A Patient's Guide to

Ankle Sprain and Instability

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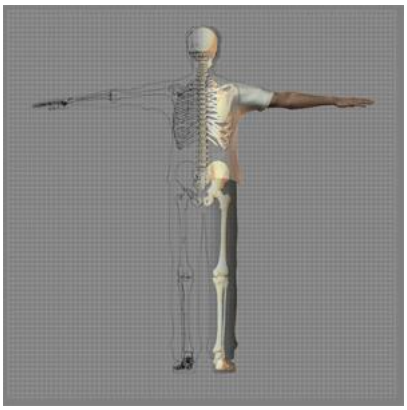

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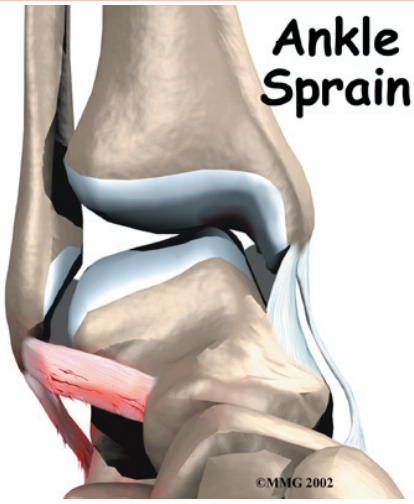


Introduction

An *ankle sprain* is a common injury and usually results when the ankle is twisted, or turned in (*inverted*). The term *sprain* signifies injury to the soft tissues, usually the ligaments, of the ankle.

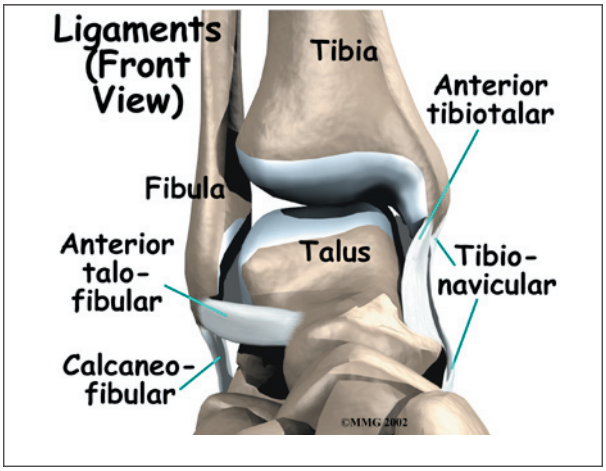
This guide will help you understand

- **how an ankle sprain occurs**
- **how doctors diagnose the condition**
- **what can be done to treat a sprain**

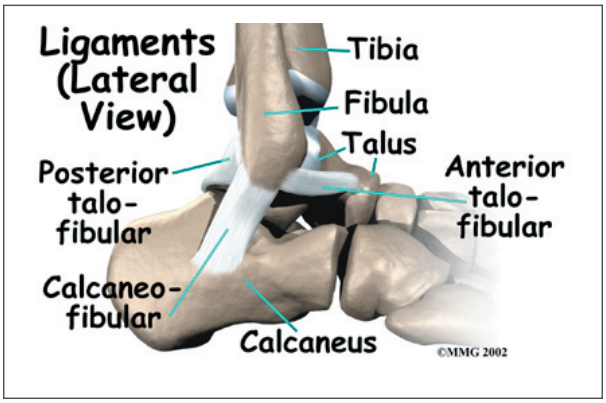
Anatomy

What part of the ankle is involved?

Ligaments are tough bands of tissue that help connect bones together. **Three ligaments** make up the *lateral ligament complex* on the side of the ankle farthest from the other ankle.

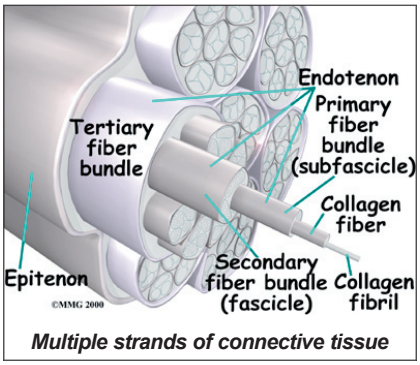


They are the *anterior talofibular ligament* (ATFL), the *calcaneofibular ligament* (CFL), and the *posterior talofibular ligament* (PTFL). The common inversion injury to the ankle usually involves **two ligaments**, the ATFL and CFL. Normally, the ATFL keeps the ankle from sliding forward, and the CFL keeps the ankle from rolling inward on its side.



