

# The Causes and Incidences of Medial Ligament Injury

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## Abstract

In recent years, sports have witnessed a high incidence of medial ligament damages among athletes, especially those participating in contact sports. The medial ligament is the main stabilizing ligament of the knee joint and is responsible for preventing the knee from collapsing inward. To deep understand the causes and incidences of medial ligament injury, this article fully discusses the causes and incidences and provides a practical rehabilitation program for medial ligament injury.

**Keywords:** medial ligament injury, ligament of knee, rehabilitation

## 1. Introduction

The medial collateral ligament (MCL) is the major ligament spanning the space between the “femur and tibia” on the medial side of the knee. One might qualify it as the innermost of all four knee ligaments. That’s why it is so painful when this ligament is stretched too much or torn. It occurs when a blow hits one of two locations: from outside, through the “valgus” position, or else through a “supra-condylar” position (Johns Hopkins, 2019). Injuries to this band can happen mostly through sports or accidents. Out of all four knee ligaments, it usually alone goes into sprain since there are almost no cases of injury involving both MCL and anterior cruciate ligament(ACL) at once.

Nowadays, sports have witnessed a high incidence of medial ligament damage among athletes, especially those participating in contact sports. The medial ligament is the main stabilizing ligament of the knee joint and is responsible for preventing the knee from collapsing inward. When this ligament is injured, it can cause the knee to become unstable and give way, leading to serious injury (Johns Hopkins, 2019). “Athletes who participate in sports that involve a lot of cutting and turning, such as football, soccer, and basketball, are particularly at risk for medial ligament injuries” (Johns Hopkins, 2019). These movements exact a lot of stress on the knee joint and can cause the ligament to stretch or tear. In some cases, the ligament may completely tear away from the bone, which can require surgery to repair.

Medial ligament injuries are most often caused by an undeviating setback to the outer knee area or by a severe twisting of the knee. Medial ligament injuries affect the medial meniscus, the medial collateral ligament, and the anterior cruciate ligament<sup>1</sup>. “The medial collateral ligament (MCL) is one of the four major ligaments of the knee, along with the anterior cruciate ligament (ACL), posterior cruciate ligament (PCL), and the lateral collateral ligament (LCL)” <sup>2</sup>. Therefore, this essay discusses the causes and incidences and provides a practical rehabilitation program for medial ligament injury.

## 2. Rehabilitation Methods

The medial ligament is one of the four major ligaments of the knee. “A medial ligament injury is a severe injury to the knee that can occur from a fall, a direct blow, or overuse and it is located on the inner side of the knee and is responsible for stabilizing the joint”. A “medial ligament injury” can occur when the ligament is stretched or

torn (Johns Hopkins, 2019). This type of injury is often seen in players who participate in sports that involve sudden changes in direction, such as football or basketball. Symptoms of a medial ligament injury include pain on the innermost side of the knee, swelling, and difficulty walking. “Treatment for a medial ligament injury typically includes rest, ice, and physical therapy” (Massachusetts General Hospital, 2022). In austere cases, surgery may be needed. The rehabilitation process for medial ligament injury (knee) can be lengthy and complex, depending on the extent of the damage. The first step is to rest and ice the knee to reduce swelling. Once the swelling has gone down, gentle exercises may be prescribed to help regain range of motion and strength. Physical therapy may also be recommended to help with the rehabilitation process. In some cases, surgery may be necessary to repair the ligament (Andrews K, Lu A, Mckean L & Ebraheim N., 2017). After surgery, a more extended rehabilitation period usually requires a gradual return to activity.

The most important things about rehabilitation for medial ligament injuries are stability, strength, and endurance. The goal of rehabilitation for damages to the medial stabilizers of the knee is to restore pain-free proprioception, power, and function to the joint (Andrews K, Lu A, Mckean L & Ebraheim N., 2017). Proprioception refers to the ability to sense the location of the knee joint and the position of the body parts relative to the knee.

The first phase of medial injury rehabilitation occurs for around six weeks. The knee is a complex joint that is vulnerable to various injuries. A short-hinged brace is an effective way to protect the knee while it heals. Contingent to the brutality of the injury, the brace may need to be worn for 3 to 6 weeks (Andrews K, Lu A, Mckean L & Ebraheim N., 2017). The brace will help stabilize the knee and prevent further damage (Andrews K, Lu A, Mckean L & Ebraheim N., 2017). Besides, during the first three to six weeks, an athlete should use crutches and a brace to help with their injury, as inculcated by the clinician. Also, you should smear ice if there is inflammation (Balduini FC, Vegso JJ, Torg JS & Torg E., 1987). When elevating a leg, he must use elastic bandages or compression sleeves instead of regular socks because they are less likely to slip down over time. It is also recommended to let the ankle soak in warm water on occasion. When the pain and swelling go away after a couple of days since the incident first happened, give getting back motion in your knee a try—only do what feels comfortable at first. Avoid pivoting or twisting your knee for a couple of weeks following clean-up because it might make it more vulnerable to re-injury.

