



Anterior Cruciate Ligament Injury

What is the anterior cruciate ligament (ACL)?

Ligaments are ropes that hold bones together. The knee has four major ligaments. Two collateral ligaments run along the sides of the knee. There are also two cruciate ligaments which cross in the middle of the knee (the term 'cruciate' comes from the Latin word for cross). The anterior cruciate ligament (ACL) is an important stabilizing ligament of the knee. It courses from back of the femur (thigh bone) to the front of the tibia (shin bone). The primary function is to keep the tibia from sliding forward, especially with twisting or pivoting motions.

How is the anterior cruciate ligament injured?

ACL injuries can occur by a variety of mechanisms. ACL injuries can be due to physical contact, occurring with a blow to the outer aspect of the knee (for example getting tackled from the side in football). Non-contact injuries can also cause an ACL tear. This type of injury occurs when an athlete is running or jumping and then suddenly slows and changes direction or twists.

What are the symptoms?

You may feel or hear a "pop" in your knee at the time of injury. Most people with an ACL tear feel an initial sharp pain and have significant swelling which develops in the first few hours after injury. Swelling can make the knee feel "full" and stiff. Over days or weeks, the swelling resolves; pain generally improves as well. After the initial phase of healing, athletes are often left with a feeling that their knee is unstable and have a sense that it will "give out" with certain motions. Movements such as squatting, pivoting, walking down stairs, and moving to the side are most often affected.

Are there any risk factors?

Women engaging in pivoting sports, such as soccer and basketball, sustain non-contact ACL injuries at higher rates than men performing the same activities. There are many possible explanations for this finding. Girls use and control their muscles in a different way than boys do which seems to contribute to the risk of ACL injuries. Other risk factors for ACL injuries include increased knee joint laxity (looseness), weakness in the hamstring muscles, increased body mass index (BMI), genetic factors, and playing on surfaces with increased traction (e.g. synthetic gym floors). Adults who tear their ACLs have a significant risk of tearing their meniscus (the cartilage shock-absorber of the knee) at the same time. This is less common in children who have not finished growing.

How is it diagnosed?

Your doctor will perform a detailed physical examination of the knee including maneuvers that test the ACL. The unaffected knee will also be tested for comparison. Your doctor may perform x-rays to see if there are any injuries to the bone; x-rays are excellent for assessing bony injuries but they do not show the cartilage or ligaments. If your doctor is suspicious of an ACL injury based on the physical exam, he or she may order an MRI. The MRI helps confirm the diagnosis and determine if there is any associated injury to the cartilage.

How is it treated?

In the initial period after the injury, ice and compression can help decrease swelling and assist with pain. Ice can be applied to the area for 15-20 minutes as often as every 2-3 hours until the pain goes away. A brace may also be



provided to add support to your knee. Your doctor may provide you with crutches initially until you have the strength and confidence to put weight on your knee. Your doctor may also prescribe physical therapy to help you regain full motion of your knee and to help you gain strength in your thigh muscles.

If your ACL is torn, then your doctor will discuss possible treatment options. Unfortunately, if the ACL is truly torn, the body cannot repair it. Therefore, for most patients who plan to return to sports, physicians will recommend eventual surgery to replace/reconstruct the ACL. The ACL cannot be sewn back together; surgery involves using another tendon from your body or a graft from a cadaver. For younger patients, doctors often recommend physical therapy and bracing until the child is closer to completing his/her growth. The exact method of surgery can vary depending on many factors including your child's age. Your surgeon will discuss various options with you.

When can I return to my sport or activity?

The goal is to return your child to his or her sport as quickly and safely as possible. Some patients are able to return to sports after a course of physical therapy with an appropriate brace. Others have continued symptoms despite these measures and are unable to safely return to pivoting/twisting sports until after surgery. Generally patients who have surgery return to full activities between 3 and 6 months later, depending on their age and how the surgery technique.

How can ACL injuries be prevented?

Unfortunately, individuals who sustain ACL injuries are at a much higher risk of arthritis, regardless of whether they have the ligament reconstructed surgically. Therefore, researchers have been looking for ways to protect young athletes against ACL tears. ACL injuries can be prevented through a strengthening, agility and flexibility program which emphasizes proper biomechanics. Your doctor may recommend that you participate in a specific exercise program if you play a high-risk sport. The programs will help strengthen the lower body and core muscles and teach specific landing, cutting, and stopping maneuvers. Well-designed knee injury prevention programs have been shown in research studies to decrease the risk of ACL injuries.