A Complete Radial Collateral Ligament Avulsion of the Small Finger Metacarpophalangeal Joint with Displacement through the Radial Sagittal Band

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Abstract A displaced complete radial collateral ligament avulsion with associated injury to the sagittal band of the metacarpophalangeal joint of the small finger, if left untreated, may result in chronic pain, instability, weakness, and deformity. A case of a displaced radial collateral ligament that ruptured through the radial sagittal band of the small finger, with resultant injury to the extensor mechanism, is described and discussed with a review of the literature. Proper identification of this injury by physical exam and imaging studies along with surgical repair is associated with good outcome.

Keywords Metacarpophalangeal · Collateral ligament · Avulsion

A case is reported in which the radial collateral ligament of the small finger metacarpophalangeal (MCP) joint was avulsed from the distal insertion and ruptured through the sagittal band with the ligament remaining displaced superficial to the sagittal band. This represented an injury to both the collateral ligament and to the extensor mechanism (sagittal band). Complete radial collateral ligament injuries of the small finger MCP joint, with associated ligament displacement through the sagittal bands, are uncommon [3, 6, 9, 16]. In particular, attention to the detection and repair of this displaced ligament injury and ruptured sagittal band may restore joint stability, range

of motion, and extensor function and prevent late instability, pain and deformity.

Case Report

A 52-year-old male security officer presented immediately after reaching up with his open left hand and jamming his small finger against a shelf with an ulnarly directed force. The patient complained of pain, swelling, and the inability to adduct or extend the small finger. He had a previous history of repeated soft tissue mallet injuries in the same finger but reported good function following those injuries. His medical history was otherwise unremarkable.

Physical examination revealed intact skin and moderate swelling with slight ulnar deviation and flexion of the small finger at the MCP joint. Palpation was remarkable for tenderness over the radial MCP joint, but it was difficult to palpate for any mass between the ring finger and small finger due to the location between the metacarpal heads. There was an extension lag at the MCP joint of approximately 30°, but with passive reduction of the MCP joint into extension, he was able to maintain extension, and there was no subluxation of the small finger extensor tendons. Ulnar deviation of the finger at rest approached 40° and was unstable with further ulnar deviation in the flexed position. The joint was stable to radial deviation in both flexion and extension. Interphalangeal joint motion was full. Radiographs revealed a congruent joint space and no fracture or subluxation (Fig. 1).

The provisional diagnosis was a radial collateral ligament avulsion with a secondary concern regarding a sagittal band or extensor mechanism injury. A magnetic resonance imaging (MRI) scan was obtained to determine the severity and location of the ligament tear and to further define the

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Figure 1 Congruent small finger metacarpophalangeal joint without fracture.

injury to the extensor mechanism. The MRI scan identified the ligament avulsion from the base of the proximal phalanx and revealed a ruptured radial sagittal band, with displacement of the distal end of the ligament superficial to the radial sagittal band (Fig. 2a and b).

Due to the displaced complete ligament injury, sagittal band rupture, and the unstable MCP joint, surgical repair was recommended. Exposure was performed through a dorsal midline incision, and the radial collateral ligament was found superficial and radial to the sagittal band where the ligament had ruptured through the proximal sagittal band fibers (Fig. 3). It appeared that the displaced ligament, which was traversing the sagittal band, also interfered with gliding of the extensor mechanism. The ligament was then reduced and repaired with a suture anchor that was placed in the center of the bare area resulting from the ligament avulsion (Fig. 4). The sagittal band was repaired with suture, and the extensor tendon was stable and glided well throughout flexion and extension without subluxation. Postoperatively, the interphalangeal joints were mobilized with buddy taping, and the MCP joint was initially immobilized at about 40° of flexion. Motion was then allowed from 0° to 40° for 3 weeks, and then full flexion and extension was allowed with buddy taping to the ring finger. The patient recovered 0–80° of MCP motion with a stable joint and full interphalangeal motion and has returned to his job, full duty.

Figure 2 Axial (a) and coronal MRI (b) with arrows indicating the end of the displaced ligament avulsion located superficial to the sagittal band.

Figure 3 Intraoperative photos of the displaced ligament (black arrow) and sagittal band (white arrow).

Figure 4 Suture anchor repair of the distal radial collateral ligament avulsion.

Discussion

A displaced, complete ligament tear of the small finger MCP joint radial collateral ligament (with or without extensor mechanism) is not encountered frequently [3, 6, 9, 14, 16] but, if left untreated, may result in an unstable joint that may progress to chronic instability with pain, deformity, and weakness [6].

