



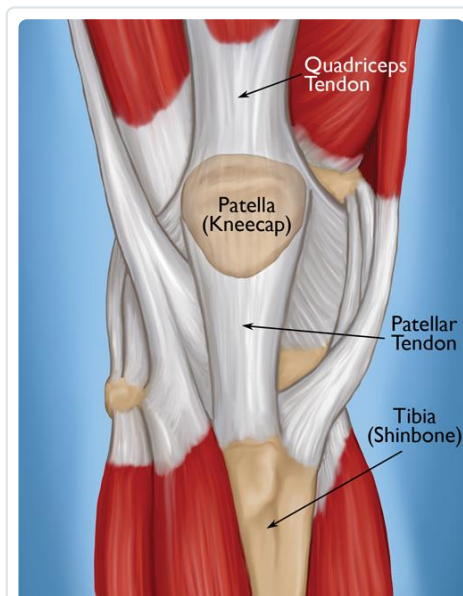
## DISEASES & CONDITIONS

# Patellar Tendon Tear

Tendons are strong cords of fibrous tissue that attach muscles to bones. The patellar tendon works with the muscles in the front of your thigh to straighten your leg.

Small tears of the tendon can make it difficult to walk and participate in other daily activities. A large tear of the patellar tendon is a disabling injury. It usually requires surgery and physical therapy to regain full knee function.

## Anatomy



The tendons of the knee. Muscles are connected to bones by tendons.

The patellar tendon attaches the bottom of the kneecap (patella) to the top of the shinbone (tibia). It is actually a ligament that connects to two different bones, the patella and the tibia.

The patella is attached to the quadriceps muscles by the quadriceps tendon. Working together, the quadriceps muscles, quadriceps tendon and patellar tendon straighten the knee.

# Description

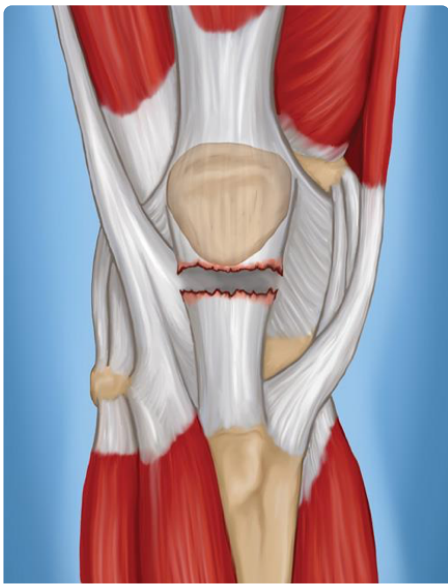
Patellar tendon tears can be either partial or complete.

**Partial tears.** Many tears do not completely disrupt the soft tissue. This is similar to a rope stretched so far that some of the fibers are frayed, but the rope is still in one piece.

**Complete tears.** A complete tear will disrupt the soft tissue into two pieces.

When the patellar tendon is completely torn, the tendon is separated from the kneecap. Without this attachment, you cannot straighten your knee.

The patellar tendon often tears at the place where it attaches to the kneecap, and a piece of bone can break off along with the tendon. When a tear is caused by a medical condition – like tendinitis – the tear usually occurs in the middle of the tendon.



A complete tear of the patellar tendon.

## Cause

### *Injury*

A very strong force is required to tear the patellar tendon.

**Falls.** Direct impact to the front of the knee from a fall or other blow is a common cause of tears. Cuts are often associated with this type of injury.

**Jumping.** The patellar tendon usually tears when the knee is bent and the foot planted, like when landing from a jump or jumping up.

## ***Tendon Weakness***

A weakened patellar tendon is more likely to tear. Several things can lead to tendon weakness.

**Patellar tendinitis.** Inflammation of the patellar tendon, called patellar tendinitis, weakens the tendon. It may also cause small tears.

Patellar tendinitis is most common in people who participate in activities that require running or jumping. While it is more common in runners, it is sometimes referred to as "jumper's knee."

Corticosteroid injections to treat patellar tendinitis have been linked to increased tendon weakness and increased likelihood of tendon rupture. These injections are typically avoided in or around the patellar tendon.

**Chronic disease.** Weakened tendons can also be caused by diseases that disrupt blood supply. Chronic diseases which may weaken the tendon include:

- Chronic renal failure
- Hyper betalipoproteinemia
- Rheumatoid arthritis
- Systemic lupus erythmatosus (SLE)
- Diabetes mellitus
- Infection
- Metabolic disease

**Steroid use.** Using medications like corticosteroids and anabolic steroids has been linked to increased muscle and tendon weakness.

## ***Surgery***

Previous surgery around the tendon, such as a total knee replacement or anterior cruciate ligament reconstruction, might put you at greater risk for a tear.

