Pilon Fractures of the Ankle

Pilon fractures affect the bottom of the shinbone (tibia) at the ankle joint. In most cases, both bones in the lower leg, the tibia and fibula, are broken near the ankle.

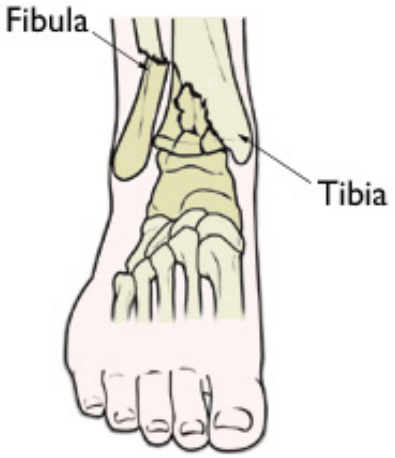
Pilon is a French word for pestle, an instrument used for crushing or pounding. In many pilon fractures, the bones of the ankle joint are crushed due to the high-energy impact causing the injury. Pilon fractures may be considered high-energy ankle fractures.

Because of the energy required to cause this type of fracture, 25% to 50% of patients have additional injuries that require treatment.

Cause

Pilon fractures are most often caused by high-energy impacts, such as:

- Fall from height
- Motor vehicle/motorcycle collisions
- Skiing



A pilon fracture often affects both bones of the lower leg.

Risk Factors

- **Age.** The average age of someone with a pilon fracture is 35 to 40 years old. Pilon fractures are rare in children and elderly people. However, as our population ages, seniors will account for a larger amount of these fractures.
- **Male.** Men are three times more likely than women to have pilon fractures.

Air Bags

In recent years, there has been an increase in pilon fractures. This is due to the impact airbags have had in saving people's lives. Before there were airbags, most people did not survive high-speed car crashes. More people survive these crashes now, but because airbags do not protect the legs, there are also more leg injuries like pilon fractures.

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Symptoms

- Immediate and severe pain
- Swelling
- Bruising
- Tender to the touch
- Cannot put any weight on the injured foot
- Deformity ("out of place")—your ankle looks angled or crooked

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Doctor Examination

After discussing your symptoms and medical history, your doctor will examine your lower leg and ankle. This will include

looking at your ankle and pushing on different areas to see if it hurts.

Your doctor will check for sensation and look for a pulse to make sure there is blood supply to yourfoot and ankle. He or she will also check for swelling, which may determine if and when surgery can be done.

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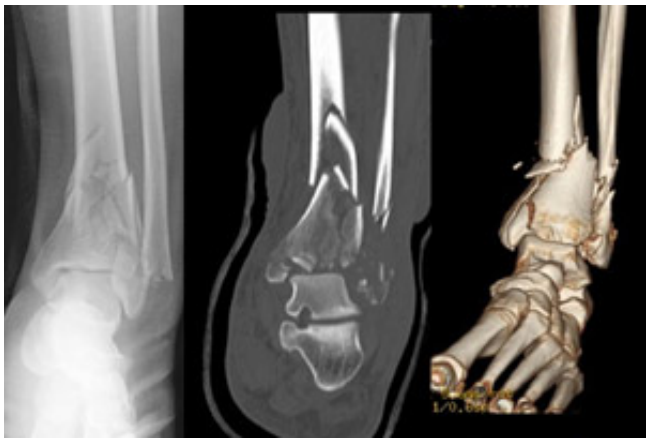
Tests

Along with the physical examination, x-rays of your leg, ankle, and foot are the most common ways to evaluate your ankle. They can show whether a bone is intact or broken.



To fully evaluate your fracture, your doctor may recommend an x-ray (left), a CAT scan (center), or a three-dimensional CAT scan (right).

A computed tomography (CT or CAT) scan is commonly done to evaluate your ankle joint. This type of scan can create a cross-section image of your ankle. Your doctor may order this scan right away, or wait until after an external fixator (discussed below) is applied.

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Treatment

Many pilon fractures require surgery, but some stable fractures can be treated nonsurgically. Whether or not your doctor recommends surgery often depends on how out of place (displaced) the fractured pieces of bone are. If the pieces are aligned and stable, nonsurgical treatment may effectively heal the fracture.

For patients with significant health problems, surgery may pose too great a risk. Nonsurgical treatment may also be a better option for patients who do not do a lot of walking.

Nonsurgical Treatment

Splints and casts. In most cases, your doctor will first apply a splint to hold your ankle in place. Once the swelling goes down, your doctor will replace the splint with a short leg cast. To provide effective support, your cast must correctly fit your ankle. As the swelling in your ankle changes, you may need frequent cast changes.

Monitoring. Your doctor will closely monitor the healing of the fracture. You will need to return to the clinic regularly and repeat your x-rays to make sure your ankle remains stable.

Recovery. You will most likely not be able to put weight on your ankle for as long as 12 weeks after your injury. After 6 weeks, your doctor may replace your cast with a removable brace. This will offer continued protection while your ankle continues to heal.

