

# Tennis Elbow (Lateral Epicondylitis)

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## Introduction

Lateral epicondylitis, also commonly referred to as tennis elbow, describes an overuse injury secondary to eccentric overload of the common extensor tendon at the origin of the extensor carpi radialis brevis (ECRB) tendon.[1][2]

## Etiology

Tennis elbow is often an overuse injury primarily due to repetitive strain from tasks and activities that involve loaded and repeated gripping and/or wrist extension. It historically occurs in tennis players but can result from any sports that require repetitive wrist extension, radial deviation, and/or forearm supination. It is also seen in athletes who play squash and badminton and other sports or activities that require similar movements. As it relates to athletes, this condition is often precipitated by poor mechanics and technique or improper equipment.[3]

## Epidemiology

Tennis elbow is the most common cause of elbow symptoms in patients presenting with elbow pain in general. The condition tends to affect men and women equally. The annual incidence is one to three percent in the United States. Despite the condition being commonly referred to as tennis elbow, tennis players make up only 10% of the patient population. Half of tennis players develop pain around the elbow, of which 75% represent true tennis elbow. It is more common in individuals older than 40 years of age. Smoking, obesity, a repetitive movement for at least two hours daily, and vigorous activity (managing physical loads over 20 kg) are risk factors in the general population for the development of this condition. The natural course of the condition is favorable with spontaneous recovery within one to two years in 80% to 90% percent of the patients.[4][5][4]

## Pathophysiology

This condition is primarily a degenerative overuse process of the extensor carpi radialis brevis and common extensor tendon. Aside from degenerative changes, the histological findings include granulation tissue, micro-rupture, an abundance of fibroblasts, vascular hyperplasia, unstructured collagen, and notably a lack of traditional inflammatory cells (macrophages, lymphocytes, neutrophils) within the tissue. The term has been previously described as angiofibroblastic dysplasia based on multiple histologic studies describing its microscopic appearance and characteristics [6][7]. Ultrasound evaluation often reveals calcifications, intrasubstance tears, marked irregularity of the lateral epicondyle, and thickening and heterogeneity of the common extensor tendon.[8]

## Histopathology

Multiple studies reporting the histologic appearance of pathologic ECRB specimens characterize any combination of

the following characteristics: [7]

- hypertrophic or abundant fibroblasts
- collagen disorganization
- vascular hyperplasia
- lack of inflammatory cells

## History and Physical

Patients will typically report pain with an insidious onset but upon further questioning will often relate an overuse history without a specific inciting traumatic event. The pain commonly occurs one to three days after unaccustomed activity that involves repeated wrist extension.

In an athlete, the history may reveal new equipment use or an atypical workout circumstance such as an abnormally intense or prolonged workout. This condition can also be precipitated by an acute injury or strain such as lifting a heavy object or performing a hard backhand swing in tennis. This acute injury can lead to a more chronic process (i.e. acute-on-chronic overuse injury). The pain is usually over the lateral elbow that worsens with activity and improves with rest. The pain can vary from being mild, for example, with aggravating activities like tennis or the repeated use of a hand tool, or it can be such severe pain that simple activities like picking up and holding a coffee cup or a coffee cup sign will act as a trigger for the pain.

On examination, the point of maximal tenderness is usually over the lateral epicondyle, occasionally in a focal, distal location about 1 cm to 2 cm from the lateral epicondyle itself. Palpation of the entire tendon may have some degree of discomfort, and the connecting muscle may exhibit significant tightness. The patient's pain will increase or be reproduced with resisted wrist extension, especially when the elbow is extended and the forearm is pronated. Resisted extension of the middle finger, while the elbow is extended, is particularly painful secondary to increased stress placed on the tendon, further supporting the diagnosis. Notably, there should be an absence of radicular symptoms or numbness/tingling. These symptoms suggest an alternative process such as a radial nerve entrapment although these conditions can coexist[9].

## Evaluation

Lateral epicondylitis is a clinical diagnosis and imaging is often not necessary. A provider may consider obtaining elbow radiographic series (anteroposterior and lateral) if other injuries or conditions are suspected by history and/or physical exam. Other conditions warranting potential imaging workup include evaluating for concomitant degenerative joint changes, fractures, tumors, or bursitis. If the patient is not responding to nonoperative management modalities, then the provider may consider ordering an MRI or ultrasound to evaluate for tears, stress fractures, or osteochondral defects.[10]

## Treatment / Management

### Nonoperative management

First line management for the management of lateral epicondylitis includes rest from offending activity as guided by the level of pain. Ice after activity and oral/topic NSAIDs can be used to help with pain control. Forearm counterforce straps ("Cho-Pat" straps) are prescribed to relieve tension at the lateral epicondyle. These should be worn during activity. The role of cho-pat straps is relatively controversial as some patients may report pain over the area of maximal tenderness secondary to direct mechanical compression on the area itself. Brace use in the form of a cock-

up wrist splint should be prescribed to take stress off of the wrist extensors [9].

