

Accessory Navicular Syndrome

What is the Accessory Navicular?

The accessory navicular (os navicularum or os tibiale externum) is an extra bone or piece of cartilage located on the inner side of the foot just above the arch. It is incorporated within the posterior tibial tendon, which attaches in this area.

An accessory navicular is congenital (present at birth). It is not part of normal bone structure and therefore is not present in most people.

What is Accessory Navicular Syndrome?

People who have an accessory navicular often are unaware of the condition if it causes no problems. However, some people with this extra bone develop a painful condition known as accessory navicular syndrome when the bone and/or posterior tibial tendon are aggravated. This can result from any of the following:

- Trauma, as in a foot or ankle sprain
- Chronic irritation from shoes or other footwear rubbing against the extra bone
- Excessive activity or overuse

Many people with accessory navicular syndrome also have flat feet (fallen arches).

Having a flat foot puts more strain on the posterior tibial tendon, which can produce inflammation or irritation of the accessory navicular.

Signs and Symptoms of Accessory Navicular Syndrome

Adolescence is a common time for the symptoms to first appear. This is a time when bones are maturing and cartilage is developing into bone. Sometimes, however, the symptoms do not occur until adulthood. The signs and symptoms of accessory navicular syndrome include:

- A visible bony prominence on the midfoot (the inner side of the foot, just above the arch)
- Redness and swelling of the bony prominence
- Vague pain or throbbing in the midfoot and arch, usually occurring during or after periods of activity

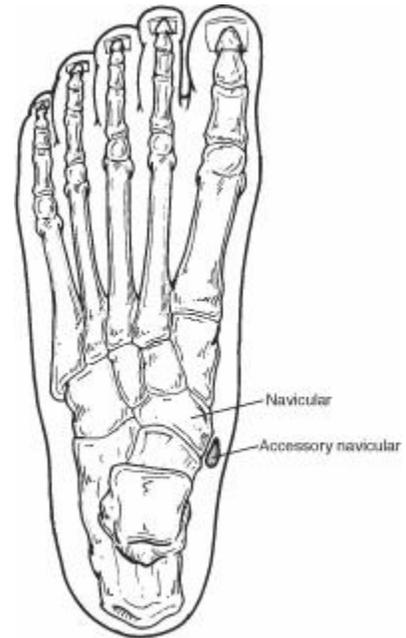
Diagnosis

To diagnose accessory navicular syndrome, the foot and ankle surgeon will ask about symptoms and examine the foot, looking for skin irritation or swelling. The doctor may press on the bony prominence to assess the area for discomfort. Foot structure, muscle strength, joint motion, and the way the patient walks may also be evaluated.

X-rays are usually ordered to confirm the diagnosis. If there is ongoing pain or inflammation, an MRI or other advanced imaging tests may be used to further evaluate the condition.

Treatment: Non-Surgical Approaches

The goal of non-surgical treatment for accessory navicular syndrome is to relieve the symptoms. The following may be used:



- **Immobilization.** Placing the foot in a cast or removable walking boot allows the affected area to rest and decreases the inflammation.
- **Ice.** To reduce swelling, a bag of ice covered with a thin towel is applied to the affected area. Do not put ice directly on the skin.
- **Medications.** Oral nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, may be prescribed. In some cases, oral or injected steroid medications may be used in combination with immobilization to reduce pain and inflammation.
- **Physical therapy.** Physical therapy may be prescribed, including exercises and treatments to strengthen the muscles and decrease inflammation. The exercises may also help prevent recurrence of the symptoms.
- **Orthotic devices.** Custom orthotic devices that fit into the shoe provide support for the arch, and may play a role in preventing future symptoms.

Even after successful treatment, the symptoms of accessory navicular syndrome sometimes reappear. When this happens, non-surgical approaches are usually repeated.

When Is Surgery Needed?

If non-surgical treatment fails to relieve the symptoms of accessory navicular syndrome, surgery may be appropriate. Surgery may involve removing the accessory bone, reshaping the area, and repairing the posterior tibial tendon to improve its function. This extra bone is not needed for normal foot function.

Achilles Tendon Rupture

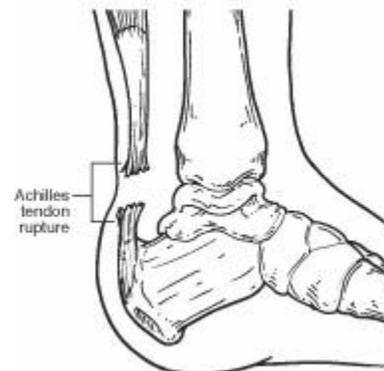
What is the Achilles Tendon?

A tendon is a band of tissue that connects a muscle to a bone. The Achilles tendon runs down the back of the lower leg and connects the calf muscle to the heel bone. Also called the "heel cord," the Achilles tendon facilitates walking by helping to raise the heel off the ground.

What is an Achilles Tendon Rupture?

An Achilles tendon rupture is a complete or partial tear that occurs when the tendon is stretched beyond its capacity. Forceful jumping or pivoting, or sudden accelerations of running, can overstretch the tendon and cause a tear. An injury to the tendon can also result from falling or tripping.

Achilles tendon ruptures are most often seen in "weekend warriors" – typically, middle-aged people participating in sports in their spare time. Less commonly, illness or medications, such as steroids or certain antibiotics, may weaken the tendon and contribute to ruptures.



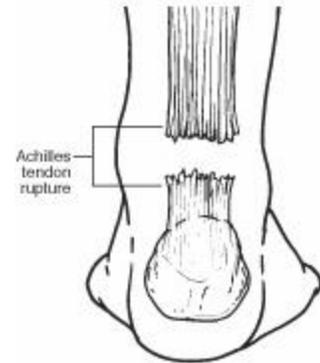
Signs and Symptoms

A person with a ruptured Achilles tendon may experience one or more of the following:

- Sudden pain (which feels like a kick or a stab) in the back of the ankle or calf – often subsiding into a dull ache
- A popping or snapping sensation
- Swelling on the back of the leg between the heel and the calf
- Difficulty walking (especially upstairs or uphill) and difficulty rising up on the toes

These symptoms require prompt medical attention to prevent further damage. Until the patient is able to see a doctor, the "R.I.C.E." method should be used. This involves:

- **Rest.** Stay off the injured foot and ankle, since walking can cause pain or further damage.
- **Ice.** Apply a bag of ice covered with a thin towel to reduce swelling and pain. Do not put ice directly against the skin.
- **Compression.** Wrap the foot and ankle in an elastic bandage to prevent further swelling.
- **Elevation.** Keep the leg elevated to reduce the swelling. It should be even with or slightly above heart level.



Diagnosis

In diagnosing an Achilles tendon rupture, the foot and ankle surgeon will ask questions about how and when the injury occurred and whether the patient has previously injured the tendon or experienced similar symptoms. The surgeon will examine the foot and ankle, feeling for a defect in the tendon that suggests a tear. Range of motion and muscle strength will be evaluated and compared to the uninjured foot and ankle. If the Achilles tendon is ruptured, the patient will have less strength in pushing down (as on a gas pedal) and will have difficulty rising on the toes.

The diagnosis of an Achilles tendon rupture is typically straightforward and can be made through this type of examination. In some cases, however, the surgeon may order an MRI or other advanced imaging tests.

Treatment

Treatment options for an Achilles tendon rupture include surgical and non-surgical approaches. The decision of whether to proceed with surgery or non-surgical treatment is based on the severity of the rupture and the patient's health status and activity level.

Non-Surgical Treatment

Non-surgical treatment, which is generally associated with a higher rate of re-rupture, is selected for minor ruptures, less active patients, and those with medical conditions that prevent them from undergoing surgery. Non-surgical treatment involves use of a cast, walking boot, or brace to restrict motion and allow the torn tendon to heal.

Surgery

Surgery offers important potential benefits. Besides decreasing the likelihood of re-rupturing the Achilles tendon, surgery often increases the patient's push-off strength and improves muscle function and movement of the ankle.

Various surgical techniques are available to repair the rupture. The surgeon will select the procedure best suited to the patient.

Following surgery, the foot and ankle are initially immobilized in a cast or walking boot. The surgeon will determine when the patient can begin weightbearing.

Complications such as incision-healing difficulties, re-rupture of the tendon, or nerve pain can arise after surgery.

Physical Therapy

Whether an Achilles tendon rupture is treated surgically or non-surgically, physical therapy is an important component of the healing process. Physical therapy involves exercises that strengthen the muscles and improve the range of motion of the foot and ankle.

Acute Inflammation

What Is Acute Inflammation?

Inflammation is the body's normal protective response to an injury, irritation, or surgery. This natural "defense" process brings increased blood flow to the area, resulting in an accumulation of fluid. As the body mounts this protective response, the symptoms of inflammation develop. These include:

- Swelling
- Pain
- Increased warmth and redness of the skin

Inflammation can be acute or chronic. When it is acute, it occurs as an immediate response to trauma (an injury or surgery), usually within two hours. When it is chronic, the inflammation reflects an ongoing response to a longer-term medical condition, such as arthritis.

Although inflammation can be caused by an infection, they are not the same and are treated differently. Your foot and ankle surgeon can best determine the cause of your inflamed tissue.

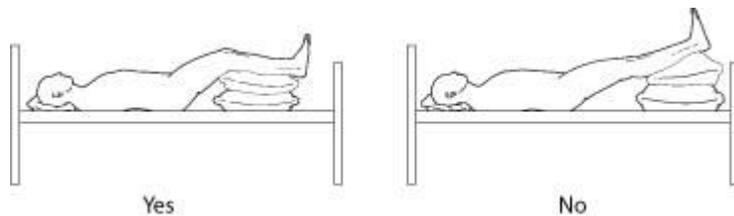
Treatment

To reduce inflammation and the resulting swelling and pain, injured tissue needs to be properly treated. The earlier you start treatment, the better.

Initial treatment for acute inflammation in the foot or ankle consists of RICE therapy:

- **Rest:** Stay off the foot or ankle. Walking may cause further injury.
- **Ice:** Apply an ice pack to the injured area, placing a thin towel between the ice and the skin. Use ice for 20 minutes and then wait at least 40 minutes before icing again.
- **Compression:** An elastic wrap should be used to control swelling.
- **Elevation:** The foot or ankle should be raised slightly above the level of your heart to reduce swelling.

