

The Most common lateral disorders of knee joints

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Knee pain affects about one in four adults, often limiting mobility and diminishing quality of life. An injury can cause pain on the outer (or lateral) part of the knee.

Inflammation of a band of tough fibrous tissue that runs along the outside of the leg and joins to the front of the tibia could potentially cause it (shin bone). Arthritis can also produce pain in this location.

Lateral knee pain is very common among distance runners. However, an injury involving twisting the knee or pushing the knee out (away from the other leg) can also result in lateral knee pain.

Treatment for lateral knee pain depends on the cause and severity of your symptoms. Most of the time, conservative or non-surgical treatment is all that's needed. However, in some cases, surgery may be necessary. As with treatment, recovery time from a lateral knee injury depends on the severity of the problem.

This study explores the most common causes of lateral knee pain and how diagnosed and treated.

Iliotibial band syndrome

Anatomy

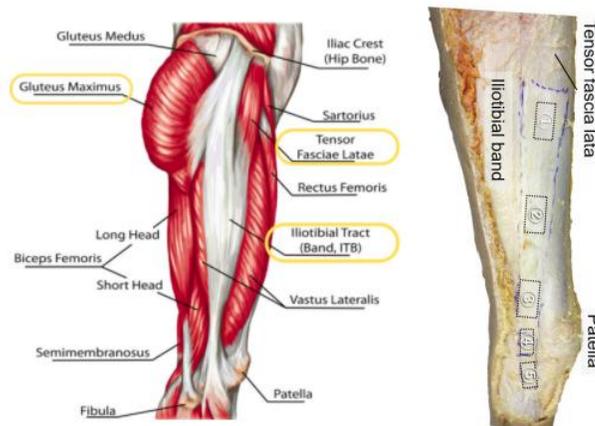


Figure (1) Iliotibial band anatomy

The iliotibial band tract, often known as the IT band, is a fibrous sheath that extends along the lateral thigh and is a key component in lower extremity movements. Maissiat's band is another name for the ITB. Before insertion on Gerdy's tubercle on the proximal/lateral tibia, the ITB traverses the lower extremity on its lateral face.

The ITB receives fascial contributions from the deep fascia of the thigh, gluteus maximus, and tensor fascia lata proximally in the thigh (TFL).

[1, 10] The TFL is the thigh's deep investing fascia, which encompasses the hip and lower extremity muscles in this area. [2] The ITB becomes a unique soft tissue layer of the lateral knee as it progresses. [3, 12]

Structure and Function

Origin, insertion, and structure

The origins, insertions, and variants of the ITB and TFL have been disputed in the literature for decades. In a recent study from 2013, Huang et al. described the proximal anatomy.

Table 1 shows the anatomy of the iliotibial band & Gluteal contributions

| The iliotibial band & Gluteal contributions | | |
|--|--|---|
| IT layers | Origin | Insertion |
| <i>Superficial IT layer:</i> | Ilium (superficial to the TFL origin) | proximal to the knee joint, joins the intermuscular septum and supracondylar tubercle of the femur. |
| <i>Intermediate IT layer:</i> | Ilium (distal to the TFL origin) | |
| <i>Deep IT layer</i> | originates between the hip joint capsule and the reflected head of the rectus femoris in the supra-acetabular fossa. | |
| The Tensor Fasciae Latae (TFL) | Between the superficial and intermediate IT layer sources is the iliac crest. | As it mixes with the superficial and intermediate IT layers, it develops a tendinous structure. Near the GT, they converge into a single confluent structure. |
| Gluteal aponeurotic fascia | Iliac crest (posterior site) | gluteal tuberosity on the femur |
| Superior gluteus maximus | The inferior gluteus maximus's superficial fibers and the deep fibers of the inferior gluteus maximus | the gluteal tuberosity of the linea aspera. |

Proximal to the lateral femoral epicondyle, the ITB is more tendinous. Because of its anatomic position, intimal contact with the epicondyle, and proximity to the lateral collateral ligament, it contributes to lateral knee stability at the epicondyle level (LCL)[6, 7, 8].

Function

Proximal ITB function includes

- Hip extension

- Hip abduction
- Lateral hip rotation

Distally, The location of the knee joint affects ITB function[2].

- 0 degrees/full extension to 20 to 30 degrees of flexion
 - Active knee extensor
- The ITB is situated in front of the lateral femoral epicondyle.
- 20 to 30 degrees of flexion to full flexion ROM
 - Active knee flexor
 - The ITB is located posterior to the lateral femoral epicondyle [5].

