

Managing Ankle Sprains: Keys to Preserving Motion and Strength

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In Brief: The vast majority of ankle injuries involve one or more of the lateral supporting ligaments and can usually be managed successfully in the primary care setting. Important diagnostic variables include the mechanism of injury, the level of weight-bearing ability, and the presence or absence of bony tenderness. Early application of a focal compression device is the paramount measure for preserving range of motion and strength. Other important measures include early mobilization, contrast baths, strength exercise, and, on return to activity, prophylactic bracing.

Acute ankle injuries are common in patients who present to the primary care office and emergency room. In sports like basketball, volleyball, and soccer, such injuries account for a significant amount of player time spent on the injured list (1,2).

Studies have shown that roughly 85% of all ankle injuries involve some degree of sprain of the ankle ligaments. Of these, 85% are inversion sprains of the lateral ligaments. The anterior talofibular ligament is the most susceptible to injury, and associated sprains of the calcaneofibular ligament often occur as well (1).

Orthopedic surgeons use a grading system to describe ankle sprains. Patients whose injury involves only a mild stretch of the ligamentous fibers—a grade 1 sprain—are usually able to bear weight on the ankle immediately following injury. Patients who have grade 2 sprains, in which there is some tearing of the ligaments, generally present with more significant swelling, but they generally can bear some weight. A complete tear of one or more ligaments is classified as a grade 3 sprain. Patients usually present with significant swelling and bruising and may demonstrate functional and clinical instability of the ankle. The grade of the injury or percentage of the ligament fibers torn, however, does not influence the treatment plan.

Though most simple injuries respond well to treatment, many patients who sustain "twisted ankles" never see a physician. It is important to determine whether a complex injury is present, since misdiagnosis or nontreatment after an initial ankle injury can result in chronic symptoms in as many as 40% (3).

When a patient presents with a history of ankle injury, what are the key decisions the primary care physician must make?

The biggest decisions involve determining whether there's a major fracture or dislocation, or simply a soft-tissue injury. If there is no gross deformity of the ankle, it's unlikely that there are any major complications. Basically, you have to decide whether you are going to take care of the patient or refer the patient to an orthopedist.

What clinical methods do you use in assessing the injury?

In addition to inquiring about the mechanism of injury, it's important to examine the ankle for bony tenderness, check the pulses, and confirm that sensation is intact. All patients who have ankle injuries will have a loss of range of motion, so assessing range of motion contributes very little to your diagnosis. Likewise, strength tests on an acute injury are not very accurate.

What about tests for ankle instability, such as the anterior drawer and talar tilt tests?

These tests for clinical instability are fine for gathering esoteric information, but the results would not determine how I manage the injury. My approach to treating ankle sprains is pragmatic: I don't do the tests if the information will not influence the treatment plan.

Is it always necessary to get x-rays?

There is an algorithm that was promulgated in the emergency medicine literature several years ago that is commonly referred to as the Ottawa ankle rules (4). Essentially, these rules state that if the patient does not have tenderness over the posterior distal portion of either the medial or lateral malleolus, and if the patient was able to bear weight immediately following the injury, then you don't need x-rays.

These rules were established primarily for adults and have a disclaimer for patients under age 18, probably out of concern for missing a possible epiphyseal fracture. However, it has been my experience and that of others that an epiphyseal fracture will cause symptoms like any other fracture. So it seems to me that the rules can probably be applied in children as well as adults.

What specific signs do you look for in diagnosing a fracture?

One fairly simple way to test for the presence of a fracture is to squeeze the tibia and fibula together midway between the ankle and knee. If there is a proximal fibular fracture this maneuver will cause pain. It will usually hurt, too, if there is a distal fibular fracture or syndesmosis sprain. If an epiphyseal fracture is present, the patient will have tenderness over the malleoli and will usually be unable to comfortably bear weight on the ankle.

It's also important to palpate the base of the fifth metatarsal bone, because two types of foot fractures occur frequently with inversion injury and can cause tenderness in this area. One is an avulsion or flake fracture of the styloid process of the fifth metatarsal, which is treated in the same manner as an ankle sprain. The other, a Jones fracture, is a transverse fracture about an inch distal to the proximal end of the fifth metatarsal. This type of fracture often results in nonunion of the fractured bone. Whenever patients present with tenderness at the base of the fifth metatarsal, it is important to x-ray the ankle and the foot.