An exercise program is critical for the recovery and rehabilitation of medial ligament injury and must take place between five to seven days per week. Every day, the athlete should ride a bicycle one to two times (Andrews K, Lu A, Mckean L & Ebraheim N., 2017). Use a motionless bike to interchange the knee joint and surge your knee flexion. “In case you cannot pedal round, retain the foot injured leg on the lever and cycle back and forth till your knee will curve far ample to allow a full cycle” (Macaluso A & De Vito G., 2003). Many persons can attain a full cycle revolution with this technique in reverse first, followed by forwarding. “You may ride the bike with no resistance for up to 10-15 minutes, one time per day” (Andrews K, Lu A, Mckean L & Ebraheim N., 2017). Make sure that while inactive on the cycle seat, your knee is completely protracted, with your heel quiescent on the pedal in its lowest location. Then place both feet on the pedals and ride as if you had an actual bike between both feet. Figure 1 shows a range of motion and strengthening exercise to rehabilitate medial ligament injury.

Days per Week: 5-7	
Times per Day: 1-2	
Quadriceps setting	1-2 sets of 15-20 reps
Heel prop	5 minutes
Heel slides with towel assist	1 set of 5 to 15 minutes
Straight Leg Raises	3 sets of 10 reps
Short-Arc Lift	3 sets of 10 reps
Standing hamstring curl	3 sets of 10 reps
Standing toe-raises	3 sets of 10 reps
Hip abduction	3 sets of 10 reps
Partial squats	3 sets 15 reps
Wall slides	3 sets of 15 reps

Figure 1. Motion and strengthening exercises

The second phase) of the knee, rehabilitation focuses on rebuilding the forte of the knee muscles after damage. This phase typically begins six weeks after the initial injury and may last for several months, as shown in figure 2. The goal of this phase is to gradually regain knee strength and function through various exercises (Massachusetts General Hospital, 2022). These may include leg presses, squats, and other strength-training exercises. In addition, patients may also undergo physical therapy to help diminish swelling and discomfort. However, when exercising in the rehabilitation of medial ligament injury, a few precautions must be taken to prevent further injury:

i) It is important to start slowly and gradually increase the workouts' intensity; ii) Always warm up before starting the exercises and cool down afterwards; iii) Listen to your body and don't overdo it; iv) Make sure to use proper form when doing the exercises; v) Focus on strengthening the muscles around the knee; vi) Don't forget to stretch.

<b>Range of Motion and Strengthening Exercises</b>		
Days per week: 3	Times per day: 1	
Quadriceps setting		1-2 sets of 15-20 reps
Heel prop		5 minutes
Prone hang		5 minutes
Heel slides with towel assist		1 set of 5 to 15 minutes
Straight leg raises		3 sets of 10 reps
Short-Arc Lift		3 sets of 10 reps
Standing hamstring curl		3 sets of 10 reps
Standing toe-raises- single leg		3 sets of 10 reps
Hip abduction		3 sets of 10 reps
Squat to chair		3 sets 15 reps
Wall slides		3 sets of 15 reps
Single leg strengthening progression		see timeline
<b>Stretching Exercises</b>		
Days per week: 5-7	Times per day: 1-2	
Hamstring stretch		3-5 reps holding 15 to 30 seconds
Quadriceps stretch		3-5 reps holding 15 to 30 seconds
Calf Stretch		3-5 reps holding 15 to 30 seconds
<b>Optional Additional Weight Training</b>		
Days per week: 2-3	Times per day: 1	3 sets of 20 repetitions
The following exercises may be added to your exercise program about 6 weeks after surgery:		
Seated Leg Press	Roman Chair	Knee Extension machine
(short-arc)		
Hamstring Curl	Calf Raise Machine	Hip Flexor Machine
HIP Abductor/Adductor Machine		

Figure 2. Phase two of medial ligament injury rehabilitation (Massachusetts General Hospital, 2022)

Several principles of strength training can be applied in rehabilitating medial ligament injury. One of the most significant is the principle of overload, which conditions that to improve muscular strength, the muscles must be worked harder than they are accustomed to (McDonagh MJN & Davies CTM, 1984). This can be accomplished by increasing the amount of weight lifted, the number of repetitions, or the intensity of the workout. Another important principle is the principle of specificity, which states that the muscles must be worked in a way specific to the desired activity (Myer GD, Paterno MV, Ford KR, Quatman CE & Hewett TE., 2006). For example, if the goal is to improve running speed, the training must be specific. Finally, the principle of progression states that the drill must be regularly increased to avoid damage and allow the body to adapt to the new demands.