# Symptoms

When a patellar tendon tears there is often a tearing or popping sensation. Pain and swelling typically follow, and you may not be able to straighten your knee. Additional symptoms include:

- An indentation at the bottom of your kneecap where the patellar tendon tore
- Bruising
- Tenderness
- Cramping
- Your kneecap may move up into the thigh because it is no longer anchored to your shinbone
- Difficulty walking due to the knee buckling or giving way

## Doctor Examination

### *Medical History and Physical Examination*

Your doctor will discuss your general health and the symptoms you are experiencing. He or she will also ask you about your medical history. Questions you might be asked include:

- Have you had a previous injury to the front of your knee?
- Do you have patellar tendinitis?
- Do you have any medical conditions that might predispose you to a knee or a patellar tendon injury?
- Have you had surgery to your knee, such as a total knee replacement or an anterior cruciate ligament reconstruction?



Doctors use the knee extension test to help diagnose a quadriceps tendon tear.

*Reproduced from JF Sarwark, ed: Essentials of Musculoskeletal Care, ed 4. Rosemont, IL, American Academy of Orthopaedic Surgeons, 2010.*

After discussing your symptoms and medical history, your doctor will conduct a thorough examination of your knee. To determine the exact cause of your symptoms, your doctor will test how well you can extend, or straighten, your knee. While this part of the examination can be painful, it is important to identify a patellar tendon tear.

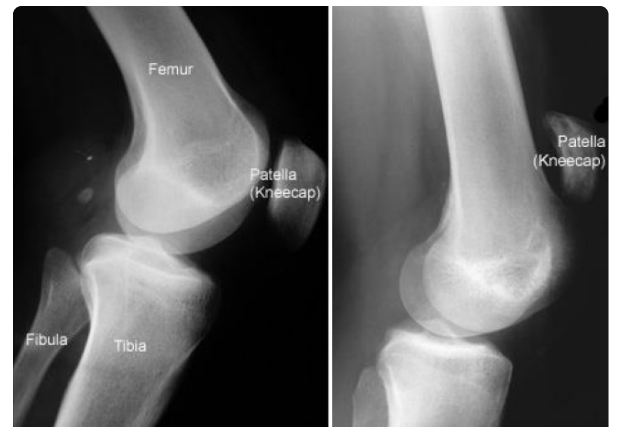
## ***Imaging Tests***

To confirm the diagnosis, your doctor may order some imaging tests, such as an x-ray or magnetic resonance imaging (MRI) scan.

**X-rays.** The kneecap moves out of place when the patellar tendon tears. This is often very obvious on a "sideways" x-ray view of the knee. Complete tears can often be identified with these x-rays alone.

(Left) This x-ray taken from the side shows the normal location of the kneecap. (Right) The kneecap has moved out of place due to a torn patellar tendon.

*Reproduced and adapted from J Bernstein, ed: Musculoskeletal Medicine. Rosemont, IL, American Academy of Orthopaedic Surgeons, 2003.*



**MRI.** This scan creates better images of soft tissues like the patellar tendon. The MRI can show the amount of tendon torn and the location of the tear. Sometimes, an MRI is required to rule out a different injury that has similar symptoms.

## **Treatment**

Your doctor will consider several things when planning your treatment, including:

- The type and size of your tear
- Your activity level
- Your age

## ***Nonsurgical Treatment***

Very small, partial tears respond well to nonsurgical treatment.

**Immobilization.** Your doctor may recommend you wear a knee immobilizer or brace. This will keep your knee straight to help it heal. You will most likely need crutches to help you avoid putting all of your weight on your leg. You can expect to be in a knee immobilizer or brace for 3 to 6 weeks.

**Physical therapy.** Once the initial pain and swelling has settled down, physical therapy can begin. Specific exercises can restore strength and range of motion.

While you are wearing the brace, your doctor may recommend exercises to strengthen your quadriceps muscles. Straight-leg raises are often prescribed. As time goes on, your doctor or therapist will unlock your brace. This will allow you to move more freely with a greater range of motion. You will be prescribed more strengthening exercises as you heal.

## ***Surgical Treatment***

Most people require surgery to regain knee function. Surgical repair reattaches the torn tendon to the kneecap.

People who require surgery do better if the repair is performed soon after the injury. Early repair may prevent the tendon from scarring and tightening into a shortened position.

**Hospital stay.** Although tendon repairs are sometimes done on an outpatient basis, most people do stay in the hospital at least one night after this operation. Whether or not you will need to stay overnight will depend on your medical needs.

