Repair of ulnar collateral ligament injuries of thumb metacarpophalangeal joint with microanchors

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Background
Ulnar collateral ligament (UCL) injuries of the metacarpophalangeal (MCP) joint of the thumb are common. Complete rupture can be a debilitating injury resulting in decreased grip and pinch strength.

Purpose
The present study evaluated prospectively the functional results of 27 patients who had open repair of UCL of the thumb using microanchors either acutely or delayed (up to 9 weeks postinjury).

Patients and methods
Through a standard S-shaped incision over the dorsoulnar aspect of the thumb, one or two 1.5- or 1.3-mm microanchors are fixed to the base of the proximal phalanx in the footprint of the avulsed ligament and are used to suture the proximally based flap after temporary pinning of the MCP joint.

Results
The stability, range of motion, pinch grip, and radiographs were evaluated at least 16 months after surgery. The mean time off work was 10 weeks. All patients had equal stability and normal pinch grip when compared with the untreated thumb, allowing all patients to return to preinjury activities, including sports, except one (96% of patients). During final follow-up, radiographs showed no implant complications and no osteoarthritic changes in the MCP joints, and stress testing showed that all patients had normal stability in the treated thumb when compared with the untreated thumb. Only two patients complained a lumpy swelling at the ulnar aspect of the MCP joint, one of which was tender.

Conclusion
Repair of UCL of the MCP joint of the thumb with this technique is an effective, durable, and safe method to allow restoration and maintenance of a stable, pain-free thumb.

Keywords:
anchors, metacarpophalangeal joint, thumb injuries, ulnar collateral ligament

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Introduction

Ulnar collateral ligament (UCL) injuries are the most common injury of the thumb metacarpophalangeal (MCP) joint [1]. The mechanism of injury is sudden, severe radial deviation (abduction).

Complete rupture of the UCL of the thumb MCP joint can be a debilitating injury resulting in decreased grip and pinch strength, thumb discomfort, and/or secondary osteoarthritis [2]. The ligament is usually torn from the distal attachment, but sometimes there are proximal or intrasubstance ruptures [3–5]. In most of these injuries, the distal portion of the ruptured UCL is displaced proximally and is entrapped superficially to the proximal edge of the intact adductor aponeurosis (Fig. 1). This prevents healing of the ruptured ligament and is known as Stener lesion. Stener lesions are reported to be present in 64–87% of complete ruptures of UCL, necessitating surgical treatment [4,6].

Purpose

The present study evaluated prospectively the functional results of 27 patients who had open repair of UCL of the thumb MCP joint using microanchors for a minimum of 16 months.

Patients and methods

Twenty-seven patients with acute or delayed (after 3 weeks postinjury up to 9 weeks) presentation of UCL injuries of the thumb were included in this study. Most patients included in this study (21 patients) presented 3 weeks postinjury.

All patients had a clear history of a valgus-directed traumatic incident that caused the rupture. There was pain, swelling, ecchymosis, and tenderness at the ulnar aspect of the MCP joint of the thumb, and in some patients (especially in patients with delayed presentation) a lump or mass is palpable in this area that might be indicative of a Stener lesion. Valgus

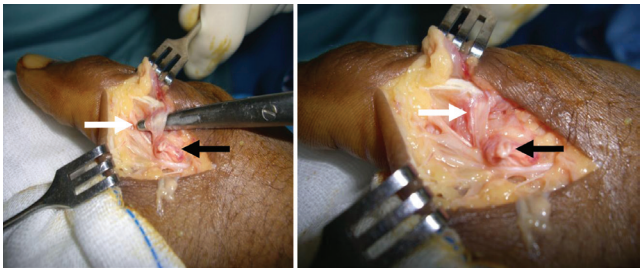
stress testing is performed with the thumb held in full extension and 30 degrees of flexion [4,6–8].

Standard posteroanterior, lateral, and oblique radiographs were obtained in all patients with suspected UCL injury to identify an accompanying avulsion or condylar fracture, and sometimes volar and radial subluxation of the proximal phalanx can be noted.

The presence of 30° overall valgus laxity or a 15° difference from the contralateral thumb in the absence of a clear endpoint to valgus was also considered as an indication of complete ruptures [9–11]. If there is a firm endpoint to valgus stress testing, a partial UCL tear is diagnosed and nonoperative treatment is favored. In cases where testing valgus instability is too painful or a firm endpoint is difficult to feel, the MCP joint is infiltrated with 2 ml of lidocaine to improve the reliability of clinical testing as described by Cooper *et al*. [12]. Although there is concern regarding stress testing in the presence of a nondisplaced fracture, it is relatively safe to assume that, if the initial force of the injury did not displace the fracture, additional stress testing is not thought to be sufficient to displace the fracture [2,9]. If the MCP joint is unstable to stress or the avulsed fragment is displaced or malrotated or the proximal phalanx is subluxed, it has been shown that operative treatment is necessary [10].

