



# Ruptured Tendon

## Ruptured Tendon Overview

A tendon is the fibrous tissue that attaches muscle to bone in the human body. The forces applied to a tendon may be more than 5 times your body weight. In some rare instances, tendons can snap or rupture. Conditions that make a rupture more likely include the injection of steroids into a tendon, certain diseases (such as gout or hyperparathyroidism), and having type O blood.

Although fairly uncommon, a tendon rupture can be a serious problem and may result in excruciating pain and permanent disability if untreated. Each type of tendon rupture has its own signs and symptoms and can be treated either surgically or medically depending on the severity of the rupture and the confidence of the surgeon.

The 4 most common areas of tendon rupture include:

- **Quadriceps**
  - A group of 4 muscles that come together just above your kneecap (patella) to form the patellar tendon.
  - Often called the quads, this group of muscles is used to extend the leg at the knee and aids in walking, running, and jumping.
- **Achilles**
  - This tendon is located on the back portion of the foot just above the heel. It is the site where the calf muscle attaches to the heel of the foot (the calcaneus bone).
  - This tendon is vital for pushing off with the foot. The Achilles helps you stand on your tiptoes and push off when starting a foot race.
- **Rotator cuff**
  - Your rotator cuff is located in the shoulder and is actually composed of 4 muscles that function together to raise your arm out to the side, to help you rotate the arm, and to keep your shoulder from popping out of its socket.
  - The rotator cuff tendon is one of the most common areas in the body affected by tendon injury. Some studies of people after death have shown that 8% to 20% have rotator cuff tears.
- **Biceps**
  - The biceps muscle of the arm functions as a flexor of the elbow. This muscle brings the hand toward the shoulder by bending at the elbow.

- Ruptures of the biceps are classified as proximal (close) or distal (far). Distal ruptures are extremely rare. The proximal rupture occurs where the biceps attaches at the top of your shoulder.

## Ruptured Tendon Causes

In general, tendon rupture occurs in a middle-aged or older man. In the young, muscle usually tears before the attached tendon does. But in older people and in those with certain diseases (such as gout and hyperparathyroidism) tendon ruptures are more common.

- General causes of tendon rupture include:
  - Direct trauma
  - Advanced age. As you age, your blood supply decreases. This decreases blood going to the tendon, resulting in weakening of the tendon.
  - Eccentric loading. When your muscle contracts while it is being stretched in the opposite direction, increased stress is placed on the involved tendon.
  - Steroid injection into the tendon. This treatment is sometimes used for severe tendonitis.
  - Certain antibiotics. Antibiotics such as fluoroquinolones increase the risk for tendon rupture, particularly the Achilles tendon.
- Quadriceps tendon rupture may be caused by:
  - Direct trauma to the knee just above the patella (kneecap)
  - Advanced age resulting in decreased blood supply to the inside of the tendon
  - Combination of quadriceps contraction and stretching of the muscle (eccentric loading)
- Achilles tendon rupture may result from:
  - Advanced age resulting in decreased blood supply to the inside of the tendon
  - Strenuous physical activity by those who are not well conditioned
  - Direct trauma
  - Unexpected forcing of the sole of your foot upward as in landing on your feet after jumping from a height
  - Excessive strain while pushing off with the weight-bearing foot
  - Having group O blood type (This is a controversial cause-and-effect relationship.)
- Rotator cuff tendon rupture may be caused by:
  - Lifting a heavy object overhead
  - Direct trauma

- Attempting to break a fall with an outstretched hand
- Biceps tendon rupture may result from:
  - Forced flexion of the arm
  - Lifting 150 pounds or more (traumatic rupture)
  - Advanced age resulting in gradual weakening of the tendon
  - May occur spontaneously

## Ruptured Tendon Symptoms

An injury that is associated with the following signs or symptoms may be a tendon rupture:

- A snap or pop you hear or feel
- Severe pain
- Rapid or immediate bruising
- Marked weakness
- Inability to use the affected arm or leg
- Inability to move the area involved
- Inability to bear weight
- Deformity of the area

Symptoms associated with specific injuries include the following:

- Achilles tendon rupture: You will be unable to support yourself on your tiptoes on the affected leg (you may be able to flex your toes downward because supporting muscles are intact).
- Rotator cuff rupture: You will be unable to bring your arm out to the side.
- Biceps tendon rupture: You will have decreased strength of elbow flexion and decreased ability to raise the arm out to the side when the hand is turned palm up.