How do you distinguish a syndesmosis sprain from other types of sprains?

The key to diagnosing a syndesmosis sprain is the mechanism of injury, which is usually different from the mechanism for inversion injuries. Often the foot is dorsiflexed. The area of maximum tenderness is usually higher, between the tibia and fibula at the tibiofibular ligament.

For what other types of acute ankle injury should the clinician be on the lookout?

One commonly misdiagnosed injury is an Achilles tendon rupture. It's not uncommon for a patient to come to the emergency room and say, "I did something to my ankle and I felt a pop." This is sometimes a painless injury. So it's always important to palpate the Achilles tendon, though the patient may not have any tenderness in the area.

The only other acute injury seen with any frequency is a peroneal tendon dislocation. The mechanism of injury is again different than in the typical ankle sprain. Usually it's a hyperdorsiflexion injury, such as might occur when you fall over the tip of your skis. Often by the time the patient reaches a physician, the tendon has spontaneously reduced. The tip-offs here are the mechanism of injury and swelling and tenderness that extend up along the posterior border of the fibula, well proximal to the ligaments. Patients often have swelling in and around the tendon sheath as well.

What initial treatment do you recommend for the typical ankle sprain?

It's critical to get on top of the injury as quickly as possible. Initially, we follow the standard RICE (rest, ice, compression, and elevation) protocol. Proper use of a compression wrap is, without question, the most important measure. The goal is to prevent swelling, bleeding, and edema around the capsule of the ankle that will result in loss of motion. If you lose motion, you'll lose strength, and it's difficult for patients to regain strength and motion of the ankle. The more swelling you can prevent, the better off the patient will be.

Using the right kind of compression wrap is essential. Simply putting an elastic wrap around a sprained ankle will encourage it to swell into the little hollow areas around the ankle, precisely where you don't want swelling to occur. Most people recommend focal compression devices such as a pair of felt horseshoes or donuts placed around the medial and lateral malleoli and held in place with either an elastic bandage or elasticized stockinette (figure 1). The elastic stocking allows the patient to comfortably wear a shoe and easily remove and correctly replace the wrap.

The compression wrap should remain in place for the first 24 to 36 hours, when most of the swelling will have stabilized. After that, a less bulky compression wrap can be used to stabilize the ankle.

Is it necessary to immobilize the ankle in a cast?

About 30 years ago, a Swedish traumatologist wrote a series of articles about the outcomes of several treatment options in patients with severe ankle sprains, the results of which have never been contradicted (5). He treated patients with severe ankle sprains—grade 3, or complete tears of either the anterior talofibular ligament or the anterior talofibular ligament plus the calcaneofibular ligament that were documented by x-ray and other techniques—with surgery and cast immobilization or by wrapping the ankle with elastic wrap. No difference was found in the number of patient complaints or residual ankle instability between those who were casted and those who were not.

To my knowledge, there has never been an article published showing that casting an ankle sprain does anything but weaken muscles. Occasionally, you might cast someone for convenience's sake, as when the patient is very uncomfortable bearing weight and needs to get around for work or school. Otherwise there is certainly no justification in the literature for casting ankle sprains.

What are the goals of your management plan for these patients?

My initial goal is for patients to lose as little strength and motion as possible. Then I try to have them regain what was lost as quickly as I can. I have a bar graph outline of my management plan that I've used for years (figure 2).

Basically, I have the patient use a compression wrap until swelling subsides, then bear weight as tolerated. After 24 to 48 hours, I start them on contrast baths at home. Using one bucket of water at about 100°F (37.7°C) and another with ice water, I have them perform range-of-motion exercises for 4 minutes in warm water followed by 1 minute in cold, repeated four times. I've found that compliance is much better if I instruct patients to trace the alphabet in large letters with their big toe, rather than prescribing up-and-down and side-to-side exercises. Patients find it's easier to do range-of-motion exercise in warm water, and it seems to be quite effective.

