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Opinion

Anterior Cruciate Ligament Injury of the Knee

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The primary joint stabilization of the knee occurs through the action of the following four ligament structures:

- Medial Collateral Ligament.
- External Collateral Ligament.
- Anterior Cruciate Ligament.
- Posterior Cruciate Ligament.

Once a lesion has occurred, these structures do not heal completely, and then surgical treatment is considered.

Anterior Cruciate Ligament (ACL) Tear

The ACL is a tissue that connects the femur to the tibia at the knee and helps to stabilize the knee joint. Basketball, soccer, football, skiing, tennis, volleyball, and other sports that involve sudden movements and changes of direction are the most common causes of injuries.

The incidence of ACL injuries is higher in women than in men, ranging from two to six times higher when performing the same sports activity. However, the severity of an ACL injury is greater for men due to their higher level of participation in contact sports. Usually, an ACL injury is secondary to a sudden movement or an external force that is greater than the resistance of this anatomic structure. It is caused by a partial or total tear to its fibers and, consequently, joint instability.

Sports-related ACL injuries can occur when

- Jumping and spinning while playing basketball or volleyball.
- When you receive a strong lateral hit to the knee, for example, during a tackle in American football.
- When the knee joint is overextended when falling.
- When you stop quickly and change direction when running, such as in soccer or skiing.

Recent tests indicate that most of these injuries are non-contact and do not involve a collision with other players.

Symptoms of an ACL Injury

The characteristic feature of an ACL injury is the intense pain experienced, as well as joint effusion and functional impotence of the knee, with a loss of strength and a feeling of instability. Most athletes who suffer a tear are unable to continue playing and are forced to be helped off the field. The knee usually develops rapid swelling in the first few hours after the injury.

Diagnosis

During the initial care of the injured person in the emergency room and after a specialized assessment, which may be limited by the pain presented by the patient, a knee sprain is often diagnosed and the limb is usually immobilized with a splint. It is recommended to follow up on the injury with a specialist in the following days.

During the physical exam, the doctor will examine the knee for swelling and tenderness detection, comparing the injured knee to the healthy one. In the same way, and if the painful condition of the injured person allows it, they can manipulate the knee in different positions to assess the arcs of motion and the general functioning of the joint.

Often, the diagnosis can be made only by physical examination. However, more specific studies may be required to detect other possible causes and thus specify the extent of the injury; examinations such as:

- **X-rays:** Allow us to discard a fracture, even though X-rays can't show soft tissues, such as ligaments and tendons.
- **Magnetic Resonance Imaging:** This test uses radio waves and a powerful magnetic field to generate images of the hard and soft tissues of the body; In addition, it shows the length of the **ACL** injury and possible injuries to other knee tissues such as menisci and articular cartilage. You may also find tissue damage or diseases such as an infection or tumor.
- **Echography:** With the use of sound waves, intra-articular structures are visualized and lesions are detected.

Treating an ACL Injury

We must apply the RICE protocol from the moment the injury occurs. This protocol involves:

- Resting the limb.
- Applying local ice for 24 to 48 hours.
- Compression of the limb.
- Elevation of the limb.

And also, we have to prevent the knee from moving by placing a splint. In general, it is recommended to utilize crutches to initiate movement and the prescription of analgesic anti-inflammatory medications such as paracetamol and ibuprofen.

Your doctor may recommend surgery

- When an athlete wants to continue practicing the sport and recover the pre-competitive level and needs to jump and perform speed maneuvers and changes of direction.
- When an injury occurs to other structures of the knee, such as cartilage, meniscus, or other ligaments, particularly in the event of a fracture.
- When the injury results in a limitation of routine activities and a reduced quality of life.
- When there are symptoms of severe pain and a feeling of knee joint instability.

The preoperative treatment involves

- You need to get a professional medical diagnosis.
- Imaging studies are always necessary.
- Prescribe analgesic-anti-inflammatory medications to reduce pain.
- Deep rehab with strengthening of the knee muscles.
- The goal is to improve movement and the quality of life by decreasing symptoms.

The patient may be forced to miss normal activities for a few days, such as classes or work, due to the trauma. If a patient with an ACL injury is willing to limit their contact sports activity and uses an orthosis to provide joint support, the person may be able to perform their activities again without the urgent need for surgery. Although it must be taken seriously that an individual with an injured ACL is at risk of developing instability in the knee and the joint degenerative process will be accelerated.

Many young athletes who prefer or need to continue playing sports opt for ACL reconstruction surgery. If this is the case, ligament is replaced with a nearby tendon in ACL surgical repair. This repair is accomplished through the creation of bone tunnels in the tibia and femur. Through these tunnels, the graft that will replace the injured ligament is passed and fixed.

It is possible that children and adolescents will develop growth disorders if standard ACL surgery is performed on the knee before it has finished growing because the physis (growth plates) are still present. A special ACL reconstruction for children restores normal anatomy and function without touching or crossing the growth plates. This reduces the risk of growth problems in the knee.

Arthroscopy is a minimally invasive procedure used to diagnose and treat joint problems. The surgeon inserts, through small incisions in the front of the knee, a lens connected to a video camera that transmits the image through fiber optics to explore the intra-articular structure.

An autologous (of the same patient) or heterologous (from a tissue bank) graft tendon is used to replace the damaged ligament in an ACL arthroscopic reconstruction.

If an active and athletic person does not have surgery, they can develop joint instability, meniscus tears, and deterioration of articular cartilage.

Rehabilitation

Medical treatment for an ACL injury starts with several weeks of rehabilitation therapy. A Physical Therapist will determine and delineate the exercises to be performed either under continuous supervision or at home. The use of an immobilization device may also be prescribed, as well as the use of crutches for a period of time in order to avoid putting weight on the knee. Rehabilitation therapy will start after surgery. A successful ACL plasty, combined with an adequate rehabilitation, can often restore stability and functionality to the knee.

The goal of rehabilitation is to

- Get rid of pain and swelling.
- Restore full range of motion to the knee.
- Enhance the strength of your muscles.

Physical therapy can be effective in treating an ACL injury in patients who are partially inactive, engage in recreational activities, practice moderate exercise, or play sports that put less pressure on the knee.

After the ACL reconstruction, it is typically feasible to resume the competitive level of practice before the injury without any further occurrences of instability. A splint may be employed for support; however, it is advisable to refrain from participating for a reasonable period of time in sports like football, soccer, skiing, wrestling, volleyball, etc.

There is no explicit time frame for patients to resume their sports practices. Recent studies indicate that approximately one-third of athletes experience a second injury to the same knee or another within the next two years. Therefore, extending the recovery period may reduce the likelihood of a recurrence of an ACL injury.

It is recommended that athletes wait at least a year before returning to sports competition. Specialist doctors and physiotherapists will perform periodic evaluations during the rehabilitation program to ensure the knee's stability, movement, strength, and functionality is at its highest, and determine its ability to return to its pre-competitive functional level before returning to practice with a potential for ACL injury.