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ACL Surgery Informed Consent



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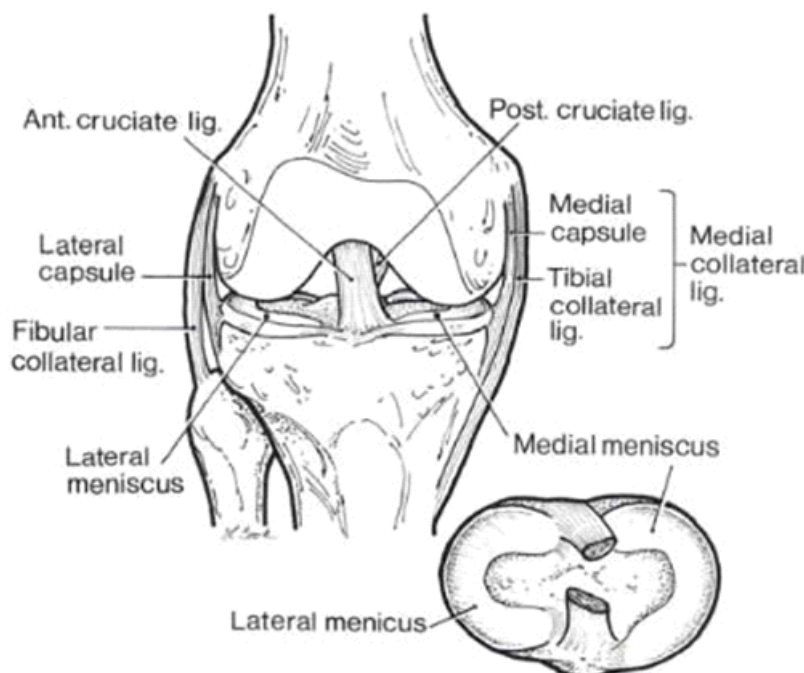


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Department of Orthopaedics

ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION SURGERY

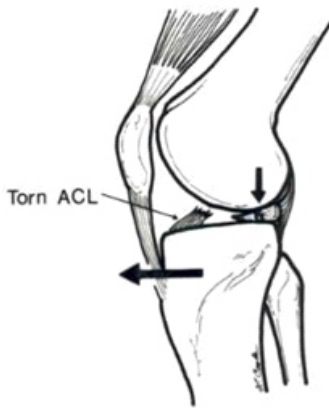
What is the Anterior Cruciate Ligament (ACL)?



The anterior cruciate ligament (ACL) is one of four major ligaments that stabilize the knee joint. A ligament is a tough band of fibrous tissue, similar to a rope, connecting the bones together at a joint. There are two ligaments on the sides of the knee (collateral ligaments) that give stability to sideways motions: the medial collateral ligament (MCL) on the inner side and the lateral collateral ligament (LCL) on the outer side of the knee.

Two ligaments cross over in the center of the knee joint (therefore, called cruciate). The forward ligament is the Anterior Cruciate ligament (ACL) and the ligament behind is the posterior cruciate ligament (PCL). The ACL prevents the shin bone (tibia) from sliding forward relative to the thigh bone (femur) and stabilizes the knee to allow pivoting, twisting, and jumping sports. The PCL prevents the tibia from moving backward relative to the femur.

How can the ACL tear?



The most common mechanism is a combination of a sudden stopping motion on the leg while quickly twisting at the knee. The planted foot remains stationary while the body rotates toward the opposite side of the body. This can happen in a sport such as basketball, when a player lands on the leg when coming down from a rebound or is running down the court and makes an abrupt stop to pivot.

In football, soccer, or lacrosse, cleats prevent the foot from slipping during this motion. As a result all the stress is transferred to the ACL of the knee. When this stress exceeds the strength of the ACL, the ligament tears.

In skiing, the ACL is commonly injured when the skier sits back while falling. The modern ski boot is stiff, high, and is tilted forward. The boot thus holds the tibia forward. The weight of the body can quickly shift backwards. When the body rotates away from the weight bearing ski, the knee is twisted.

Similar to soccer, the ski prevents the foot from moving, causing all the stress to be absorbed by the ACL. When force exceeds the strength of the ligament, it fails (tears).

What are the signs that an ACL is torn?

When the ACL tears, the person feels the knee go out of joint and often hears or feels a "pop". If he or she tries to stand on the leg, the knee may feel unstable and give out. The knee usually swells a great deal immediately (within two hours). Over the next several hours, pain becomes more severe and it becomes difficult to walk.

What other knee structures can be injured when the ACL tears?