Following initial contact with a physical therapist, the patient begins strengthening exercises at home once or twice a day. I have them use Theraband exercise bands for four-direction exercises (inversion, eversion, dorsiflexion, and plantar flexion), advancing them through several degrees of elasticity. I also tell patients that once on their feet they should use every opportunity to stand instead of sit and should balance on the injured foot, when possible with the heel raised an inch or so off the ground.

Figure: Courtesy of James G. Garick, MD



Figure 1. A photograph of a 19-year-old football player's ankle 5 days after he sustained a grade 3 lateral ankle sprain demonstrates the effects of proper compression wrap treatment. The on-site athletic trainer immediately placed a compression wrap with a donut on the injured ankle. As a result, the patient had no bleeding around the malleolus that would have restricted motion, though much bleeding is seen elsewhere. When this photo was taken, the patient had essentially full range of motion and, when taped, was able to run comfortably without a limp.

How soon can the patient expect to return to his or her full activity level?

This, of course, depends on the severity of the injury and appropriate early management. It can take anywhere from 3 days to 6 weeks, depending on how comfortable the patient feels with the movement and how quickly he or she regains muscular strength. If you were to wait for a ligament to heal completely and regain substantial tensile strength, then no one would be back to sports in less than 6 months. The point is that the majority of patients are back to full activity long before the ligament heals. If you are strong and have good muscles that are working properly, you can compensate for almost any degree of ankle instability.

Patients who have syndesmotic sprains take much longer to rehabilitate than those who have lateral ligament sprains. As a rule of thumb you can double or triple the amount of time it's going to take to get them back. They are really uncomfortable.

Is surgical repair ever warranted for a severe sprain?

I can't imagine a lateral ankle sprain, absent a fracture, that I would operate on. Frequently, you will see people report in the literature that they operated on a high-level athlete because they wanted the best result possible. But there's really nothing in the literature to support that treatment philosophy. There certainly is evidence that if you do surgery there are a number of complications that might occur. And the published studies that have compared surgical treatment to either casting or no-immobilization management show that the time lost from work or sports is appreciably longer with a surgical patient (6,7).

What complications might you encounter down the road as a result of an ankle injury?

There are several complications with ankle sprains, none of which is possible to predict. The first, occurring in about 1% of patients, is a synovial impingement, which occurs as a result of irritation and swelling in the joint lining. You get a little tongue of synovium that grows into the anterolateral aspect of the ankle and gets caught during dorsiflexion, causing pain. By pressing on the front of the ankle while dorsiflexing it, you can magnify this symptom. In the majority of patients, synovial impingement resolves once they regain range of motion and strength. However, arthroscopy is sometimes required to remove the little piece of synovium.

Another complication that can occur is a fracture of either the joint surface cartilage or the cartilage and the subchondral bone on the talar dome. Most of these fractures are not initially visible on x-rays. The tip-off here is that patients will report episodes of brief, spontaneous, lancinating pain during rehabilitation, like getting hit suddenly with an ice pick. A radioisotope bone scan or MRI is the most effective way to distinguish these types of fractures from other complications.

Some sources say that as many as 40% of patients develop chronic ankle instability and pain following an ankle injury. Does this match your experience?

If patients experience chronic problems it is generally because of inadequate rehabilitation. Patients who have ankle sprains need to regain normal strength and motion. If they don't get their strength back, they tend to have a chronically swollen ankle that is clinically and functionally unstable. They can't walk over rough ground, they become apprehensive, and they tend to get recurrent sprains. But increasingly abundant reports, particularly in Scandinavian soccer players, show that such problems are much less frequent if patients rehabilitate properly.

What measures do you recommend to avoid recurrent injuries?

When patients return to play, I suggest they use a prophylactic ankle brace or wrap for the first few months. Ankle braces seem to protect the ankle by holding it in an anatomic position. There is no evidence that any one device is better than another. Go with one that's inexpensive and comfortable, such as the nonelastic web wrap commonly called Louisiana wrap. There is pretty solid evidence that supportive devices such as these will prevent sprains (8,9).

The earlier you mobilize, the less strength you lose and the quicker you regain motion. And the quicker you regain normal motion and strength, the less likely it is that you will get a recurrent injury.

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