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Common extensor tendon rupture following a corticosteroid injection and olympic weightlifting: A case report, management, and outcome

Breanna Caywood, Andrew Schannen

ABSTRACT

Introduction: Corticosteroid injections are a common form of treatment for orthopedic-related pain, such as knee arthritis, shoulder arthropathy, and in this case, lateral epicondylitis. While most cases of elbow epicondylitis are self-limited and resolve over a 12- to 18-month period, patients often seek treatment for more immediate pain relief well before then. Any form of treatment comes with its own risks, benefits, and alternatives, and corticosteroid injections are no different. Many patients suffering from chronic pain and pain-limited ability to do their activities of daily living or other activities they enjoy choose corticosteroid injections, reasoning that the benefits grossly outweigh the risks. When administered correctly, most patients tolerate corticosteroid injections without complications, and the reported complication rate is very low. Complications from corticosteroid injections are rare but include post-injection pain, tendon rupture, benign skin changes, subcutaneous tissue atrophy, and infection—the most common complications are limited to pain and skin changes. Previous publications report the possible complication of tendon rupture of the flexor digital, patellar, and Achilles tendons associated with corticosteroid injections. Still, few reports of such injuries require a high degree of intervention, such as tendon reconstruction and a muscle flap.

Case Report: This case report discusses the rare presentation of skin changes, fat atrophy, lateral collateral ligament (LCL) rupture, and retraction of the right elbow common extensor origin after a single corticosteroid injection and acute weightlifting injury, requiring lateral ulnar collateral ligament reconstruction and an anconeus rotational muscle flap.

Conclusion: Complete rupture of the common extensor tendon, in addition to massive soft tissue atrophy causing capsular instability, is rare. In the present case, the administration of a corticosteroid injection placed the tendon and surrounding soft tissue at risk, coupled with excessive axial force and varus stress from weightlifting, caused this injury. Care must be taken when correctly placing corticosteroid injections to avoid subcutaneous lipoatrophy and intratendinous placement.

Keywords: Common extensor tendon, Corticosteroid injection, Lateral epicondylitis, Rupture, Tennis elbow

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Breanna Caywood[1], DO, Andrew Schannen[2], MD

Affiliations: [1]Community Memorial Hospital, Ventura, CA, USA; [2]New Mexico Orthopaedic Associates, P.C., Albuquerque, NM, USA.

Corresponding Author: Breanna Caywood, DO, 147 N. Brent St., Ventura, CA 93003, USA; Email: ortho.bre@gmail.com

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INTRODUCTION

Lateral epicondylitis (LE), known colloquially as "tennis elbow," is a common condition affecting between 1% and 3% of the population. It generally affects the middle-aged, with no preference for sex [1]. Most cases are self-limited and resolve within 12–18 months, with 90% of patients recovering within 12 months [2]. Lateral epicondylitis typically presents as a lateral elbow with tenderness upon palpation of the lateral epicondyle.

While the name may suggest inflammation, histologic studies do not show an abundance of inflammatory cells, and thus, LE is considered more of a tendinosis, a degenerative process of the tendon. Additional clinical findings include radiation of pain up the extensor bundle and positive Cozen's, Maudsley's, and Mill's tests [1].

The treatment of lateral epicondylitis is not standardized but generally consists of conservative treatment like rest, nonsteroidal anti-inflammatory drugs (NSAIDS), activity modification, physical therapy, and bracing. The next tier of treatment includes corticosteroid injections, autologous blood injections, platelet-rich plasma injections, percutaneous radiofrequency thermal treatment, extracorporeal shock wave therapy, low-level laser therapy, acupuncture, dry needling, and botulinum toxin A injections. Surgical options include percutaneous, open, and arthroscopic approaches [3].

Corticosteroid injections have been considered safe and effective for short-term efficacy but have not reached sufficient evidence for long-term effectiveness. Depigmentation or subcutaneous tissue atrophy may occur with inappropriate technique or excessive cortisone dose [4].