Elevate the Leg Properly



In addition to the above measures, your foot and ankle surgeon may prescribe a nonsteroidal anti-inflammatory drug (NSAID), such as ibuprofen, or another type of medication.

If Pain Persists or Becomes Worse

The symptoms of inflammation typically improve within two or three days. If your pain and discomfort do not improve after three days, call your doctor or go to an emergency room to determine whether a more serious problem exists.

As with any medical problem, it's important that you follow your doctor's instructions carefully regarding your injury or postoperative care.

Ankle Fractures

What Is an Ankle Fracture?

A fracture is a partial or complete break in a bone. Fractures in the ankle can range from the less serious avulsion injuries (small pieces of bone that have been pulled off) to severe shattering-type breaks of the tibia, fibula, or both.

Ankle fractures are common injuries that are most often caused by the ankle rolling inward or outward. Many people mistake an ankle fracture for an ankle sprain, but they are quite different and therefore require an accurate and early diagnosis. They sometimes occur simultaneously.

Symptoms

An ankle fracture is accompanied by one or all of these symptoms:

- Pain at the site of the fracture, which in some cases can extend from the foot to the knee
- Significant swelling, which may occur along the length of the leg or may be more localized
- Blisters may occur over the fracture site. These should be promptly treated by a foot and ankle surgeon.
- Bruising that develops soon after the injury
- Inability to walk—however, it *is* possible to walk with less severe breaks, so never rely on walking as a test of whether a bone has been fractured
- Change in the appearance of the ankle – it will look different from the other ankle
- Bone protruding through the skin—a sign that immediate care is needed. Fractures that pierce the skin require immediate attention because they can lead to severe infection and prolonged recovery.

Diagnosis

Following an ankle injury it is important to have the ankle evaluated by a foot and ankle surgeon for proper diagnosis and treatment. If you are unable to do so right away, go to the emergency room and then follow up with a foot and ankle surgeon as soon as possible for a more thorough assessment.

The affected limb will be examined by the foot and ankle surgeon by touching specific areas to evaluate the injury. In addition, the surgeon may order x-rays and other imaging studies, as necessary.

Non-Surgical Treatment

Treatment of ankle fractures depends upon the type and severity of the injury. At first, the foot and ankle surgeon will want you to follow the R.I.C.E. protocol:

- **Rest:** Stay off the injured ankle. Walking may cause further injury.
- **Ice:** Apply an ice pack to the injured area, placing a thin towel between the ice and the skin. Use ice for 20 minutes and then wait at least 40 minutes before icing again.
- **Compression:** An elastic wrap should be used to control swelling.
- **Elevation:** The ankle should be raised slightly above the level of your heart to reduce swelling.

Additional treatment options include:

- **Immobilization.** Certain fractures are treated by protecting and restricting the ankle and foot in a cast or splint. This allows the bone to heal.
- **Prescription medications.** To help relieve the pain, the surgeon may prescribe pain medications or anti-inflammatory drugs.

When is Surgery Needed?

For some ankle fractures, surgery is needed to repair the fracture and other soft tissue related injuries, if present. The foot and ankle surgeon will select the procedure that is appropriate for your injury.

Follow-up Care

It is important to follow your surgeon's instructions after treatment. Failure to do so can lead to infection, deformity, arthritis, and chronic pain.

Ankle Pain

Ankle pain is often due to an ankle sprain but can also be caused by ankle instability, arthritis, gout, tendonitis, fracture, nerve compression (tarsal tunnel syndrome), infection and poor structural alignment of the leg or foot. Ankle pain can be associated with swelling, stiffness, redness, and warmth in the involved area. The pain is often described as an intense dull ache that occurs upon weight bearing and ankle motion.

Initial treatment may consist of rest, ice, elevation, and immobilization, but may also include nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen, physical therapy, and cortisone injection. A foot and ankle surgeon can best determine the cause of the ankle pain and appropriate treatment options.

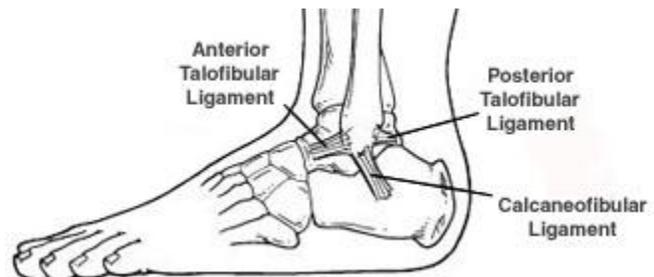
Ankle Sprain

What Is an Ankle Sprain?

An ankle sprain is an injury to one or more ligaments in the ankle, usually on the outside of the ankle.

Ligaments are bands of tissue – like rubber bands – that connect one bone to another and bind the joints together. In the ankle joint, ligaments provide stability by limiting side-to-side movement.

Some ankle sprains are much worse than others. The severity of an ankle sprain depends on whether the ligament is stretched, partially torn, or completely torn, as well as on the number of ligaments involved. Ankle sprains are not the same as strains, which affect muscles rather than ligaments.



Causes

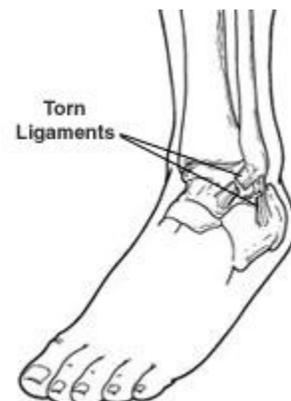
Sprained ankles often result from a fall, a sudden twist, or a blow that forces the ankle joint out of its normal position. Ankle sprains commonly occur while participating in sports, wearing inappropriate shoes, or walking or running on an uneven surface.

Sometimes ankle sprains occur because a person is born with weak ankles. Previous ankle or foot injuries can also weaken the ankle and lead to sprains.

Symptoms

The symptoms of ankle sprains may include:

- Pain or soreness
- Swelling
- Bruising
- Difficulty walking



- Stiffness in the joint

These symptoms may vary in intensity, depending on the severity of the sprain. Sometimes pain and swelling are absent in people with previous ankle sprains. Instead, they may simply feel the ankle is wobbly and unsteady when they walk. Even if there is no pain or swelling with a sprained ankle, treatment is crucial. Any ankle sprain – whether it's your first or your fifth – requires prompt medical attention.

Why Prompt Medical Attention Is Needed

There are four key reasons why an ankle sprain should be promptly evaluated and treated by a foot and ankle surgeon:

- An untreated ankle sprain may lead to chronic ankle instability, a condition marked by persistent discomfort and a “giving way” of the ankle. Weakness in the leg may also develop.
- A more severe ankle injury may have occurred along with the sprain. This might include a serious bone fracture that, if left untreated, could lead to troubling complications.
- An ankle sprain may be accompanied by a foot injury that causes discomfort but has gone unnoticed thus far.
- Rehabilitation of a sprained ankle needs to begin right away. If rehabilitation is delayed, the injury may be less likely to heal properly.

Diagnosis

In evaluating your injury, the foot and ankle surgeon will obtain a thorough history of your symptoms and examine your foot. X-rays or other advanced imaging studies may be ordered to help determine the severity of the injury.

Non-surgical Treatment

When you have an ankle sprain, rehabilitation is crucial—and it starts the moment your treatment begins. Your foot and ankle surgeon may recommend one or more of the following treatment options:

- **Rest.** Stay off the injured ankle. Walking may cause further injury.
- **Ice.** Apply an ice pack to the injured area, placing a thin towel between the ice and the skin. Use ice for 20 minutes and then wait at least 40 minutes before icing again.
- **Compression.** An elastic wrap may be recommended to control swelling.
- **Elevation.** The ankle should be raised slightly above the level of your heart to reduce swelling.
- **Early physical therapy.** Your doctor will start you on a rehabilitation program as soon as possible to promote healing and increase your range of motion. This includes doing prescribed exercises.
- **Medications.** Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, may be recommended to reduce pain and inflammation. In some cases, prescription pain medications are needed to provide adequate relief.

When Is Surgery Needed?

In more severe cases, surgery may be required to adequately treat an ankle sprain. Surgery often involves repairing the damaged ligament or ligaments. The foot and ankle surgeon will select the surgical procedure best suited for your case based on the type and severity of your injury as well as your activity level.

After surgery, rehabilitation is extremely important. Completing your rehabilitation program is crucial to a successful outcome. Be sure to continue to see your foot and ankle surgeon during this period to ensure that your ankle heals properly and function is restored.

Arch Pain

Pain across the bottom of the foot at any point between the heel and the ball of the foot is often referred to as "**arch pain**." Although this description is non-specific, most arch pain is due to strain or inflammation of the plantar fascia (a long ligament on the bottom of the foot). This condition is known as plantar fasciitis and is sometimes associated with a heel spur.

In most cases, arch pain develops from overuse, unsupportive shoes, weight gain, or acute injury. If arch pain persists beyond a few days, see a foot and ankle surgeon for treatment to prevent this condition from becoming worse.

Arch Supports

Arch supports and shoe inserts are devices that are placed inside of shoes to support and align the foot and lower extremities (knees, hips, and lower back), thus preventing the progression of a foot deformity, improving the function of the foot, and diminishing or eliminating pain.

These devices can range from generic over-the-counter inserts to prescription devices custom made for the individual's foot and/or foot problem.

Athlete's Foot

Athlete's foot is a skin infection caused by fungus. A fungal infection may occur on any part of the body; on the foot it is called athlete's foot, or tinea pedis. Fungus commonly attacks the feet because it thrives in a dark, moist, warm environment such as a shoe.

Fungal infections are more common in warm weather when feet tend to sweat more. Fungus thrives in damp areas such as swimming pools, showers, and locker rooms. Athletes commonly have sweaty feet and use the facilities where fungus is commonly found, thus the term "athlete's foot."

Athlete's foot usually produces itchy, dry, scaling skin. It is commonly seen on the soles of the feet and in between the toes. In advanced cases, inflammation, cracks, and blisters may form; an infection caused by bacteria can also result. The fungus can spread to other areas of the body, including toenails.