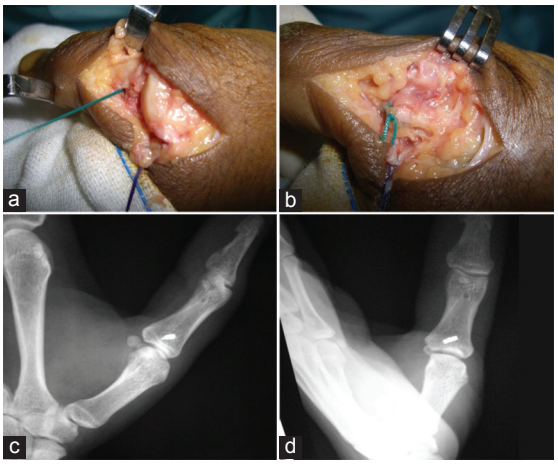
A standard lazy S-shaped incision over the dorsoulnar aspect of the thumb is used. The adductor aponeurosis is identified and separated from the joint capsule. For more common distal avulsions, proximally based flap containing UCL is raised and distally based flap containing UCL remnants, capsule, and soft tissue is raised off the ulnar edge of the proximal phalanx. A temporary transosseous k-wire is used to hold the MCP joint in a reduced position while the ligament is repaired and tensioned, then removed at the end of the procedure. One or two 1.5- or 1.3-mm microanchors are fixed to the base of the proximal phalanx in the footprint of the avulsed ligament and are used to suture the proximally based flap (Fig. 2) after temporary pinning of the MCP joint. The distal flap is now secured on top of the repair using the same sutures from the anchor. In patients with avulsion fractures, small fragments are typically excised and the ligament is repaired back down to the bone with the same technique, whereas larger fragments are sometimes retained and incorporated into the repair (Fig. 3) [11]. Only two patients in our series showed proximal avulsions and were treated similarly, but anchors were inserted into the metacarpal head. None of our patients had a true midsubstance tear and in all patients, even with delayed presentation, the ligament

Figure 1



Showing Stener lesion. White arrow: abductor aponeurosis. Black arrow: distally avulsed ulnar collateral ligament of the MCP joint of thumb. MCP, metacarpophalangeal.

Figure 2



(a) Anchor in place in the footprint of the avulsed ulnar collateral ligament of the MCP joint of thumb at the base of the proximal phalanx. (b) Proximally based UCL is sutured in place using the suture anchor. (c, d) Radiographs showing anchors in place. MCP, metacarpophalangeal; UCL, ulnar collateral ligament.

Figure 3

(a) Large avulsion fracture of the distal insertion of ulnar collateral ligament of the MCP joint of thumb. (b) Fractured fragment is incorporated in the repair with anchor in place. MCP, metacarpophalangeal.

was identifiable and repairable. Tears in the volar plate and dorsal capsule are identified and repaired if present, especially in patients with subluxation of the proximal phalanx.

Of the 25 patients with distal avulsions of UCL of the thumb, 19 patients were found to have Stener lesions where the the distal portion of the ruptured UCL is displaced proximally and is entrapped superficially to the proximal edge of the intact adductor aponeurosis.

The thumb is immobilized postoperatively in a below elbow thumb spica cast for 3–4 weeks and the distal phalanx is not included, and range-of-motion exercises for interphalangeal joint are immediately started to avoid adhesions of the extensor tendons to the injured MP joint capsule. After this, a removable thermoplastic hand-based thumb spica splint is used that is removed about five times daily for controlled active range-of-motion and strengthening exercises. The splint is worn continuously for 3–4 weeks then intermittently for another 3–5 weeks.

Once the thumb regains full range of motion and strength, with no pain on radial stress testing, the splint is no longer used and patient is allowed to return to unrestricted sport. In our series, this usually occurred at about 12 weeks (average 12.4 weeks and a range of 11–15 weeks).

Range-of-motion as well as pinch strength were evaluated weekly starting the 5th week, whereas stability testing by the valgus stress test was started at the 9th week. Radiographs were evaluated immediately postoperatively and at monthly intervals for the first 4 months then every 3 months for the first year after which radiography was performed in patients every 6 months. After return to work or sports, patient was followed up every 1–3 months. The mean follow-up duration was 19 months ranging from 16 to 26 months.

Results

The mean time off work was 10 weeks, whereas the mean return to unrestricted sports was 12.4 weeks. All patients had full active range of motion of the treated thumb at the final follow-up evaluation, which was a minimum of 16 months after surgery. All patients had equal stability and normal pinch grip when compared with the untreated thumb, allowing all patients to return to preinjury activities, including sports, except one (96% of patients). During final follow-up, radiographs showed no implant complications and no osteoarthritic changes in the MCP joints, and stress testing showed that all patients had normal stability in the treated thumb when compared with the untreated thumb. Only two patients complained a lumpy swelling at the ulnar aspect of the MCP joint, one of which was tender.

Discussion

Different techniques have been described for repair of UCL injuries of the thumb, including direct repair to the periosteal tissues at the base of the proximal phalanx of the thumb [6,13–15], transosseous sutures tied over a bone tunnel or over a button on the radial aspect of the MCP joint [16–18] as well as repair using suture anchors [19–21]. Despite the increased expense of the suture anchors, we have found suture anchors to provide effective fixation as well as reliable results in addition to saving operative time, avoiding exposed suture materials, or adding a radial incision. This has been also concluded by many authors in recent literature [11,19–23].

In our series, 19 of the 25 patients (76%) with distal avulsion injuries of UCL of the MCP joint of the thumb had Stener lesions. Because of this, most authors advocate surgical repair of suspected complete injuries. However, there are two studies that report nonoperative treatment for suspected complete injuries. Landsman *et al.* [24] studied 40 patients with suspected complete ruptures who were treated with thumb immobilization for 8–12 weeks. They were followed up for an average of over 2 years. They reported that only 15% of patients did require surgical stabilization, whereas 85% of these patients had no signs of instability, pain, arthrosis, or stiffness. Pichora *et al.* [25] also reported very good results with bracing, but three of the 32 patients at final follow-up reported failure of treatment with persistence of symptoms. Because of less predictable results of nonoperative treatment and the difficulty of delayed reconstruction, we recommend surgical treatment of suspected complete UCL ruptures, after discussion of the treatment options with our patients.

Conclusion

Repair of UCL of the MCP joint of the thumb with suture anchors is an effective, durable, and safe method to allow restoration and maintenance of a stable, pain-free thumb.

Acknowledgements

Conflicts of interest

None declared.

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