Disruption of the Thumb Dorsal Extensor Mechanism in Two Catchers

Joseph N. Liu¹ Grant D. Shifflett¹ Steve K. Lee¹

¹Department of Orthopaedic Surgery, Hospital for Special Surgery, New York, New York, United States

J Hand Microsurg 2016;8:118–119.

Address for correspondence Joseph N. Liu, MD, Department of Orthopaedic Surgery, Hospital for Special Surgery, 535 East 70th Street, New York, NY, 10021, United States (e-mail: LiuJ@HSS.EDU).

Traumatic disruption of the thumb extensor mechanism uncommonly occurs in athletes.¹ We present the previously unreported combination of extensor pollicis brevis (EPB) and dorsal capsule rupture, and extensor pollicis longus (EPL) subluxation in two athletes who sustained this injury pattern while catching and offer a surgical treatment for this complex injury.

A 15-year-old right-hand-dominant adolescent girl sustained an injury to the gloved-hand while playing softball. After a hard catch, she felt immediate pain in the thumb metacarpophalangeal (MP) joint. Physical exam demonstrated 60-degree MP joint extension lag; active flexion was 60 degrees. Interphalangeal (IP) joint had normal active range of motion (0–70 degrees). MP joint was stable to varus/valgus stress. Radiographs and magnetic resonance imaging (MRI) were unrevealing. During surgery, the EPB tendon demonstrated midsubstance rupture near its insertion on the proximal phalanx. The dorsal capsule was also ruptured. The EPL had subluxated ulnarly and palmarly relative to the mid-axis of the thumb. After MP joint reduction/pinning at 0 degrees extension, the EPB was advanced distally and repaired to its insertion at the proximal phalanx with a bone suture anchor. The EPL was then centralized over the mid-aspect of the joint and held with sutures, and dorsal capsular repair was performed with another bone suture anchor. After thumb spica immobilization for 6 weeks, the patient was started on gentle range of motion for 4 weeks, then progressive strengthening. Five months postoperatively, the patient had near full range of motion of the left thumb (0/60 MP, 0/70 IP), no pain or activity restrictions, and returned to softball.

A 23-year-old right-hand-dominant male recreational baseball catcher was evaluated for chronic left thumb deformity and pain. He first noticed these symptoms at age 14 years of age after sessions of hard catching. Physical exam demonstrated 50-degree MP joint extension lag, but no IP hyperex-

tension. MP joint was stable to varus/valgus stress. Radiographs showed a flexed and palmarly subluxated MP joint. MRI revealed chronic remodeling of the ulnar collateral ligament. Intraoperatively, the EPB tendon was ruptured off the proximal phalanx and retracted proximal to the MP joint. The EPL was subluxated off midline and migrated ulnarly and palmarly to the axis of rotation of the thumb, causing the thumb to subluxate palmarly at the MP joint. The attenuated MP joint capsule was opened, which demonstrated osteoarthritis in the dorsal 20% of the joint; however, the remainder of the joint was intact. Consequently, MP joint reduction/pinning, EPB advancement/repair, EPL realignment, and dorsal capsular repair were performed. After 6 weeks of immobilization, the K-wire was removed and the patient started rehabilitation. Approximately 6 months postoperatively, the patient had no pain, an active range of motion of the MP joint of 10/30 and IP joint of 10/45, and returned to baseball.

While uncommon, thumb extensor mechanism injuries have previously been described.^{1,2} Fujimoto et al¹ reported isolated EPB rupture and MP extension lag in the throwing hand of a 15-year-old pitcher, hypothesizing that repeated stress of pitching since a young age induced spontaneous rupture of an immature EPB tendon. The underdevelopment of the EPB tendon made direct repair impossible, and extensor indicis proprius transfer was performed. Failla et al² described three cases of acute EPB rupture off the MP dorsal capsule in conjunction with radial collateral ligament (RCL) injury in patients who were struck in the unprotected thumb. The combination of acute EPB and RCL injury resulted in ulnar deviation and palmar subluxation deformity of the MP joint requiring direct repair of the EPB, dorsal capsule, and RCL. Unlike the previously described cases, both thumb injuries in this series were of the non-throwing, gloved hand. Another important distinction is the subluxation of the EPL tendon that required surgical realignment.

received

May 30, 2016

accepted

June 24, 2016

published online

July 21, 2016

© 2016 Society of Indian Hand & Microsurgeons

DOI <http://dx.doi.org/10.1055/s-0036-1586137>.
ISSN 0974-3227.

The functional role of EPB and need for repair is controversial.^{3,4} The EPB may be thin or absent in some patients, suggesting that tendon reconstruction may not be necessary for full thumb function. Cadaveric dissections, however, have shown a close relationship between the dorsal capsule and the EPB insertion—the tendon may actually insert on the dorsal capsule rather than the proximal phalanx.² While this anatomic variation was not present in our patients, dorsal capsule disruption undoubtedly contributed to the thumb deformities described. The combination of EPB and dorsal capsule rupture, and EPL subluxation prevented our patients from extending the thumb MP joint while maintaining the ability of actively extend the IP joint. Our patients did not have boutonniere deformities as there was lack of IP hyperextension deformity.

Our patients wished to undergo reconstruction for extension of the MP joint and to return to optimal function and activity. Restoration of the EPB with soft tissue balancing including dorsal capsular repair and EPL centralization yielded excellent restoration of the extensor mechanism of the thumb.

Funding

The authors, their immediate family, and any research foundation with which they are affiliated have not received any financial payments or other benefits from any commercial entity related to the subject of this article.

References

- 1 Fujimoto T, Tanase Y, Oribe T, Watanabe Y. Spontaneous rupture of the extensor pollicis brevis tendon in a baseball pitcher: a case report. *Ups J Med Sci* 2009;114(3):189–192
- 2 Failla JM. Combined extensor pollicis brevis and radial collateral ligament injury: three case reports. *J Hand Surg Am* 1996;21(3):434–437
- 3 Bailey RAJ. Some closed injuries of the metacarpophalangeal joint of the thumb. *J Bone Joint Surg [Br]* 1963;45:428–429
- 4 Britto JA, Elliot D. Thumb function without the abductor pollicis longus and extensor pollicis brevis. *J Hand Surg [Br]* 2002;27(3):274–277