Avoiding walking barefoot combined with good foot hygiene can help reduce the spread of the fungus. Feet should be washed every day with soap and water and thoroughly dried, including between the toes. Feet should be kept as dry as possible. If your feet sweat a lot you may need to change your socks during the day. Anti-fungal powders, sprays, and/or creams are often utilized to treat athlete's foot. Your foot and ankle surgeon will recommend the best treatment for you.

Black Toenails

A black, purple, or brownish discoloration under or involving a toenail is frequently due to trauma to the toe nail, such as when something is dropped on the toe. The color results from a blood clot or bleeding under the nail, and may involve the

entire nail or just a small portion of it. This can be very painful when the entire nail is involved, and may need medical attention to relieve the pressure caused by bleeding under the toenail.

Although it is very rare, a more serious cause of black toenails is malignant melanoma. Since early diagnosis and treatment of melanoma improves the chances for a good outcome, it is important that all black toenails be evaluated by a qualified foot and ankle surgeon to rule out this cause.

Other rare causes of black toenails include fungal infections, chronic ingrown nails, or health problems affecting the rest of the body.

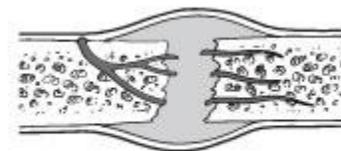
Bone Healing

How Does a Bone Heal?

All broken bones go through the same healing process. This is true whether a bone has been cut as part of a surgical procedure or fractured through an injury.

The bone healing process has three overlapping stages: inflammation, bone production, and bone remodeling.

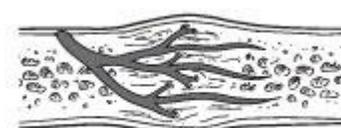
- **Inflammation** starts immediately after the bone is fractured and lasts for several days. When the bone is fractured there is bleeding into the area, leading to inflammation and clotting of blood at the fracture site. This provides the initial structural stability and framework for producing new bone.
- **Bone production** begins when the clotted blood formed by inflammation is replaced with fibrous tissue and cartilage (known as “soft callus”). As healing progresses, the soft callus is replaced with hard bone (known as “hard callus”), which is visible on x-rays several weeks after the fracture.
- **Bone remodeling**, the final phase of bone healing, goes on for several months. In remodeling, bone continues to form and becomes compact, returning to its original shape. In addition, blood circulation in the area improves. Once adequate bone healing has occurred, weightbearing (such as standing or walking) encourages bone remodeling.



Inflammation



Bone production



Bone remodeling

How Long Does Bone Healing Take?

Bone healing is a complex process. Speed and success differ among individuals. The time required for bone healing can be affected by many factors, including the type of fracture and the patient's age, underlying medical conditions, and nutritional status.

Bone generally takes 6 to 8 weeks to heal to a significant degree. In general, children's bones heal faster than those of adults. The foot and ankle surgeon will determine when the patient is ready to bear weight on the area. This will depend on the location and severity of the fracture, the type of surgical procedure performed, and other considerations.

What Helps Promote Bone Healing?

If a bone will be cut during a planned surgical procedure, some steps can be taken pre-and post-operatively to help optimize healing. The surgeon may offer advice on diet and nutritional supplements that are essential to bone growth. Smoking cessation, and adequate control of blood sugar levels in diabetics, are important. Smoking and high glucose levels interfere with bone healing.

For all patients with fractured bones, **immobilization** is a critical part of treatment, because any movement of bone fragments slows down the initial healing process. Depending on the type of fracture or surgical procedure, the surgeon may use some form of fixation (such as screws, plates, or wires) on the fractured bone and/or a cast to keep the bone from moving. During the immobilization period, weightbearing is restricted as instructed by the surgeon.

Once the bone is adequately healed, **physical therapy** often plays a key role in rehabilitation. An exercise program designed for the patient can help in regaining strength and balance and assist in returning to normal activities.

What Can Hinder Bone Healing?

A wide variety of factors can slow down the healing process. These include:

- Movement of the bone fragments; weightbearing too soon
- Smoking, which constricts the blood vessels and decreases circulation
- Medical conditions, such as diabetes, hormone-related problems, or vascular disease
- Some medications, such as corticosteroids and other immunosuppressants
- Fractures that are severe, complicated, or become infected
- Advanced age
- Poor nutrition or impaired metabolism

How Can Slow Healing be Treated?

If the bone is not healing as well as expected or fails to heal, the foot and ankle surgeon can choose from a variety of treatment options to enhance the growth of bone, such as continued immobilization for a longer period, bone stimulation, or surgery with bone grafting or use of bone growth proteins.

Bunions (Hallux Abducto Valgus)

Even though bunions are a common foot deformity, there are misconceptions about them. Many people may unnecessarily suffer the pain of bunions for years before seeking treatment.

What is a Bunion?

A bunion (also referred to as hallux valgus or hallux abducto valgus) is often described as a bump on the side of the big toe. But a bunion is more than that. The visible bump actually reflects changes in the bony framework of the front part of the foot. The big toe leans toward the second toe, rather than pointing straight ahead. This throws the bones out of alignment – producing the bunion's “bump.”

Bunions are a progressive disorder. They begin with a leaning of the big toe, gradually changing the angle of the bones over the years and slowly producing the characteristic bump, which becomes increasingly prominent. Symptoms usually appear at later stages, although some people never have symptoms.

Causes

Bunions are most often caused by an inherited faulty mechanical structure of the foot. It is not the bunion itself that is inherited, but certain foot types that make a person prone to developing a bunion.



Although wearing shoes that crowd the toes won't actually cause bunions, it sometimes makes the deformity get progressively worse. Symptoms may therefore appear sooner.

Symptoms

Symptoms, which occur at the site of the bunion, may include:

- Pain or soreness
- Inflammation and redness
- A burning sensation
- Possible numbness

Symptoms occur most often when wearing shoes that crowd the toes, such as shoes with a tight toe box or high heels. This may explain why women are more likely to have symptoms than men. In addition, spending long periods of time on your feet can aggravate the symptoms of bunions.

Diagnosis

Bunions are readily apparent – the prominence is visible at the base of the big toe or side of the foot. However, to fully evaluate the condition, the foot and ankle surgeon may take x-rays to determine the degree of the deformity and assess the changes that have occurred.

Because bunions are progressive, they don't go away, and will usually get worse over time. But not all cases are alike – some bunions progress more rapidly than others. Once your surgeon has evaluated your bunion, a treatment plan can be developed that is suited to your needs.



Non-Surgical Treatment

Sometimes observation of the bunion is all that's needed. To reduce the chance of damage to the joint, periodic evaluation and x-rays by your surgeon are advised.

In many other cases, however, some type of treatment is needed. Early treatments are aimed at easing the pain of bunions, but they won't reverse the deformity itself. These include:

- **Changes in footwear.** Wearing the right kind of shoes is very important. Choose shoes that have a wide toe box and forgo those with pointed toes or high heels which may aggravate the condition.
- **Padding.** Pads placed over the area of the bunion can help minimize pain. These can be obtained from your surgeon or purchased at a drug store.
- **Activity modifications.** Avoid activity that causes bunion pain, including standing for long periods of time.
- **Medications.** Oral nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, may be recommended to reduce pain and inflammation.
- **Icing.** Applying an ice pack several times a day helps reduce inflammation and pain.
- **Injection therapy.** Although rarely used in bunion treatment, injections of corticosteroids may be useful in treating the inflamed bursa (fluid-filled sac located around a joint) sometimes seen with bunions.
- **Orthotic devices.** In some cases, custom orthotic devices may be provided by the foot and ankle surgeon.

When Is Surgery Needed?

If non-surgical treatments fail to relieve bunion pain and when the pain of a bunion interferes with daily activities, it's time to discuss surgical options with a foot and ankle surgeon. Together you can decide if surgery is best for you.

A variety of surgical procedures is available to treat bunions. The procedures are designed to remove the "bump" of bone, correct the changes in the bony structure of the foot, and correct soft tissue changes that may also have occurred. The goal of surgery is the reduction of pain.

In selecting the procedure or combination of procedures for your particular case, the foot and ankle surgeon will take into consideration the extent of your deformity based on the x-ray findings, your age, your activity level, and other factors. The length of the recovery period will vary, depending on the procedure or procedures performed.

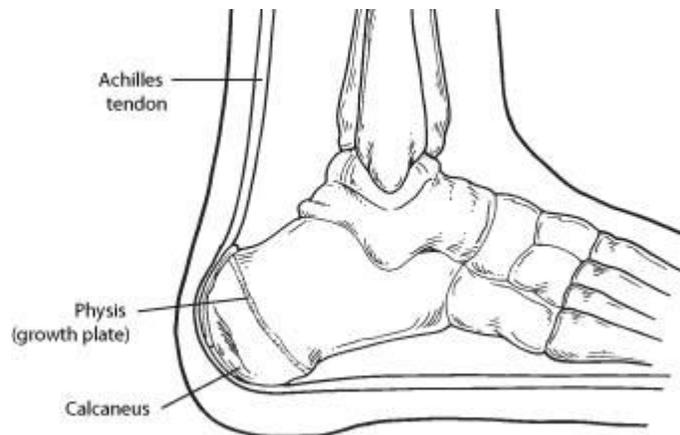
Calcaneal Apophysitis (Sever's Disease)

What Is Calcaneal Apophysitis?

Calcaneal apophysitis is a painful inflammation of the heel's growth plate. It typically affects children between the ages of 8 and 14 years old, because the heel bone (calcaneus) is not fully developed until at least age 14. Until then, new bone is forming at the growth plate (physis), a weak area located at the back of the heel. When there is too much repetitive stress on the growth plate, inflammation can develop.

Calcaneal apophysitis is also called Sever's disease, although it is not a true "disease." It is the most common cause of heel pain in children, and can occur in one or both feet.

Heel pain in children differs from the most common type of heel pain experienced by adults. While heel pain in adults usually subsides after a period of walking, pediatric heel pain generally doesn't improve in this manner. In fact, walking typically makes the pain worse.



