

# ANTERIOR CRUCIATE LIGAMENT TEAR

## Common Causes

Rupture of the anterior cruciate ligament (ACL) occurs more often in females than in males, from adolescents to older adults. Noncontact injuries to the knee are responsible for most ACL tears. Pivoting and cutting sports (soccer and basketball) are the most common scenarios for noncontact ACL injuries, whereas most direct contact ACL injuries occur in American football. ACL tears can be associated with meniscal tears or collateral ligament injuries.

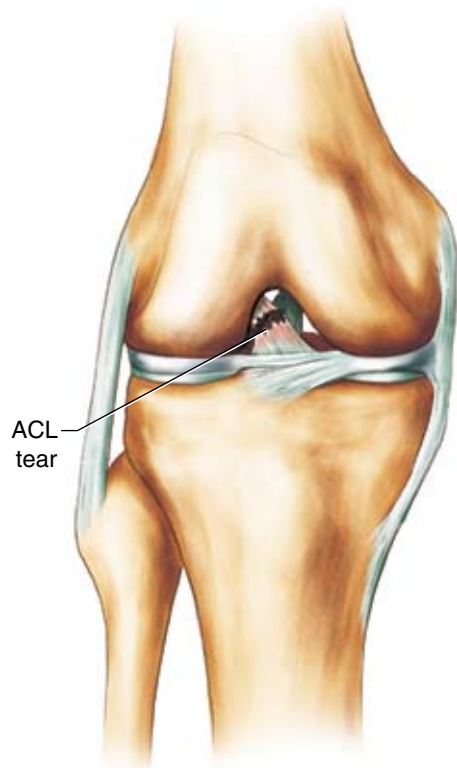
## Identification

Most athletes who have torn their ACL will hear or feel a pop accompanied by pain and, soon after, swelling, though in rare cases little swelling occurs. Rapid swelling in the knee is typically caused by bleeding associated with the injury. The pain might subside quickly after an ACL injury, but this does not mean the tear or strain is healing. An athlete will experience instability with an insecure sensation while pivoting or loading the knee; an occasional sense of hyperextension of the knee is also common. Tenderness often occurs at the lateral joint line.

Critical to diagnosis of the ACL tear is the Lachman test, which evaluates the ACL laxity at 30 degrees of knee flexion and includes the uninjured knee for comparison. If the ligament is intact, there will be an endpoint feeling like tensing a string. Absence of this firm sensation typically signals an ACL tear. The medial, lateral, and posterior ligaments are tested as well. Evaluating range of motion is especially important. Standard X-rays are required but seldom reveal much. Occasionally, a small piece of bone that has pulled off of the lateral aspect of the tibia might show up on X-ray. This indicates an avulsion fracture and is typically associated with an ACL tear. MRI is quite accurate in diagnosing ACL tears. Typically, MRI findings with a torn ACL include bone bruises at the end of the thigh bone, femur, and posterior tibia; swelling; and an abnormal ACL at the femoral attachment. It is not uncommon to have an associated meniscal injury (see p. 210) with an ACL tear, and this is also diagnosed with MRI.

## Treatment

Age, occupation, desired activity, sports involvement, and associated injuries to the knee are all taken into consideration when deciding on treatment for an ACL tear. Nonoperative treatment includes supervised physical therapy to restore range of



## ANTERIOR CRUCIATE LIGAMENT TEAR

motion, decrease swelling, and restore strength. With return to activities, athletes in more vigorous sports might use a derotational ACL brace.

Thanks to recent advances in arthroscopic ACL reconstructive procedures and more rapid postop recovery and return to sports, surgery for ACL tears is a much more attractive option than it once was. In the very young patient with open growth plates, surgery might be delayed until bone maturation, but there is some controversy about this. In the patient older than 60 years, nonoperative treatment is generally recommended but certainly the octogenarian who skis on a regular basis may opt for surgical reconstruction of the ACL. Whereas nonoperative treatment might be considered in any age group for isolated ACL injuries, it is typically less successful in active and athletic patients.

