Anterior Cruciate Ligament (ACL) Surgery

Surgery Overview

Surgery for anterior cruciate ligament (ACL) injuries involves reconstructing or repairing the ACL.

- ACL reconstruction surgery uses a graft to replace the ligament. The most common grafts are autografts using part of your own body, such as the tendon of the kneecap (patellar tendon) or one of the hamstring tendons. Another choice is allograft tissue, which is taken from a deceased donor.
- Repair surgery typically is used only in the case of an avulsion fracture (a separation of the ligament and a piece of the bone from the rest of the bone). In this case, the bone fragment connected to the ACL is reattached to the bone.

Arthroscopic surgery

ACL surgery is usually done by making small incisions in the knee and inserting instruments for surgery through these incisions (arthroscopic surgery). In some cases, it is done by cutting a large incision in the knee (open surgery).

ACL surgeries are done by orthopedic surgeons.

Many orthopedic surgeons use arthroscopic surgery rather than open surgery for ACL injuries because:

- It is easy to see and work on the knee structures.
- It uses smaller incisions than open surgery.
• It can be done at the same time as diagnostic arthroscopy (using arthroscopy to find out about the injury or damage to the knee).
• It may have fewer risks than open surgery.

Arthroscopic surgery is done under regional (such as spinal) anesthesia or general anesthesia.

What happens

During arthroscopic ACL reconstruction, the surgeon makes several small incisions—usually two or three—around the knee. Sterile saline (salt) solution is pumped into the knee through one incision to expand it and to wash blood from the area. This allows the doctor to see the knee structures more clearly.

The surgeon inserts an arthroscope into one of the other incisions. A camera at the end of the arthroscope transmits pictures from inside the knee to a TV monitor in the operating room.

Surgical drills are inserted through other small incisions. The surgeon drills small holes into the upper and lower leg bones where these bones come close together at the knee joint. The holes form tunnels through which the graft will be anchored.

The surgeon will also make another incision in the knee and take the graft (replacement tissue).

• A graft (See figure in appendix) taken from the tendon at the front of the knee below the kneecap (patellar tendon) will include two small pieces of bone called "bone blocks" on the ends of the tissue. One piece of bone is taken from the kneecap and the other piece is taken from a part of the lower leg bone near the knee joint. This type of graft allows better healing because the tendon is still attached to its original bone, and the pieces of bone just need to heal into their new locations.
• If the autograft comes from the hamstring, bone blocks are not taken. This type of graft may allow the knee to look more normal after it heals, because the tendon from the front of the knee is not used. It is also easier to add extra tissue from a deceased donor (allograft) to this type of graft.
• The whole graft may also be taken from a deceased donor (allograft).

The graft is pulled through the two tunnels that were drilled in the upper and lower leg bones. The surgeon secures the graft with hardware such as screws or staples and will close the incisions with stitches or tape. The knee is bandaged, and you are taken to the recovery room for 2 to 3 hours.

During ACL surgery, the surgeon may repair other injured parts of the knee as well, such as menisci, other knee ligaments, cartilage, or broken bones.

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.

To care for your incision while it heals, you need to keep it 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 may range from 4 to 6 months.¹

**Why It Is Done**

The goal of ACL surgery is to restore normal or almost normal stability in the knee and the level of function you had before the knee injury, limit loss of function in the knee, and prevent injury or degeneration to other knee structures.

Not all ACL tears require surgery. You and your doctor will decide whether rehabilitation (rehab) only or surgery plus rehab is right for you.

You may choose to have surgery if you:

- Have completely torn your ACL or have a partial tear and your knee is very unstable.
- Have gone through a rehab program and your knee is still unstable.
- Are very active in sports or have a job that requires knee strength and stability (such as construction work), and you want your knee to be as strong and stable as it was before your injury.
- Are willing to complete a long and rigorous rehab program.
- Have chronic ACL deficiency, which is when your knee is unstable and affecting your quality of life.
- Have injured other parts of your knee, such as the cartilage (See figure in appendix) or meniscus, or other knee ligaments or tendons.

You may choose not to have surgery if you:

- Have a minor tear in your ACL (a tear that can heal with rest and rehab).
- Are not very active in sports and your work does not require a stable knee.
- Are willing to stop doing activities that require a stable knee or stop doing them at the same level of intensity. You may choose to substitute other activities that don't require a stable knee, such as cycling or swimming.
- Can complete a rehab program that stabilizes your knee and strengthens your leg muscles to reduce the chances that you will injure your knee again and are willing to live with a small amount of knee instability.
- Do not feel motivated to complete the long and rigorous rehab program
necessary after surgery.