Causes

Overuse and stress on the heel bone through participation in sports is a major cause of calcaneal apophysitis. The heel's growth plate is sensitive to repeated running and pounding on hard surfaces, resulting in muscle strain and inflamed tissue. For this reason, children and adolescents involved in soccer, track, or basketball are especially vulnerable.

Other potential causes of calcaneal apophysitis include obesity, a tight Achilles tendon, and biomechanical problems such as flatfoot or a high-arched foot.

Symptoms

Symptoms of calcaneal apophysitis may include:

- Pain in the back or bottom of the heel
- Limping
- Walking on toes
- Difficulty running, jumping, or participating in usual activities or sports
- Pain when the sides of the heel are squeezed

Diagnosis

To diagnose the cause of the child's heel pain and rule out other more serious conditions, the foot and ankle surgeon obtains a thorough medical history and asks questions about recent activities. The surgeon will also examine the child's foot and leg. X-rays are often used to evaluate the condition. Other advanced imaging studies and laboratory tests may also be ordered.

Treatment

The surgeon may select one or more of the following options to treat calcaneal apophysitis:

- **Reduce activity.** The child needs to reduce or stop any activity that causes pain.
- **Support the heel.** Temporary shoe inserts or custom orthotic devices may provide support for the heel.
- **Medications.** Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, help reduce the pain and inflammation.
- **Physical therapy.** Stretching or physical therapy modalities are sometimes used to promote healing of the inflamed issue.
- **Immobilization.** In some severe cases of pediatric heel pain, a cast may be used to promote healing while keeping the foot and ankle totally immobile.

Often heel pain in children returns after it has been treated because the heel bone is still growing. Recurrence of heel pain may be a sign of calcaneal apophysitis, or it may indicate a different problem. If your child has a repeat bout of heel pain, be sure to make an appointment with your foot and ankle surgeon.

Can Calcaneal Apophysitis Be Prevented?

The chances of a child developing heel pain can be reduced by:

- Avoiding obesity
- Choosing well-constructed, supportive shoes that are appropriate for the child's activity
- Avoiding or limiting wearing of cleated athletic shoes
- Avoiding activity beyond a child's ability.

Calf Pain

Calf pain can result from many different causes. Sometimes something as simple as over-activity causes muscle strain in the calf. Or, dietary imbalances may cause cramping in the calf.

However, calf pain may be a symptom of more serious problems as well. Poor blood flow to the legs (peripheral vascular disease, or PVD) may cause cramping in the calf while walking or when sitting with the legs elevated. A blood clot in the calf (deep vein thrombosis or DVT), a very serious problem, also produces pain in the calf.

Calf pain can also be the result of injuries, such as tearing of the calf muscle or tendonitis. In any case, it is not something that should be ignored. A foot and ankle surgeon should be seen for a thorough examination and diagnosis, to determine whether the cause is due to a serious health problem, an injury, or merely overuse. The cause of the calf pain will determine the proper treatment.

Callus

A **callus** is a thickened area of skin on the foot caused by pressure and repeated rubbing, such as from a shoe or sock. The rubbing causes the skin to produce a layer of protective skin (a callus). Calluses vary in size, and can become painful.

There are a number of treatments for painful calluses. People who have calluses are cautioned against performing "bathroom surgery," as this can lead to cuts and infection. A foot and ankle surgeon can evaluate the cause of the calluses

and recommend the treatment most appropriate for your condition. However, if the underlying cause of the callus is not treated or removed, the callus may return.

Capsulitis of the Second Toe

What is Capsulitis of the Second Toe?

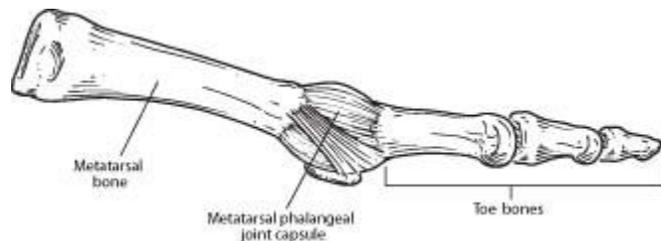
Ligaments surrounding the joint at the base of the second toe form a “capsule,” which helps the joint to function properly. Capsulitis is a condition in which these ligaments have become inflamed.

Although capsulitis can also occur in the joints of the third or fourth toes, it most commonly affects the second toe. This inflammation causes considerable discomfort and, if left untreated, can eventually lead to a weakening of surrounding ligaments that can cause dislocation of the toe. Capsulitis—also referred to as predislocation syndrome—is a common condition that can occur at any age.

Causes

It is generally believed that capsulitis of the second toe is a result of abnormal foot mechanics, where the ball of the foot beneath the toe joint takes an excessive amount of weight-bearing pressure.

Certain conditions or characteristics can make a person prone to experiencing excessive pressure on the ball of the foot. These most commonly include a severe bunion deformity, a second toe longer than the big toe, an arch that is structurally unstable, and a tight calf muscle.



Symptoms

Because capsulitis of the second toe is a progressive disorder and usually worsens if left untreated, early recognition and treatment are important. In the earlier stages—the best time to seek treatment—the symptoms may include:

- Pain, particularly on the ball of the foot. It can feel like there’s a marble in the shoe or a sock is bunched up
- Swelling in the area of pain, including the base of the toe
- Difficulty wearing shoes
- Pain when walking barefoot

In more advanced stages, the supportive ligaments weaken leading to failure of the joint to stabilize the toe. The unstable toe drifts toward the big toe and eventually crosses over and lies on top of the big toe—resulting in “crossover toe,” the end stage of capsulitis. The symptoms of crossover toe are the same as those experienced during the earlier stages. Although the crossing over of the toe usually occurs over a period of time, it can appear more quickly if caused by injury or overuse.

Diagnosis

An accurate diagnosis is essential because the symptoms of capsulitis can be similar to those of a condition called Morton’s neuroma, which is treated differently from capsulitis.

In arriving at a diagnosis, the foot and ankle surgeon will examine the foot, press on it, and maneuver it to reproduce the symptoms. The surgeon will also look for potential causes and test the stability of the joint. X-rays are usually ordered, and other imaging studies are sometimes needed.

Non-surgical Treatment

The best time to treat capsulitis of the second toe is during the early stages, before the toe starts to drift toward the big toe.

At that time, non-surgical approaches can be used to stabilize the joint, reduce the symptoms, and address the underlying cause of the condition.

The foot and ankle surgeon may select one or more of the following options for early treatment of capsulitis:

- **Rest and ice.** Staying off the foot and applying ice packs help reduce the swelling and pain. Apply an ice pack, placing a thin towel between the ice and the skin. Use ice for 20 minutes and then wait at least 40 minutes before icing again.
- **Oral medications.** Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, may help relieve the pain and inflammation.
- **Taping/splinting.** It may be necessary to tape the toe so that it will stay in the correct position. This helps relieve the pain and prevent further drifting of the toe.
- **Stretching.** Stretching exercises may be prescribed for patients who have tight calf muscles.
- **Shoe modifications.** Supportive shoes with stiff soles are recommended because they control the motion and lessen the amount of pressure on the ball of the foot.
- **Orthotic devices.** Custom shoe inserts are often very beneficial. These include arch supports or a metatarsal pad that distributes the weight away from the joint.

When is Surgery Needed?

Once the second toe starts moving toward the big toe, it will never go back to its normal position unless surgery is performed. The foot and ankle surgeon will select the procedure or combination of procedures best suited to the individual patient.

Cavus Foot (High-Arched Foot)

What is Cavus Foot?

Cavus foot is a condition in which the foot has a very high arch. Because of this high arch, an excessive amount of weight is placed on the ball and heel of the foot when walking or standing. Cavus foot can lead to a variety of signs and symptoms, such as pain and instability. It can develop at any age, and can occur in one or both feet.

Causes

Cavus foot is often caused by a neurologic disorder or other medical condition such as cerebral palsy, Charcot-Marie-Tooth disease, spina bifida, polio, muscular dystrophy, or stroke. In other cases of cavus foot, the high arch may represent an inherited structural abnormality.

An accurate diagnosis is important because the underlying cause of cavus foot largely determines its future course. If the high arch is due to a neurologic disorder or other medical condition, it is likely to progressively worsen. On the other hand, cases of cavus foot that do not result from neurologic disorders usually do not change in appearance.

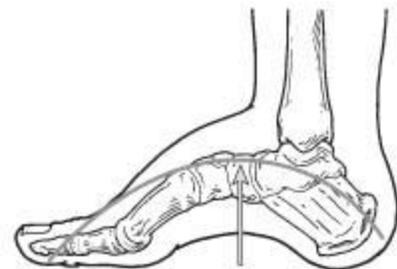
Symptoms

The arch of a cavus foot will appear high even when standing. In addition, one or more of the following symptoms may be present:

- Hammertoes (bent toes) or claw toes (toes clenched like a fist)



Normal Foot



Cavus Foot

- Calluses on the ball, side, or heel of the foot
- Pain when standing or walking
- An unstable foot due to the heel tilting inward, which can lead to ankle sprains

Some people with cavus foot may also experience foot drop, a weakness of the muscles in the foot and ankle that results in dragging the foot when taking a step. Foot drop is usually a sign of an underlying neurologic condition.

Diagnosis

Diagnosis of cavus foot includes a review of the patient's family history. The foot and ankle surgeon examines the foot, looking for a high arch and possible calluses, hammertoes, and claw toes. The foot is tested for muscle strength, and the patient's walking pattern and coordination are observed. If a neurologic condition appears to be present, the entire limb may be examined. The surgeon may also study the pattern of wear on the patient's shoes.

X-rays are sometimes ordered to further assess the condition. In addition, the surgeon may refer the patient to a neurologist for a complete neurologic evaluation.

Non-Surgical Treatment

Non-surgical treatment of cavus foot may include one or more of the following options:

- **Orthotic devices.** Custom orthotic devices that fit into the shoe can be beneficial because they provide stability and cushioning to the foot.
- **Shoe modifications.** High-topped shoes support the ankle, and shoes with heels a little wider on the bottom add stability.
- **Bracing.** The surgeon may recommend a brace to help keep the foot and ankle stable. Bracing is also useful in managing foot drop.