Description

Iliotibial band syndrome (ITBS) is more common among males than females and usually affects runners. Athletes who engage in repetitive motions — such as cycling, climbing, and jumping — are also at higher risk. Repetitively bending and straightening the knee under intense circumstances can cause it to tighten and become inflamed. The iliotibial band may also irritate nearby tissue. Pain is most commonly felt on the outer part of the knee but can be felt higher up in the outer thigh.

Lateral meniscus tear

The menisci are two tough, rubbery pieces of cartilage that sit in between the femur (thigh bone) and tibia (shinbone). The medial meniscus is on the inside part of the knee, while the lateral meniscus is on the outer side.

The lateral meniscus is often torn when the foot is planted, and the body turns to the side during a sudden twisting motion. Athletes who make sudden change-of-direction moves — such as those who play football, soccer, tennis, and basketball — are especially vulnerable to this injury.

A torn lateral meniscus may also develop slowly as the cartilage becomes less resilient with age. These tears often occur without a noticeable injury but can cause significant pain. Other symptoms of meniscus tears include a locking sensation when attempting to straighten the leg, swelling, and pain when squatting.

Lateral collateral ligament injury

The lateral collateral ligament (LCL) is one of the four main ligaments of the knee. It connects the outer side of the femur and tibia and is primarily responsible for stabilizing the outer aspect of the knee.

An LCL injury (sprain) is often the result of a blow to the inside part of the knee; this causes the LCL to stretch beyond normal and can result in partial or complete tearing of the ligament.[9].

Symptoms may include soreness on the outside of the knee, swelling, and stiffness. You may experience instability — a feeling that the knee is unstable and going to buckle or give out.

Osteoarthritis

Osteoarthritis (OA) is the most common form of arthritis and affects more than 32 million adults in the United States.

With ageing, the cartilage that helps cushion the ends of bones in the knee joint can wear thin and eventually allow the bones to rub together. Pain, stiffness, and loss of joint movement can follow.

Some people have more significant wearing of the cartilage in the knee joint's outer compartment, which can lead to lateral-sided knee pain.

Lateral tibial plateau fracture

The tibial plateau is located at the top of the shin at the knee. A break on the outer or lateral part of the tibial plateau can cause considerable knee pain. A lateral tibial plateau fracture is often the result of a vehicle accident or a bad fall that impacts the outer knee directly.

If the bones are still aligned, surgery may not be required to treat the injury. However, if not, you may need surgery to place the affected bones in their proper position and secure them with screws or plates.

Contusion

A knee contusion is a clinical term for a bruised knee. A soft-tissue contusion is limited to the skin and muscle tissue, but if the injury is deep enough to hurt the bone, it's called a bone contusion.

When the bruise occurs on the outer knee, lateral knee pain can linger for a few hours or a few days, depending on the injury's severity. Usually, ice, rest, and elevating the knee are enough to relieve symptoms and heal the lateral knee bruise [11].

Diagnosis

Clinical symptoms such as location and type of pain; if the pain is sharp or aching and when the pain started and what activity you were doing when your symptoms began.

a physical examination that will typically involve extending and flexing the knee joint, as well as moving it gently from side to side. This may reveal whether there's any swelling, areas of tenderness or looseness in any of the ligaments.

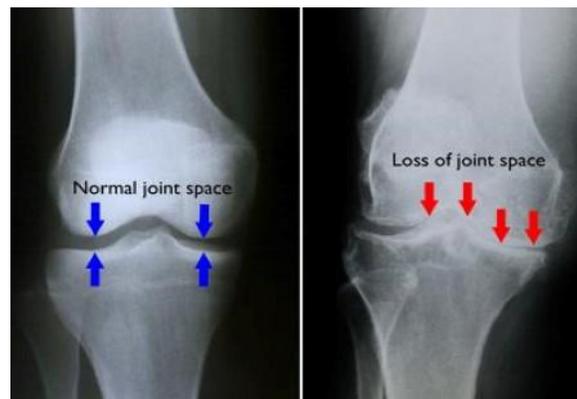
Imaging tests may also be appropriate, including one or more of the following:

- X-ray to see bones
- Magnetic resonance imaging (MRI) to get detailed images of ligaments, tendons, muscles, and cartilage
- Computed tomography (CT) scan provides a more detailed image of the bone than is possible with a standard X-ray.