The last phase in rehabilitating a medial ligament injury is the return to sports phase (Lee B & Vance F, 2014). This phase begins when the athlete is cleared by their doctor to return to sport and ends when they feel comfortable and confident competing at their pre-injury level. The athlete will gradually increase their training volume and intensity during this phase and should focus on regaining their explosiveness and agility (Millett PJ, Wickiewicz TL & Warren RF., 2001). Plyometric and power exercises are often incorporated into this phase to help the athlete regain their previous level of performance.

### 3. Findings and Discussions

#### 3.1 Causes of Medial Ligament Injury (Knee)

There are many different causes of medial ligament injury. The most common is overuse, which can occur from repetitive activities such as running or jumping (Millett PJ, Wickiewicz TL & Warren RF., 2001). This type of injury is often seen in athletes who participate in sports that involve a lot of jumping and running. Another common cause of medial ligament injury is trauma, which can occur from a direct upset to the knee or a fall (Andrews K, Lu A, Mckean L & Ebraheim N., 2017). This type of injury is often seen in people who participate in contact sports such as soccer or hockey. Medial ligament injury can also ensue from degenerative changes that occur with ageing. This type of injury is often seen in older adults who have arthritis. Recovery from a medial ligament injury can take several weeks or even months. Athletes need to rest and avoid activities that stress the knee joint while the ligament heals (Saxon L, Finch C & Bass S., 1999). Physical therapy may also be necessary to assist in strengthening the knee and regaining range of motion. Athletes suffering from medial ligament injury require a well-designed practical rehabilitation program.

#### 3.2 Symptoms and Diagnosis

The symptoms of a collateral ligament injury can vary contingent on the sternness. The symptoms may include discomfort and sensitivity on the outdoor of the knee for a mild injury (Reid DC, 1988). For a more severe injury, the symptoms may include pain and tenderness outside the knee, swelling, bruising, and the incapability to completely encompass or flex the knee. In some cases, a more severe injury may also result in knee joint dislocation. Medial ligament injuries are often characterized by tenderness outside the knee, bruising, and difficulty moving the knee. These symptoms can be caused by various factors, including direct trauma to the knee, overstretching of the ligament, or degenerative changes in the ligament.

Diagnosis of a “medial ligament injury” is typically based on the symptoms and a physical examination. X-rays may be ordered to rule out other injuries. An MRI may also be ordered to confirm the diagnosis and assess the injury’s severity (Solomon DH, Simel DL, Bates DW, Katz JN & Schaffer JL, 2001). “An X-ray is an indicative test that uses invisible electromagnetic energy beams to display imageries of internal tissues, bones, and organs onto film.” (Shirazi R & Shirazi-Adl A., 2009) This test can be used to rule out an injury to bone instead of, or in addition to, a ligament injury. X-rays are painless and quick to obtain diagnostic information about the body. They are often used in emergencies to rule out fractures or other injuries. X-rays can also diagnose problems with the lungs, heart, and other organs (Ying X, Guo H, Ma K, Wu J, Weng Z, Zheng Y., 2019). This imaging technique can provide a clear picture of the ligament, bones, and surrounding tissues, which can help determine the injury’s extent. In some cases, X-rays may also rule out other potential causes of knee pain, such as a fracture or arthritis.

“Magnetic resonance imaging (MRI)” is a diagnostic tool that can be used to assess knee injuries, including medial ligament injuries. “MRI uses magnetic fields and radio waves to produce detailed images of the knee joint and surrounding structures” (RICHARDSON J, BOWTELL R, MADER K & MELIA C., 2005). This technique can be used to evaluate the damage to the medial ligament and to determine if there are any associated injuries, such as tears of the meniscus or damage to the cartilage. MRI is generally considered the most accurate imaging modality for diagnosing knee injuries and can help guide treatment decisions.

Arthroscopy is a triflingly invasive surgical procedure used to treat, diagnose and rehabilitate medial ligament injuries. The procedure involves making a small incision in the knee and inserting a tiny camera into the joint (Wu L, Jaiprakash A, Pandey AK, Fontanarosa D, Jonmohamadi Y & Antico M, et al, 2020). This consents the surgeon to get a vibrant view of the ligament and any other damage that may be present. Arthroscopic surgery can be used to repair the ligament if it is completely torn. If the ligament is only partially torn, the surgeon may opt to trim or debride any damaged tissue. Sometimes, the surgeon may also need to perform a collateral ligament release if the other ligaments around the knee are too tight. After surgery, the knee will be placed in a splint or cast and will need to be immobilized for 4-6 weeks.