When is Surgery Needed?

If non-surgical treatment fails to adequately relieve pain and improve stability, surgery may be needed to decrease pain, increase stability, and compensate for weakness in the foot.

The surgeon will choose the best surgical procedure or combination of procedures based on the patient's individual case. In some cases where an underlying neurologic problem exists, surgery may be needed again in the future due to the progression of the disorder.



Normal foot
(rear view)



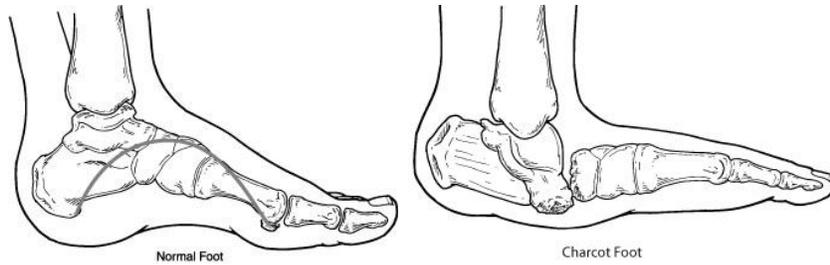
Cavus foot with high arch
(rear view)

Charcot Foot

What Is Charcot Foot?

Charcot foot is a condition causing weakening of the bones in the foot that can occur in people who have significant nerve damage (neuropathy). The bones are weakened enough to fracture, and with continued walking the foot eventually changes shape. As the disorder progresses, the joints collapse and the foot takes on an abnormal shape, such as a rocker-bottom appearance.

Charcot foot is a very serious condition that can lead to severe deformity, disability, and even amputation. Because of its seriousness, it is important that patients with diabetes—a disease often associated with neuropathy—take preventive measures and seek immediate care if signs or symptoms appear.



Causes

Charcot foot develops as a result of neuropathy, which decreases sensation and the ability to feel temperature, pain, or trauma. Because of diminished sensation, the patient may continue to walk—making the injury worse.

People with neuropathy (especially those who have had it for a long time) are at risk for developing Charcot foot. In addition, neuropathic patients with a tight Achilles tendon have been shown to have a tendency to develop Charcot foot.

Symptoms

The symptoms of Charcot foot may include:

- Warmth to the touch (the affected foot feels warmer than the other)
- Redness in the foot
- Swelling in the area
- Pain or soreness

Diagnosis

Early diagnosis of Charcot foot is extremely important for successful treatment. To arrive at a diagnosis, the surgeon will examine the foot and ankle and ask about events that may have occurred prior to the symptoms. X-rays and other imaging studies and tests may be ordered.

Once treatment begins, x-rays are taken periodically to aid in evaluating the status of the condition.

Non-Surgical Treatment

It is extremely important to follow the surgeon's treatment plan for Charcot foot. Failure to do so can lead to the loss of a toe, foot, leg, or life.

Non-surgical treatment for Charcot foot consists of:

- **Immobilization.** Because the foot and ankle are so fragile during the early stage of Charcot, they must be protected so the weakened bones can repair themselves. Complete non-weightbearing is necessary to keep the foot from further collapsing. The patient will not be able to walk on the affected foot until the surgeon determines it is safe to do so. During this period, the patient may be fitted with a cast, removable boot, or brace, and may be required to use crutches or a wheelchair. It may take the bones several months to heal, although it can take considerably longer in some patients.
- **Custom shoes and bracing.** Shoes with special inserts may be needed after the bones have healed to enable the patient to return to daily activities—as well as help prevent recurrence of Charcot foot, development of ulcers, and possibly amputation. In cases with significant deformity, bracing is also required.
- **Activity modification.** A modification in activity level may be needed to avoid repetitive trauma to both feet. A patient with Charcot in one foot is more likely to develop it in the other foot, so measures must be taken to *protect both feet*.

When is Surgery Needed?

In some cases, the Charcot deformity may become severe enough that surgery is necessary. The foot and ankle surgeon will determine the proper timing as well as the appropriate procedure for the individual case.

Preventive Care

The patient can play a vital role in preventing Charcot foot and its complications by following these measures:

- Keeping blood sugar levels under control can help reduce the progression of nerve damage in the feet.
- Get regular check-ups from a foot and ankle surgeon.
- Check *both* feet every day—and see a surgeon immediately if you notice signs of Charcot foot.
- Be careful to avoid injury, such as bumping the foot or overdoing an exercise program.
- Follow the surgeon's instructions for long-term treatment to prevent recurrences, ulcers, and amputation.

Chronic Ankle Instability

What Is Chronic Ankle Instability?

Chronic ankle instability is a condition characterized by a recurring “giving way” of the outer (lateral) side of the ankle. This condition often develops after repeated ankle sprains. Usually the “giving way” occurs while walking or doing other activities, but it can also happen when you’re just standing. Many athletes, as well as others, suffer from chronic ankle instability.

People with chronic ankle instability often complain of:

- A repeated turning of the ankle, especially on uneven surfaces or when participating in sports
- Persistent (chronic) discomfort and swelling
- Pain or tenderness
- The ankle feeling wobbly or unstable

Causes

Chronic ankle instability usually develops following an ankle sprain that has not adequately healed or was not rehabilitated completely. When you sprain your ankle, the connective tissues (ligaments) are stretched or torn. The ability to balance is often affected. Proper rehabilitation is needed to strengthen the muscles around the ankle and “retrain” the tissues within the ankle that affect balance. Failure to do so may result in repeated ankle sprains.

Repeated ankle sprains often cause – and perpetuate – chronic ankle instability. Each subsequent sprain leads to further weakening (or stretching) of the ligaments, resulting in greater instability and the likelihood of developing additional problems in the ankle.

Diagnosis

In evaluating and diagnosing your condition, the foot and ankle surgeon will ask you about any previous ankle injuries and instability. Then he or she will examine your ankle to check for tender areas, signs of swelling, and instability of your ankle as shown in the illustration. X-rays or other imaging studies may be helpful in further evaluating the ankle.

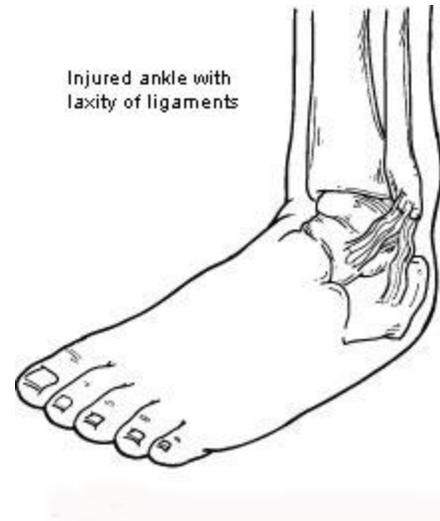


Examination technique:
Chronic lateral ankle instability

Non-Surgical Treatment

Treatment for chronic ankle instability is based on the results of the examination and tests, as well as on the patient's level of activity. Non-surgical treatment may include:

- **Physical therapy.** Physical therapy involves various treatments and exercises to strengthen the ankle, improve balance and range of motion, and retrain your muscles. As you progress through rehabilitation, you may also receive training that relates specifically to your activities or sport.
- **Bracing.** Some patients wear an ankle brace to gain support for the ankle and keep the ankle from turning. Bracing also helps prevent additional ankle sprains.
- **Medications.** Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, may be prescribed to reduce pain and inflammation.



When Is Surgery Needed?

In some cases, the foot and ankle surgeon will recommend surgery based on the degree of instability or lack of response to non-surgical approaches. Surgery usually involves repair or reconstruction of the damaged ligament(s). The surgeon will select the surgical procedure best suited for your case based on the severity of the instability and your activity level. The length of the recovery period will vary, depending on the procedure or procedures performed.

Cold Feet

Cold feet are most commonly a result of medical conditions that cause poor blood flow in the legs or feet, such as peripheral vascular disease (PVD), a blockage or narrowing of the arteries, Raynauds's phenomenon (cold sensitivity which causes a spasm of the blood vessels), and heart disease. Some medications which cause constriction of blood vessels can also lead to cold feet or limbs. Beta blockers for high blood pressure, ergotamine medications for migraine headaches, and cold medications that contain pseudoephedrine may all cause this problem.

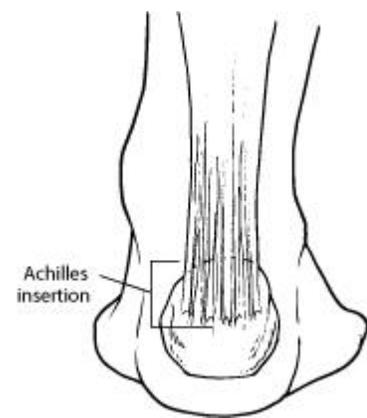
Other potential causes of **cold feet** include hormonal abnormalities such as hypothyroidism and adrenal insufficiency, nerve disorders such as peripheral neuropathy and fibromyalgia, and autoimmune disorders (lupus, scleroderma).

Because there is such a wide range of causes for **cold feet**, it is important to see a foot and ankle surgeon for diagnosis and treatment.

Common Disorders of the Achilles Tendon

What Is the Achilles Tendon?

A tendon is a band of tissue that connects a muscle to a bone. The Achilles tendon runs down the back of the lower leg and connects the calf muscle to the heel bone. Also called the "heel cord," the Achilles tendon facilitates walking by helping to raise the heel off the ground.



Achilles Tendonitis and Achilles Tendonosis

Two common disorders that occur in the heel cord are Achilles tendonitis and Achilles tendonosis.

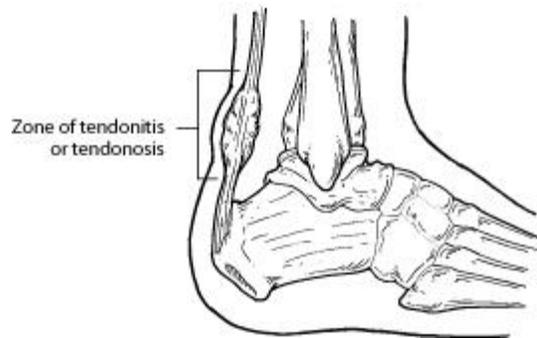
Achilles tendonitis is an inflammation of the Achilles tendon. This inflammation is typically short-lived. Over time, if not resolved, the condition may progress to a degeneration of the tendon (Achilles tendonosis), in which the tendon loses its organized structure and is likely to develop microscopic tears. Sometimes the degeneration involves the site where the Achilles tendon attaches to the heel bone. In rare cases, chronic degeneration with or without pain may result in rupture of the tendon.