## When to Seek Medical Care

Call a doctor if you hear or feel a snap or pop, have severe pain, rapid or immediate bruising after an accident, and are unable to use the affected arm or leg. You may have a tendon rupture.

Visit the hospital's emergency department whenever an injury occurs that produces severe pain and is accompanied by a pop or snap. Weakness, inability to move the area involved, inability to bear weight, and deformity of the area are other key symptoms that require a visit to the emergency department.

Because you know your body the best, if something appears to be serious to you, it is usually the best course to be conservative and have an evaluation.

## Exams and Tests

Tendon rupture is usually diagnosed using a physical examination. Any imaging is done to confirm the diagnosis and decide the severity of the rupture

### Quadriceps

- X-rays often show that your patella (kneecap) is lower than its normal position on a side view of the knee.
- Using an MRI, your doctor can tell whether your rupture is partial or complete.

### Achilles tendon

- Your doctor may do a Thompson test. In this test, your doctor will have you kneel on a chair and dangle your foot over the edge. The doctor will then squeeze your calf in a particular place. If the toes on your foot don't point downward when the doctor squeezes, then you probably have a ruptured Achilles tendon.
- In a test called the blood pressure cuff test, your doctor will place a blood pressure cuff on your calf. The cuff is then inflated to 100 mm Hg. The doctor will then move your foot into a toes-up position. If your tendon is intact, it will cause the pressure to rise to about 140 mm Hg. If you have a tendon rupture, the pressure will increase only a small amount.
- You may be able to flex your foot downward because your supporting muscles are intact. You will be unable to support yourself on your tiptoes on the affected side however.
- X-rays taken from the side may show darkening of the triangular fatty tissue-filled space in front of the Achilles tendon or a thickening of the tendon.
- MRI or ultrasound may be used to decide how severe your rupture is, although these tests are usually not needed to make the diagnosis.

### Rotator cuff

- You will be unable to initiate bringing your arm out to the side.
- Your doctor may do a drop arm test. In this test, your arm is passively raised to 90°, and you are asked to hold your arm at this position. If you have rotator cuff rupture, slight pressure on the forearm will cause you to suddenly drop the arm.
- X-rays may show that the long bone in your upper arm (the humerus) is slightly out of place.
- Shoulder arthrography is most helpful in identifying a suspected rotator cuff tear. In this test, a dye that shows up on X-rays is injected directly into the shoulder joint,

and the joint is then moved around. Then an X-ray of the shoulder is taken. If any dye is seen leaking from the joint, then it is highly likely that you have a ruptured rotator cuff.

- MRI provides a noninvasive means of assessing the integrity of the rotator cuff although it is more costly and not as specific as arthrography.

## Biceps

- X-rays may show that your upper arm bone is out of place or that the place where the muscle attaches has changed.
- If your biceps tendon is completely ruptured, the biceps retracts toward the elbow causing a swelling just above the crease in your arm. This is called the Popeye deformity.
- You will experience decreased strength of elbow flexion and arm supination (moving the hand palm up).
- You will have decreased ability to raise the arm out to the side when the hand is turned palm up.

## Ruptured Tendon Treatment

### Self-Care at Home

For all ruptured tendons, regardless of the site, follow the standard RICE (Rest, Ice, Compression, Elevation) home therapy procedure as you seek medical attention. RICE involves:

- Resting the affected extremity
- Applying ice to the affected area
  - Apply ice in a plastic bag wrapped in a towel or with a reusable cold pack wrapped in a towel.
  - Applying ice directly to skin may lead to further damage if left on for a prolonged period of time.
- Compression of the affected area to minimize swelling
  - Apply compression by loosely wrapping the affected area with an ACE bandage.
  - Be sure that the bandage does not cut off blood flow to the area in question.
- Elevation of the extremity if possible
  - Try to keep the area above the level of your heart to minimize swelling.
  - It is recommended that the quadriceps rupture should be immobilized in an extended (straight knee) position and that biceps rupture should be immobilized in a sling with the elbow bent at 90°.