Postsurgery, athletes typically return to school or sedentary work within a week. Athletes will use crutches for one to two weeks and begin physical therapy almost immediately. Physical therapy and a strengthening program continue until the injured knee has 90 percent of the strength of the other knee. Training focuses on strengthening the hamstring and quadriceps muscle groups as well as the other lower extremities. The hamstring muscles are particularly important because they add stability to the injured knee. Hamstring contractions pull the tibia backward, which helps counter the inherent ACL instability, which is a forward glide of the tibia. Also, full-knee extension is critical for long-term knee function and should always be a priority in treatment. Clinical results of ACL reconstruction are quite good, with very low reinjury rates. The most common complication is some residual anterior knee pain. Strengthening the hip muscles during therapy is also extremely important in helping to restore stability in the lower limbs and decrease strain on the reconstructed ligament.

### Return to Action

With surgery and rehab, athletes can usually return to sport in about six months. Bracing might be initially beneficial upon return. The decision to brace usually depends on athlete preference and whether any instability remains in the rehabilitated knee. Some medical professionals evaluate the post-ACL athlete via a series of functional tests to assess the knee's strength and stability. Devices such as isokinetic strength-testing machines and a series of hopping tests are used. Athletes must progress slowly in resuming sport activity and perform exercises such as running, cutting, twisting, and jumping to mimic the movements of the sport before beginning full participation.

# POSTERIOR CRUCIATE LIGAMENT TEAR

## Common Causes

Injuries to the posterior cruciate ligament occur when a front-to-back force is directed straight onto the upper tibia. This injury typically occurs during a fall onto a flexed knee, after trauma to the front part of the extended knee, or when the knee is hyperextended. PCL injuries are most common in contact sports such as American football and in cutting and pivoting sports such as basketball, in which knee hyperextension could occur. These injuries are often overlooked and undiagnosed because pain might be the only symptom.

## Identification

Posterior cruciate ligament injuries are much less common than ACL injuries. The athlete with an injured PCL complains of local knee pain, might have swelling, and offers little complaint of instability. The injury is debilitating in that it adversely affects an athlete's ability to run all out, either because of pain or a sense of not being able to trust the knee. Athletes might say, "the knee just doesn't feel right." Diagnosis is confirmed via MRI.

## Treatment

Most PCL injuries are treated conservatively. Unless associated injuries cause either instability or increased biomechanical stress, surgery is not usually required. However, extensive rehabilitation is necessary. The focus of rehabilitation is strengthening the quadriceps muscles because these muscles add stability to the PCL-deficient knee.

## Return to Action

Expect three to six months of rehab with conservative (nonsurgical) treatment of a PCL injury. At least six months are required to rehabilitate the surgically repaired PCL-injured knee. As with the ACL-injured knee, return to athletics is permitted once the knee is relatively pain free, range of motion is good, and the athlete can complete a series of functional knee tests. Bracing is recommended if the athlete wants it or if any knee instability remains. Athletes must progress slowly when returning to sport and perform exercises such as running, cutting, twisting, and jumping to mimic the movements of the sport before beginning full participation.



# LATERAL COLLATERAL LIGAMENT TEAR

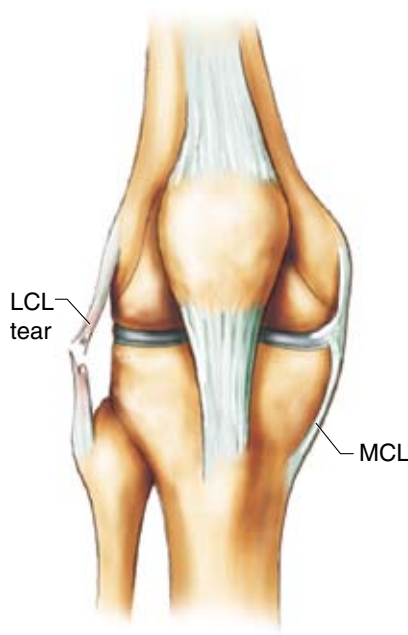
## Common Causes

Injury to the lateral collateral ligament (LCL) usually occurs because of a force directed from the medial (inner side) knee toward the lateral (outer side) knee. This injury can result from a direct blow in contact sports or by a misstep or sharp pivot during pivoting sports.

## Identification

Athletes with an injury to the LCL will have local discomfort along the lateral knee. If the athlete sits and flexes the injured knee and then places the foot of the injured knee over the other knee, pain will flare up at the top of the fibula bone. Feel for a tight band of tissue that travels toward the upper knee—this is the LCL.

LCL stress testing and a ligamentous exam can verify an LCL diagnosis and help check for an associated anterior cruciate ligament (ACL) tear or other ligament injury. MRI may also be used to determine whether or not the injury is isolated to the LCL. Rotary maneuvers involving stress testing at the knee might be painful. These tests are typically positive in athletes with meniscal tears but also cause pain in those with LCL sprains.