Causes

As “overuse” disorders, Achilles tendonitis and tendonosis are usually caused by a sudden increase of a repetitive activity involving the Achilles tendon. Such activity puts too much stress on the tendon too quickly, leading to micro-injury of the tendon fibers. Due to this ongoing stress on the tendon, the body is unable to repair the injured tissue. The structure of the tendon is then altered, resulting in continued pain.

Athletes are at high risk for developing disorders of the Achilles tendon. Achilles tendonitis and tendonosis are also common in individuals whose work puts stress on their ankles and feet, such as laborers, as well as in “weekend warriors”—those who are less conditioned and participate in athletics only on weekends or infrequently.

In addition, people with excessive pronation (flattening of the arch) have a tendency to develop Achilles tendonitis and tendonosis due to the greater demands placed on the tendon when walking. If these individuals wear shoes without adequate stability, their over-pronation could further aggravate the Achilles tendon.



Symptoms

The symptoms associated with Achilles tendonitis and tendonosis include:

- Pain—aching, stiffness, soreness, or tenderness—within the tendon. This may occur anywhere along the tendon’s path, beginning with the tendon’s attachment directly above the heel upward to the region just below the calf muscle. Often pain appears upon arising in the morning or after periods of rest, then improves somewhat with motion but later worsens with increased activity.
- Tenderness, or sometimes intense pain, when the sides of the tendon are squeezed. There is less tenderness, however, when pressing directly on the back of the tendon.
- When the disorder progresses to degeneration, the tendon may become enlarged and may develop nodules in the area where the tissue is damaged.

Diagnosis

In diagnosing Achilles tendonitis or tendonosis, the surgeon will examine the patient’s foot and ankle and evaluate the range of motion and condition of the tendon. The extent of the condition can be further assessed with x-rays or other imaging modalities.

Treatment

Treatment approaches for Achilles tendonitis or tendonosis are selected on the basis of how long the injury has been present and the degree of damage to the tendon. In the early stage, when there is sudden (acute) inflammation, one or more of the following options may be recommended:

- **Immobilization.** Immobilization may involve the use of a cast or removable walking boot to reduce forces through the Achilles tendon and promote healing.

- **Ice.** To reduce swelling due to inflammation, apply a bag of ice over a thin towel to the affected area for 20 minutes of each waking hour. Do not put ice directly against the skin.
- **Oral medications.** Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, may be helpful in reducing the pain and inflammation in the early stage of the condition.
- **Orthotics.** For those with over-pronation or gait abnormalities, custom orthotic devices may be prescribed.
- **Night splints.** Night splints help to maintain a stretch in the Achilles tendon during sleep.
- **Physical therapy.** Physical therapy may include strengthening exercises, soft-tissue massage/mobilization, gait and running re-education, stretching, and ultrasound therapy.

When is Surgery Needed?

If non-surgical approaches fail to restore the tendon to its normal condition, surgery may be necessary. The foot and ankle surgeon will select the best procedure to repair the tendon, based upon the extent of the injury, the patient's age and activity level, and other factors.

Prevention

To prevent Achilles tendonitis or tendonosis from recurring after surgical or non-surgical treatment, the foot and ankle surgeon may recommend strengthening and stretching of the calf muscles through daily exercises. Wearing proper shoes for the foot type and activity is also important in preventing recurrence of the condition.

Contact Dermatitis

Contact dermatitis of the foot is an inflammation of the skin in response to an irritant. This irritant is something with which the foot has come into contact, such as materials and chemicals with which shoes are made, poison ivy or harsh chemicals.

When the skin of the foot comes into contact with the substance, an allergic response is initiated. Symptoms, including redness, itchiness, and small blisters, usually occur within 24 hours of exposure to the irritant. The symptoms should be evaluated by a foot and ankle surgeon for proper diagnosis and treatment.

Corns

A "**corn**" is a small circular thickened lesion in the skin of the foot. It usually forms due to repeated pressure on the skin, such as the rubbing of a shoe. The name "corn" comes from its resemblance to a kernel of corn. A corn is different from a callus in that it has a central core of hard material.

People with foot deformities, such as hammertoes, often suffer from corns because the tops of the bent toes rub against the tops of shoes.

There are a number of treatment options for corns. When corns get hard enough to cause pain, a foot and ankle surgeon will recommend the treatment option most appropriate for you. However, if the underlying cause of the corn is not treated or removed, the corn may return. It is important to avoid trying to remove a corn at home or using medicated corn pads, as serious infection may occur.

Cracked Heels

There are many potential causes of "**cracked heels**." Dry skin (xerosis) is common and can get worse with wearing open-back shoes, increased weight, or increased friction from the back of shoes. Dry cracking skin can also be a subtle sign of more significant problems, such as diabetes or loss of nerve function (autonomic neuropathy).

Heels should be kept well moisturized with a cream to help reduce the cracking. If an open sore is noted, make an appointment with a foot and ankle surgeon for evaluation and treatment.

Custom Orthotic Devices

These medical devices, custom made by a foot and ankle surgeon, are placed inside of shoes to maintain the correct and aligned position of the foot. Custom orthotic devices are created from impressions or images of the individual patient's foot. The devices may need to be adjusted for proper fit after a break-in period.

Deep Vein Thrombosis

What is Deep Vein Thrombosis?

The blood supply of the leg is transported by arteries and veins. The arteries carry blood from the heart to the limbs; veins carry blood back to the heart. The leg contains superficial veins, which are close to the surface, and deep veins, which lie much deeper in the leg. Deep vein thrombosis (DVT) is a condition in which a blood clot (a blockage) forms in a deep vein. While these clots most commonly occur in the veins of the leg (the calf or thigh), they can also develop in other parts of the body.

DVT can be very dangerous and is considered a medical emergency. If the clot (also known as a thrombus) breaks loose and travels through the bloodstream, it can lodge in the lung. This blockage in the lung, called a pulmonary embolism, can make it difficult to breathe and may even cause death. Blood clots in the thigh are more likely to cause a pulmonary embolism than those in the calf.

Risk Factors for DVT:

Blood or vein conditions:

- Previous DVT
- Varicose veins
- Blood clotting disorders
- Family history of DVT or blood-clotting disorders

Other medical conditions:

- Heart disease
- Chronic swelling of the legs

Causes of DVT

Many factors can contribute to the formation of a DVT. The more risk factors a person has, the greater their risk of having a DVT. However, even people without these risk factors can form a DVT.

Signs and Symptoms of DVT in the Leg

Some people with DVT in the leg have either no warning signs at all or very vague symptoms. If any of the following warning signs or symptoms are present, it is important to see a doctor for evaluation:

- Swelling in the leg
- Pain in the calf or thigh
- Warmth and redness of the leg

Diagnosis

DVT can be difficult to diagnose, especially if the patient has no symptoms. Diagnosis is also challenging because of the similarities between symptoms of DVT and those of other conditions such as a pulled muscle, an infection, a clot in a superficial vein (thrombophlebitis), a fracture, and arthritis.

If DVT is suspected, the doctor will immediately send the patient to a vascular laboratory or a hospital for testing, which may include a blood test, Doppler ultrasound, venogram, MRI, or angiogram.

Treatment of DVT

If tests indicate a clot is present, the doctor will make a recommendation regarding treatment. Depending on the location of the clot, the patient may need hospitalization. Medical or surgical care will be managed by a team of physicians which may include a primary care physician, internist, vascular (blood vessel) surgeon, or hematologist (blood disease specialist).

Treatment may include:

- **Medication.** A blood-thinning medication is usually prescribed to help prevent additional clots from forming.
- **Compression stockings.** Wearing fitted hosiery decreases pain and swelling.
- **Surgery.** A surgical procedure performed by a vascular specialist may be required.

Complications of DVT

An early and extremely serious complication of DVT is a pulmonary embolism. A pulmonary embolism develops if the clot breaks loose and travels to the lung. Symptoms of a pulmonary embolism include:

- Shortness of breath
- Chest pain
- Coughing up blood
- A feeling of impending doom

A long-term consequence of DVT is damage to the vein from the clot. This damage often results in persistent swelling, pain and discoloration of the leg.

Preventative Measures

For those who have risk factors for DVT, these strategies may reduce the likelihood of developing a blood clot:

- Take blood-thinning medication, if prescribed.
- Reduce risk factors that can be changed. For example, stop smoking and lose excess weight.

- Obesity
- Inflammatory bowel disease
- Cancer
- Dehydration
- Sepsis

Women's Health issues:

- Hormone replacement therapy
- Birth control pills containing estrogen
- Pregnancy or recent childbirth

Other:

- Age over 40 years old
- Immobility (through inactivity or from wearing a cast)
- Recent surgery
- Trauma (an injury)
- Smoking

- During periods of prolonged immobility, such as on long trips.
 - Exercise legs every 2 to 3 hours to get the blood flowing back to the heart. Walk up and down the aisle of a plane or train, rotate ankles while sitting, and take regular breaks on road trips.
 - Stay hydrated by drinking plenty of fluids; avoid alcohol and caffeine.
 - Consider wearing compression stockings.

Diabetic Complications and Amputation Prevention

People with diabetes are prone to having foot problems, often because of two complications of diabetes: nerve damage (neuropathy) and poor circulation. Neuropathy causes loss of feeling in your feet, taking away your ability to feel pain and discomfort, so you may not detect an injury or irritation. Poor circulation in your feet reduces your ability to heal, making it hard for even a tiny cut to resist infection.

Having diabetes increases the risk of developing a wide range of foot problems. Furthermore, with diabetes, small foot problems can turn into serious complications.

