

Ankle Fracture

Non-Operative Versus Operative Management
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Non-operative Management

Summary

Stable ankle fractures involve a fracture of the outside bone of the ankle joint (the fibula). However, although the outside bone is fractured, the ankle joint itself remains well positioned and stable. They are associated with pain, resulting in it being very difficult or even impossible to walk on the ankle. Treatment is non-operative, although it often takes 6 weeks or more for the bone to heal. The total time to a complete recovery can be many months.

Clinical Presentation

Patients will usually report a twisting injury to the ankle. The foot may be rolled to the inside similar to an ankle sprain, or the foot may be fixed on the ground while the body rotates around it. In either case, patients will describe pain and swelling in their ankle. Often they will not be able to bear weight on the ankle, although in some cases they may be able to walk with significant pain.

Imaging Studies

Plain x-rays of the ankle joint will identify a fracture (Figure 1) of the outer bone of the ankle (the fibula). However, the ankle joint itself will be intact and will be exactly where it should be. In some instances, the ankle joint will appear to be intact, but the joint will displace when it is stressed, demonstrating that the ankle fracture is actually unstable.

Figure 1: Plain X-rays of a Stable Ankle Fracture

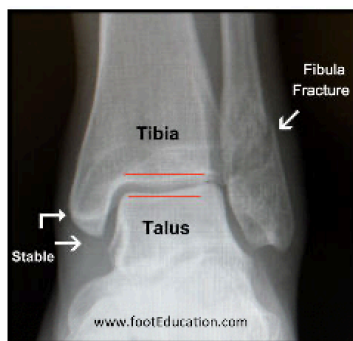


Figure 2: Twisting Mechanism of Injury



There are two common types of stable ankle fractures:

1. Pulling Fractures of the Fibula (Avulsion or Weber A type fractures). These injuries are equivalent to a severe ankle sprain. The main difference is that instead of the outside ankle ligament tearing, the ligament pulls a piece of the fibula off.
2. Twisting Fractures of the Fibula (Weber B1-type fractures). In these fractures, the foot (and therefore the lower bone of the ankle) is fixed on the ground while the body (and therefore the

two upper bones of the ankle) rotates inwards, causing the outer ankle bone (the fibula) to break (Figure 2). However, the rotation stops before the structures on the inside of the ankle are injured. Therefore the ankle joint itself remains anatomically positioned and stable.

Treatment

Stable ankle fractures may be treated without surgery because the ankle joint itself remains truly stable. If the joint is displaced or if there is some question about the integrity of the ankle joint, then surgery is often indicated.

Non-Operative Treatment

- Relative immobilization. Non-weight bearing or limited weight-bearing will limit pain, and allow the fracture to heal without being subject to excessive motion. Commonly, a walking boot such as a CAM walker is used.
 - Ice. Ice is used to decrease the blood flow to the ankle and therefore decrease the swelling. A certain amount of blood flowing to the ankle is important, however, in patients who have recently suffered an ankle fracture, there is often too much blood flowing to the area.
 - Elevation. Elevation will help limit the swelling and thereby decrease the pain. In general, the ankle should be elevated 6-12 inches above the heart (i.e. with the foot on a pillow when you are lying down)
 - Early Range of Motion. The ankle joint itself is stable so early motion can help prevent stiffness and allow muscle strength to be retained.
 - Time. Bones that are broken (fractured) just take time to heal. Usually, it takes a minimum of 6 weeks before a bone, such as the fibula, to heal enough to withstand normal everyday forces (ex. normal walking) through the ankle joint. However, it often takes many months for the fracture, soft-tissues, and muscle strength to return to pre-injury levels.
 - Rehabilitation. Aggressive rehabilitation working on regaining lost strength, motion, and proprioception, is often instituted after the bones have healed enough to withstand these forces (often 6 weeks). This type of rehabilitation program is often overseen by a physical therapist.
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Unstable Ankle Fracture

Summary

In unstable ankle fractures, the ankle joint itself is displaced or can be displaced when it is subject to normal forces. Specifically, the lower bone of the ankle joint (the talus) is out of position or can be shifted out of position, leading to incongruity of the ankle joint. For ankle fracture to be unstable the restraining structures on the inside (medial side) of the ankle (Deltoid ligament and or medial malleolus) are disrupted. Unstable ankle fractures often require surgery to reposition bones and stabilize the ankle joint.