Acute elbow injuries from weight lifting are not rare, and injuries of the lateral ulnar collateral ligament (LUCL) complex have been described [5]. The lateral collateral ligamentous complex comprises the radial collateral ligament, LUCL, and annular ligament. In combination, the lateral collateral ligaments form the primary stabilizers of the elbow against varus stress.

This case report discusses a healthy 54-year-old female who presented with pain and lateral instability of her right elbow, in addition to skin changes and subcutaneous tissue atrophy. The patient, who competes as an Olympic weightlifter, had previously received a single corticosteroid injection for lateral epicondylitis. She was lifting weights overhead when she felt an acute pop and immediate pain and instability in her elbow. Magnetic resonance imaging (MRI) without contrast showed edema, tearing, delamination of the common extensor origin, and rupture of her lateral collateral ligament. While it is possible the patient could have injured her elbow from the acute weightlifting injury alone, it is speculated that the corticosteroid injection contributed to severe soft tissue atrophy that contributed to capsule incompetence and instability.

CASE REPORT

A healthy and physically active 54-year-old female presented with pain and lateral instability of her right elbow. The patient, who competes as an Olympic weightlifter, received a single corticosteroid injection of 1 cc 1% lidocaine and 1 cc of 40 mg kenalog for lateral epicondylitis five months prior. She reported experiencing some skin changes and fat atrophy from that injection. She was lifting weights overhead when she felt an acute pop and immediate pain and instability in her elbow.

Physical examination showed the right elbow had a 4 × 4 cm area of fat atrophy and skin changes over the lateral epicondyle. The lateral epicondyle and radial head were prominent subcutaneously. The patient was neurovascularly intact with 2+ radial and ulnar pulses, sensation intact to light touch in the median, ulnar, and radial nerve distributions, and intact anterior interosseous nerve (AIN), posterior interosseous nerve (PIN), and ulnar nerve function. Elbow range of motion was 0 degrees extension to 130 degrees of flexion and 90 degrees of both pronation and supination. There was tenderness to palpation laterally and mild pain with resisted extension. No varus or valgus instability.

Radiographs showed no acute fracture or dislocation, no degenerative changes, and no osseous abnormalities. Magnetic resonance imaging (MRI) without contrast showed edema, tearing, delamination of the common extensor origin, and rupture of her lateral collateral ligament.

Conservative management, including therapy and bracing, were discussed, but the patient preferred a more definitive option due to her activity level. Common extensor origin repair and lateral collateral ligament repair were discussed. Risks of surgery, including, but not limited to, bleeding, infection, wound healing problems, nerve, vessel, or tendon injury, residual elbow pain, stiffness, and instability, were discussed, as well as increased concern for wound healing problems in fat atrophy. Informed consent was obtained, and the patient was told to proceed with the surgery.

Due to the fat atrophy, the 6 cm curvilinear lateral incision was made more dorsal than usual. The common extensor origin was exposed and was avulsed from the lateral epicondyle, showing a bare area that extended from the capitellum to the annular ligament (Figure 1). A rongeur was used to decorticate the lateral aspect of the capitellum, and a #2 FiberTape suture was used to capture and imbricate the lateral ulnar collateral ligament and its associated sleeve of soft tissue. The sutures were placed through a Zimmer 2.4 mm knotless suture anchor in order to minimize any prominent knots due to subcutaneous fat atrophy. The anchor was placed at the isometric point of the humerus, which recreated the patient's varus-valgus stability (Figure 2). The avulsed tendon of the common extensor origin would not reach the lateral epicondyle, but a side-to-side repair was performed with 0-Vicryl, which reinforced the lateral soft tissue envelope (Figure 3). The patient tolerated the procedure well and had no known complications.

In subsequent follow-ups, two weeks post-surgery and five weeks post-surgery, the patient reported improvement with no pain. The physical exam revealed swelling of the operative site, neurovascular integrity, an appropriately healing incision without evidence of infection, intact sutures, and no evidence of dehiscence. The patient recovered a normal range of motion and started some light strengthening.