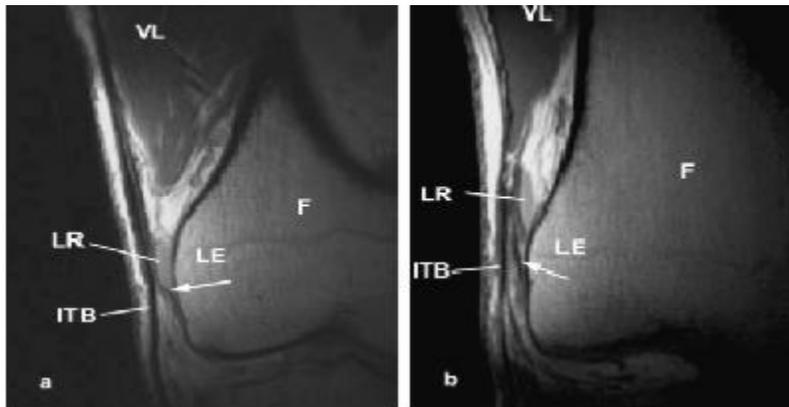
Based on symptoms, the physical exam and imaging, a doctor should be able to diagnose the cause and severity of your knee injury and propose a treatment plan.

How are these potential causes treated?

For minor lateral knee injuries, rest and conservative (non-surgical) measures are all that are needed to allow them to heal. However, ligament tears, meniscus tears, and advanced arthritis may require surgery.



(Left) In this x-ray of a normal knee, the space between the bones indicates healthy cartilage (arrows). (Right) This x-ray of an arthritic knee shows severe loss of joint space[13].



Coronal plane MR scans (proton density weighted) of the iliotibial tract (ITB) showing the fibrous strands (arrows) linking the tract to the lateral epicondyle (LE) of the femur (F) in an asymptomatic volunteer. Note the presence of the lateral recess (LR) of the knee, which can be mistaken for a bursa. VL, vastus lateralis[8].

Iliotibial band syndrome

ITBS can usually be treated with rest and a slow return to activity once you're feeling better. Exercises that improve the flexibility of the iliotibial band and strength of the knee can also be helpful. Other treatments include:

- ice on the outside of the knee
- anti-inflammatory medications, like ibuprofen (Advil), naproxen (Aleve) or acetaminophen (Tylenol)
- corticosteroid injection to reduce inflammation

A study published in the International Journal of Therapeutic Massage & Bodywork also found that a form of physical therapy known as soft tissue mobilization may also improve symptoms[10,11].

Lateral meniscus tear

Only the very outer portion of the meniscus has a healthy blood supply, and therefore most meniscus tears do not heal on their own. However, small tears can be treated with some combination of rest, ice, bracing (or a compression bandage), physical therapy, and a “cortisone” injection.

More serious tears often require surgery to either repair the tear or trim off the damaged portion of meniscus tissue.

Ligament injuries

Sprains or minor tears of a ligament may not require surgery. Rest and bracing may be enough to allow the ligament to heal. A complete tear of the LCL most often requires an operation to repair.

Osteoarthritis

The Osteoarthritis Research Society International recommends several non-surgical options for treating an arthritic knee. These include:

- strength training to help the muscles surrounding the knee better support and stabilize the joint
- biomechanical devices, such as knee braces, to support the knee when walking and doing other activities
- water- and land-based exercises to help improve knee flexibility and function
- weight loss (if overweight) to help relieve pressure on the knees and other joints

For patients with advanced arthritis and severe pain, surgical options include partial or total knee replacement for those patients who have “failed” other forms of conservative (non-operative) treatment.

What’s the recovery like for these potential causes of knee pain?

Recovery time depends on the type of injury you have, how severe it is, and the physical therapy you've been prescribed. However, here are the typical recovery times for specific injuries.

Table 2 shows the treatment duration of the Most common lateral disorders of knee joints.

| IT band syndrome | Lateral meniscus tears | LCL sprains or tears | Osteoarthritis |
|---|---|---|---|
| Full ITBS recovery can take 4 to 8 weeks, depending on the severity and how well you stick to physical therapy. | A minor lateral meniscus tear may heal enough to allow you to return to normal activities within two weeks. With surgery, recovery time is about six weeks. | Minor LCL sprains may take between a week to a month to heal enough for you to be able to return to normal activities. If surgery is required, full recovery may take several months for an LCL tear to heal. | Non-surgical treatments for osteoarthritis can start to help immediately. Surgery and physical therapy that follows can take several months to get you back to your usual activities. |

With all major knee injuries, physical therapy is usually required to help and regain strength and a full range of motion.

Knee injuries can affect athletes, children, older adults, and everyone in between. Because knee injuries can worsen without rest and proper treatment, it’s important to have lateral knee pain evaluated by a doctor. An orthopedic surgeon who specializes in knee injuries can be especially helpful in diagnosing and treating this kind of injury.

it is very important to run on flat surfaces as much as possible. Uneven terrain and banked running tracks can lead to ITBS and other knee injuries.

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