The finding of a displaced ligament avulsion superficial to the sagittal band fibers has been reported as “Stener-like” in several reports [3, 9, 14, 16]. In similarity to the thumb ulnar collateral “Stener lesion” [15], significant disability may result if the ligament is not repaired as the interposed sagittal band of the finger may prevent any healing of the ligament to bone. It is of equal importance to detect abnormalities in the extensor mechanism function, as this may raise awareness of a more severe injury and help to direct treatment as well.

Although small finger MCP collateral ligament injuries are rare [3, 6, 16], there are several reports in the literature regarding radial collateral ligament injuries of the small finger MCP joint [8, 16]. Three reports, which were not specifically limited to the small finger MCP joint, have included descriptions of displaced collateral ligaments being found ruptured through a portion of the sagittal band [9, 14, 16]. The long finger MCP joint is most commonly involved with a roughly equal distribution of radial or ulnar

collateral ligament injury. For the border digits, the index finger more commonly has injury to the ulnar collateral ligament, and the small finger typically has injury to the radial collateral ligament, and all of the finger MCP ligament injuries together occur less commonly than in the thumb [3, 6]. Other authors have reported upon unstable MCP ligament injuries of the long finger [6], the ring finger [9], and the index finger [4]. These injuries have also been described with proximal and with distal avulsions [5, 7], with distal avulsions being more common. The importance of surgical correction, often with the use of suture anchors or intrasubstance repair, as well as attention to intra-articular fractures or fragments, has been quite successful, with stable joints and good range of motion being reported [6, 8, 14, 16].

Examination of the stability of the MCP joint and the extensor mechanism is important in determining treatment. Ulnar deviation of the small finger may be apparent due to the pull of the hypothenar muscles [8], the ruptured radial collateral ligament [6], or an injured volar third interosseous muscle or tendon. Extension lag may result from rupture of the sagittal bands with subluxation of the extensor tendon or from interference with gliding of the tendon from the interposed ligament. Examination should include testing the joint for stability in the flexed and extended positions, but instability in the flexed position likely represents a complete tear or avulsion of the collateral ligament. Instability in the extended position represents instability of the accessory collateral ligament, which originates volar to the collateral ligaments [6, 13]. Deviation greater than 40° has been associated with instability [14], while the absence of an “endpoint” may also be found upon exam. A mass may be palpable, but the location of the radial collateral ligament of the small finger MCP joint is more difficult to palpate than the ulnar collateral ligament of the thumb MCP joint due to the adjacent metacarpal head. Examination for the ability to attain extension at the MCP or to maintain extension once the joint has been passively extended will help evaluate for the presence of a sagittal band injury that may be associated with subluxation of the extensor tendon.

Imaging may include radiographs, and a Brewerton view [11] may help to identify an associated fracture of the metacarpal head. Radiographs may demonstrate a congruent joint, an ulnarly deviated joint, or a distracted joint space indicating trapped soft tissue or an intra-articular fragment of bone or cartilage. Further imaging has included arthrography [9] and MRI, and MRI has been shown to be effective in identifying ligament injuries about the finger MCP joints in acute and chronic conditions [2, 12]. In the presented case, MRI clearly demonstrated the displaced, distal ligament avulsion and injury to the radial sagittal band (Fig. 2a and b).

Operative repair is especially reliable in the acute setting and is typically completed through a dorsal approach [1, 3, 6, 8, 10, 14, 16]. In cases where the distal ligament avulsion has ruptured through the sagittal bands, it is also important to be certain that the extensor tendon is centralized and not subluxed following repair of the sagittal band [4, 6]. Postoperative protected mobilization was associated with excellent motion and a stable joint in this case.

Early diagnosis and repair of an acute, displaced, complete radial collateral ligament avulsion with injury to the sagittal band of the small finger MCP joint, is associated with good outcome. Further awareness and suspicion of this injury may improve diagnosis and treatment. Physical examination is likely to yield sufficient information to consider operative intervention, while MRI is a useful tool to confirm the degree and amount of displacement of the ligament tear or avulsion and to evaluate for injury to the extensor mechanism. Surgical repair may be completed through a dorsal approach with either suture repair of intrasubstance tears or suture anchor repair of avulsion injuries. In cases with associated sagittal band injury, the sagittal band should be evaluated and repaired if there is subluxation of the extensor tendon, and proper gliding of the tendon should be observed following repair.

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