Surgical Treatment

If your pilon fracture is out of place, the most common way to treat it is with surgery. During surgery, metal implants — such as plates and screws — are used to hold things in place until the bone is fully healed.

If you have significant swelling or blisters, your doctor will delay your surgery until the swelling goes down. Surgery that is performed too early increases your risk for infection or problems with your incision.

Your doctor may place your ankle in a splint until your surgery, or recommend that you have two surgeries:

- If your fibula is also broken, the first surgery will fix the fibula fracture and get your ankle back into place. Your surgeon will use an external fixator to hold your pilon fracture in place. This fixator is a stabilizing frame that holds the bones in proper position so they can heal. Threaded pins are placed in bone above and below the fracture. The threaded pins attach to a metal bar outside the skin.
- Once the swelling and blisters go away, your doctor can perform surgery to fix the tibia bone with plates and screws.

An external fixator may be applied to protect your fracture and your skin until it is safe to perform an operation.

If the skin and bone are severely damaged, using plates and screws and large incisions may injure the skin further. This may result in infection. In this case, you may be treated with an external fixator only or with an external fixator and some screws.

Plates and screws may be used to fix the break, as long as the skin and surrounding tissues are healthy.

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Outcome

Early Recovery

Because your leg and ankle will be immobilized for a period of time, you will be at greater risk for blood clots. To decrease your risk for a clot, your doctor may prescribe a blood thinner while you are waiting for surgery and early on during your recovery.

You will most likely start moving your ankle after 2 to 6 weeks. This will depend upon your surgeon's preference, your fracture type, and the treatment method used for your injury. If you have an external fixator, you may not be able to start moving your ankle until the external fixator is removed.

Most patients are not able to put all of their weight on the ankle for 2 to 3 months. Crutches or a walker can be used during that time.

Rehabilitation

Once you are allowed to start moving your ankle, your doctor will place your ankle in a removable cast/brace. When you do therapy exercises, you can remove the brace. These first exercises focus on improving the range of motion in your ankle. Strengthening exercises will be added to your therapy exercises around 6 weeks after surgery.

As you transition to regular shoes, you will gradually stop wearing your brace. By 4 months after surgery, you will no longer need crutches or a cane to walk.

It is important to continue the exercises, even after you have completed the formal physical therapy program.

Complications

Complications that may occur with pilon fractures include:

Stiffness. It is very common to have ankle stiffness after a pilon fracture. Your ankle will not be like it was before your injury. It is very common to have difficulty bending your ankle as far back as you were able to before your injury. It may also be difficult to go up and down stairs, or climb a ladder. Being consistent with your exercise program will help relieve stiffness and discomfort.

Ankle arthritis. Chronic ankle pain can occur after a pilon fracture. This pain can be related to stiffness, scar tissue, and ankle arthritis. Ankle arthritis occurs in up to 40% of people with pilon fractures. Your risk for arthritis is mostly determined by how bad your fracture was (how out of place it was, if the bones broke through your skin, and how many broken pieces there were).

Many people have ankle arthritis, yet have little pain and no need for further surgery. Your doctor will develop a treatment plan for your ankle arthritis or stiffness based on your individual problems.

Infection. By delaying surgery in severe injuries, surgeons have continued to decrease the risk of infection and wound problems. This risk has been brought down to 10% or less of patients with pilon fractures.

Minor infections are treated with antibiotics and dressing changes. More severe infections may require intravenous antibiotics for several weeks at a time. Surgery is also sometimes necessary to get rid of the infection. In a small number of patients, the infection cannot be cleared. In these cases, amputation is required.

Bone healing problems. If your fracture is failing to heal, further surgery may be required. Surgery to promote healing usually includes placing a bone graft over the fracture, as well as new plates and screws.

Painful plates and screws. In some cases, the plates and screws irritate the skin or cause discomfort. Some patients choose to have their plates and screws removed after the bone has healed.

Additional complications of pilon fractures include:

- Wound healing problems
- Blood vessel or nerve damage

Long-Term Outcomes

How you do after your injury depends upon several things:

- How severe your injury is
- What type of job you have
- Other medical problems that you have
- If you injured your leg at work

Depending upon your job or recreational activities, there is up to a 90% chance that you can return to your preinjury activity level. However, if you have a demanding manual labor job or enjoy high-impact recreational activities, you may need to consider changing professions or limiting your activities.

Patients who enjoy high-impact activities, like sports, usually do not resume them until 6 months after surgery or injury. If you have a manual labor job, you will typically need 4 to 6 months of rehabilitation before going back on full duty at work.

It is common to limp for several months after your injury because of stiffness, discomfort, and weakness. Studies have shown that people with pilon injuries often continue to improve for up to 2 years after injury.

What to discuss with your orthopaedic surgeon:

- When will I be able to start putting weight on my leg?
- How long will I be off work?
- Do I have any specific risks for not doing well?
- If I have to have surgery, what risks are there?
- Do I have weak bones?
- Will I get arthritis?

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