What is Anterior Cruciate Ligament (ACL) Reconstruction?

**Definition**
ACL reconstruction is surgery to replace the ligament in the center of the knee (the anterior cruciate ligament, or ACL) with a new ligament.

**Description**
The purpose of a ligament is to hold two bones together. The ACL is a ligament in the center of your knee that prevents the shin bone (tibia) from moving forward on the thigh bone (femur). A tear of this ligament can cause your knee to give way during physical activity. Research suggests that if a torn ACL is left untreated, and the knee repeatedly gives way, cartilage damage and early arthritis may occur.

ACL reconstruction is surgery to replace the torn ligament. There are several choices of tissue to use for the new ligament, including tissue from your own body (an autograft) or tissue from someone who has died (an allograft). The most common autografts use part of the tendon in the front of the knee (patellar tendon) or in the hamstring. Each type of graft has small advantages and disadvantages, and works well for many people.

The procedure is usually done by knee arthroscopy. With arthroscopy, a camera is inserted into the knee through a small poke-hole. The camera is connected to a video monitor. The surgeon checks the cartilage and ligaments of the knee. If there is other damage, such as a meniscus tear, the surgeon will fix the problem. You will most likely go to sleep for the procedure, but it can be performed under different types of anesthesia.

Then, the surgeon will replace the ACL. Other small incisions are made around the knee to place the new ligament. The old ligament will be removed using a shaver or other instruments. Bone tunnels will be made to place the new ligament in the knee at the site of the old ACL. If your own tissue is to be used for the new ligament, a larger, “open” incision will be made to take the tissue. The new ligament is then fixed to the bone using screws or other devices to hold the ligament in place.

At the end of the surgery, the incisions are closed, and a dressing is applied. During the arthroscopy, most surgeons take pictures of the procedure from the video monitor to show you what was found and what was done.

**Why the procedure is performed?**
ACL reconstruction may be recommended for knee problems such as:
- Unstable knee
- Knee that gives way
- Knee pain
- Inability to play sports or other activities
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Risks
ACL reconstruction is generally a very safe procedure, but as with any surgical procedure there can be complications. See the “Risks of Anterior Cruciate Ligament (ACL) Reconstruction” outlined below.

Outlook (Prognosis)
ACL reconstruction is usually a very successful surgery. A tear of the ACL used to be a career-ending injury for many athletes, but improvements in the surgery and in rehabilitation have led to greatly improved results. These improvements have resulted in less pain and stiffness, fewer complications, and faster recovery time. Most people will have a stable knee that does not give way after ACL reconstruction.

Recovery
After the surgery, you may have to wear a knee brace for the first 1 to 4 weeks. You also may need crutches for 1 to 4 weeks. Most people are allowed to move the knee immediately after surgery to help prevent any stiffness. Pain is usually managed with medication.

Physical therapy can help many people regain motion and strength in the knee. Therapy can last from 2 to 6 months.

How soon you restart activities such as returning to work will depend on your job, but can be anywhere from a few days to a few months. A full return to activities and sports generally takes at least 6 months.

See the “After Anterior Cruciate Ligament (ACL) Reconstruction” information outlined below for more information on recovery.
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Risks of Anterior Cruciate Ligament (ACL) Reconstruction

Summary of Procedure

ACL reconstruction is a surgical procedure designed to stabilize the knee by replacing a torn ligament. It is indicated after some ACL injuries and your orthopedic surgeon can help you decide if the procedure is right for you. The surgery is generally done using a small arthroscopic camera, working through incisions placed at the knee. A graft is secured in the knee to function as a new ACL. Associated injuries such as meniscal tears or cartilage injuries are sometimes treated during the same procedure. The surgery is often done on an outpatient basis. Surgery is followed by several months of rehabilitation which will be directed by your surgeon and a physical therapist.

Complications of ACL Reconstruction surgery

ACL reconstruction surgery is generally safe. Complications from surgery or that may arise during rehabilitation and recovery.

- 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, infection, 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 manipulation under anesthesia can help. Rehabilitation usually attempts to restore a range of motion between 0 degrees (straight) and 130 degrees (bent or flexion). You may lack a few degrees at either end of the range of motion after surgery and rehabilitation.

- Grating of the kneecap (crepitus) as it moves against the lower end of the thighbone (femur), this may develop in people who did not have it before surgery. This may be painful and may limit your athletic performance. Rarely, the kneecap may be fractured while the graft is being taken during surgery or from a fall onto the knee soon after surgery.

- Pain or swelling during activities ranging from daily activities to strenuous sports. A thorough rehabilitation program and a slow, gradual return to activities will reduce the likelihood of pain and swelling.

- 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 graft of any type is attached.