## Treatment

Virtually all isolated LCL injuries can be managed nonoperatively (though multiple ligament injuries might require surgery). For a low-grade LCL injury, the athlete should begin active-passive range-of-motion exercises immediately, local ice massage, exercise bicycle as tolerated, and quadriceps-strengthening exercises. Supervised physical therapy should accelerate recovery. No bracing is required, but a medial-lateral sleeve can provide some additional comfort. For more severe isolated LCL injuries, bracing might be necessary to assist in ligament healing. The brace starts at 30 degrees in a hinged locked brace that is gradually unlocked to allow increased motion and physical therapy as healing progresses. Discontinue bracing after four to six weeks. If progress remains limited after three months, MRI might be necessary to check for additional injuries.

Physical therapy should emphasize lower-limb strengthening and balance exercises that focus on the hip muscles to reduce stress and strain on the knee. Use caution with hip exercises to avoid stressing the outer leg or lateral collateral ligament.

## Return to Action

Overall recovery might take three months. Return to sport depends on restoration of range of motion and strength and resolution of pain. Athletes typically use a knee sleeve with supports on the medial and lateral sides as they return to activity. They should progress slowly and perform exercises that mimic their sport before attempting full participation.

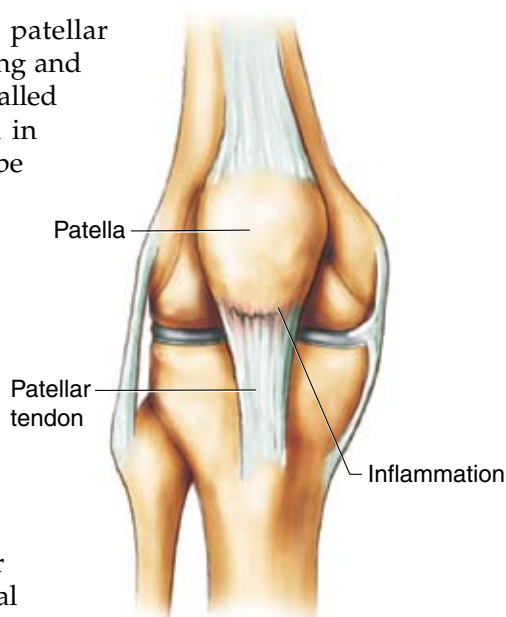
# PATELLAR TENDINITIS

## Common Causes

Painful knee symptoms associated with patellar tendinitis are commonly related to jumping and repetitive running. This condition is often called “jumper’s knee” and is seen most often in basketball players. The injury might also be related to overuse of the knee.

## Identification

The hallmark of patellar tendinitis is localized pain in the proximal portion of the patellar tendon near the lower part of the patella. The pain is aggravated by jumping and running and not typically related to any single traumatic event. When pain is severe, athletes might complain of discomfort while stair climbing and sitting. Swelling is uncommon, and the remainder of the knee exam is normal. MRI might reveal changes in the proximal portion of the patellar tendon that are consistent with a partial tear or thickening of the tendon in chronic cases.



## Treatment

Most athletes with patellar tendinitis respond to nonoperative treatment. In acute cases, a 10-day course of approved nonsteroidal inflammatory medications (if tolerated) is recommended. The athlete should begin an exercise program emphasizing quadriceps stretching and strengthening. Ice massage might have some benefit. The athlete should avoid all jumping activities. Most athletes will respond to this conservative treatment. Surgical treatment for patellar tendinitis is quite uncommon. On rare occasions, the athlete who has not responded to more than six months of nonoperative treatment and has an abnormal patellar tendon on MRI might consider surgery. Surgical treatment is usually followed by a three- to six-month recovery period. Cortisone shots are not recommended for this injury. Cortisone may hasten degeneration of the patella tendon.

## Return to Action

Return time following nonoperative treatment of patellar tendinitis is highly variable. The condition rarely improves before six weeks. Chronic symptoms are not uncommon and often require repetitive treatment. Some athletes report improvement of symptoms and ability to play using a strap at the level of the mid-patellar tendon, similar to the strap used for tennis elbow. The rare athlete who requires surgical treatment might not return to action for six months. Because there is no guarantee for success of this procedure, return time could be much longer.