Diabetes-related Foot and Leg Problems

- **Infections and ulcers (sores) that don't heal.** An ulcer is a sore in the skin that may go all the way to the bone. Because of poor circulation and neuropathy in the feet, cuts or blisters can easily turn into ulcers that become infected and won't heal. This is a common – and serious – complication of diabetes and can lead to a loss of your foot, your leg, or your life.
- **Corns and calluses.** When neuropathy is present, you can't tell if your shoes are causing pressure and producing corns or calluses. Corns and calluses must be properly treated or they can develop into ulcers.
- **Dry, cracked skin.** Poor circulation and neuropathy can make your skin dry. This may seem harmless, but dry skin can result in cracks that may become sores and can lead to infection.
- **Nail disorders.** Ingrown toenails (which curve into the skin on the sides of the nail) and fungal infections can go unnoticed because of loss of feeling. If they are not properly treated, they can lead to infection.
- **Hammertoes and bunions.** Nerve damage affecting muscles can cause muscle weakness and loss of tone in the feet, resulting in hammertoes and bunions. If left untreated, these deformities can cause ulcers.
- **Charcot foot.** This is a complex foot deformity. It develops as a result of loss of sensation and an undetected broken bone that leads to destruction of the soft tissue of the foot. Because of neuropathy, the pain of the fracture goes unnoticed and the patient continues to walk on the broken bone, making it worse. This disabling complication is so severe that surgery, and occasionally amputation, may become necessary.
- **Poor blood flow.** In diabetes, the blood vessels below the knee often become narrow and restrict blood flow. This prevents wounds from healing and may cause tissue death.

What Your Foot and Ankle Surgeon Can Do

Your foot and ankle surgeon can help wounds heal, preventing amputation. There are many new surgical techniques available to save feet and legs, including joint reconstruction and wound healing technologies. Getting regular foot checkups and seeking immediate help when you notice something can keep small problems from worsening. Your foot and ankle surgeon works together with other health care providers to prevent and treat complications from diabetes.

Your Proactive Measures

You play a vital role in reducing complications. Follow these guidelines and contact your foot and ankle surgeon if you notice any problems:

- **Inspect your feet daily.** If your eyesight is poor, have someone else do it for you. Inspect for:

- *Skin or nail problems:* Look for cuts, scrapes, redness, drainage, swelling, bad odor, rash, discoloration, loss of hair on toes, injuries, or nail changes (deformed, striped, yellowed or discolored, thickened, or not growing).
- *Signs of fracture:* If your foot is swollen, red, hot, or has changed in size, shape, or direction, see your foot and ankle surgeon immediately.
- **Don't ignore leg pain.** Pain in the leg that occurs at night or with a little activity could mean you have a blocked artery. Seek care immediately.
- **Nail cutting.** If you have any nail problems, hard nails, or reduced feeling in your feet, your toenails should be properly trimmed.
- **No "bathroom surgery."** Never trim calluses or corns yourself, and don't use over-the-counter *medicated* pads.
- **Keep floors free of sharp objects.** Make sure there are no needles, insulin syringes, or other sharp objects on the floor.
- **Don't go barefoot.** Wear shoes, indoors and outdoors.
- **Check shoes and socks.** Shake out your shoes before putting them on. Make sure your socks aren't bunched up.
- **Have your circulation and sense of feeling tested.** Your foot and ankle surgeon will perform tests to see if you've lost any feeling or circulation.

When Is Amputation Necessary?

Even with preventative care and prompt treatment of infection and complications, there are instances when amputation is necessary to remove infected tissue, save a limb, or even save a life.

Diabetic Foot Care Guidelines

Diabetes can be dangerous to your feet – even a small cut can produce serious consequences. Diabetes may cause nerve damage that takes away the feeling in your feet. Diabetes may also reduce blood flow to the feet, making it harder to heal an injury or resist infection. Because of these problems, you may not notice a foreign object in your shoe. As a result you could develop a blister or a sore. This could lead to an infection or a non-healing wound that could put you at risk for an amputation.

To avoid serious foot problems that could result in losing a toe, foot, or leg, follow these guidelines.

Inspect your feet daily. Check for cuts, blisters, redness, swelling, or nail problems. Use a magnifying hand mirror to look at the bottom of your feet. Call your doctor if you notice anything.

Wash your feet in lukewarm (not hot!) water. Keep your feet clean by washing them daily. Use only *lukewarm* water – the temperature you would use on a newborn baby.

Be gentle when bathing your feet. Wash them using a soft washcloth or sponge. Dry by blotting or patting, and carefully dry between the toes.

Moisturize your feet – but not between your toes. Use a moisturizer daily to keep dry skin from itching or cracking. But DON'T moisturize between the toes – that could encourage a fungal infection.

Cut nails carefully. Cut them straight across and file the edges. Don't cut nails too short, as this could lead to ingrown toe nails. If you have concerns about your nails, consult your doctor.

Never treat corns or calluses yourself. No “bathroom surgery” or medicated pads. Visit your doctor for appropriate treatment.

Wear clean, dry socks. Change them daily.

Avoid the wrong type of socks. Avoid tight elastic bands (they reduce circulation). Don’t wear thick or bulky socks (they can fit poorly and irritate the skin).

Wear socks to bed. If your feet get cold at night, wear socks. NEVER use a heating pad or hot water bottle.

Shake out your shoes and feel the inside before wearing. Remember, your feet may not be able to feel a pebble or other foreign object, so always inspect your shoes before putting them on.

Keep your feet warm and dry. Don’t let your feet get wet in snow or rain. Wear warm socks and shoes in winter.

Never walk barefoot. Not even at home! Always wear shoes or slippers. You could step on something and get a scratch or cut.

Take care of your diabetes. Keep your blood sugar levels under control.

Don’t smoke. Smoking restricts blood flow in your feet.

Get periodic foot exams. Seeing your foot and ankle surgeon on a regular basis can help prevent the foot complications of diabetes.

Diabetic Peripheral Neuropathy

What is Diabetic Peripheral Neuropathy?

Diabetic neuropathy is nerve damage caused by diabetes. When it affects the arms, hands, legs and feet it is known as diabetic peripheral neuropathy. Diabetic peripheral neuropathy is different from peripheral arterial disease (poor circulation), which affects the blood vessels rather than the nerves.

Three different groups of nerves can be affected by diabetic neuropathy:

- *Sensory* nerves, which enable people to feel pain, temperature, and other sensations
- *Motor* nerves, which control the muscles and give them their strength and tone
- *Autonomic* nerves, which allow the body to perform certain involuntary functions, such as sweating.

Diabetic peripheral neuropathy doesn’t emerge overnight. Instead, it usually develops slowly and worsens over time. Some patients have this condition long before they are diagnosed with diabetes. Having diabetes for several years may increase the likelihood of having diabetic neuropathy.

The loss of sensation and other problems associated with nerve damage make a patient prone to developing skin ulcers (open sores) that can become infected and may not heal. This serious complication of diabetes can lead to loss of a foot, a leg, or even a life.

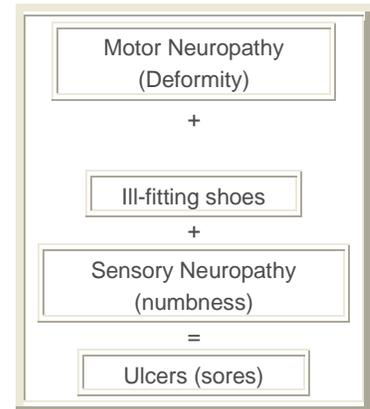
Causes

The nerve damage that characterizes diabetic peripheral neuropathy is more common in patients with poorly managed

diabetes. However, even diabetic patients who have excellent blood sugar (glucose) control can develop diabetic neuropathy. There are several theories as to why this occurs, including the possibilities that high blood glucose or constricted blood vessels produce damage to the nerves.

As diabetic peripheral neuropathy progresses, various nerves are affected. These damaged nerves can cause problems that encourage development of ulcers. For example:

- Deformities (such as bunions or hammertoes) resulting from motor neuropathy may cause shoes to rub against toes, creating a sore. The numbness caused by sensory neuropathy can make the patient unaware that this is happening.
- Because of numbness, a patient may not realize that he or she has stepped on a small object and cut the skin.
- Cracked skin caused by autonomic neuropathy, combined with sensory neuropathy's numbness and problems associated with motor neuropathy can lead to developing a sore.



Symptoms

Depending on the type(s) of nerves involved, one or more symptoms may be present in diabetic peripheral neuropathy.

For *sensory neuropathy*:

- Numbness or tingling in the feet
- Pain or discomfort in the feet or legs, including prickly, sharp pain or burning feet

For *motor neuropathy*:

- Muscle weakness and loss of muscle tone in the feet and lower legs
- Loss of balance
- Changes in foot shape that can lead to areas of increased pressure

For *autonomic neuropathy*:

- Dry feet
- Cracked skin

Diagnosis

To diagnose diabetic peripheral neuropathy, the foot and ankle surgeon will obtain the patient's history of symptoms and will perform simple in-office tests on the feet and legs. This evaluation may include assessment of the patient's reflexes, ability to feel light touch, and ability to feel vibration. In some cases, additional neurologic tests may be ordered.

Treatment

First and foremost, treatment of diabetic peripheral neuropathy centers on control of the patient's blood sugar level. In addition, various options are used to treat the painful symptoms.

Medications are available to help relieve specific symptoms, such as tingling or burning. Sometimes a combination of different medications is used.

In some cases, the patient may also undergo physical therapy to help reduce balance problems or other symptoms.

Prevention

The patient plays a vital role in minimizing the risk of developing diabetic peripheral neuropathy and in preventing its possible consequences. Some important preventive measures include:

- Keep blood sugar levels under control.
- Wear well-fitting shoes to avoid getting sores.
- Inspect your feet every day. If you notice any cuts, redness, blisters, or swelling, see your foot and ankle surgeon right away. This can prevent problems from becoming worse.
- Visit your foot and ankle surgeon on a regular basis for an examination to help prevent the foot complications of diabetes.
- Have periodic visits with your primary care physician or endocrinologist. The foot and ankle surgeon works together with these and other providers to prevent and treat complications from diabetes.