There are two types of cartilage in the knee. One type of fibrous cartilage is called the meniscus. Each knee has two crescent shaped menisci that act as shock absorbers between the femur and tibia. There is a medial (inner) and lateral (outer) meniscus. The menisci are attached to the tibia. The ACL prevents excessive forward tibial motion at the knee joint. When the ACL tears, the knee can partially dislocate (subluxate). Either meniscus can become compressed between the femur and tibia resulting in tears. This abnormal motion of the joint can also bruise the bones.

There is a second type of cartilage in the knee joint called articular cartilage. This joint cartilage is the hard white tissue that is seen at the end of a chicken bone. It is a smooth, white glistening surface that covers the ends of the bones. The surface is slick and much smoother than ice and as a result, there is very little friction when the joint moves. This joint cartilage can get damaged when the ACL tears.

If this articular cartilage is injured, the joint no longer moves smoothly. Stiffness, pain, swelling and grinding can occur. Eventually, arthritis can develop.

With severe contact injuries, such as trauma from motor vehicle accidents, other ligaments can be injured as well. The medial collateral ligament tears when the knee is hit from the outside. The lateral collateral ligament is torn when the knee is hit from the inside. When multiple ligaments are torn, the knee may have injuries to the nerves and blood vessels as well.

What is the initial treatment for a knee that may have a torn ACL?

The initial treatment of the injured joint is to apply ice and gentle compression to control swelling. A knee splint and crutches are used. Medical attention should be sought to confirm the diagnosis and to evaluate the entire extremity. X-rays are taken to rule out a fracture. Sometimes an MRI is needed, but usually the diagnosis can be made by physical examination.

How will the knee function if the ACL is torn?

If no structure other than the ACL is injured, the knee usually regains its range of motion and is painless after six or eight weeks. The knee can then feel completely normal. However, it can be a "trick knee". If a knee does not have an ACL it can give way or be unstable when the person pivots or changes direction. The person can usually run straight ahead and ride a bicycle without a difficulty. However, when the person with a torn ACL makes a quick turning motion away from the planted foot, the knee tends to give way and collapse. This abnormal motion can damage the menisci or articular cartilage and cause further knee problems.

If a person does not participate in pivoting sports and is relatively inactive, the knee can feel quite normal without an ACL. Thus, many patients especially over the age of thirty may not need to have the ACL reconstructed. This is especially true if they do not participate in sports that require quick changes in direction.

In young, athletic patients, however, the knee will tend to give way during activities in which the person quickly changes direction. Each time the knee gives way, the menisci and articular cartilage are exposed to abnormal stresses. Damage to the joint surfaces and menisci can result in early arthritis.

Nonsurgical Treatment: Do all ACL tears need surgery?

No. Some knees function almost normally despite having a torn ACL. Good knee function is more common in patients who are over thirty years old who are relatively inactive in sports. Patients who are less than twenty-five years old, regardless of activity level, tend to have problems with instability and have frequent episodes of giving way. Therefore, surgical reconstruction of a torn ACL is usually recommended for patients who are less than age twenty-five years. However, surgery should be delayed until after the acute injury has subsided (usually at least six weeks following injury).

Surgical Treatment:

When should surgery be performed for a torn ACL?

It is best to wait for the pain and swelling to subside and to allow associated injuries to heal before performing surgery for the ACL. If surgery is done too soon after injury, rehabilitation is difficult. The knee may get stiff and have permanent loss of motion. The athlete will usually get back to sports much more quickly if the knee is allowed to recover from initial injury and to regain its full painless range of motion (usually at least six weeks) before performing surgery.

Usually, the best treatment following acute ACL injury is to protect the joint and apply ice and use crutches for several weeks. As the swelling and pain subside, the patient can put weight on the leg. The knee immobilizer and crutches are discontinued. The patient starts therapeutic exercises to regain motion. Resistive exercises to build up strength should not be done during this time to prevent damaging the kneecap (patella).

If the knee also has an injured medial collateral ligament (MCL), it is best to allow the MCL to heal completely (usually six to eight weeks) before reconstructing the ACL. Then an arthroscopic procedure can be performed to reconstruct the ACL. The torn MCL usually does not need to be repaired surgically.

There may be instances when a surgeon wants to perform surgery immediately following an injury. An example is knee dislocation when multiple ligaments are torn. Tears of the outer knee ligament (lateral collateral ligament) should usually be repaired surgically.

Patient Considerations

Active adult patients involved in sports or jobs that require pivoting, turning or hard-cutting as well as heavy manual work are encouraged to consider surgical treatment. This includes older patients who have previously been excluded from consideration for ACL surgery. Activity, not age, should determine if surgical intervention should be considered.