Occupational therapy with a focus on forearm stretching and strengthening and progression to eccentric muscle strengthening of the common extensor tendon has also shown to be helpful. If pain does not respond to conservative measures, then consider more advanced or invasive techniques such as topical nitrates, botulinum toxin, autologous platelet-rich plasma, and dextrose prolotherapy.

## **Surgical management**

Surgery should be considered as a last resort in the management of lateral epicondylitis. Prolonged nonoperative management (i.e. 6- to 12-months) should be attempted prior to considering surgical management. Specific surgical techniques utilized vary throughout the literature. Most surgeons prefer varying degrees of ECRB debridement and/or release of the tendinous origin at the lateral epicondyle. In the setting of the surgeon electing to forego an actual ECRB detachment, a generous debridement should be performed at the ECRB origin with confirmation of debridement of the pathologic tissue and stimulation of a healthy, bleeding, bony bed of tissue at the lateral epicondyle to help stimulate healing potential.[11][12]

## **Differential Diagnosis**

The differential diagnosis for lateral epicondylitis includes, but is not limited to, any of the following conditions: [13]

- Elbow bursitis
- Cervical radiculopathy
- Posterolateral elbow plica
- Posterolateral rotatory instability (PLRI)
- Radial nerve entrapment
- Radial tunnel syndrome
  - palpation 3-4 cm distal and anterior to the lateral epicondyle
  - pain with resisted third-finger extension
  - pain with resisted forearm supination
- Occult fracture(s)
- Capitellar osteochondritis dissecans
- Triceps tendinitis
- Radiocapitellar osteoarthritis
- Shingles

## **Complications**

- Failing to address concomitant pathology
  - patients report inferior outcomes and lack of improvement if the primary cause of symptoms is not addressed; patients should be educated regarding the risks and benefits of surgery -- the former include but are not limited to infection, blood loss, neurovascular injury, continued pain, stiffness, or continued or

worsening overall dysfunction

- radial nerve entrapment can be missed or not addressed clinically in up to 5% of patients being managed for lateral epicondylitis
- Iatrogenic LUCL injury
  - occurs iatrogenically with increased risk if the surgical dissection extends beyond the radial head equator
  - postoperative iatrogenic posterolateral rotatory instability (PLRI) can develop if the extension or LUCL compromise is significant
- Iatrogenic neurovascular injury
  - radial nerve injury
- Heterotopic ossification
  - decrease risk with via copious saline irrigation following decortication and debridement
- Infection

## Pearls and Other Issues

After diagnosis, patient education, and a prescription for conservative treatment, patients can typically follow-up, as needed. Sometimes more chronic cases will need additional follow-up to consider more advanced therapies. Posterior interosseous nerve entrapment (radial tunnel syndrome) may coexist in up to 15% of cases. Keep this diagnosis in mind as a coexisting condition or alternative diagnosis if radicular symptoms are present. Corticosteroid injections have been shown to be beneficial in the short-term (less than six weeks) but ineffective in the long term. Topical nitrates are thought to increase blood flow to the area and as a result, promote healing to the tendon. There has been some suggestion that extracorporeal shockwave therapy can be used to treat this condition chronically. Although, there have been no significant improvements using this therapy thus far. Although evidence has been mixed, platelet-rich plasma and dextrose prolotherapy are pro-inflammatory agents that are designed to cause inflammation or irritation to the tendon and trigger a healing response. Platelet rich plasma seems to have better evidence to date as compared to dextrose prolotherapy. Most notably patients with chronic pain due to this condition report decreased levels of pain and increased levels of functionality compared to corticosteroid injections.[14][15]

## Enhancing Healthcare Team Outcomes

Tennis elbow is very common in society and can occur from many types of racquet sports including golf. Most patients present to the primary care provider with pain around the elbow and the key is patient education. One has to adopt good habits like stretching before taking part in the intense physical activity. In addition, when the pain comes on, it is important to rest the hand. Nurses and physicians in a sports clinic should emphasize the importance of improving muscle strength and conditioning. In addition, one has to use proper equipment.

With rest, the majority of patients with tennis elbow improve within 3-18 months. Surgery is rarely required. [16]

## Questions

To access free multiple choice questions on this topic, [click here](#).

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