

Plain Language Summary

The Management of Anterior Cruciate Ligament Injuries



Background

This plain language summary is an overview of the surgical management of anterior cruciate ligament (ACL) injuries in adults and children.

There are four ligaments in the knee. The medial collateral ligament (MCL) is on the inside of the knee, and the lateral collateral ligament is located on the outside of the knee. Both of these ligaments control the side-to-side knee motion. The other two ligaments are the ACL, and the posterior cruciate ligament (PCL) with the ACL being located in the front of the knee and the PCL located in the back of the knee. These ligaments control the front and back movement of the knee.

The ACL is the most important of the four ligaments that stabilize the knee, and it is the most commonly injured. This ligament connects the femur (thigh bone) to the tibia (shin bone) inside the knee joint. Injury usually results from a sports-related injury, which may occur with or without contact with another player. Non-contact injuries are more common, and female athletes

experience non-contact ACL injury 2-4 times as often as male athletes.

In the United States, around 200,000 ACL injuries occur each year. While the mean age of patients has remained stable at 29 years old, ACL surgery has increased more than 200% in patients older than 40 and younger than 14 years old. This increase in surgery reflects the changing activity level and expectations of both older and younger athletes.

What are the risk factors for ACL injury?

Risk factors for an ACL injury include environmental factors and patient factors. Bad weather and field conditions can contribute to the potential for injury. Additionally, the shape of the areas where the femur bone and the tibia bone meet can also affect the stress placed on the ACL. Female athletes may have additional risk of ACL injury if they have loose knee ligaments, higher body mass index, a family history of injury, or in response to hormones during the menstrual cycle.

What are treatment options for ACL injury?

Treatment options depend on many factors including the patient's overall health, how loose or unstable the knee feels, any other injuries to the knee, and activity level of the patient. Surgery is typically the preferred option for active patients with an ACL injury. Many patients will receive physical therapy before surgery to ensure they have full motion of the knee and to allow swelling or skin wounds to heal before having an operation. A part of these patients may complete therapy and feel stable enough that they decide not to have ACL surgery. However, most young, active patients with an ACL injury will go on to require surgery to maintain their knee stability and activity level. Additionally, patients with injuries to multiple ligaments or to the meniscus (a c-shaped pad of cartilage in the knee that acts as a shock absorber) or cartilage will often require surgery to repair those issues as well. In rare cases, patients

will have so much swelling immediately after injury that the knee may be too painful to move at all. For these patients, the surgeon may suggest removing the fluid from the knee to improve pain control and range of motion.

What is done to prepare for surgery?

Complete History and Physical assessments are very important to evaluating a patient with a knee injury, and the surgeon will often diagnose an ACL injury with a physical exam alone. Radiographs (X-rays) and a Magnetic Resonance Imaging (MRI) test will usually be performed to evaluate the knee for additional injury. Lab tests and other diagnostic tests may be ordered but are not generally required for ACL surgery. When surgery is planned for an ACL injury, strong evidence shows that surgery within three months of injury has a lower risk of additional cartilage and meniscus injury. Additionally, pain management prior to surgery may be a combination of medications and nerve block. A preoperative nerve block injection may be administered to numb the injured knee, as this helps control pain from the surgery.

Surgical treatment

There are multiple methods for performing ACL surgery, so the surgeon will explain the options and their risks and benefits during your appointment before surgery. Currently, techniques for ACL repair have not been as effective as reconstruction, therefore ACL reconstruction is the “gold standard” for treatment of ACL injury. The ACL can be reconstructed with a “single-bundle” or “double-bundle” technique, which describes what portions of the ACL the surgeon will recreate. The two techniques have similar outcomes and strong evidence shows they are both safe and effective techniques, therefore surgeons will usually perform the technique that they feel most comfortable performing. The surgeon will discuss the type of graft that will be used; grafts are pieces of tissue that may be from the patient’s body (autograft) or from a cadaver (allograft). While both graft choices are effective, strong evidence shows that failure rates are lower, and outcomes are better in young patients with autograft tissue. If the patient decides to use autograft tissue, the surgeon will discuss the

location and type of graft. The graft may be from the kneecap, “bone-patellar tendon-bone” (BTB) or from another tendon, such as the hamstrings (muscle that is located on the back of your thigh) or quadriceps (muscle that is located on the front of your thigh). During surgery, the surgeon will remove a portion of healthy tissue and use it to replace the damaged ACL. While BTB has a lower risk of failure and infection, hamstring tendon grafts have less knee pain or discomfort with kneeling after surgery. The surgeon will also discuss the different types of hardware (screws, sutures, or other implants) that will be used to secure the graft. The graft is commonly secured using screws inserted into the bone of the femur and the tibia or by using sutures with a small metal button on the outside of the bone. Both techniques are effective regardless of graft type. If there are other ligament, meniscus, or cartilage injuries in the knee, these will usually be repaired or reconstructed at the same time to reduce graft failure and improve function. Before surgery, anesthesia will be administered to keep the patient from feeling pain. General anesthesia or spinal anesthesia are the most common types of anesthesia used during knee surgery, and both are very safe and have similar patient reported outcomes.

What to expect following surgical treatment for an ACL injury

Postoperative (after surgery) care consists of a team of clinicians, which may include orthopaedic surgeons and physical therapists. For pain management, a combination of medications in different combinations may be used to help manage pain following surgery. Nerve blocks may also help control postoperative pain. After surgery, the patient can expect to get up and move around as soon as possible, as early movement lowers the chances of developing a blood clot. Additionally, in patients with a higher risk of blood clots, medicines to thin the blood may be prescribed. Physical therapy will generally start very soon after surgery and will advance based on the patient’s pain control, range of motion (how far you are able to move your knee), and the strength of the muscles around the knee. Strengthening, agility, and balance exercises will be important not only for rehabilitation of the

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injured knee, but to prevent injury in the future. In many cases, a brace will be used after surgery to control knee motion and protect the reconstruction. Strong evidence shows that using braces as the patient returns to activity is not necessary, therefore most surgeons will advise to discontinue brace wear soon after surgery. Any additional injuries to the knee may require brace wear for a longer period of time; the surgical team will explain how long to wear the brace to best treat the patient's injury.

Finally, most patients will require crutches for several weeks after surgery. While many patients can bear full weight on the knee after ACL reconstruction, other injuries in the knee may require a period of not bearing weight. The surgical and physical therapy teams will work with the patient on the best rehabilitation program to get back to full function.

This summary was written by the Committee on Healthcare Safety.

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