In young children or adolescents with ACL tears, early ACL reconstruction creates a possible risk of growth plate injury, leading to bone growth problems. The surgeon can delay ACL surgery until the child is closer to skeletal maturity or the surgeon may modify the ACL surgery technique to decrease the risk of growth plate injury.

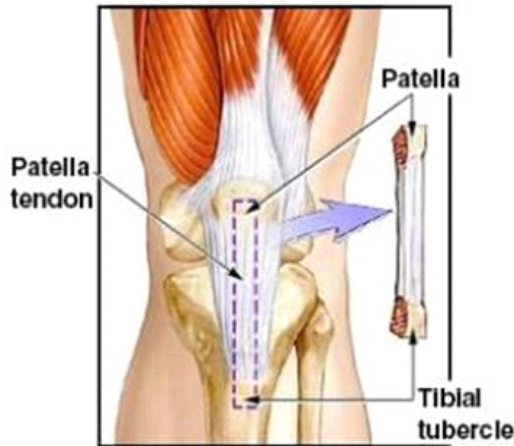
A patient with a torn ACL and significant functional instability has a high risk of developing secondary knee damage and should therefore consider ACL reconstruction.

It is common to see ACL injuries combined with damage to the menisci (50 percent), articular cartilage (30 percent), collateral ligaments (30 percent), joint capsule, or a combination of the above. The "unhappy triad," frequently seen in football players and skiers, consists of injuries to the ACL, the MCL, and the medial meniscus.

In cases of combined injuries, surgical treatment may be warranted and generally produces better outcomes. As many as 50 percent of meniscus tears may be repairable and may heal better if the repair is done in combination with the ACL reconstruction.

Surgical Choices

Patellar tendon autograft. The middle third of the patellar tendon of the patient, along with a bone plug from the shin and the kneecap is used in the patellar tendon autograft. Occasionally referred to by some surgeons as the "gold standard" for ACL reconstruction, it is often recommended for high-demand athletes and patients whose jobs do not require a significant amount of kneeling. (However, patellar tendon autografts have a greater incidence of postoperative pain in the front of the knee from where the graft was taken. This typically subsides over the months following surgery.)



The pitfalls of the patellar tendon autograft are:

- Postoperative pain behind the kneecap
- Pain with kneeling
- Slightly increased risk of postoperative stiffness
- Low risk of patella fracture

Allografts. Allografts are grafts taken from cadavers and are becoming increasingly popular.^{84, 85} These grafts are also used for patients who have failed ACL reconstruction before and

in surgery to repair or reconstruct more than one knee ligament. Advantages of using allograft tissue include elimination of pain caused by obtaining the graft from the patient, decreased surgery time and smaller incisions. The patellar tendon allograft allows for strong bony fixation in the tibial and femoral bone tunnels with screws.

However, allografts are associated with a risk of infection, including viral transmission (HIV and Hepatitis C), despite careful screening and processing, deaths linked to bacterial infection from allograft tissue (due to improper procurement and sterilization techniques) have led to improvements in allograft tissue testing and processing techniques. There have also been conflicting results in research studies as to whether allografts are slightly more susceptible to graft elongation (stretching), which may lead to increased laxity during testing.

Recently published literature may point to a higher failure rate with the use of allografts for ACL reconstruction. Failure rates ranging from 23% to 34.4% have been reported in young, active patients returning to high-demand sporting activities after ACL reconstruction with allografts. This is compared to autograft failure rates ranging from 5% to 10%.

The reason for this higher failure rate is unclear. It could be due to graft material properties (sterilization processes used, graft donor age, storage of the graft). It could possibly be due to an ill-advised earlier return to sport by the athlete because of a faster perceived physiologic recovery, when the graft is not biologically ready to be loaded and stressed during sporting activities. Further research in this area is indicated and is ongoing.

Surgical Procedure



Passage of patellar tendon graft into tibial tunnel of knee.



Post-operative X-ray after ACL patellar tendon reconstruction (with picture of graft superimposed) shows graft position and bone plugs fixation with metal interference screws.

The patient, the surgeon, and the anesthesiologist select the anesthesia used for surgery. Patients may benefit from an anesthetic block of the nerves of the leg to decrease postoperative pain.

The surgery usually begins with an examination of the patient's knee while the patient is relaxed due to the effects of anesthesia. This final examination is used to verify that the ACL is torn and also to check for looseness of other knee ligaments that may need to be repaired during surgery or addressed postoperatively.

If the physical exam strongly suggests the ACL is torn, the selected tendon is harvested (for an autograft) or thawed (for an allograft) and the graft is prepared to the correct size for the patient.



