DISEASES & CONDITIONS

Tennis Elbow (Lateral Epicondylitis)

Tennis elbow, or *lateral epicondylitis,* is a painful condition of the elbow caused by overuse. Not surprisingly, playing tennis or other racquet sports can cause this condition. However, several other sports and activities can also put you at risk.

Tennis elbow involves the degeneration (wearing down) or, in some cases, microtearing of the tendons that join the forearm muscles on the outside of the elbow. The forearm muscles and tendons become damaged from overuse — repeating the same motions again and again, which leads to pain and tenderness on the outside of the elbow.

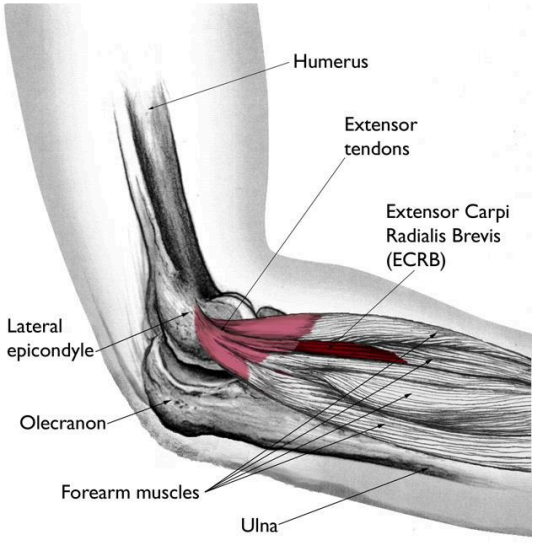
There are many treatment options for tennis elbow. In most cases, treatment involves a team approach. Primary care doctors, physical or occupational therapists and, in some cases, surgeons work together to provide the most effective care.

Anatomy

The elbow joint is a joint made up of three bones:

- The humerus (upper arm bone)
- The radius and ulna (the two bones in the forearm)

There are bony prominences (bumps) at the sides of your elbow and bottom of the humerus called epicondyles, where several muscles of the forearm begin their course. The bony prominence on the outside (lateral side) of the elbow is called the lateral epicondyle.



The ECRB muscle and tendon is usually involved in tennis elbow.

Reproduced and modified from The Body Almanac. © American Academy of Orthopaedic Surgeons, 2003.

Muscles, ligaments, and tendons hold the elbow joint together.

Lateral epicondylitis, or tennis elbow, involves the muscles and tendons of the forearm that are responsible for the extension of your wrist and fingers. The forearm tendons — often called extensors — attach the muscles to bone. The tendon usually involved in tennis elbow is called the extensor carpi radialis brevis (ECRB), which attaches the ECRB forearm muscle to the lateral epicondyle.

Cause

Overuse

Tennis elbow is often due to damage to a specific forearm muscle (ECRB). The ECRB muscle helps stabilize the wrist when the elbow is straight. This occurs during a tennis groundstroke, for example. When the ECRB muscle is weakened from overuse, microscopic tears form in the ECRB tendon where it attaches to the lateral epicondyle. This leads to pain directly over the outside (lateral) part of the elbow.

The ECRB may also be at increased risk for damage because of its position. As the elbow bends and straightens, the muscle rubs against bony prominences (bumps), which can cause gradual wear and tear of the muscle over time.

Activities

Athletes are not the only people who get tennis elbow. Many people with tennis elbow participate in work or recreational activities that require repetitive and vigorous use of the forearm muscle or repetitive extension of the wrist and hand.

Painters, plumbers, and carpenters are particularly prone to developing tennis elbow. Studies have shown that auto workers, cooks, and even butchers get tennis elbow more often than the rest of the population. It is thought that the repetition and weightlifting required in these occupations leads to injury.

Playing tennis is a possible cause of tennis elbow, but other activities can also put you at risk.

Thinkstock © 2015.

Age

Most people who get tennis elbow are between the ages of 30 and 50, although anyone can get tennis elbow if they have the risk factors. In racquet sports like tennis, improper stroke technique and improper equipment may be risk factors.

Unknown

Lateral epicondylitis can occur without any recognized repetitive injury. This occurrence is called idiopathic, or of an unknown cause.