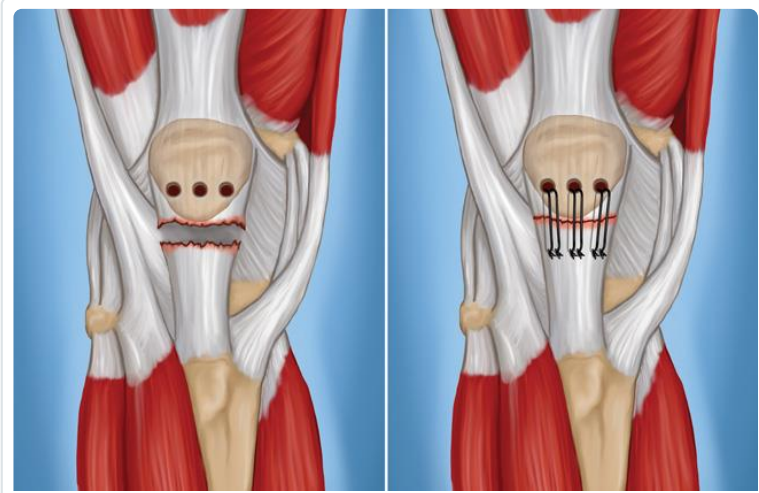
The surgery may be performed with regional (spinal) anesthetic which numbs your lower body, or with a general anesthetic that will put you to sleep.

**Procedure.** To reattach the tendon, sutures are placed in the tendon and then threaded through drill holes in the kneecap. The sutures are tied at the top of the kneecap. Your surgeon will carefully tie the sutures to get the correct tension in the tendon. This will also make sure the position of the kneecap closely matches that of your uninjured kneecap.



Nonsurgical treatment most often includes wearing a brace and physical therapy.

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To reattach the tendon, small holes are drilled in the kneecap (**left**) and sutures are threaded through the holes to pull the tendon back to the bone (**right**).

**New Technique.** A recent development in patellar tendon repair is the use of suture anchors. Surgeons attach the tendon to the bone using small metal implants (called suture anchors). Using these anchors means that drill holes in the kneecap are not necessary. This is a new technique, so data is still being collected on its effectiveness. Most orthopaedic research on patellar tendon repair involves the direct suture repair with the drill holes in the kneecap.

**Considerations.** To provide extra protection to the repair, some surgeons use a wire, sutures, or cables to help hold the kneecap in position while the tendon heals. If your surgeon does this, the wires or cables may need to be removed during a later, scheduled operation.

Your surgeon will discuss your need for this extra protection before your operation. Sometimes, surgeons make this decision for additional protection during surgery. It is then that they see the tendon shows more damage than expected, or the tear is more extensive.

If your tendon has shortened too much before surgery, it will be hard to re-attach it to your kneecap. Your surgeon may need to add tissue graft to lengthen the tendon. This sometimes involves using donated tissue (allograft).

Tendons often shorten if more than a month has passed since your injury. Severe damage from the injury or underlying disease can also make the tendon too short. Your surgeon will discuss this additional procedure with you prior to surgery.

**Complications.** The most common complications of patellar tendon repair include weakness and loss of motion. Re-tears sometimes occur, and the repaired tendon can detach from the kneecap. In addition, the position of your kneecap may be different after the procedure.

As with any surgery, the other possible complications include infection, wound breakdown, a blood clot, or anesthesia complications.

**Rehabilitation.** After surgery you will require some type of pain management, including ice and medications. About 2 weeks after surgery, your skin sutures or staples will be removed in the surgeon's office.

Most likely, your repair will be protected with a knee immobilizer or a long leg cast. You may be allowed to put your weight on your leg with the use of a brace and crutches (or a walker). To start, your surgeon may recommend "toe touch" weight bearing. This is when you lightly touch your toe to the floor, putting down just the weight of your leg. By 2 to 4 weeks, your leg can usually bear about 50% of your body weight. After 4 to 6 weeks, your leg should be able to handle your full body weight.

Over time, your doctor or therapist will unlock your brace. This will allow you to move more freely with a greater range of motion. Strengthening exercises will be added to your rehabilitation plan.

In some cases, an "immediate motion" protocol (treatment plan) is prescribed. This is a more aggressive approach and not appropriate for all patients. Most surgeons protect motion early on after surgery.

The exact timeline for physical therapy and the type of exercises prescribed will be individualized to you. Your rehabilitation plan will be based on the type of tear you have, your surgical repair, your medical condition, and your needs.

Complete recovery takes about 6 months. Many patients have reported that they required 12 months before they reached all their goals.

## Outcomes

Most people are able to return to their previous occupations and activities after recovering from a patellar tendon tear. Many people report stiffness in the affected leg. Most regain nearly equal motion compared to the uninjured leg.



If you are an athlete, your surgeon will most likely want to test your leg strength before giving a go-ahead to return to sports. Your surgeon will compare your leg strength using some functional knee testing (like hopping). The goal is that your strength be at least 85-90% of your uninjured side. In addition to leg strength, your surgeon will assess your leg's endurance, your balance, and if you are having any swelling.

Your return to competitive status will be addressed very carefully with you by your surgeon.

**Last Reviewed**

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