Arthroscopic view of ACL graft [yellow star] in position.

What To Expect After Surgery

Arthroscopic surgery is often done on an outpatient basis, which means that you do not spend a night in the hospital. Other surgery may require staying in the hospital for a couple of days.

You will feel tired for several days. Your knee will be swollen, and you may have numbness around the cut (incision) on your knee. Your ankle and shin may be bruised or swollen. You can put ice on the area to reduce swelling. Most of this will go away in a few days, and you should soon start seeing improvement in your knee.

While it heals, you need to keep your incision(s) clean and dry and watch for signs of infection.

Physical rehabilitation after ACL surgery may take several months to a year. The length of time until you can return to normal activities or sports is different for every person. It takes most people at least 6 months to return to activity after surgery.

Pain Management

After surgery, you will feel some pain. This is a natural part of the healing process. Your doctor and nurses will work to reduce your pain, which can help you recover from surgery faster.

Medications are often prescribed for short-term pain relief after surgery. Many types of medicines are available to help manage pain, including opioids, non-steroidal anti-inflammatory drugs

(NSAIDs), and local anesthetics. Your doctor may use a combination of these medications to improve pain relief, as well as minimize the need for opioids.

Be aware that although opioids help relieve pain after surgery, they are a narcotic and can be addictive. Opioid dependency and overdose has become a critical public health issue in the U.S. It is important to use opioids only as directed by your doctor. As soon as your pain begins to improve, stop taking opioids. Talk to your doctor if your pain has not begun to improve within a few days of your surgery.

Postoperative Course. In the first 10 to 14 days after surgery, the wound is kept clean and dry, and early emphasis is placed on regaining the ability to fully straighten the knee and restore quadriceps control.

The knee is iced regularly to reduce swelling and pain. The surgeon may dictate the use of a postoperative brace and the use of a machine to move the knee through its range of motion. Weight-bearing status (use of crutches to keep some or all of the patient's weight off of the surgical leg) is also determined by physician preference, as well as other injuries addressed at the time of surgery.

The goals for rehabilitation of ACL reconstruction include reducing knee swelling, maintaining mobility of the kneecap to prevent anterior knee pain problems, regaining full range of motion of the knee, as well as strengthening the quadriceps and hamstring muscles.

The patient may return to sports when there is no longer pain or swelling, when full knee range of motion has been achieved, and when muscle strength, endurance and functional use of the leg have been fully restored.

Rehabilitation

Physical therapy is a crucial part of successful ACL surgery, with exercises beginning immediately after the surgery. Much of the success of ACL reconstructive surgery depends on the patient's dedication to rigorous physical therapy. With new surgical techniques and stronger graft fixation, current physical therapy uses an accelerated course of rehabilitation.

What are the potential risks of Arthroscopic surgery and ACL reconstruction?

Infection. The incidence of infection after arthroscopic ACL reconstruction has a reported range of 0.2 percent to 0.48 percent. There have also been several reported deaths linked to bacterial infection from allograft tissue due to improper procurement and sterilization techniques.

Viral transmission. Allografts specifically are associated with risk of viral transmission, including HIV and Hepatitis C, despite careful screening and processing. The chance of obtaining a bone allograft from an HIV-infected donor is calculated to be less than 1 in a million.

Bleeding, numbness. Rare risks include bleeding from acute injury to the popliteal artery (overall incidence is 0.01 percent) and weakness or paralysis of the leg or foot. It is not uncommon to have numbness of the outer part of the upper leg next to the incision, which may be temporary or permanent.

Blood clot. A blood clot in the veins of the calf or thigh is a potentially life-threatening complication. A blood clot may break off in the bloodstream and travel to the lungs, causing pulmonary embolism or to the brain, causing stroke. This risk of is reported to be approximately 0.12 percent. Instability. Recurrent instability due to rupture or stretching of the reconstructed ligament or poor surgical technique (reported to be as low as 2.5 percent and as high as 34 percent) is possible.

Stiffness. Knee stiffness or loss of motion has been reported at between 5 percent and 25 percent.

Extensor mechanism failure. Rupture of the patellar tendon (patellar tendon autograft) or patella fracture (patellar tendon or quadriceps tendon autografts) may occur due to weakening at the site of graft harvest.

Kneecap pain. Postoperative anterior knee pain is especially common after patellar tendon autograft ACL reconstruction. The incidence of pain behind the kneecap varies between 4 percent and 56 percent in studies, whereas the incidence of kneeling pain may be as high as 42 percent after patellar tendon autograft ACL reconstruction.

Reviewed: _____ Date: _____