Causes

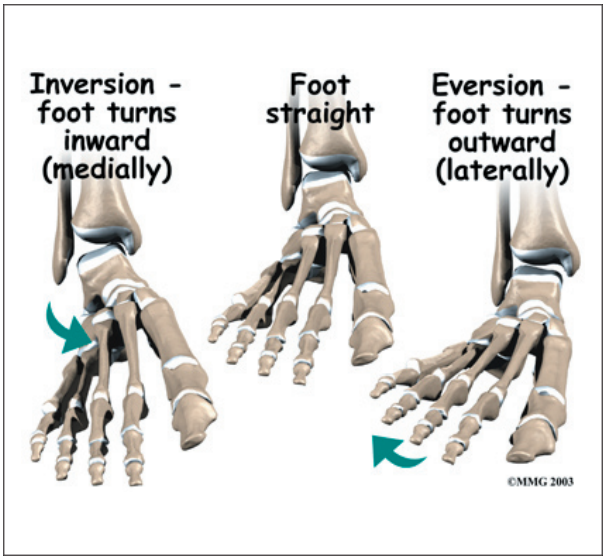
Why do I have this problem?



Multiple strands of connective tissue

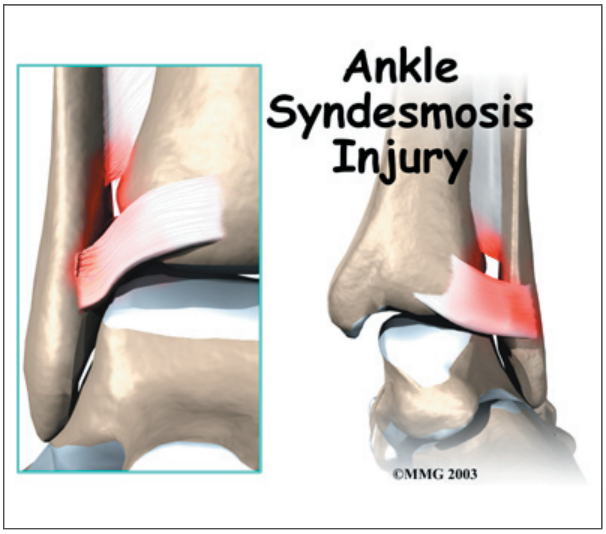
A ligament is made up of **multiple strands of connective tissue**, similar to a nylon rope. A sprain results in stretching or tearing of the ligaments. Minor sprains only stretch the ligament. A tear may be either a complete tear of all the strands of the ligament or a partial tear of only some of the strands. The ligament is weakened by the injury; how much it is weakened depends on the degree of the sprain.

The lateral ligaments are by far the most commonly injured ligaments in a **typical** *inversion injury* of the ankle. In an inversion injury the ankle tilts inward, meaning the bottom of the foot angles toward the other



foot. This forces all the pressure of your body weight onto the outside edge of the ankle. As a result, the ligaments on the outside of the ankle are stretched and possibly torn.

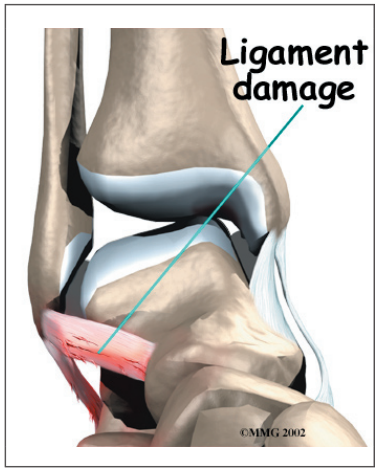
A severe form of ankle sprain, called an *ankle syndesmosis injury*, involves damage to other supportive ligaments in the ankle. This type of injury is sometimes called a *high ankle sprain* because it involves the ligaments above the ankle joint. In an ankle syndesmosis injury, at least one of the ligaments connecting the *tibia* and *fibula* bones (the lower leg bones) is sprained. Recovering from even mild injuries of this type takes at least twice as long as from a typical ankle sprain.



