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Treatment of Ulnar Collateral Ligament Fracture-Avulsion of the Thumb: A Case Report

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Abstract **Case Report**

Ulnar collateral ligament (UCL) injuries of the thumb, often termed "gamekeeper's thumb," can result from falls or repetitive thumb abduction, predominantly affecting males. The severity ranges from stretching (grade I) to complete tearing (grade III), occasionally accompanied by avulsion fractures. Surgical intervention is advocated in some cases to restore joint stability and prevent osteoarthritis. The authors present a case report of a 51-year-old male with a displaced avulsion fracture at the UCL's distal attachment. Surgical treatment was performed. A lazy S dorsomedial approach over the first metacarpophalangeal joint was made, with careful protection of the dorsal cutaneous branches of the radial sensory nerve. An anatomic reduction of the fracture was achieved with the use of a suture passing k wire that was inserted through the avulsed fragment and then the phalanx and a non-absorbable suture (*fiberwire*) was passed. The free ends of the suture were securely tied on the distal radial side of the proximal phallanx, ensuring a stable fixation. Postoperative immobilization and rehabilitation led to a successful outcome, with the patient returning to work within 6 weeks, without complications. This case underscores the importance of surgical techniques in managing UCL injuries, emphasizing the restoration of joint stability to prevent long-term complications such as osteoarthritis, chronic pain and stiffness. The described method offers a viable option for treating UCL avulsion fractures, facilitating early recovery and preserving joint function.

Keywords: Thumb; Avulsion; ulnar collateral ligament; surgery; transosseous sutures.

INTRODUCTION

The ulnar collateral ligament (UCL) is located at the base of the thumb and plays a crucial role in stabilizing the thumb during activities that involve abduction or extension of the finger (Mohseni M *et al.*, 2024). Injuries to this ligament, commonly caused by falls or repetitive thumb abduction, can lead to hyperabduction or hyperextension. UCL injuries of the thumb are more frequent in males (Richard JR, 1996) and were first described in gamekeepers resulting from thumb impacts on ski poles and are therefore frequently referred to as the gamekeeper's thumb. Individuals engaging in tasks requiring repetitive thumb abduction are also at increased risk.

The severity of UCL injuries can vary, ranging from stretching without tearing (grade I) to partial tearing (grade II) or complete tearing (grade III). Complete ruptures typically affect the distal end of the ligament. In about 25% of cases of complete UCL ruptures, there may also be an avulsion fracture at the base of the proximal phalanx of the thumb (Samelis PV, 2020; Avery DM III *et al.*, 2015). In most cases of complete ruptures of the UCL, adductor pollicis aponeurosis interposes between the injured ligament ends and it's called a Stener lesion. This lesion is considered an indication for surgical intervention (Samelis PV, 2020; Manneck S *et al.*, 2021).

Loss of the thumb metacarpophalangeal joint stability significantly impacts pinch and grip function and is associated with a substantial risk for developing osteoarthritis of the affected joint (Samelis PV, 2020).

As with most musculoskeletal injuries, ulnar collateral ligament injuries can be treated acutely with conservative treatment with application of a thumb spica splint. Surgical treatment is recommended when there is an avulsion fracture at the base of the proximal phalanx of the thumb, in grade III injuries or if there is joint instability - defined as valgus deviation exceeding 15 to

20 degrees compared to the unaffected thumb (Avery DM III *et al.*, 2015).

The aim of this report is to describe a reinsertion surgical technique for UCL fracture-avulsion of the thumb.

CASE REPORT

A 51-year-old male presented at the emergency room with a swollen and painful left thumb after a fall.During clinical evaluation, valgus stress was applied and an unstable metacarpophalangeal joint was noted. Radiological evaluation of the hand revelead a displaced avulsion fracture at the distal attachment of the UCL (Figure 1). Surgical treatment was proposed.

Figure 1: X-ray view of left thumb with a displaced avulsion fracture of the UCL - AP view (left) and dynamic AP view with valgus stress (right)

Under general anesthesia a tourniquet was applied at the level of the arm and inflated to 250 mmHg. A valgus stress was performed with increase of displacement and instability was confirmed. A lasy S dorsomedial approach over the first metacarpophalangeal (MCP) joint was performed and the dorsal cutaneous branches of the radial sensory nerve carefully located and protected. Following this, the aponeurosis of the adductor pollicis muscle was cut, allowing access to inspect the ulnar collateral ligament (UCL). The fracture gap was observed, debris and clots were removed (Figure 2).