- You have medical problems that make surgery too risky.

**How Well It Works**

A few people who have ACL surgery still have knee pain and instability and may need another surgery (revision ACL reconstruction). Revision ACL reconstruction is generally not as successful as the initial ACL reconstruction.

**Risks**

ACL reconstruction surgery is generally safe. Complications that may arise from surgery or during rehabilitation (rehab) and recovery include:

- Problems related to the surgery itself. These are uncommon but may include:
  - Numbness in the surgical scar area.
  - Infection in the surgical incisions.
  - Damage to structures, nerves, or blood vessels around and in the knee.
  - Blood clots in the leg.
  - The usual risks of anesthesia.
- Problems with the graft tendon (loosening, stretching, reinjury, or scar tissue). The screws that attach the graft to the leg bones may cause problems and require removal.
- Limited range of motion, usually at the extremes. For example, you may not be able to completely straighten or bend your leg as far as the other leg. This is uncommon, and sometimes another surgery or manipulation under anesthesia can help. Rehab attempts to restore a range of motion between 0 degrees (straight) and 130 degrees (bent or flexion). It's important to be able to get your knee straight so you can walk normally.
- Grating of the kneecap (crepitus) as it moves against the lower end of the thighbone (femur), which may develop in people who did not have it before surgery. This may be painful and may limit your athletic performance. In rare cases, the kneecap may be fractured while the graft is being taken during surgery or from a fall onto the knee soon after surgery.
- Pain, when kneeling, at the site where the tendon graft was taken from the patellar tendon or at the site on the lower leg bone (tibia) where a hamstring or patellar tendon graft is attached.
- Repeat injury to the graft (just like the original ligament). Repeat surgery is more complicated and less successful than the first surgery.

**What To Think About**

In an avulsion fracture, repair surgery is always done as soon as possible.

In reconstruction of a partial or complete tear of the ACL, the best time for surgery is...
not known. Surgery immediately after the injury has been associated with increased fibrous tissue leading to loss of motion (arthrofibrosis) after surgery. Some experts believe that surgery should be delayed until the swelling goes down, you have regained range of motion in your knee, and you can strongly contract (flex) the muscles in the front of your thigh (quadriceps). Many experts recommend starting exercises to increase range of motion and regain strength shortly after the injury.

In adults, age is not a factor in surgery, although your overall health may be. Surgery may not be the best treatment for people with medical conditions that make surgery a greater risk. These people may choose nonsurgical treatments and may try to change their activity levels to protect their knees from further injury.

Current research on the surgical treatment of ACL injuries includes different techniques and places to attach grafts; different ways of securing the graft; different types of grafts, such as tendon, muscle, or fascial grafts from your body (autograft); and grafts from a donor (allograft). When choosing a graft, consider the following:

- The success of surgery may be more dependent on the surgeon's skill and preference than the type of graft used.
- A kneecap tendon graft may result in some pain when kneeling.
- The knee functions the same with either a kneecap graft or a hamstring graft.
- A kneecap graft entails more rehab considerations than a hamstring graft, such as increased pain and swelling that may limit exercises for the thigh muscles for a while.

Complete the surgery information form (PDF) to help you prepare for this surgery.

References

Citations


For anterior cruciate ligament (ACL) surgery, the replacement graft can be harvested from tissue in the patellar (kneecap) region. The surgeon removes the tissue along with a small piece of bone called a "bone block" at each end. The graft is first pulled through the two tunnels that were drilled in the upper and lower leg bones and then secured with screws or staples.
Cartilage of the Knee

Cartilage is a type of firm, thick, slippery tissue that coats the ends of bones where they meet with other bones to form a joint. Cartilage acts as a protective cushion between bones. In the knee, there is cartilage on the ends of the bones and at the back of the kneecap (patella).

A meniscus is a piece of cartilage that acts as a shock absorber between bones. It stabilizes the joints by evenly distributing the load across the joint area. In the knee, the crescent-shaped menisci are in between the ends of the upper (femur) and lower (tibia) leg bones. The menisci protect the knee joint surface and absorb the shock produced by activities such as walking, running, and jumping.