The Anterior Cruciate Ligament Explained

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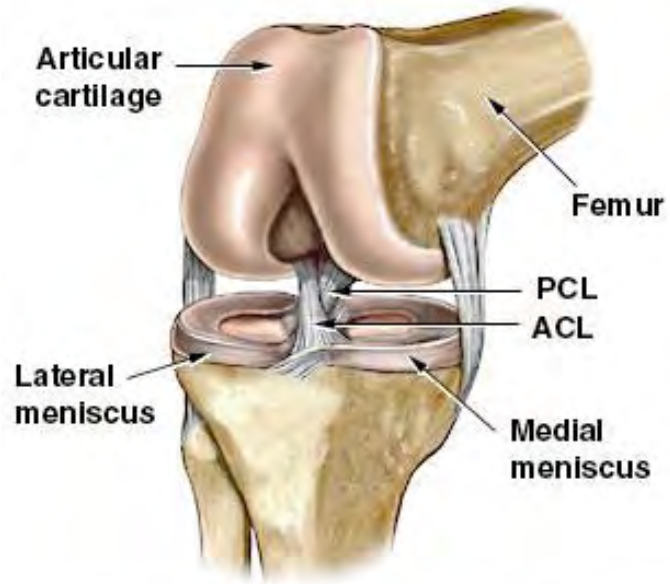
Anatomy

The Anterior Cruciate Ligament (ACL) lies deep within the knee joint, connecting the thigh bone (femur) to the shin bone (tibia).



Function

The biomechanical function of the ACL is complex for it provides both mechanical stability and proprioceptive feedback to the knee. In its stabilising role, it prevents excessive forward motion of the shin relative to the thigh; it also prevents excessive rotation at the knee joint and hyperextension of the knee joint.

Injury

The ACL ligament can be injured in several different ways, most commonly by landing from a jump onto a bent knee then twisting, or landing on a knee that is hyperextended. In collision sports, direct contact of the knee from opponents can cause damage to the ACL. When skiing the injury normally occurs during a fall when the bindings do not release. Because of the amount of force required to injure the ACL it is not uncommon for other structures inside the knee to be damaged, such as the meniscus (cartilage) or the medial collateral ligament (the ligament on the inside of the knee).

Signs and Symptoms

At the moment of injury the person may experience a popping sensation deep within the knee. There will be pain, proportional to the force and degree of damage to other structures within the knee joint. The knee will become painful and swollen due to what is known as a haemarthrosis (bleeding within the joint) in severe cases this has to be aspirated (drained) by a Doctor.

Treatment

During the acute stage of the injury (the first 48-72hours) exact diagnosis can sometimes be difficult due to the pain and the gross swelling inside the knee. Once the initial treatment to decrease the swelling (Rest Ice Compression Elevation regime) has taken effect a clinical diagnosis may be possible.

This may be achieved by a Physiotherapist or an Orthopaedic Consultant performing what is know as stress tests on the knee. The degree of laxity found when doing these test will allow the clinician to estimate the degree of damage to the ACL ligament. The three main test performed are the Lachman test, the Pivot shift test and the Anterior draw test. If there is any doubt, or to confirm the clinical diagnosis the patient may be sent for further investigations. Most commonly an MRI scan is used to ascertain the level of knee injury. In some cases the MRI scan may not give a completely clear picture of all the structures injured and in this case it may be necessary to survey the joint with an arthroscope.

Management

The management of an ACL injury is completely dependent upon the degree of damage and the subsequent functional impairment, the age of the patient and the level of sporting activity. If the diagnostic investigations only reveal a partial tear and there is minimal instability then a conservative approach with a physiotherapist is indicated. If the ligament is completely ruptured and functional instability is present (i.e. giving way) then surgical reconstruction may be necessary to restore normal function and a return back to sport.

Conservative Management

Once the acute stage of the injury has been treated rehabilitation to the knee can start. Many different things need to be taken into consideration when rehabilitation a knee with an ACL injury. The major one being what level of sport the person is looking to get back to. Depending on this a rehab programme will be devised by your physiotherapist. The aims of the rehab programme are outlined below:

- To regain full range of motion at the knee joint
- To regain full strength to the injured leg
- To regain endurance and power to the injured leg
- To retrain balance and proprioception
- Sports specific rehab to allow a safe return to sporting activity

Surgical Management

If surgical reconstruction has been opted for, the patient and the Orthopaedic surgeon will discuss the different forms of surgery that can be undertaken and the planned after care.

The two major types of ACL ligament reconstruction performed are one using a graft from the middle third of the patella tendon (bone-patella-bone graft), and the other using a graft from the hamstring muscle (semitendonosis and gracilis graft).

Rehabilitation following repair

- **Early stage**

Immediately after your operation you will be taught basic exercises by a Physiotherapist. A specialist knee brace may or may not be used depending on your Consultant's protocol. The patient is usually in hospital for 1-2 days, and should be able to return to work after 1-2 weeks. Driving is not recommended for 2-3 weeks. For the first two weeks the patient is expected to use crutches and exercise the knee gently.

- **Middle stage**

From 2-6 weeks rehabilitation is focused on minimising swelling, regaining quadriceps control and range of movement in the knee. It is important the knee can be fully straightened (but not hyper-extended) as quickly as possible. Core stability and swiss ball exercises are often taught to improve overall fitness. By six weeks patients are usually permitted to swim frontcrawl. It is important not to progress too quickly at this stage, even if the knee is feeling strong, due to risk of graft injury. As the graft matures, further training in a gym-based program can begin in proprioception, balance and strengthening.

- **Late stage**

From 3 months, the patient can be expected to participate in gym activites such as treadmill running, progressing to agility drills, plyometrics and sports specific activities. It is usually not recommended to return to contact sports until at least 6-9

months following repair. months following repair.

Success
80-90% of patients have reliable knee stability in the long-term, making the ACL reconstruction an extremely successful surgery.

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