Symptoms

What does an ankle sprain feel like?

Initially the ankle is swollen, painful, and may turn *ecchymotic* (bruised). The bruising and swelling are due to ruptured blood vessels from the **tearing of the soft tissues**. Most of the initial swelling is actually bleeding into the surrounding tissues. The ankle swells as extra fluid continues to leak into the tissues over the 24 hours following the sprain.



People who have sprained an ankle often end up spraining the ankle again. If the ankle keeps turning in with activity, the condition is called *ankle instability*. Patients who have ankle instability lose confidence in their ankle to support them, especially on uneven ground. They often have swelling around the ankle that doesn't go away. Pain and swelling in a joint can cause a reflex where the body turns off the muscles around the joint. This can cause times when the ankle feels like it is going to give way, meaning it may have a tendency to twist again very easily.

People who have had several mild ankle sprains or one severe sprain are prone to impingement problems in the ankle. The ligaments that were sprained may become irritated and thickened, causing them to get pinched near the edge of the ankle joint.

Diagnosis

How do doctors diagnose the condition?

The diagnosis of an ankle sprain is usually made by examination of the ankle and X-rays to make sure that the ankle is not fractured. A physical examination is used to determine

which ligament has been injured. The doctor will move your ankle in different positions in order to check the ligaments and other soft tissues around the ankle. Some tests place stress directly on the ankle ligaments to see if the ankle has become unstable and to find out if one or more ligaments has been partially or completely torn.

If a complete rupture of the ligaments is suspected, your doctor may order *stress X-rays* as well. These X-rays are taken while the ligaments are placed in a stretched position. The X-ray will show a slight tilt in the ankle bone if the ligaments have been torn.

Treatment

What can be done for the problem?

Nonsurgical Treatment

Nonsurgical treatment options depend on whether your problem is an ankle sprain or ankle instability.

Ankle Sprain

The best results after an ankle sprain come when treatment is started right away. Treatments are used to stop the swelling, ease pain, and protect how much weight is placed on the injured ankle. A simple way to remember these treatments is by the letters in the word *RICE*. These stand for rest, ice, compression, and elevation.

- Rest: The injured tissues in the ankle need time to heal. Crutches will prevent too much weight from being placed on the ankle.
- Ice: Applying ice can help ease pain and may reduce swelling.
- Compression: Gentle compression pushes extra swelling away from the ankle. This is usually accomplished by using an elastic wrap.
- Elevation: Supporting your ankle above the level of your heart helps control swelling.

Your doctor may also prescribe medications. Mild pain relievers help with the discomfort. Anti-inflammatory medications can help ease pain and swelling and get people back to activity sooner after an ankle sprain. These medications include common over-the-counter drugs such as ibuprofen. But newer anti-inflammatory medicines called *COX-2 inhibitors* show promising results and don't seem to cause as much stomach upset and other intestinal problems.

As treatment progresses, it is helpful to gradually begin putting weight through the joint. Casts have fallen out of favor because soft tissues weaken when they are kept immobile. But braces that can be worn to support the ankle, but still allow weight bearing, are the most popular treatment for helping reduce strain on the healing tissues.

Healing of the ligaments usually takes about six weeks, but swelling may be present for several months. Your doctor may suggest that you work with a physical therapist to help you regain full range of ankle motion, improve balance, and maximize strength.

Ankle Instability

If the ankle ligaments do not heal adequately, you may end up with ankle instability. This can cause the ankle to give way and feel untrustworthy on uneven terrain. If your ankle ligaments do not heal adequately following an ankle sprain, your doctor may suggest several things.

Changes in your footwear may be prescribed to help keep your ankle from turning in. Placing a heel wedge under the outer half of your heel blocks the ankle from rolling, as does a flared heel built into your shoe. In extreme cases, doctors may prescribe a plastic brace, called an *orthosis*, to firmly hold your ankle from rocking side to side. Some patients feel a sense of steadiness from wearing high-topped shoes. Patients with ankle instability should avoid wearing high-heeled shoes.