However, the patient followed up eight weeks post-surgery and reported a worsening in symptoms. While

driving and turning the steering wheel, she felt her elbow move and had immediate swelling. She reported swelling and pain with activities. A physical exam showed a normal range of motion with no varus or valgus instability. She had a palpable soft tissue defect between the radial head and capitellum. She was placed in a hinged elbow brace for additional support. The patient works as a pediatric physical therapist and is familiar and comfortable with physical therapy. She will continue to work on gentle range of motion and light activities.

The patient followed up 10 weeks post-surgery with worsening symptoms, especially mechanical symptoms, and instability with low levels of activity. Her pain increased, and she continues to have pain with activities. A physical exam showed that the incision was well healed and neurovascularly intact, with a full range of motion and a sizeable subcutaneous elbow effusion. It was probable that the patient had some soft tissue and capsular incompetency contributing to the effusion. The patient was interested in discussing further options. Lateral ulnar collateral ligament reconstruction using her palmaris longus or a slip of the abductor pollicis longus was discussed, in addition to an anconeus rotational flap to cover the common extensor origin and lateral elbow joint. The risks and benefits of surgery were discussed, and the patient consented to surgery.

Ten days later, the patient underwent the revision procedure. A right elbow lateral collateral ligament reconstruction with palmaris longus autograft and suture anchors and reconstruction of the continuity of the radiocapitellar joint with an anconeus rotational muscle flap was performed.

The previous surgical incision was utilized and extended proximally and distally approximately 2 cm in either direction. The effusion was immediately encountered in the subcutaneous tissue, and once evacuated, the radiocapitellar joint was visible directly underneath the skin. It was evident that the capsule was widely incompetent. The common extensor origin had retracted approximately 2 cm. The joint was unstable, and the previous lateral ulnar collateral ligament repair had degraded. The suture anchor was removed. The lateral epicondyle was roughened to create a flat surface, and a Beath pin was placed at the isometric point. A 5.5 mm cannulated Arthrex drill was used for a 4.75 mm SwiveLock.

The interval between the extensor carpi ulnaris and anconeus was exploited, and the anconeus was lifted off the ulna in a distal to proximal fashion, preserving the proximal attachments and tucked away for later use as a flap. The midway point between the articular surface of the radial head and radial neck was marked and drilled to create a 5.5 mm hole for the 4.75 mm SwiveLock. The palmaris longus was harvested to a length of about 10 cm, and both ends were whipstitched with 2.0 FiberWire. The autograft and FiberWire were loaded into the SwiveLock and inserted in the ulna oriented toward the humeral condyle.

The elbow was held reduced, and the second SwiveLock was inserted at the isometric point of the humerus. The graft appeared to be isometric and restored stability to the elbow. The distal edge of the anconeus rotational muscle flap was sutured with 3-0 proline to the common extensor origin and then circumferentially around the soft tissue defect. The patient tolerated the procedure well and had no known complications.

Two weeks post-right lateral collateral ligament reconstruction with palmaris longus autograft and anconeus rotation flap, the physical exam showed the incision healing appropriately with no evidence of infection. Elbow extension was limited to 20 degrees shy of full extension. Flexion was 110 degrees, supination 90 degrees, and pronation 90 degrees with no instability. The patient was removed from her splint and placed into a hinged elbow brace.

Six weeks post-surgery, the patient reported no pain. Elbow extension improved to 5 degrees shy of full extension, flexion 120 degrees, and no instability. The patient can start weaning from her hinged elbow brace.

Three months out from surgery, the patient reports she is doing well. She has no pain, tenderness, or instability. Her range of motion was 0–130 degrees extension to flexion with 90 degrees pronation and supination, and no varus or valgus instability. She has resumed some gym activities on her own and in therapy. The brace was discontinued at this time.

At final follow up, five months out, the patient reports her symptoms have improved. Her common extensor tendon rupture has appeared to be healed. Her range of motion was 0–130 degrees of extension to flexion with 90 degrees of supination and pronation. She has no pain or instability. She has advanced in her gym activities and will continue to do so slowly. She reports new pain and symptoms consistent with lateral epicondylitis of her left elbow. It was agreed to avoid corticosteroid injections and, instead, continue with activity modification and self-directed therapy.

