

Understanding ACL Injuries



Anterior Cruciate Ligament (ACL) injuries are very common. Almost everybody knows an athlete who has torn their ACL.

Anterior Cruciate Ligament (ACL) injuries can occur to men and women of various ages, at any level of athletics.

There are four main ligaments that stabilize the knee. The anterior cruciate ligament is responsible for stabilizing rotational movements at the knee that occur during cutting and pivoting activities. The ACL is also a secondary restraint to knee hyperextension. The ACL stabilizes the knee joint in two ways. First, the ligament acts as a passive restraint to excessive movement through its connection to the tibia and femur. Second, the ACL has mechanically sensitive nerve receptors, called proprioceptors, which sense the position of a joint. When a joint starts to exceed its normal range or speed of movement these proprioceptors will send a signal to the brain and spinal cord, which in turn stimulates the appropriate musculature to stabilize the joint.

An ACL injury usually occurs without contact from another player. The most common form of non-contact injury is a deceleration injury. An athlete is planting to cut or change directions, and the ACL cannot withstand the force placed on it, so it tears. This causes the knee to buckle or give out. The ACL also can be torn if the knee is forcefully hyperextended while landing from a jump.

Although less common, contact ACL injuries do occur. An example of a

contact injury would be a football player who is hit from the side at the knee. These injuries often involve more than one ligament.

Research studies have attempted to determine what factors contribute to an increased injury risk, but ACL injuries appear to be a multi-factorial injury that cannot be isolated to a single cause.

There are several ways to diagnose an ACL injury. A magnetic resonance imaging (MRI) scan can visualize soft tissue and is a relatively accurate test in predicting an ACL tear. A KT-1000 is a device that measures the laxity or looseness in the uninjured knee compared to the injured knee. In a diagnostic arthroscopy, a surgeon looks inside the knee with a camera to determine an injury. This is the most definitive test, but also the most expensive and invasive.

A physical examination is often the most reliable and least expensive method of diagnosis. A sports medicine physician, physical therapist or athletic trainer will assess the knee's laxity, compared to the uninjured knee, using a Lachman's test and an anterior drawer test. They will also test the rotational stability component with a test called the pivot shift test. This test attempts to reproduce the athlete's sensation of buckling or giving out.

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When treating an ACL injury, the key is controlling the instability of the knee. Repeated instability not only hinders athletic performance, but more importantly increases the risk of further injury to the cartilage and other ligaments of the knee. Cutting and pivoting activities are the most stressful for the ACL and therefore are the activities most likely to reproduce the instability in an athlete with a torn ACL. The choices for treatment should be individualized and should take into account the age, activity level and the desire to return to sports which require significant amounts of cutting and pivoting or other high-speed movements.

One form of conservative treatment is to modify the athlete's sports participation. This involves discontinuing sports involving cutting and pivoting, such as soccer and basketball. These sports could be replaced by sports that do not involve cutting and pivoting, such as swimming or running.

Another form of conservative treatment is rehabilitation. Rehabilitation for an ACL injury focuses on improving an athlete's proprioception and reactive muscular stabilization. For sports such as basketball, soccer and football, rehabilitation alone will not be enough to prevent instability. If instability persists, the athlete must undergo surgical reconstruction of the ligament to return to these sports.

Surgical reconstruction involves replacing the torn ACL with a graft. The graft chosen is usually the central third of the patellar tendon or a portion of the hamstring tendons.

Following surgery these athletes will undergo four to seven months of physical therapy. The post-operative

physical therapy can be divided into five phases. During the first phase, the rehabilitative goals include improving range of motion, decreasing swelling, normalizing the walking pattern and increasing strength. In phase two, the goal is to focus on restoring proper body alignment and control with basic movements, such as squats, lunges and single leg balance. This phase continues to build lower extremity and core (trunk) strength. In phase three, the focus shifts to developing good movement control with impact activities and more complex movements, such as a lunge with a rotational component. Developing movement control and eliminating apprehension while cutting and pivoting is the primary goal of phase four. At this time there is also more focus on single leg impact and push off with change of direction. The final phase transitions the athlete from performing intense cutting and pivoting activities in a controlled environment to an environment that more closely replicates their sport.

Although most athletes can return to sports, an ACL injury causes a significant amount of time lost from sports. Recent research that has shown a decreased risk of injury is associated with balance and proprioceptive training, but it is very unlikely that ACL injuries can be totally prevented in the high demand sports.



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