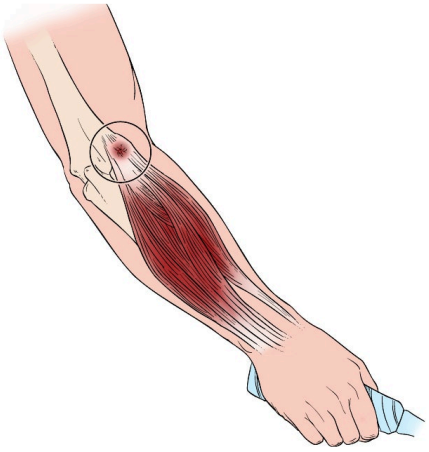
Symptoms

The symptoms of tennis elbow develop gradually. In most cases, the pain begins as mild and slowly worsens over weeks and months. There is usually no specific injury associated with the start of symptoms.

Common signs and symptoms of tennis elbow include:

- Pain or burning on the outer part of your elbow
- Weak grip strength
- Sometimes, pain at night

The symptoms are often worsened with forearm activity, such as holding a racquet, turning a wrench, or shaking hands. Your dominant arm is most often affected; however, both arms can be affected.



Location of pain in lateral epicondylitis.

Doctor Examination

Your doctor will consider many factors in making a diagnosis, including:

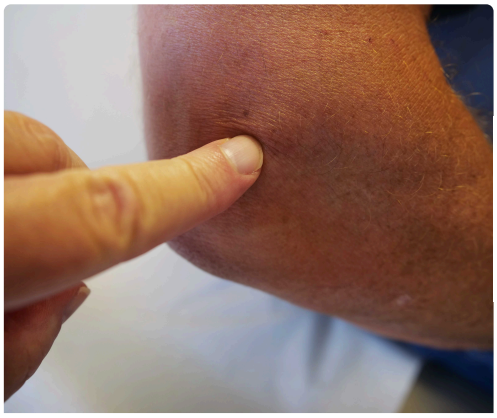
- How your symptoms developed
- Any occupational risk factors
- Recreational sports participation

Your doctor will talk to you about which activities cause symptoms and where on your arm the symptoms occur. Be sure to tell your doctor if you have ever injured your elbow. If you have a history of rheumatoid arthritis or nerve disease, tell your doctor.

During the examination:

- Your doctor will apply gentle pressure to the lateral epicondyle, checking for pain and tenderness.

- They will also use a variety of tests to pinpoint the diagnosis. For example, your doctor may ask you to try to straighten your wrist and fingers against resistance with your arm fully straight to see if this causes pain. If the tests are positive, it tells your doctor that those tendons may not be healthy.



During the exam, your doctor will apply gentle pressure to the lateral epicondyle, checking for pain and tenderness.

Photo courtesy of Stuart J. Fischer, MD, FAAOS

Tests

Your doctor may recommend additional tests to rule out other causes of your elbow pain.

- **X-rays.** X-rays provide clear images of dense structures, such as bone. They may be taken to rule out arthritis of the elbow.
- **Magnetic resonance imaging (MRI) scan.** MRI scans provide images of the body's soft tissues, including muscles and tendons. An MRI scan may be ordered to determine the extent of damage in the tendon or to rule out other injuries. If your doctor thinks your symptoms might be related to a neck problem, they may order an MRI scan of the neck to see if you have a herniated disk or arthritic changes in your neck. Both of these conditions can produce arm pain.
- **Electromyography (EMG).** Your doctor may order an EMG to rule out nerve compression. Many nerves travel around the elbow, and the symptoms of nerve compression at the elbow are similar to those of tennis elbow.

Treatment

Nonsurgical Treatment

Approximately 80 to 95% of patients have success with nonsurgical treatment.

Rest. The first step toward recovery is to give your arm proper rest. This means that you will have to stop or decrease participation in sports, heavy work activities, and other activities that cause painful symptoms for several weeks.

Medications. Acetaminophen or nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen or naproxen, may be taken to help reduce pain and swelling

Physical or occupational therapy. Specific exercises are helpful for strengthening the muscles of the forearm. Your therapist may also perform ultrasound, ice massage, or muscle-stimulating techniques to improve muscle healing.

Wrist stretching exercise with elbow extended.