Figure 2: Dorsomedial approach to the MCP of the left thumb

Anatomical reduction of fracture was accomplished and under fluoroscopy, two 1.1mm suture-passing k wire were inserted through the fragment and the phalanx of the thumb (Figure 3 and 4). A small incision was made on the radial side of the proximal phalanx, to allow the passage of the k wires, protecting the digital nerve.

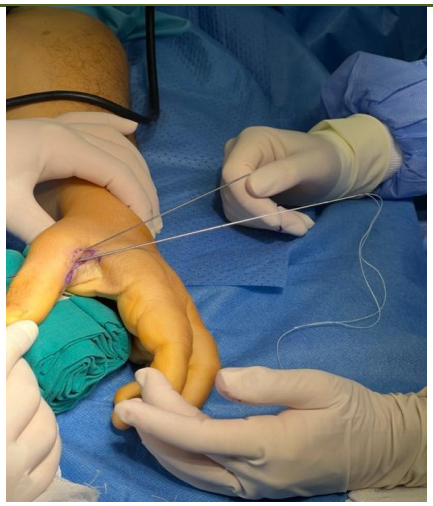

Figure 3: Suture passing K Wire insertion

Figure 4: K Wire position was confirmed

A non-absorbable suture (*Fiberwire*) was threaded from proximal to distal using the suture passing K wire. To connect the exit points of the two k wires, a very small radial incision was carefully made. Blunt dissection was performed to allow direct contact of the suture loop with the radial bone cortex. The free ends of the suture were then pulled and securely tied. The final anatomic reduction and internal fixation of the avulsion fracture was confirmed with fluoroscopy (Figure 5). A valgus stress test was then performed, ensuring the joint stability. The wound was closed.

Figure 5: X-rays of the thumb after reattachment of the avulsed fragment

The patient was immobilized with a thumb spica splint for 4 weeks and then began rehabilitation. There were no postoperative complications. The patient returned to work 6 weeks after surgery. Follow-up was maintained and 2 years after surgery the patient presented with no pain or instability of thumb metacarpophalangeal joint with a Quick DASH score of 2.3% and a Kapandji thumb score of 9 (Figure 6 and 7).

Figure 6: Last follow up, two years after surgery

Figure 7: X-ray two years after surgery, AP view (left) and lateral view (right)

DISCUSSION

Acute complete ligament tears are usually managed surgically, by repairing the ligament in its natural position. This repair process depends on the original ligament tissue being sufficiently long and strong. If the tissue is deficient in either length or quality, reconstruction should be considered instead of an insufficient repair (Avery DM III *et al.*, 2015). When a bone avulsion involves a considerable portion of the joint surface, the preferred approach is to anatomically restore the fragment rather than removing it.

The objective of surgical intervention for unstable tears of the UCL is to regain stability in the thumb metacarpophalangeal joint, thereby restoring pinch strength, grip strength, and therefore hand function and to avoid posttraumatic arthritis or stiffness (Samelis PV, 2020; Avery DM III *et al.*, 2015).

Several techniques are available for the acute repair of the UCL. Midsubstance tears can be addressed through direct suture repair. In cases where ligament disruptions occur proximally at the metacarpal origin or at insertion on the proximal phalanx, surgical reattachment of the ligament to the bone can be performed using trans-osseous sutures, suture anchors or interference screws (Avery DM III *et al.*, 2015). Several studies have demonstrated that these techniques have successful patient outcomes with good motion and restoring pinch and grip strength. Complications are rare and may include primary repair failure, infection,

paresthesias along the radial border of the thumb and reduced range of motion (Avery DM III *et al.*, 2015).

In the presented case a displaced avulsion fracture at the distal attachment of the UCL was diagnosed and anatomic reduction with stable internal fixation was performed. Several surgical techniques have shown successful patient outcomes. We decided to use trans-osseous sutures to avoid implants and minimize complications. This technique restored the thumb metacarpophalangeal joint stability, avoiding stiffness and minimizing the risk of posttraumatic arthritis.

CONCLUSION

This article introduces a case report about one surgical method for internal fixation of an avulsion fracture at the distal attachment of the ulnar collateral ligament (UCL) of the first metacarpophalangeal joint using transosseous sutures was threaded from proximal to distal using the suture passing K wire. In our case, this surgical method allowed restoring the bone avulsion promptly, resulting in early restoration of regular function and avoid stiffness of the first metacarpophalangeal joint.

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