

## **MEDIAL & LATERAL COLLATERAL LIGAMENT INJURY**

Knee collateral ligament sprains or tears are a common sports injury. Athletes who participate in direct contact sports like football or soccer are more likely to injure their collateral ligaments. The medial collateral ligament (MCL) and lateral collateral ligament (LCL) serve as mediolateral stabilizers of the knee and provide some degree of rotational stability.

### **ANATOMY:**

- Two bones meet to form your knee joint: the femur and the tibia. The patella sits in front of the joint to provide some protection. Bones are connected to other bones by ligaments. The collateral ligament acts like strong ropes to hold the bones together and keep the knee stable.
- These are found on the sides of the knee. They control the side to side motion of the knee and brace it against unusual movement.
- The medial collateral ligament (MCL) is on the inside. It connects the femur to the tibia. The lateral collateral ligament (LCL) is on the outside. It connects the femur to the fibula (the smaller bone in the lower leg).

### **CAUSES:**

- Injuries to the collateral ligaments are usually caused by a force that pushes the knee sideways.
- MCL sprains occur as a result of an excessive valgus load and/or external tibial rotation. Isolated LCL sprains result from an excessive varus load to the knee.
- These injuries typically occur in contact and collision sports (football or soccer) or in sports where high torque forces can be generated about the knee (i.e., skiing and ice skating).

### **EPIDEMIOLOGY:**

- The MCL is injured in at least 42% of knee ligament injuries, with isolated MCL injuries accounting for 29% of ligamentous knee injuries alone.
- In young athletes, females were found to have a higher rate of MCL injury. MCL injuries are also commonly seen in contact sports such as football, soccer, hockey and rugby.

- MCL injuries are more common than LCL injuries. Isolated LCL injuries are rare, accounting for only 2% of knee ligament injuries. LCL injuries are more commonly associated with a more profound injury to the knee involving the posterolateral corner structures.

### **TYPES OF INJURY:**

Collateral ligament sprains are graded as:

**Grade 1:** pain along ligament, no instability or gapping of joint with stress testing

**Grade 2:** partial gapping (5-10 mm) of joint with stress testing at 30 degrees of knee flexion

**Grade 3:** wide gapping (>10 mm) of joint at 30 degrees of knee flexion (no end feel).

### **SYMPTOMS:**

- Pain at the sides of knee. If there is an MCL injury the pain is on the inside of the knee, an LCL injury may cause pain on the outside of the knee.
- Swelling over the site of the injury.
- Instability - the feeling that your knee is giving way.
- The quadriceps muscle may become inhibited secondary to pain and swelling. During the sub-acute phase, pain and swelling resolve and ligamentous laxity improves.
- UNHAPPY TRIAD- it is also known as the terrible triad or O`Donoghue triad. It involves full or partial tears of ACL, MCL and MEDIAL MENISCUS.

### **DIAGNOSIS:**

- **Radiographs** (A-P, lateral) are generally ordered to assess for fractures. Stress radiographs are completed with valgus stress at 20 degrees of flexion and can elucidate more severe injury:
- **MRI** has an 86.4 % sensitivity and accuracy in identifying an MCL injury; and to identify the grades of MCL injury.
- **Ultrasonography** is a quick and cost effective way to assess the collateral ligaments.

## **SPECIAL TEST:**

**Valgus test:** The patient is placed in supine position. The examiner places one hand at the outside of the knee while the other hand is placed at the foot. The medial joint line is palpated while the examiner simultaneously applies an abducting force at the foot, and a valgus force through the knee joint.

This test is typically performed at both 30 and 0 degrees of knee flexion. When performed at 30 degrees the MCL is more isolated from other medial joint structures with a sensitivity of .86-.96 for MCL tears. This can be followed by performing the second version of the test at 0 degrees of knee flexion which allows for assessment of other medial joint structures.

The two versions are as follows:

**Knee valgus @ 0°** - Along with the MCL the Medial Joint Capsule of The Knee, anterior cruciate ligament (ACL), and the posterior cruciate ligament (PCL) are stressed.

**Knee valgus @ 30°** - The MCL is the prime stabilizer in this position and is therefore the primary structure assessed. The medial joint capsule is also stressed in this position.

## **Varus stress test:**

A varus stress test is performed in supine position by stabilizing the femur and palpating the lateral joint line. The other hand provides a varus stress to the ankle. The test is performed at 0° and 20-30°, so the knee joint is in the closed packed position. The physiotherapist stabilizes the knee with one hand, while the other hand adducts the ankle. If the knee joint adducts greater than normal (compared to the unaffected leg), the test is positive. This an indication of LCL tear.