## Medical Treatment

- Quadriceps
  - Partial tears may be treated without surgery by placing your straight leg in a cast or immobilizer for 4-6 weeks.
  - Once you are able to raise the affected leg without discomfort for 10 days, it is safe to slowly stop the immobilization.
- Achilles tendon
  - Treatment without surgery involves immobilizing your foot so that the sole of the foot is pointed downward for 4-8 weeks.
  - This treatment has been advocated by some because it gives similar results to surgery in motion and strength. The problem with this treatment is that it has a rerupture rate of up to 30%. Nevertheless, it may still be a reasonable option for those who are at increased operative risk because of age, medical problems, or inactivity.
- Rotator cuff
  - The rotator cuff is unique because treatment without surgery is the treatment of choice in most tendon injuries. More than 90% of tendon injuries are long term in nature, and 33-90% of these chronic rupture symptoms go away without surgery.
  - In contrast, acute rupture, as occurs with trauma, may or may not be repaired surgically depending on the severity of the tear.
  - If the tear is either less than 50% of the cuff thickness or less than 1 cm in size, the dead tissue is removed arthroscopically. A small incision is made and a tool called an arthroscope is passed into the joint. Through it, the surgeon can see and remove dead tissue without actually cutting the joint open. The shoulder is then left to heal.
- Biceps
  - Most surgeons prefer not to operate on a ruptured biceps tendon because function is not severely impaired with its rupture.
  - Studies suggest that after biceps rupture, only a small fraction of elbow flexion is lost and approximately 10%-20% strength reduction in supination (ability to turn the hand palm up). This is considered to be a moderate loss and not worth the risk of surgery in middle-aged and older people.

## Surgery

- Quadriceps
  - Unless the doctor is sure that the injury is a partial tear, surgery will be done to repair the tendon.
  - After your operation, you will be placed in a cast or immobilizer as if you had a partial tear.

- With physical therapy, your injured leg should be up to speed with your noninjured leg in 6 months.
- Achilles tendon
  - Surgery to repair your Achilles tendon is recommended for active people who desire near normal strength and power in plantarflexion. An additional advantage with surgical correction is a lower rerupture rate of the tendon.
  - After your operation, your foot will be immobilized with your toes pointing downward for 3-4 weeks and then progressively brought into neutral position over 2-3 weeks before weight-bearing is started. Surgery carries with it a higher risk of infection than closed treatment.
- Rotator cuff
  - Many surgeons will not attempt surgical repair until nonoperative treatment has failed, even in cases of larger tears.
  - Surgical treatment is usually reserved for a severe tear in a young person or in an older person (aged 60-70 years) who is suddenly unable to externally rotate their arm.
  - Acromioplasty, removal of the coracoacromial ligament and repair of the rotator cuff tendon, usually results in near full rotator cuff strength.
- Biceps
  - In young people unwilling to accept the loss of function and mild deformity involved with this injury, surgery is performed to repair the tendon.
  - Surgery is also considered for the middle-aged person who requires full supination strength in their line of work.
  - You should leave your arm in a sling for a few days after surgery and then begin to use the affected arm as tolerated. After surgery, your elbow flexion and arm supination is near normal in about 12 weeks.

## Next Steps

### Prevention

To prevent future tears, avoid the cause of the ruptured tendon or treat the problem that led to the tear.

## Outlook

The prognosis for both surgery and nonsurgical treatment varies with the location and severity of the rupture.

Surgical repair, in concert with additional physical therapy, can result in return to normal strength. Nonoperative repair has also shown promise in tendon ruptures.

Nonoperative treatment is most effective in partial tendon ruptures. The drawback of nonoperative treatment is that strength is not as reliably returned to baseline with this type

of treatment. The benefits include a decreased risk of infection and generally shorter recovery time.

## Synonyms and Keywords

patellar tendon rupture, Achilles tendon rupture, rotator cuff rupture, biceps tendon rupture, ruptured tendon

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Sources 

### **SOURCES:**

Author: Samuel J Haraldson, MD, Sports Medicine Fellow, Department of Sports Medicine, UT Southwestern/Methodist Charlton Hospital.

Coauthor(s): Barbara J Blasko, MD, Clinical Assistant Professor, Department of Emergency Medicine, University of California at Irvine College of Medicine.

Editors: Michael D Burg, MD, Assistant Clinical Professor, Department of Emergency Medicine, University Medical Center, University of California at San Francisco-Fresno; Francisco Talavera, PharmD, PhD, Senior Pharmacy Editor, eMedicine; Thomas Rebbecchi, MD, FAAEM, Program Director, Assistant Professor, Department of Emergency Medicine, University of Medicine and Dentistry of New Jersey. Ruptured Tendon from eMedicineHealth.

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