### 3.3 Treatment

Many different medications can be used to treat medial ligament injuries, reliant on the strictness of the injury. “Hence, medications used to treat medial ligament injuries include over-the-counter options like ibuprofen” (Wu L, Jaiprakash A, Pandey AK, Fontanarosa D, Jonmohamadi Y & Antico M, et al, 2020). Ibuprofen is a non-steroidal anti-inflammatory drug (NSAID) that can help to reduce pain and swelling. It is important to follow the instructions on the packaging when taking ibuprofen, as it can cause stomach upset if taken in large doses. Other NSAIDs like naproxen and diclofenac may also be effective for treating medial ligament injuries (Vuurberg G, Hoorntje A & Wink LM, et al., 2018). If over-the-counter medications are not providing relief, a doctor may prescribe a stronger NSAID or a corticosteroid. Corticosteroids are powerful anti-inflammatory drugs that can be injected directly into the injured ligament to provide relief. Surgery is rarely required for medial ligament injuries, but sometimes, a torn ligament may need to be repaired.

Treatment for a medial ligament injury typically involves Rest, Ice, Compression, and Elevation (RICE), and physical therapy to help reinforce the ligament and support the knee joint (Lynch SA & Renstrom PAFH.,1999). Depending on the cruelty of the injury, a medial ligament injury may require a period of halt in a splint or cast. Surgery is rarely necessary. Physical therapy will focus on exercises to improve the assortment of motion and strength. Also, some athletes require crutches or a knee brace. Physical therapy may involve exercises to improve range of motion and strength and activities to help condense swelling and advance joint stability. In severe cases, surgery may be necessary to repair the ligament. Muscle strengthening exercises are a key part of recovering from a medial ligament injury (Yoo JH, Lim BO & Ha M, et al., 2009). These exercises help to improve the stability of the joint, as well as the strength and power of the muscles that support it. In addition, muscle strengthening exercises can help prevent further injury by increasing the joint’s range of motion and improving the quality of the supporting muscles.

Although many ways to treat a medial ligament injury are reported, one of the most common is to apply an ice pack. The ice pack application is a common treatment for medial ligament injuries. The ice pack helps reduce the swelling and inflammation around the injured ligament (Bleakley C, McDonough S & MacAuley D., 2004). It is

important to apply the ice pack for the recommended time to reduce swelling. This helps to lessen swelling and pain in the affected area. It is important to apply the ice pack for 20-30 minutes at a time and to do this numerous times a day for the first few days after the injury.

Moreover, surgery may be necessary to repair the damage if an athlete has suffered a “medial ligament injury”. The medial ligament is responsible for stabilizing the joint. If it is torn or ruptured, it can cause instability in the knee joint and pain. Surgery is typically the only way to repair a medial ligament injury. The surgeon will make an incision in the knee and then insert a graft to replace the damaged ligament (Bleakley C, McDonough S & MacAuley D., 2004). The surgery usually takes about an hour to complete and is likely to need to stay in the hospital for a few days afterwards. Also, the athlete must wear a knee brace for several weeks or months to protect the graft as it heals.

A knee brace is a device worn around the knee to help support the joint and protect it from further injury. It also helps to reduce pain and swelling by providing compression and support to the area. Wearing a knee brace during exercise can help take some of the strain off the joint and allow it to heal properly.

#### 4. Conclusion

An injury to the medial ligament is a common sports injury that can be caused by a sudden twisting motion of the knee. “The medial ligament is a strong band of tissue that runs down the inside of the knee and helps stabilize the joint. When this ligament is stretched or torn, it can cause pain and swelling on the inside of the knee. Medial ligament injuries can be diagnosed with a physical examination and imaging tests such as an MRI. Treatment options include rest, ice, and physical therapy.

Medial ligament injuries are common in athletes, particularly those participating in contact sports. While the severity of the injury can vary, all medial ligament injuries share one common goal: rehabilitation. Resting the joint is the first step in rehabilitating a medial ligament injury. This permits the ligament to begin the healing process and prevents additional injury. Once the joint has had time to heal, physical therapy can begin. Physical therapy helps to strengthen the ligament and improve the range of motion.

In some cases, surgery may be necessary to repair the ligament. However, this is typically only done in cases of severe injury. After surgery, the rehabilitation process is similar to a non-surgical injury, though it may take longer to reach full recovery. No matter the severity of the injury, medial ligament rehabilitation is a process that takes time and patience. With proper treatment, most athletes can reoccurrence to their previous activity level.

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