What is an ACL injury?
One of the most common injuries involving the knee joint is an anterior cruciate ligament tear. The anterior cruciate ligament, also called the ACL, is one of four ligaments that are critical to the stability of the knee joint. A ligament is a structure made of tough fibrous material and connects bone to a bone. There are over 250,000 ACL injuries per year in the United States.

What is the normal function of the ACL?
The anterior cruciate ligament is the primary restraint to forward motion of the shin bone (tibia). The ACL also influences angular and twisting forces across the joint. The ACL performs these functions by attaching to the femur on one end, and to the tibia on the other. The other major ligaments of the knee are the posterior cruciate ligament (PCL) and the medial and lateral collateral ligaments (MCL and LCL, respectively). The anatomy of the knee joint is critical to understanding this relationship. Essentially, the femur (thigh bone) sits on top of the tibia (shin bone) and the knee joint allows movement at the junction of these bones. Without ligaments to stabilize the knee, the joint would be unstable and prone to dislocation. The ACL prevents the tibia from sliding too far forward.

What happens when there is an ACL injury?
When an ACL injury occurs, the knee becomes less stable. The ACL injury is a problem because this instability can make sudden, pivoting movements difficult. An ACL injury may also make the knee more prone to develop meniscal and articular cartilage injuries, which in turn can cause pain in the knee and early arthritis.

The mechanism of injury occurs when the shin bone moves so far anteriorly that the ACL becomes partially or fully torn. An injury to a ligament is also known as a sprain. The severity of the sprain influences the treatment. Severe sprain (complete tear) of the ACL is a problem as the knee has lost one of its main stabilizers.

For an athlete, an injury to the ACL can make continued participation difficult. Many sports require a functioning ACL to perform common maneuvers such as cutting, pivoting, and sudden turns. These high demand sports include, but are not limited to:

- Football
- Soccer
- Basketball
- Skiing
- Gymnastics
- Hockey (Ice and Field)
Patients may be able to function in their normal daily activities without a normal ACL, but these high-demand sports may prove difficult. Therefore, athletes often decide to undergo surgery in order to return to their previous level of competition.

**What factors contribute to ACL injuries?**

ACL injuries can occur in anyone, however some athletes are at higher risk. The sports listed above can cause high forces to be placed on the ACL. Participants in these sports are especially prone to ACL injury.

Another factor that contributes to ACL injuries is the gender of the patient. In college basketball, female players may be up to 8 times more likely than their male counterparts to sustain a non-contact ACL injury. There are different theories as to why women are especially susceptible to ACL injury. Please refer to the enclosed handout on women and ACL injuries for more details.

Biomechanical and muscle imbalances have been implicated in non-contact ACL tears. Other mechanisms that can cause ACL tear include severe trauma, direct contact injuries, sporting injuries and work injuries. Several prevention programs have been developed to try to reduce the incidence of this mechanism of injury. Please refer to the PEP program, Prevent injury, Enhance Performance for more information.

**What are the symptoms of an ACL tear?**

An ACL tear most often occurs during sporting activities when an athlete suddenly pivots causing excessive rotational forces on the ligament. Individuals who experience ACL tears usually describe a feeling of the joint giving out or buckling; patients also often say they hear a ‘pop.’

**Signs you may have sustained an ACL tear:**

- Sudden giving way of the knee
- Hearing a 'pop' at the time of injury
- Sudden swelling of the knee joint after an injury
- Pain in the knee when walking

**What should I do if I think I have an ACL tear?**

Patients who think they have an ACL tear should be evaluated by a physician. An ACL tear may be difficult to diagnose immediately after the injury because of associated pain and swelling. There may also be muscle spasm that contributes to making the knee difficult to examine. Therefore, it may not be possible to conclusively determine the presence of an ACL tear soon after the injury. If an ACL tear is suspected, you will return for follow-up evaluation with your orthopedic surgeon.

**How does my doctor make the diagnosis of an ACL tear?**

A combination of the history of the injury, the physical examination and imaging studies including x-rays and MRI may be helpful in making the diagnosis of ACL tear. Many patients are concerned when their doctor does not order a MRI. While the MRI may be necessary in some cases, it is not necessary to diagnose all ACL tears.
**Will I need an operation for an ACL tear?**
The decision whether or not to operate on an ACL tear is dependent on several factors. These factors include the age of the patient, the activity level of the patient (both recreational and occupational), the expectations of the patient, the ability and willingness of the patient to participate in post-operative rehabilitation, the degree of instability of the joint and any other associated injuries to the knee (e.g. other ligamentous or meniscal problems).

Some patients who experience ACL tears are able to resume normal daily activities without surgical reconstruction of this ligament. There are some important factors to consider in making the decision as to whether or not operative treatment of an ACL tear is needed.

**What is the surgical treatment for ACL reconstruction?**
ACL reconstruction is usually not performed until several weeks after the injury. This time allows the inflamed and irritated knee to quiet. As the swelling and inflammation decrease, the range of motion of the knee improves. Resolution of swelling and stiffness prior to ACL reconstruction surgery improves the post-operative function of the joint.

**How is the ACL reconstruction performed?** It is not possible to repair the torn ACL by simply reconnecting the torn ends. Rather, the torn ligament must be entirely removed and a new ACL must be reconstructed using other healthy tissue.

The surgical procedure for an ACL reconstruction involves using a segment of another larger ligament or tendon to replace the damaged ACL. Graft choices are discussed at length between the patient and the surgeon. The graft options that can be used for ACL reconstruction include:

- Patellar Ligament
- Hamstring Tendons
- Allograft (Donor Tissue)

**Once I have surgery, when can I play again?**

ACL reconstruction surgery requires a four to six month rehabilitation program post-operatively. This is usually broken up into three phases with activities increasing with the strength of the healing ligament. It is extremely important to be compliant with the post operative rehabilitation. Engaging in higher stress activities when the tissues are not yet healed and the muscles are not fully functioning can lead to early failure of the ACL. Most athletes are able to return to running at 8 weeks, plyometrics and agilities by 12 weeks and sport at four to six months. Return to sport is evaluated on an individual basis and will ultimately be determined by the surgeon.