing countries, including India.

Despite its favourable safety profile, volar locking plate fixation is not without complications. Extensor tendon injuries, particularly delayed rupture of the extensor pollicis longus (EPL) tendon, remain a recognized but under-appreciated problem.³ These ruptures typically occur several months after surgery and are often attributed to dorsal screw prominence or attritional damage at the level of Lister's tubercle.⁴

Anatomically, the EPL tendon traverses a hypovascular zone around Lister's tubercle, making it especially vulnerable to ischemia and mechanical irritation. Even minimal dorsal screw protrusion of 1–2 mm has been shown to result in chronic tendon abrasion, eventually leading to rupture.⁵ Such

injuries often present suddenly, without prodromal symptoms, leading to delayed diagnosis.

In the Indian context, distal radius fractures constitute a large proportion of trauma cases managed surgically, and volar locking plates are widely used across tertiary care centres. However, delayed extensor tendon complications are likely underreported, and awareness regarding their prevention and management remains limited.⁶

Reconstruction of EPL tendon rupture is most commonly achieved using extensor indicis proprius (EIP) tendon transfer due to its similar excursion and minimal donor site morbidity.⁷ Simultaneous attrition or rupture of the EIP tendon itself is exceedingly rare and significantly complicates reconstruction. The present case illustrates such a rare scenario and describes a modified surgical approach to restore optimal hand function.

Case Report

A 52-year-old female sustained a closed fracture of the left distal radius following a fall on an outstretched hand. She underwent open reduction and internal fixation with a volar locking plate. The immediate postoperative period was uneventful, and subsequent follow-up confirmed satisfactory fracture alignment and radiological union.

Approximately eleven months postoperatively, the patient presented with a sudden inability to extend her left thumb. There was no history of recent trauma, pain, swelling, or infection. Clinical examination revealed complete loss of active thumb extension at both the metacarpophalangeal and interphalangeal joints, while passive movements

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were preserved. Wrist movements were near normal. Index finger extension was weak but present. Plain radiographs demonstrated a healed distal radius fracture with dorsal screw prominence, raising suspicion of chronic extensor tendon irritation and attritional injury. Based on clinical and radiological findings, surgical exploration was planned.

Intraoperative Findings

Exploration through a dorsal approach revealed a complete attritional rupture of the extensor pollicis longus (EPL) tendon at the level of Lister's tubercle. The tendon ends were frayed, consistent with chronic mechanical attrition rather than acute injury. Further exploration demonstrated significant distal fraying and degeneration of the extensor indicis proprius (EIP) tendon, rendering it unsuitable for complete tendon transfer. These findings suggested prolonged mechanical irritation secondary to dorsal screw prominence affecting tendons in adjacent dorsal compartments.

Surgical Technique

Given the compromised quality of the EIP tendon, a modified reconstructive strategy was adopted. The proximal healthy segment of the EIP tendon was transferred to the distal EPL stump to restore active thumb extension.

To preserve independent index finger extension, the distal segment of the EIP tendon was sutured to the extensor digitorum communis using a side-to-end Pulvertaft weave, a technique known to provide strong and reliable tendon union.

Postoperatively, the limb was immobilized in a thumb spica splint for four weeks, followed by a supervised physiotherapy program.

Outcome

At final follow-up, the patient demonstrated:

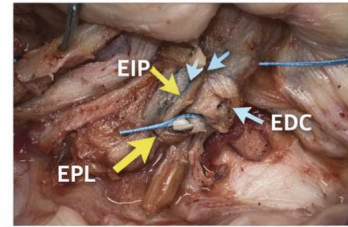
- Restoration of active thumb extension
- Preserved independent extension of the index finger
- No donor site morbidity
- Satisfactory functional recovery without pain or limitation in daily activities



Preoperative radiographs
Dorsally prominent volar locking plate screws



Intraoperative findings
Complete EPL rupture and frayed, degenerated EIP



Modified reconstructive technique
EIP Proximal Ac roxime EPL tendon, 5Ad meniscal rout autures sutured ot EDC

Discussion

Delayed extensor tendon rupture following volar locking plate fixation is an uncommon but clinically significant complication. Although volar plating reduces dorsal soft-tissue irritation compared with dorsal plating, extensor pollicis longus rupture remains the most frequently reported tendon injury when complications occur.⁸ Dorsal screw prominence has consistently been identified as the predominant etiological factor.

The delayed presentation observed in this case—eleven months after surgery—is characteristic of attritional rupture caused by chronic mechanical irritation rather than acute intraoperative injury. Laane et al. demonstrated that a substantial proportion of EPL ruptures following volar plating are related to dorsally prominent screws, even when fracture union has been achieved.

Detection of dorsal screw penetration intraoperatively remains challenging. Ozer et al. showed that standard lateral fluoroscopic views often fail to detect dorsal cortex penetration and recommended the routine use of dorsal tangential views to improve accuracy.⁹ Subsequent studies confirmed that using multiple fluoroscopic projections significantly reduces the risk of unrecognized dorsal prominence.^{10,11}

The unique feature of the present case is the simultaneous involvement of the EIP tendon, which is exceedingly rare. Dey et al. reported a similar case of concomitant EPL and EIP rupture following volar plating, emphasizing that more than one extensor tendon may be compromised by dorsal hardware prominence.¹² Additional reports have highlighted that such multi-tendon involvement complicates reconstruction and necessitates individualized surgical strategies.^{13,14}

Delayed EIP involvement has also been described independently, reinforcing that extensor tendon complications may present long after fracture healing.¹⁵ Imaging modalities such as ultrasound may help detect early tendon irritation before complete rupture occurs.¹⁶

The modified reconstruction performed in this case—partial EIP-to-EPL transfer combined with Pulvertaft weave repair—allowed restoration of thumb extension while preserving index finger function. This adaptable approach aligns with

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recommendations for managing complex extensor tendon injuries where standard donor tendons are compromised.

Conclusion

Volar locking plate fixation, although reliable, is not devoid of late complications. This case highlights a rare instance of delayed simultaneous rupture of the extensor pollicis longus and extensor indicis proprius tendons due to dorsal screw prominence. Meticulous surgical technique, appropriate intraoperative imaging, and long-term vigilance are essential. Modified tendon reconstruction can achieve excellent functional outcomes when conventional options are limited.

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