

## Injuries to the Knee – Part 1

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### Anatomy

The knee joint is made up of the femur, the two lower leg bones (tibia, fibula) and the patella (kneecap). It also contains four main ligaments, the lateral collateral ligament (LCL), medial collateral ligament (MCL), the anterior cruciate ligament (ACL), the posterior cruciate ligament (PCL), tendons from the surrounding muscles, and the menisci (the wedge-like rubbery cushions that protect the areas between where the major bones meet).

### Injuries to the Ligaments

The MCL is located on the inner side of the knee. It is injured by a blow to the outside of the knee or a severe outward twist that stretches (or tears) the MCL.

The LCL is on the outer side of the knee. It is injured by a blow to the inside of the knee, often with the lower leg internally rotated. It is much less frequently injured.

The PCL is within the knee joint and provides resistance to hyperextension of the knee along with assisting in rotation. It is injured by a direct blow to the front of the knee, and more frequently when the knee is flexed to 90 degrees and a person falls or is hit there.

The ACL is also within the knee joint, directly in front of the PCL (They actually cross, making an X). Its major role is to prevent excessive forward motion of the lower leg on the upper leg. In addition, it stabilizes the lower leg against excessive external rotation and assists the collateral ligaments. Injuries can occur from a direct blow to the knee, landing from a jump, and slowing down and changing direction during running. ACL tears, which are usually complete ruptures, can also have other associated injuries (other ligaments, menisci).

Interestingly, females seem to be more prone to ACL injuries, and more often injure themselves in non-contact situations. The cause is thought to be a combination of training techniques, muscle imbalance, hormones, and the differences in the female knee structure.

### Signs & Symptoms

- Pain over the ligament in question
- Swelling over the ligament (ACL tears will cause a lot of general knee swelling)
- Laxity – an athletic trainer or a physician can evaluate if there is looseness in the joint which may indicate a more serious tear.
- PCL and ACL tears may be associated with a popping sensation
- Decreases in range of motion, weakness and a feeling of instability (esp. ACL tears) may happen depending on injury severity

### Treatment

Treatment will differ depending on severity of injury. A grade I (minor) sprain will initially be treated with RICE and use of crutches as needed. The athlete should then begin an exercise program developed by an athletic trainer or physical therapist that addresses range of motion, strength, power, endurance and coordination. More serious injuries require a slower progression through this process and a brace may be used. For collateral ligaments, surgery is rarely used unless associated with other injuries that require surgical

intervention.

### Surgical intervention

**PCL:** There is some controversy as to whether these injuries should be surgically repaired. Athletes who have symptoms of instability or have a piece of bone pulled off when the ligament tears may need surgery to prevent arthritis later in life.

**ACL:** Surgical reconstruction is used for any athlete or active adult who would like to return to sports. Surgery is done by replacing the ACL with a piece of tendon, usually obtained from the person's patellar tendon or hamstring. After surgery, the person will take part in an extensive rehabilitation program that can last six to seven months.

### Meniscal Tears

There are two menisci, medial and lateral. These are C-shaped pieces of cartilage that help the joint carry weight, move in many directions and also keep the femur and tibia from rubbing together. In sports they can be torn by twisting, pivoting, cutting or decelerating. They are also injured in conjunction with ligaments (e.g. ACL tear). Older individuals can have tears develop from degenerative changes in the menisci.

### Signs & Symptoms

- Possibly popping
- Stiffness and swelling
- Pain along either the medial or lateral joint line
- Knee getting stuck in one position (locking). This can mean a piece of cartilage is stuck in the joint. These need to be referred to a physician as soon as possible and will likely need surgery to correct.

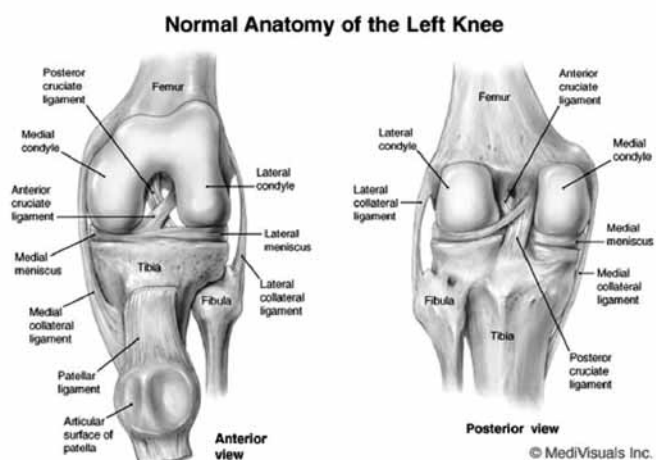
### Conservative Treatment

RICE is used initially to decrease pain and swelling along with anti-inflammatory drugs. Therapeutic exercises should be given by your ATC or a physical therapist. If the tear is small and does not lock the knee or make it unstable, this may be all that is needed. Some tears can heal on their own.

### Surgical Intervention

Knees that lock or are continually unstable and painful may require surgery. Arthroscopic surgery will be done

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with an isolated tear. Depending on the type and location of the tear, the surgeon will either repair the torn meniscus or shave off the problem area. The athlete will then use crutches only as needed and can return to activity in anywhere from a week to a couple months. Some athletes may also need rehabilitation to return range of motion and strength.

## Diagnosis

Injuries to the knee (except fracture) are diagnosed using a combination of history, physical exam, and diagnostic testing. Ligament and menisci tears may use MRI, which show the soft tissue structures (meniscus, tendon, and ligament) the best.

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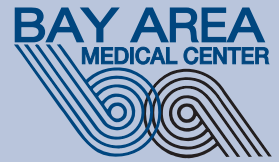
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## Knee Injuries – Part 1

- Ligament meniscus injuries need to be assessed by an ATC to determine if a physician referral is needed
- RICE is helpful in early stages of injury
- Rehab programs are essential to an athlete's quick and healthy return to play

# Sidelines

*A newsletter to promote sports health, injury prevention and recovery of student athletes*



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but by what you should accomplish with your ability.

■ JOHN WOODEN

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