Physical therapy treatments will likely be initiated to help restore joint range of motion, strength, and joint stability.

Small nerve sensors inside the ligament are injured when a ligament is stretched or torn. These nerve sensors give your brain information about the position of your joints, a sensation called *position sense*. For example, nerve sensors in your arm and hand give you the ability to touch your nose when your eyes are closed. The ligaments in the ankle work the same way. They send information to your nervous system to alert you about the position of your ankle joint. A physical therapist will help you retrain this sensation as a way to steady the ankle joint and protect you from spraining your ankle again.

Many people who have ankle instability have weakness in the muscles along the outside of the leg and ankle. These are called the *peroneal muscles*. Strengthening these muscles may help control the ankle joint and improve joint stability.

Surgery

Surgeons will occasionally do procedures right away in athletes who tear a lateral ankle ligament. In most other cases of torn ankle ligaments, surgeons will try nonsurgical treatments before doing reconstructive surgery of the ligaments.

Ligament Tightening Procedure

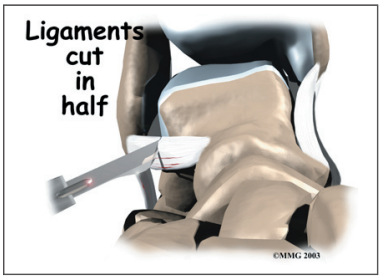
Chronic ankle instability can happen when the lateral ankle ligaments are stretched or torn and the ankle keeps giving way. Surgery can be done to tighten the stretched ligaments and improve the stability of the ankle. The surgery usually involves the ATFL and the CFL.

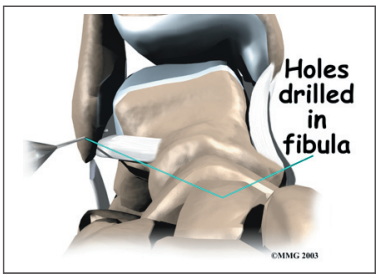
In this procedure, an incision is made in the skin that lies over the lateral ligaments. Using a scalpel, the surgeon cuts the ATFL and CFL in half.

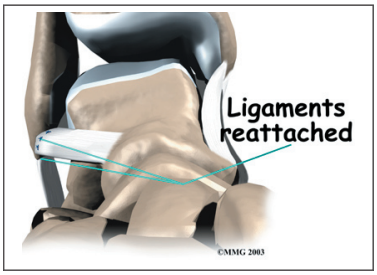
Holes are drilled along the lower end of the fibula bone, the small bone of the lower leg. The two ends of the cut ligament are overlapped and sewn together. The surgeon uses the drill holes in the fibula to hold the stitches to the bone.

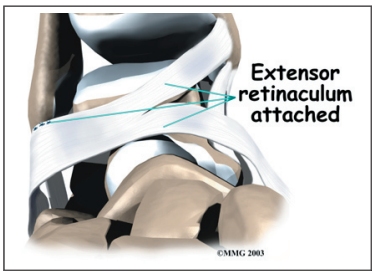
A large band of connective tissue crosses the front of the ankle just below the lateral ligaments. This band, called the *ankle retinaculum*, holds the tendons in place. The surgeon pulls the top edge of the ankle retinaculum upward and sews it into the fibula. This helps reinforce the reconstructed ligaments.

The following images show each step of the ligament tightening procedure.