Brace. Using a brace centered over the back of your forearm may also help relieve symptoms of tennis elbow. This can reduce symptoms by resting the muscles and tendons.

Counterforce brace.

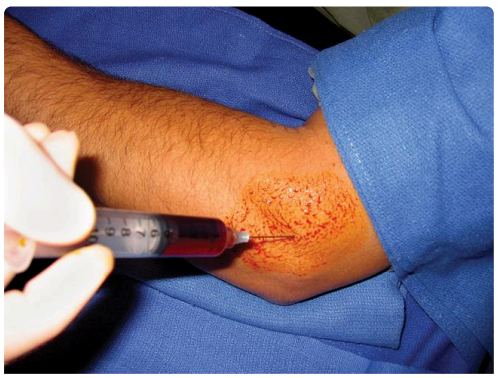
Steroid injections. Steroids, such as cortisone, are very effective anti-inflammatory medicines. Your doctor may decide to inject the painful area around your lateral epicondyle with a steroid to relieve your symptoms.

However, steroid injections should be used very sparingly for lateral epicondylitis, as excessive use can weaken the lateral epicondyle (which is where the ECRB tendon attaches at the elbow) over time.

Platelet-rich plasma. Platelet-rich plasma (PRP) is a biological treatment designed to improve the biologic environment of the tissue. This involves obtaining a small sample of blood from the arm and centrifuging it (spinning it) to obtain platelets from the solution. Platelets are known for their high concentration of growth factors, which can be injected into the affected area. While some studies about the effectiveness of PRP have been inconclusive, others have shown promising results.

An injection of PRP is used to treat tennis elbow.

Courtesy of Allan K. Mishra, MD, Menlo Park, CA.



Extracorporeal shock wave therapy. Shock wave therapy sends sound waves to the elbow. These sound waves create microtrauma that promotes the body's natural healing processes. Shock wave therapy is considered experimental by many doctors, but some sources show it can be effective.

Equipment check. If you participate in a racquet sport, your doctor may encourage you to have your equipment checked for proper fit. Stiffer racquets and looser-strung racquets often can reduce the stress on the forearm, which means that the forearm muscles do not have to work as hard. If you use an oversized racquet, changing to a smaller head may help prevent symptoms from recurring.

Surgical Treatment

If your symptoms do not respond after 6 to 12 months of nonsurgical treatments, your doctor may recommend surgery.

Most surgical procedures for tennis elbow involve removing diseased tendon and reattaching healthy tendon back to bone.

The best surgical approach for you will depend on a range of factors, including:

- The scope of your injury
- Your general health
- Your personal needs

Talk to your doctor about the options. Discuss the results your doctor has achieved and any risks associated with each procedure.

Open surgery. The most common approach to tennis elbow repair is open surgery. This involves making an incision over the outside (lateral aspect) of the elbow. This procedure is usually performed on an outpatient basis, meaning you go home from the hospital the same day as your surgery.

Arthroscopic surgery. Tennis elbow can also be treated using miniature instruments and small incisions. Like open surgery, this is a same-day or outpatient procedure. Learn more: Elbow Arthroscopy

Surgical risks. As with any surgery, there are risks with tennis elbow surgery. The most common things to consider include:

- Infection
- Nerve and blood vessel damage
- Possible prolonged rehabilitation
- Loss of strength
- Loss of flexibility
- The need for further surgery

Rehabilitation. Following surgery, your arm may be immobilized (held in one position) temporarily with a splint. About 1 week later, the sutures and splint are removed.

After the splint is removed, you will begin exercises to stretch the elbow and restore flexibility. Light, gradual strengthening exercises are started about 2 months after surgery.

Your doctor will tell you when you can return to athletic activity. This is usually 4 to 6 months after surgery.

Tennis elbow surgery is considered successful in 80 to 90% of patients. However, it is not uncommon to experience a loss of strength.

Reviewed by members of

ASES (American Shoulder and Elbow Surgeons)

Last Reviewed

April 2024

Contributed and/or Updated by

Jocelyn Ross Witstein, MD, FAAOS

Michael J. Alaia, MD, FAAOS

Peer-Reviewed by

Mary K. Mulcahey, MD, FAAOS

Stuart J. Fischer, MD, FAAOS