Bilateral Rupture of Extensor Pollicis Longus
A Case Report

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ABSTRACT: Bilateral rupture of the extensor pollicis longus tendon is a rare entity. Most case studies in the literature have been reported in patients with an underlying systemic condition such as rheumatoid arthritis or following an episode of trauma. An interesting and unusual case is presented and theories concerning etiology, various operative techniques, and recent cases in the literature are discussed.

Introduction

The extensor pollicis longus tendon is the primary extensor at the interphalangeal joint of the thumb. When intact, the tendon is usually visible and palpable. Rupture of the extensor pollicis longus tendon has been reported in association with Colles’ fracture, wrist sprain, and rheumatoid arthritis. Loss of extensor function, however, is variable and many patients do not desire treatment. A 47-year-old male with a previously undetected rupture of the extensor pollicis longus tendon on the left presented to the emergency room following a fall on the right wrist. Initially, extensor pollicis longus function was present on the right but over the next several days he developed loss of function of this tendon. The patient elected to have treatment for the recent injury and a tendon interposition graft was performed. This unusual presentation of bilateral rupture of the extensor pollicis longus tendon emphasizes that this entity must be considered in the examination of the hand after trauma since tendon injury may evolve slowly and complete rupture may not be present initially.

Case Report

A 47-year-old righthanded Bavarian male carpenter fell from a ladder at work and injured his right hand. The patient did not seek medical attention initially. Three days later, September 24, 1983, he again fell from a ladder and sustained an injury to the right hand and presented to the emergency room because of pain and swelling of the right thumb. Physical examination at that time revealed full extension but limited abduction of the right thumb. Radiographs showed no evidence of fracture or dislocation. The patient was referred to the hand clinic for follow-up on September 26. Physical examination at this time revealed edema and marked tenderness over the abductor pollicis longus and extensor pollicis longus tendons but full range of motion was present. The patient was referred to the rheumatology clinic where initial screening studies were within normal limits (blood urea nitrogen was 18; sedimentation rate, 12; uric acid, 5.1; and blood glucose, 91). On the evening of September 26 the patient experienced pain over the metacarpophalangeal joint of the right thumb with a pulling sensation arising over the dorsum of the wrist and radiating to the ulnar aspect of the right mid forearm. The pain was followed by the sudden inability to extend his right thumb.

On October 31, 1983, the patient returned to the hand clinic and was seen by the authors. A diagnosis of rupture of the extensor pollicis longus tendon of the right hand was made (Fig. 1). Further examination revealed that the patient had a complete rupture of the extensor pollicis longus tendon on the left as well. Further questioning revealed that the patient

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was an ardent ice skater and over the past several years had experienced repetitive trauma to the dorsal radial aspects of both wrists when he fell. He recalled that in April of 1982 he fell on his left wrist which subsequently became swollen and tender. The patient ignored the injury until one week later when he developed pain in the left thumb while lifting a heavy suitcase. He was unable to extend his left thumb after this incident but never sought medical treatment for this injury. However, when a similar injury occurred to his right thumb, he immediately sought medical treatment and insisted that the tendon be repaired.

At the time of surgery a curvilinear incision was made beginning at the proximal aspect of the first metacarpal extending to the wrist along the dorsal surface. Rupture of the extensor pollicis longus tendon in the region of the base of the first metacarpal was noted. The skin incision was continued in a curvilinear fashion into the proximal forearm. The frayed tendon was observed to course through the wrist into the proximal forearm (Fig. 2).

The palmaris longus tendon was harvested to serve as the intercalated graft. The distal junction was performed first by weaving the end of the graft through a slit in the tendon which was then sutured by means of a Kessler stitch using 4-0 nylon sutures. Additional sutures were placed using 5-0 nylon to give added strength to the repair. Then, with the wrist in approximately 30° of extension and the thumb in the plane of the palm with approximately 30° of metacarpal abduction and full interphalangeal extension, the proximal junction was completed at the level of the musculotendinous juncture. The retinaculum and skin were repaired using 4-0 nylon sutures. Postoperatively the hand and wrist were immobilized for 4 weeks in a cast with the wrist in moderate extension and the thumb in full extension and abduction. The patient had an excellent result postoperatively (Fig. 3, 4). When the patient was seen in hand therapy 6 months following the procedure, full extension of the thumb with the wrist in extension and full unrestrained flexion of the thumb with the wrist in flexion were possible.

**Discussion**

Rupture of the extensor pollicis longus tendon has been reported in association with Colles’ fracture,\(^{1-6}\) wrist sprain\(^{7,8}\) and rheumatoid arthritis\(^{9,10}\) but bilateral rupture is a rare entity. The extensor pollicis longus tendon is the primary extensor at the inter-
Mechanical attrition of the tendon may occur at Lister's tubercle, the area described by Denman, or by bone fragments from a Colles' fracture. Based on anatomic dissections, Denman has pointed out that the tendon may be crushed between the styloid process of the third metacarpal and the dorsal tubercle of the radius when the wrist is forced into extreme extension. He believes that rupture occurs after the crush injury at a variable time according to the degree of damage. Engkvist and Lundborg have studied the microvasculature of the extensor pollicis longus tendon and have shown that the segment of tendon near Lister's tubercle where delayed rupture commonly occurs is poorly vascularized. This area of tendon depends on diffusion from adjacent tendon or synovial fluid for its nutrition. Hemorrhage into an intact tendon sheath leads to increased pressure within the tendon and inhibits this process of diffusion and results in decreased blood supply. Weakening of the tendon structure occurs and ultimately may result in tendon rupture. In rheumatoid patients, proliferative synovitis infiltrates the tendon and weakens its structure. Regardless of etiology, surgical reconstruction can restore excellent extensor function to the thumb.

Direct repair is usually not possible since the attritional damage in the tendon usually results in some loss of tendon substance and because delays in seeking treatment allow the evolution of myoskeletal contracture. The most frequent treatment seen in the literature is tendon transfer. The extensor indicus propius is the most widely used transfer although use of extensor carpi radialis longus and extensor...
pollicis brevis have also been reported. Results are generally excellent. With this technique there is a loss of flexion as a result of the significant tension needed in the transfer to recover full extension but this is not seen as a functional handicap. Tendon grafting is a less frequently used method of treatment according to the literature but this technique has also been reported as yielding excellent results.14

The unusual presentation of this entity highlights the need to consider this injury when examining the post-traumatic hand. Although its exact mechanism is unclear, surgical treatment by either intercalated graft or tendon transfer can yield excellent restoration of extensor function to the thumb.

References