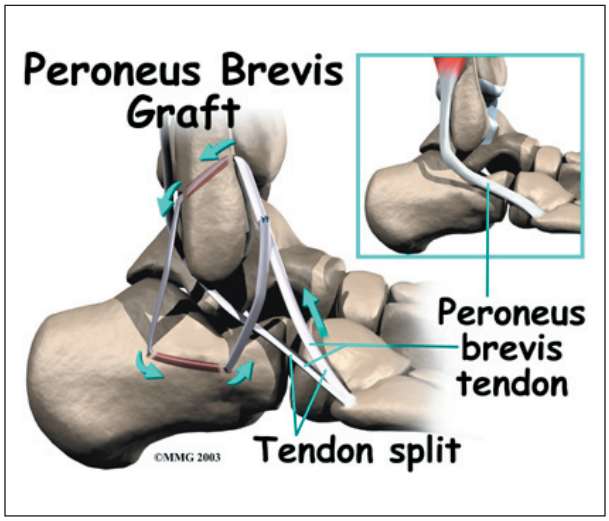
Tendon Graft Procedure

Another type of reconstruction is done using a tendon graft. If your surgeon feels that the stretched and scarred ligaments are not strong enough to simply repair in a ligament tightening procedure, then the ligaments must be reinforced with a tendon graft.

In this procedure, the surgeon removes a portion of one of the nearby tendons to use as a tendon graft. The tendon most commonly used attaches the peroneus brevis muscle to the outside edge of the small toe. A section of this tendon is put in place of the torn lateral ligaments.

After making the skin incision, the surgeon drills a hole in the fibula near the attachment of the original ligament. A second drill hole is made in the area where the ligament attaches on the talus (the anklebone).

The tendon graft is then removed (or *harvested*) and woven between these holes to recreate the ligament complex.



After surgery, you will probably be placed in a cast or brace for about six weeks to allow the tendon reconstruction to heal. Following removal of the cast, physical therapy will be required to regain full use of the ankle.

Rehabilitation

What will it take to make my ankle healthy again?

Nonsurgical Rehabilitation

Even if you don't need surgery, you may need to follow a program of rehabilitation and exercise. Doctors commonly recommend that their patients work with a physical therapist for two to four weeks. Your therapist can create a program to help you regain ankle function. It is very important to improve strength and coordination in the ankle.

Swelling and pain are treated with ice and electrical stimulation. If swelling in the ankle is severe, therapists may also apply massage strokes from the ankle toward the knee with your leg kept in an elevated position. This helps get the swelling moving out of the ankle and back into circulation. Your therapist may issue a compression wrap and instruct you to wrap your ankle and lower limb and to elevate your leg.

Therapists also apply specialized hands-on treatment called *joint mobilization* to improve normal joint motion. These treatments restore the gliding motion within the ankle joint where the lower leg meets the talus bone. This form of treatment speeds healing after an ankle sprain, and it helps return people and players more quickly to their activity or sport.

An effective treatment for ankle sprains is *disc training*, which uses a circular platform with a small sphere under it. Patients place their feet on it while they sit or stand and work the ankle by tilting the disc in various positions. This form of exercise strengthens the muscles around the ankle, and it improves joint sense (mentioned earlier).

When you get full ankle movement, your ankle isn't swelling, and your strength is improving, you'll be able to gradually get back to your work and sport activities. An ankle brace may be issued for athletes who intend to return quickly to their sport.

After Surgery

Patients usually take part in formal physical therapy after surgery. Rehabilitation after surgery can be a slow process. You will probably need to attend therapy sessions for two to three months, and you should expect full recovery to take up to six months.

Rehabilitation proceeds cautiously after reconstruction of the ankle ligaments. Most patients are prescribed an ankle brace to wear when they are up and about, and they are strongly advised to follow the recommendations about how much weight can be borne while standing or walking. You may be instructed to put little or no weight on your foot when standing or walking for up to 12 weeks. Your physical therapist will work with you to make sure you are using crutches safely and only bearing the recommended amount of weight on your foot.

The first few physical therapy treatments are designed to help control pain and swelling from the surgery. Ice and electrical stimulation treatments may be used during your first few therapy sessions to help control pain and swelling. Your therapist may also use massage and other hands-on treatments to ease muscle spasm and pain.

Treatments are also used to help improve ankle range of motion without putting too much strain on the healing ligaments.

After about six weeks you may start doing more active exercise. Exercises are used to improve the strength in the peroneal muscles. Your therapist will also help you retrain position sense in the ankle joint to improve the stability of the joint.

The physical therapist's goal is to help you keep your pain under control, improve range of motion, and maximize strength and control in your ankle. When you are well under way, regular visits to the therapist's office will end. Your therapist will continue to be a resource, but you will be in charge of doing your exercises as part of an ongoing home program.

Notes