Closed rupture of the extensor pollicis longus (EPL) tendon was first described by Duplay in 1876. He described a 36-year-old female cane maker who had fallen and injured her right hand. She was seen 6 weeks after the fall, with an inability to extend her thumb and tenderness over the EPL tendon. Duplay diagnosed her with closed rupture of the EPL tendon. From the report, it is unclear whether she sustained a nondisplaced distal radius fracture.

Ruptures of the EPL tendon are classically seen in the setting of nondisplaced distal radius fractures, with an estimated 5% incidence, and are thought to be related to impairment of vascularity. Theorized causes of EPL tendon rupture are believed to fall into 2 main categories. Although mechanical friction of the EPL tendon over a sharp bony prominence may lead to gradual wear and tear of the tendon and ultimately in an attritional rupture, as is seen in the setting of rheumatoid arthritis with Vaughan-Jackson attritional...
ruptures or Mannerfelt lesions, EPL ruptures in the setting of nondisplaced distal radius fractures are more commonly believed to have a vascular or nutritional etiology. The nondisplaced fracture results in bleeding and soft tissue swelling in the tendon sheath. Subsequently, increased pressure within the tendon sheath impairs the blood supply to the mesotendon, ultimately leading to disruption of the vascular supply to the mesotendon, subsequent avascular necrosis, and rupture of the EPL tendon.

The EPL is not only the main extensor of the interphalangeal (IP) and metacarpophalangeal (MCP) joints of the thumb but also allows for elevation of the thumb up to the level of the palm via its oblique pull. Rupture of the EPL therefore results in an inability to elevate the thumb dorsal to the plane of the palm, as well as an inability to extend the IP joint in the thumb. Some patients may compensate partially for the deficit with a strong extensor pollicis brevis; however, others find the lack of thumb terminal extension bothersome and elect for reconstructive surgery.

In the case of rupture, several options for reconstruction of the EPL tendon exist. Intercalated tendon grafts (ITG) using the ipsilateral palmaris longus (PL) tendon or another expendable donor have been shown to be successful. Another option is a tendon transfer, typically the extensor indicis proprius (EIP). Extensor indicis proprius transfer has high rates of patient satisfaction, good results overall, and few complications. Schaller et al reported that EIP transfer and PL graft can be considered equal alternatives.

It has been suggested that surgical release of the EPL tendon in the setting of tenosynovitis prior to rupture may prevent ultimate rupture of the tendon; thus, the management of EPL tenosynovitis without rupture is typically surgical due to the high risk of tendon rupture. The third compartment is released via a dorsal incision centered over Lister’s tubercle, followed by radialization of the EPL tendon. Finally, inspection of the tendon for mechanical changes is performed.

The current study was conducted to determine whether there is a prodrome of impending EPL tendon rupture in patients who sustained a nondisplaced distal radial fracture. The authors’ hypothesis was that patients with impending or completed EPL rupture associated with a nondisplaced distal radial fracture present with a distinct prodrome. They further hypothesized that if these patients can be identified early, an EPL tendon decompression can be performed, which may ultimately prevent tendon rupture.

**Materials and Methods**

Following appropriate institutional review board approval, a retrospective review was conducted of patients presenting to the senior author’s (J.E.A.) hand clinic over a period of 60 months to identify patients with EPL tendonitis or ruptures. Data were abstracted from the medical record, including age at presentation; sex; occupation; handedness; documentation of prior nondisplaced distal radius fracture; whether an EPL tendon release was performed; presence or absence of EPL tendon rupture; duration of time from injury to rupture; prodromal symptoms; type of procedure performed; clinical symptoms after release; and Quick Disability of Shoulder, Arm and Hand (Q-DASH) scores, pain rating, and grip/pinch strengths both before and after release/reconstruction.

**Results**

Nine patients (7 females and 2 males) were identified with EPL tendonitis or rupture. Among these 9 patients, 7 had sustained a nondisplaced distal radius fracture within the prior 12 months and were included in the analysis. The radiographs in Figure 1 show a healed fracture in 1 of these patients. Of the remaining 2
patients, 1 had EPL rupture following cementation of the distal radius for a giant cell tumor of bone and was excluded from the study; another had no recollection of fracture or other trauma and was likewise excluded from the analysis. Among the 7 patients with a prior nondisplaced distal radius fracture, 4 presented following EPL tendon rupture and 3 presented with tendonitis without rupture.

Of the 4 patients with EPL tendon rupture associated with known distal radius fracture, all presented with an inability to extend and hyperextend the IP joint in the affected thumb and to lift the thumb off a table from a palm-down position. Furthermore, all experienced significant discomfort/tenderness over the course of the EPL tendon. All 4 patients presented with EPL tendon rupture within 1 year of sustaining a nondisplaced distal radius fracture (average, 14.5 weeks). They were all offered and underwent surgical intervention. Postoperatively, all 4 patients were satisfied with their thumb function.