Clinical Presentation

Patients with unstable ankle fractures are invariably in a lot of pain and require urgent medical attention. They will often report a twisting injury to their ankle with their foot fixed on the ground (ex. stuck in a hole in the ground). They will not be able to weight-bear. The examining physician will assess the extent of deformity and look for any associated wounds that would suggest that the fracture has broken through the skin. He will assess muscle, vascular, and nerve function.

Imaging Studies

Plain x-rays of the ankle will be taken. However, for grossly displaced fractures it is often beneficial for the ankle joint to be repositioned (reduced) before the x-rays are taken. X-rays determine whether an ankle fracture is present and help determine if the injury is stable or unstable.

Treatment

Initial management of the fracture begins at the scene of the injury. The lower leg should be splinted and if available a bag of ice may be applied to the area. Further management occurs when the patient reaches the emergency room. If the ankle is markedly displaced (ex. dislocated) it will be necessary for a physician to perform a preliminary repositioning (reduction) of the ankle joint in the emergency room. This is done by sedating the patient or injecting local anesthetic into the ankle joint and then providing gentle traction on the ankle joint. If one of the fractures has broken through the skin this is considered an “open fracture” and relatively urgent surgery is warranted to clean out the fracture site in an effort to minimize the chance of a serious deep infection. However, if the ankle is markedly swollen and the skin is intact it may be desirable to wait a few days (or more) to let the swelling around the ankle settle as operating through swollen tissue is associated with a higher infection rate. If this is the case then the ankle is splinted and the patient is given pain medication. Elevating the involved leg above the level of the heart and placing a bag of ice (or a bag of frozen vegetables) over the area for 10-15 minutes at a time may be helpful.

Adequate treatment of an unstable ankle fracture not only requires healing of the fracture and any injured ligaments, but also a realignment of the ankle joint. Both healing and realignment must occur to ensure that the joint is congruent and thereby minimizes the risks of long-term ankle arthritis. For this reason, it is common for unstable ankle fractures to require surgery. Surgery is oriented towards repositioning (reducing) the fracture and fixing it in the previous anatomic position often with plates and screws. In addition, it is important that the surgeon ensures that the ankle joint (mortise) is anatomically positioned following the surgery. In order to do this, it is necessary to take x-ray (fluoroscopic) images during the surgery. In order to stabilize a disrupted ankle mortise, it may be necessary for the surgeon to place one or more screws across the two bones of the lower leg (Tibia and Fibula) to stabilize the relationship between these two bones while the ligaments connecting these bones (syndesmosis) heals. After these syndesmotic ligaments have healed (3-6 months) it may be necessary to remove these screws.

In some patients with significant medical conditions or where an anatomical reduction has been obtained without surgery, it may be possible to treat an unstable ankle fracture non-operatively. However, this situation is the exception rather than the rule.

Recovery

Patients undergoing surgical stabilization of an unstable ankle fracture usually require a minimum of 6 weeks non-weight-bearing in a cast after the surgery. During this “healing phase”, the bones and ligaments need to heal adequately. In some highly compliant patients with relatively stable fractures, it may be possible to treat them in a removable cast boot to allow some gentle early range of motion. Following the 6-week period of healing, more aggressive rehabilitation is performed as the patient enters the “rehabilitation phase” of recovery. The rehab phase is oriented towards regaining ankle motion, strength, and proprioception. Patients often need to walk in a protective boot or brace for a number of weeks or even months after they are allowed to begin weight-bearing. It is common for it to take six months (or more) for patients to feel comfortable performing basic everyday activities (walking a number of blocks, standing for prolonged periods, basic sporting activities, etc.) It can be a total of 12-18 months before patients who have suffered an unstable ankle fracture reach their “point of maximal improvement.”

Complications

The main potential complication that is specific to an ankle fracture is the potential for long-term ankle arthritis. A previous ankle fracture is the most common reason why patients develop significant ankle arthritis. However, most ankle fractures will not produce significant long-term arthritis. The key determinants of whether long-term arthritis will develop are whether there has been extensive cartilage damage at the time of the original injury, and whether an anatomical reduction of the ankle joint has been obtained.

Patients undergoing surgery have the usual potential risks of surgery including:

- Infection
- Wound healing problems
- Nerve injury
- Deep Vein Thrombosis (DVT)
- Pulmonary Embolism
- Non-Union
- Mal-Union

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