ACL Injuries and Prevention Strategies

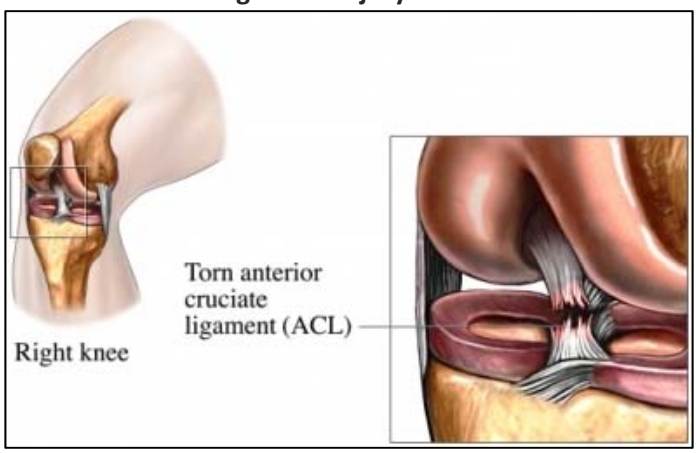
One of the most common injuries in sports is of the anterior cruciate ligament (ACL). The ACL is prone to injury in many sports. Basketball and soccer, in particular, lend themselves to ACL injuries. Contrary to popular belief, most ACL tears are not contact injuries. They are usually caused by noncontact injuries such as a sudden change of direction, cutting maneuvers combined with sudden stopping, or pivoting with the knee nearly fully extended when the foot is planted on the ground.

In one NCAA tournament game, University of Connecticut's former standout Shea Ralph recalls, "Kesha gave me a lead pass, but it was going out of bounds. I tried to stop on my right leg and reach out of bounds to get the ball, spin, and get a lay-up. When I planted my foot, my leg below my knee just stopped, but the rest of my body kept going. I felt my knee shift. [The pain] was continuous and sharp. Kind of like somebody stabbed me in the leg and was moving the knife around."

Anatomy and Function of the ACL

Ligaments are strong connective tissues that help connect bones at the joints. The ACL is the ligament in the middle of the knee that connects the back of the thigh bone (femur) to the front of the shin bone (tibia). Along with the posterior cruciate ligament (PCL), the ACL helps provide stability for knee rotation and protects the thigh bone from sliding forward and backward on the shin bone.

Anterior Cruciate Ligament Injury



Risk

There is no definitive link between ACL tears and age or gender. However, male and female athletes have different landing and cutting techniques that may explain the possible increased risk for females. For example, some female soccer players may play in more of a knock-kneed position, or a reduced hip and knee joint range of motion, or decreased hamstring strength, all of which may lead to an increased risk for an ACL injury.

Symptoms

Damage to the ACL can range from a minor tear (grade 1 sprain) to a full rupture (grade 3 sprain). Symptoms will vary by the grade of the sprain, but may include:

- Pain.
- A popping noise when injury occurs.
- Swelling in the knee within 24 hours.

- Loss of full range of motion.
- Instability—a wobbly feeling that will make it difficult to stand or walk, and especially change direction.

These symptoms are usually good indicators of an ACL injury, but doctors will examine your knee to see if there is instability. The doctor also may x-ray the knee to rule out a fracture to the bone. If a definitive diagnosis is still unclear, then other imaging tests, like an MRI, may be necessary. In some cases, an arthroscopic examination of the knee may be performed. The doctor will insert tiny cameras into your knee. The cameras will show any damage inside the knee joint.

Treatment

If you do suffer a torn ACL, your treatment will depend on your age, activity requirements, and the extent of your injury. Here are the most common treatments:

Conservative

Most of these remedies can be done at home:

- Rest and stay off the knee as much as possible.
- Keep the knee iced and elevated.
- Anti-inflammatory medications, like ibuprofen, will help with pain and swelling.
- Wearing a knee brace to stabilize the knee joint.

If these methods do not work for you, or if you are more active, other treatments are available to help repair your knee and get you back on your feet.

Surgical

ACL surgery is an elective procedure. This means that surgery is not always necessary; it may depend on your lifestyle and age. Surgery may be recommended if you have:

- A complete tear of the ACL.
- A high degree of joint instability.
- Injury to the knee that affects more than one ligament.
- A need to return to sports or other activities that require pivoting, turning, or sharp movements.
- No improvement with rehabilitative therapy.

Surgical treatment involves replacing the ligament with either your own tissue or tissue from a donor. In the past, this surgery required opening the knee to reconstruct the ACL. It was performed with success, but the rehabilitation process was slow. Today, doctors most often perform arthroscopic surgery to make repairs.

A graft, usually from a tendon in the knee, is used to rebuild or replace the ACL. This procedure is effective because it uses your own tissue and allows the knee to retain its normal range of motion. The knee can heal back to its original degree of strength with a low risk of infection or graft rupture. The reconstruction usually lasts a lifetime, but repeat tears can occur with sufficient stress.

Rehabilitation

Physical therapy programs will help to restrengthen the knee during conservative treatments and after surgery. These programs will help you:

- Regain range of motion.

- Strengthen the muscles around the knee.
- Improve balance.
- Protect the ligament from further damage.
- Provide physical training to get you playing sports again.

An ACL brace is generally prescribed for use with any physical activity for some time after the surgery. It helps stabilize the knee while it continues to strengthen.

Potential Complications
Problems from ACL surgery are rare, but all procedures have some risk. Your doctor will review potential problems, like:

- Infection.
- Excess bleeding.
- Blood clots.
- Reaction to anesthesia.
- The operation does not provide the desired improvement in function.
- Instability of the knee.
- Numbness or stiffness in the knee.
- Kneecap pain after surgery.

Before your procedure, talk to your doctor about ways to manage factors that may increase your risk of complications such as:

- Smoking.
- Drinking.
- Chronic diseases such as diabetes or obesity.

Prevention
Treatment for ACL injuries is effective, but considering the pain, inconvenience, surgery, and lengthy recovery, your best bet is to prevent ACL the injury in the first place.

Recent research shows that identifying and targeting weak muscles, such as the hamstrings, can improve strength and coordination and therefore help decrease the likelihood of an injury. In addition, other risk factors such as increased joint motion can be further assessed and corrected to improve performance.

Current studies also demonstrate that specific exercises, such as jump routines and learning to pivot properly, help athletes prevent ACL injuries, especially in young athletes. Some experts suggest it may be beneficial to integrate prevention programs during early adolescence, prior to when young athletes develop certain habits that increase the risk of an ACL injury.

Ways to Protect the ACL
Ralph has made some adjustments to try to prevent another ACL injury while playing basketball, like distributing her weight more evenly on both feet when jump-stopping. Because of her body type, she has taken even more precautions. "I worked on turning my feet outward and being conscious of it," she explains. "I also worked on keeping my knees faced out, how to jump and land, how to collapse if I fall, how to position my leg if people are about to fall on it."

Effective methods that help prevent ACL injury include:

- Plyometrics, a type of jumping exercise, used to train and strengthen the leg muscles.
- Warm-up exercises.
- Strength training for your quadriceps and hamstrings.
- Stretching exercises for your legs.