Two of the 4 patients with EPL rupture had prodromal symptoms prior to rupture; they both presented to a primary care provider’s clinic 3 weeks after sustaining nondisplaced distal radius fracture with difficulty extending the affected thumb at the IP joint. They were both capable of extending the affected thumb against resistance, but weakness compared with the contralateral thumb was observed. The other 2 patients described a history of snapping of their thumb while performing mild activities (lifting a box for 1 patient, opening a bag of chips for the other), immediately followed by an inability to extend the IP joint on that thumb (Figure 2).

All 3 patients who did not rupture their EPL tendons had a similar presentation; after sustaining a distal radius fracture a few months prior, they presented to the clinic with extreme tenderness over the course of the EPL tendon and Lister’s tubercle, in addition to wrist pain with thumb motion. However, these patients all had intact EPL function and were able to actively extend at the IP joint of the affected thumb. The diagnosis of EPL tenosynovitis following nondisplaced distal radius fracture was made following imaging (either MRI or ultrasound). Figure 3 is an MRI axial cut obtained on 1 of the patients revealing abundant fluid accumulation around the EPL at Lister’s tubercle, suggestive of tendonitis. Because of the clinical and radiographic findings, there was a concern of a risk of impending EPL rupture. These patients all underwent EPL tendon decompression and subsequently did not experience EPL rupture. The Table summarizes the characteristics of these 3 patients.

**DISCUSSION**

Extensor pollicis longus tendonitis is classically seen in the setting of nondisplaced distal radius fractures and is believed to commonly progress to tendon rupture. This retrospective study included 2 patients who sustained nondisplaced distal radius fractures and presented with EPL symptoms 3 weeks after injury. Their chief complaints were pain and difficulty extending their thumbs. On clinical examination, both patients had painful and weak thumb extension at the IP joint of the affected thumb compared with the contralateral thumb. A few days later, both presented with a complete inability to extend the IP joint in the affected thumb, in addition to tenderness over the course of the EPL tendon, indicative of EPL tendon rupture. These findings seem to indicate that presentation with complaints of weakness and pain with thumb extension...
at the IP joint after sustaining a nondisplaced radius fracture is a prodrome of impending EPL rupture.

This study also included 3 patients with prior nondisplaced distal radial fractures who were seen in clinic with complaints of persistent discomfort and point tenderness over Lister’s tubercle and along the EPL tendon of the affected hand. These 3 patients were all offered and underwent EPL tendon decompression, and all 3 patients eventually had no tenderness over the EPL tendon, no pain with active or passive thumb flexion or extension, and improved Q-DASH scores. The authors believe that this decompression surgery ultimately prevented EPL tendon rupture.

These findings suggest that it is important and possible to recognize patients with a history of prior nondisplaced distal radial fractures presenting with a clinical prodrome of impending EPL tendon rupture (i.e., tenderness over the course of the EPL tendon and Lister’s tubercle, weakness in thumb extension at the IP joint compared with the contralateral side, and pain with thumb movement). If these patients can be identified, they can undergo EPL tendon decompression, which the authors believe ultimately prevents EPL tendon rupture.

However, this study also included 2 patients with prior nondisplaced distal radial fractures who suddenly experienced snapping of the affected thumb, immediately followed by total inability to extend their thumb at the IP joint. They were ultimately diagnosed with EPL tendon rupture, and it is possible that these patients had mild symptoms that they ignored or failed to recall. An alternative is that they may have lacked prodromal symptoms.

**CONCLUSION**

Limitations of this study include the small sample size and retrospective nature. In addition, the authors speculate but cannot prove that rupture was prevented by decompression of the EPL in patients with symptoms but no rupture.

Nevertheless, based upon the findings in this series, the authors believe that it is important to identify the prodrome of EPL tendon rupture because the risk of tendon rupture is high in the setting of EPL tenosynovitis.

**REFERENCES**


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**Table**

Characteristics of Patients Who Underwent Prophylactic Surgical Decompression

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Patient 1</th>
<th>Patient 2</th>
<th>Patient 3</th>
</tr>
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<tbody>
<tr>
<td>Age, y</td>
<td>39</td>
<td>44</td>
<td>18</td>
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<tr>
<td>Prodromal symptoms</td>
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<td></td>
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<tr>
<td>Tenderness over EPL tendon</td>
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<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Tenderness over Lister’s tubercle</td>
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<td>Yes</td>
</tr>
<tr>
<td>Pain with thumb extension</td>
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<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Weakness with thumb extension</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Time between NDDRF and presentation with prodromal symptoms, wk</td>
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<td>8</td>
<td>6</td>
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<td>Prophylactic surgical decompression</td>
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<td>Follow-up after surgical decompression</td>
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<tr>
<td>Tenderness over EPL tendon</td>
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<td>No</td>
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</tr>
<tr>
<td>Tenderness over Lister’s tubercle</td>
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<td>Pain with thumb extension</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>EPL functionα</td>
<td>Intact</td>
<td>Intact</td>
<td>Intact</td>
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Abbreviations: EPL, extensor pollicis longus; NDDRF, nondisplaced distal radius fracture.
α Quick Disability of Shoulder, Arm and Hand scores and grip/pinch strengths were significantly improved after surgical decompression.


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