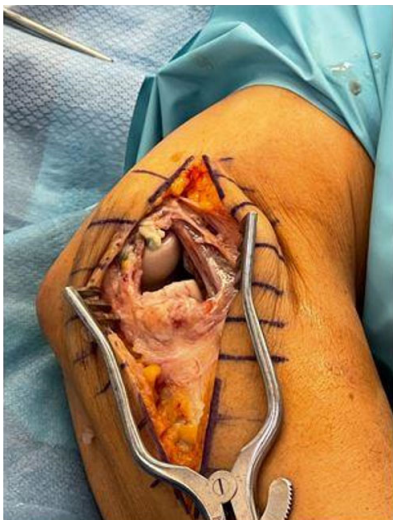

Figure 1: Radiocapitellar joint directly visible beneath the skin of the right elbow.

Figure 2: The Arthrex SwiveLock with the elbow was reduced, creating the anconeus flap.

Figure 3: Anconeus flap secured to common extensor origin.

DISCUSSION

The common extensor tendon plays a crucial role in the function of the elbow and wrist, originating from the lateral aspect of the elbow joint. It consists of several key muscles, including the extensor carpi radialis brevis, extensor carpi radialis longus, extensor digitorum, extensor digiti minimi, and extensor carpi ulnaris. These muscles work synergistically to facilitate wrist and finger extension, essential for a wide range of daily activities and athletic performance.

Degenerative enthesopathy of the common extensor tendon is relatively prevalent, occurring in approximately 1.3% of the population, and is more common among individuals engaged in repetitive overhead activities, such as athletes and manual laborers. This condition is characterized by pain and tenderness in the lateral elbow, often accompanied by stiffness and decreased range of motion.

Corticosteroid injections are a standard treatment modality for managing lateral tendinosis, delivering anti-inflammatory effects directly to the affected area. These injections, when accurately administered, demonstrate low complication rates and can provide significant relief for patients. However, it is critical to note that while corticosteroids can alleviate symptoms, their placement is paramount. Research indicates that injections directly into the tendon tissue may adversely affect its integrity, potentially leading to further degeneration or weakening [6].

Conversely, if corticosteroid injections are administered too superficially, there is a risk of subcutaneous lipoatrophy, which can lead to cosmetic concerns and functional deficits [6–8]. Patients and practitioners must be vigilant about the technique used to minimize such complications, ensuring proper technique and location of injection.

A rare but serious complication of corticosteroid therapy is a massive rupture of the common extensor origin. This risk, albeit uncommon, can have significant consequences, particularly for athletes who engage in overhead weightlifting and similar activities. Such ruptures can severely impair function and require surgical intervention, leading to extended recovery times.

Additionally, if patients experience changes in skin pigmentation or signs of lipoatrophy following a corticosteroid injection, it is essential to monitor such reactions closely. These indicators can signify significant soft tissue atrophy, which may contribute to capsular incompetence and elbow instability, conditions that could lead to further complications if left unaddressed. Therefore, a careful assessment and a tailored approach to treatment are imperative in managing disorders associated with the common extensor tendon.

CONCLUSION

Complete rupture of the common extensor tendon, in addition to massive soft tissue atrophy causing capsular instability, is rare. In the present case, the administration of a corticosteroid injection placed the tendon and surrounding soft tissue at risk, coupled with

excessive axial force and varus stress from weightlifting, caused this injury. Care must be taken when correctly placing corticosteroid injections to avoid subcutaneous lipoatrophy and intratendinous placement. Surgical repair and subsequent surgical reconstruction, including a muscle flap, are needed to restore function and capsular stability to the level of the patient's preference in order to return to her previous level of activity.

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Author Contributions

Breanna Caywood – Conception of the work, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Andrew Schannen – Design of the work, Acquisition of data, Interpretation of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.