## **ASSESSMENT:**

### **History**

#### **Mechanism of injury:**

- Did the injury occur with twisting or cutting or with a blow? Location of impact?
- Ability to continue with participation in activity immediately after injury
- Location of swelling and/or bruising and time course of swelling.
- Exacerbating and alleviating factors

- Mechanical symptoms such as instability or a locked joint
- Neurovascular symptoms

### **Physical examination**

- Observation and inspection of joint for obvious deformity
- Inspection and palpation of joint: assess effusion and tenderness
- Active and passive range of motion of hip, knee, and ankle
- Valgus and varus stress testing of the knee
- **Grade 1 injury:** firm end feel
- **Grade 2 injury:** firm end feel with minor opening of joint
- **Grade 3 injury:** soft/no end feel with significant opening of joint
- Neurologic and vascular examination of lower extremities
- **Gait:** ability to bear weight

### **Functional assessment**

- Ambulation may be limited secondary to pain and swelling.
- The patient may also report knee instability with ambulation.
- As the condition improves, the range of motion and gait normalize.

**PREVENTION:** the following tips may reduce the chances of injury:

- Carry out a regular exercise program to stretch and strengthen the structures of the knee and leg.
- Avoid returning to activities, especially contact sports, too soon following a knee injury.
- Warm up the muscles thoroughly before playing sports or engaging in other physical activities.

### **TREATMENT & REHABILITATION:**

#### **Conservative treatment:**

**RICE:** The RICE protocol is effective for most sports-related injuries. RICE stands for Rest, Ice, Compression, and Elevation.

**Rest:** Take a break from the activity that caused the injury. The doctor may recommend to use crutches to avoid putting weight on your leg.

**Ice:** Use cold packs for 20 minutes at a time, several times a day. Do not apply ice directly to the skin.

**Compression:** To prevent additional swelling and blood loss, wear an elastic compression bandage.

**Elevation:** To reduce swelling put your leg up higher than your heart.

**Nonsteroidal anti-inflammatory drugs (NSAIDs):** Anti-inflammatory drugs such as aspirin, ibuprofen, and naproxen help reduce pain and swelling.

### **Surgery:**

- Grade 3 sprains may require surgery to repair the tear in the ligament. Surgery is needed in people who have other knee injuries alongside the collateral ligament sprain.
- The surgeon may stitch up your torn LCL or attach it to the bone where it tore. It depends on how you damaged your ligament. LCL surgery is an “open-knee procedure,” which means the surgeon can’t work through smaller arthroscopic cuts, as with some other types of knee surgery.
- Recovery may take some time and people will often need physical therapy to restore full knee function.

### **REHABILITATION:**

Goal-oriented rehabilitation program for isolated collateral ligament sprains in athletes:

#### **Initial treatment**

- Apply ice with compressive wrap for 20 minutes and repeat every 3-4 hours for the first 24-48 hours.
- Apply minimally restrictive lateral hinge brace (grade II or III injuries). Use crutches allow weight bearing as tolerated.

#### **Subsequent treatment**

- Begin active range-of-motion exercises at least twice daily.
- Begin straight-leg raises and electrical muscle stimulation.
- Maintain general conditioning with upper body ergometer or swimming.

**Goal one:** Walking unassisted without a limp

- Discard crutches.
- Continue range of motion, isometrics exercises and conditioning exercises.

**Goal two:** 90 degrees of knee flexion

- Begin stair climber and bicycle ergometer with seat high gradually lower seat.

- Begin isotonic progressive resistance exercise for quadriceps and hamstrings.
- Continue range of motion exercises.

**Goal Three:** Full knee motion

Begin running and functional exercise program. For example:

- Jog 1 mile.
- Five successive 100-yard sprints at half speed.
- Five successive 100-yard sprints at three-quarters speed.
- Five successive 100-yard sprints at full speed.
- Five zigzag sprints at half speed.
- Five zigzag sprints at full speed.

Other agility drills (e.g. cariocas).

**Goal four:** Complete entire running program in one session

- May return to competition if athlete has minimal pain full range of motion and 90 percent of normal strength.
- Continue to use brace for all sports participation.

References:

<https://orthoinfo.aaos.org/en/diseases-conditions/collateral-ligament-injury>

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