- Repeat injury to the graft (just like the original ligament). Repeat surgery is more complicated and less successful than the first surgery.

- In rare cases, chronic pain, tenderness, and swelling (complex regional pain syndrome) after the injury is healed.
After ACL Reconstruction

Diet

Start with clear liquids and advance to regular food if you tolerate the liquids without nausea.

Bandages/Showers

Remove all surgical bandages on the 4th postoperative day. You may shower normally at this point (if you must bathe before this then sponge bathing is advised and please take care to keep you bandages dry prior to their removal). Please avoid soaking your knee, such as in a bath tub, swimming pool, or hot tub, until after suture removal and clearance by your physician. Band-Aids can be applied to the incision sites after the bandages have been removed.

Pain Control

Initially, you will experience some swelling and discomfort in the knee for a few days postoperatively. Crutches and a knee brace are used by some surgeons after ACL surgery. Please refer to your specific surgeon's post-op instructions.

Elevation of your knee above the level of your heart is helpful in decreasing swelling and discomfort and you should plan your schedule so that much of your time can be spent in this position for the first 48 hours after your surgery and intermittently thereafter.

Ice packs are also very effective for improving comfort and decreasing inflammation. They should be used for 20-30 min at a time. A thin towel or T-shirt under the ice pack will help prevent condensation reaching the bandages and will protect the skin after bandages have been removed.

You will most likely be given a prescription for pain medication. It is advisable to use the pain medication on a regular schedule for the first 48 hours then switch to using it as needed. Pain medication is best tolerated when taken with meals. An anti-inflammatory medication such as ibuprofen or naproxen may be used along with your prescribed pain medication in most cases.

Rehabilitation

After undergoing ACL Reconstruction, it is important to begin exercising your knee immediately to restore strength and full range of motion. Initial exercises should be nonweightbearing in nature, and should focus on gentle strengthening of the muscles surrounding the knee as well as increasing joint range of motion.

You should expect to feel a gentle stretch while performing your beginning exercises, but you should not experience any pain. Any activity that causes significant discomfort should be stopped immediately. It is also a good idea to ice and elevate your leg after performing these exercises to decrease any increase in swelling.
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The following exercises are appropriate for immediate post-ACL reconstruction rehabilitation. The movements should be gentle and steady. Bouncing or overstretching should be avoided.

**Quadriceps Contraction**

Lay on your back on a flat surface. Place a rolled towel under your ankle between you and the surface. Push your ankle down into the towel roll. This will cause your knee to straighten as it rises off the surface you are laying on. Straighten your knee as much as possible and hold the position for five seconds. (Avoid any type of bouncing motion!) Relax and repeat 10 more times.

**Hamstring Contraction**

Lie on your back with your knees bent in a 10 to 15 degree angle. Without moving your leg, pull your heel into the floor. This will cause the muscles on the back of your thigh to contract. Hold this for five seconds. Relax and repeat 10 more times.

**Gluteal Sets**

Lie on your back with your knees bent in a 10 to 15 degree angle. Squeeze your buttock muscles together. Hold for five seconds. Relax and repeat 10 more times.

**Straight Leg Raises**

Lay on your back on a flat surface. Bend the knee of your uninvolved leg (the one that wasn't operated on) to a 90-degree angle with your foot flat on the surface. Keep your involved leg straight without the knee bent. Slowly lift the involved leg six inches off the floor. (by contracting the front thigh muscles). Hold for five seconds. Slowly lower your leg to the floor. Relax and repeat 10 more times. (The knee of the raised leg should remain straight throughout this exercise. Focus on lifting by using the muscles on the front of your hip joint.)

**Knee Range of Motion**

Sit on a flat surface and slightly bend your knee. Place a towel under the heel of the foot and hold on to the ends of the towel. Using your arms to pull gently, bend the knee up and hold 3-5 seconds and then straighten to a more comfortable position. Because of swelling and your recent surgery the knee can be quite stiff and painful as you force it to bend. The best thing to do is go-slow and do not use heavy force to stretch. Usually the more you do the further it bends without additional discomfort. Repeat 10 stretches with 5 second hold, 3-6 times per day.
Stationary Biking
Once good control of swelling has occurred and the knee bends past 90 degrees, stationary biking can offer good range of motion exercise. The resistance should be near the lowest setting and the pedaling rate should be slow and steady 30-60 revolutions per minute. Seat adjustment is critical. If the seat is too low, the knee will over bend at the top of the revolution and will cause some pain. If the seat is too tall the knee will over stretch at the bottom of the revolution. The knee should easily tolerate the revolution at both top and bottom. It may take several trials of seat adjustment to get it right. Start with 3-5 minutes several times per day and increase to 15 minutes if it is helpful.