Diabetic Shoes

Shoes for diabetic patients are made of special protective inserts and soft shoe materials to accommodate for conditions such as neuropathy (numb feet), poor circulation, and foot deformities (bunions, hammertoes, etc.). The shoes decrease the chance of foot sores (ulcers) which can be caused by friction and pressure. This may lead to infection, gangrene, or even amputation.

The foot and ankle surgeon may measure the diabetic patient's foot and have the shoes made at a specialty laboratory. In some cases he/she will give the patient a prescription to have the shoes custom-made.

Eczema of the Foot

Eczema is a general term that includes many conditions that cause inflammation of the skin. The symptoms of eczema vary, but generally appear as dry, red, extremely itchy patches of skin. Small blisters may sometimes form.

Eczema can occur on any part of the body including the foot. It occurs in both children and adults and is not contagious. There is no known cause for eczema, but it often affects people with a family history of allergies.

Although there is no cure for this disease, treatments make it very manageable. The most helpful treatment is to prevent scratching. Cold compresses can be applied to help reduce itching. Lotions and creams are often used to help keep the skin as moist as possible. Corticosteroid creams can also be used to help reduce inflammation. The first step in effective treatment of eczema is a correct diagnosis. After examination and diagnosis, a foot and ankle surgeon can recommend the best treatment for you or your child.

Equinus

What is Equinus?

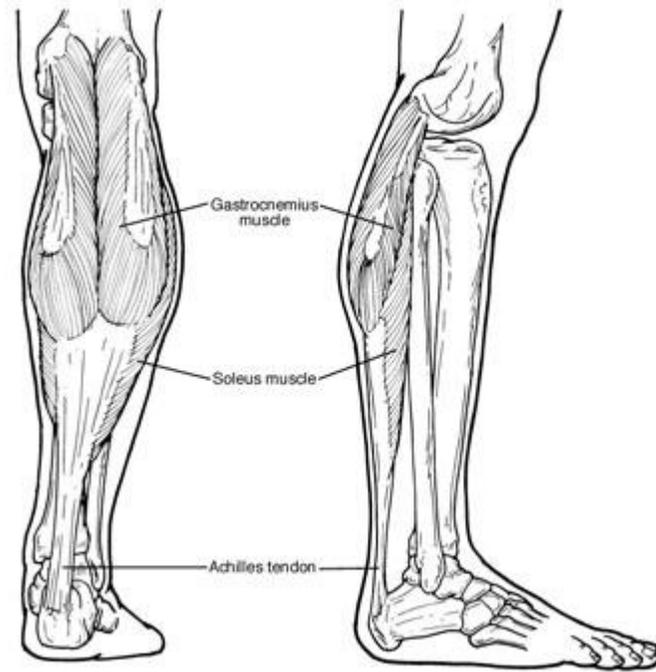
Equinus is a condition in which the upward bending motion of the ankle joint is limited. Someone with equinus lacks the

flexibility to bring the top of the foot toward the front of the leg. Equinus can occur in one or both feet. When it involves both feet, the limitation of motion is sometimes worse in one foot than in the other.

People with equinus develop ways to "compensate" for their limited ankle motion, and this often leads to other foot, leg, or back problems. The most common methods of compensation are flattening of the arch or picking up the heel early when walking, placing increased pressure on the ball of the foot. Other patients compensate by "toe walking," while a smaller number take steps by bending abnormally at the hip or knee.

Causes

There are several possible causes for the limited range of ankle motion. Often it is due to tightness in the Achilles tendon or calf muscles (the soleus muscle and/or gastrocnemius muscle). In some patients, this tightness is congenital (present at birth) and sometimes it is an inherited trait. Other patients acquire the tightness from being in a cast, being on crutches, or frequently wearing high-heeled shoes. In addition, diabetes can affect the fibers of the Achilles tendon and cause tightness.



Sometimes equinus is related to a bone blocking the ankle motion. For example, a fragment of a broken bone following an ankle injury, or bone block, can get in the way and restrict motion.

Equinus may also result from one leg being shorter than the other.

Less often, equinus is caused by spasms in the calf muscle. These spasms may be signs of an underlying neurologic disorder.

Foot Problems Related to Equinus

Depending on how a patient compensates for the inability to bend properly at the ankle, a variety of foot conditions can develop, including:

- Plantar fasciitis (arch/heel pain)
- Calf cramping
- Tendonitis (inflammation in the Achilles tendon)
- Metatarsalgia (pain and/or callusing on the ball of the foot)
- Flatfoot
- Arthritis of the midfoot (middle area of the foot)
- Pressure sores on the ball of the foot or the arch
- Bunions and hammertoes
- Ankle pain
- Shin splints

Diagnosis

Most patients with equinus are unaware they have this condition when they first visit the doctor. Instead, they come to the doctor seeking relief for foot problems associated with equinus.

To diagnose equinus, the foot and ankle surgeon will evaluate the ankle's range of motion when the knee is flexed (bent) as well as extended (straightened). This enables the surgeon to identify whether the tendon or muscle is tight and to assess whether bone is interfering with ankle motion. X-rays may also be ordered. In some cases, the foot and ankle surgeon may refer the patient for neurologic evaluation.

Non-Surgical Treatment

Treatment includes strategies aimed at relieving the symptoms and conditions associated with equinus. In addition, the patient is treated for the equinus itself through one or more of the following options:

- **Night splint.** The foot may be placed in a splint at night to keep it in a position that helps reduce tightness of the calf muscle.
- **Heel lifts.** Placing heel lifts inside the shoes or wearing shoes with a moderate heel takes stress off the Achilles tendon when walking and may reduce symptoms.
- **Arch supports or orthotic devices.** Custom orthotic devices that fit into the shoe are often prescribed to keep weight distributed properly and to help control muscle/tendon imbalance.
- **Physical therapy.** To help remedy muscle tightness, exercises that stretch the calf muscle(s) are recommended.

When is Surgery Needed?

In some cases, surgery may be needed to correct the cause of equinus if it is related to a tight tendon or a bone blocking the ankle motion. The foot and ankle surgeon will determine the type of procedure that is best suited to the individual patient.

Extra Bones

There are 26 bones in the human foot. Some people have “**extra bones**” (accessory ossicles) which are usually congenital (present at birth) but may also be due to previous trauma. These extra bones, which can occur with any bone in the foot, can be painless (asymptomatic) and are only noticed when the foot is x-rayed. Sometimes they are painful and cause significant discomfort. This pain can usually be treated by the foot and ankle surgeon using a variety of non-surgical measures, although sometimes the extra bones may need to be surgically removed.

Fallen Arches

"Fallen arches" is a common term used to describe a flatfoot condition that develops during adulthood. This should not be confused with other causes of flatfoot that may develop during childhood or adolescence.

Most cases of “fallen arches” develop when the main arch-supporting tendon (the posterior tibial tendon) becomes weakened or injured, causing the arch to gradually become lower. With time, the shape of the foot changes and secondary symptoms start to appear.

Common problems associated with fallen arches include plantar fasciitis, tendonitis, increased fatigue, and arthritis of the foot and ankle.

Flexible Flatfoot

What Is Flatfoot?

Flatfoot is often a complex disorder, with diverse symptoms and varying degrees of deformity and disability. There are several types of flatfoot, all of which have one characteristic in common: partial or total collapse (loss) of the arch.

Other characteristics shared by most types of flatfoot include:

- “Toe drift,” in which the toes and front part of the foot point outward
- The heel tilts toward the outside and the ankle appears to turn in
- A tight Achilles tendon, which causes the heel to lift off the ground earlier when walking and may make the problem worse
- Bunions and hammertoes may develop as a result of a flatfoot.



Flexible Flatfoot

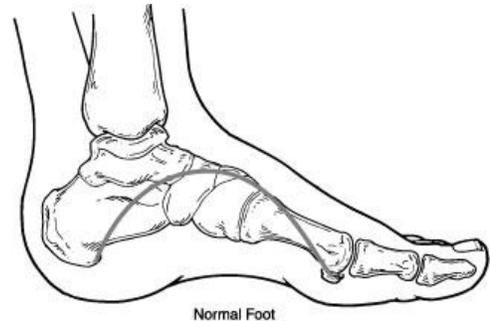
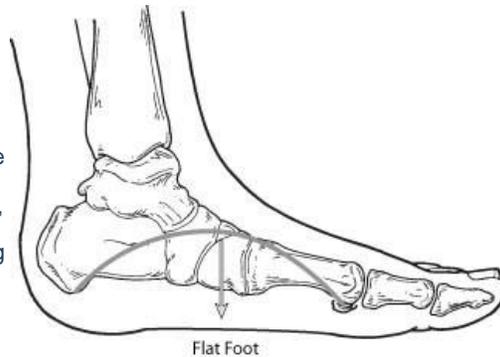
Flexible flatfoot is one of the most common types of flatfoot. It typically begins in childhood or adolescence and continues into adulthood. It usually occurs in both feet and progresses in severity throughout the adult years. As the deformity worsens, the soft tissues (tendons and ligaments) of the arch may stretch or tear and can become inflamed.

The term “flexible” means that while the foot is flat when standing (weight-bearing), the arch returns when not standing.

Symptoms

Symptoms, which may include:

- Pain in the outside of
- “Rolled-in”
- Pain along
- General leg
- Low back,



occur in some persons with flexible flatfoot,

heel, arch, ankle, or along the the foot
ankle (over-pronation)
the shin bone (shin splint)
aching or fatigue in the foot or
hip or knee pain.

Diagnosis

In diagnosing flatfoot, the foot and ankle surgeon examines the foot and observes how it looks when you stand and sit. X-rays are usually taken to determine the severity of the disorder. If you are diagnosed with flexible flatfoot but you don’t have any symptoms, your surgeon will explain what you might expect in the future.

Non-surgical Treatment

If you experience symptoms with flexible flatfoot, the surgeon may recommend non-surgical treatment options, including:

- **Activity modifications.** Cut down on activities that bring you pain and avoid prolonged walking and standing to give your arches a rest.
- **Weight loss.** If you are overweight, try to lose weight. Putting too much weight on your arches may aggravate your symptoms.
- **Orthotic devices.** Your foot and ankle surgeon can provide you with custom orthotic devices for your shoes to give more support to the arches.

- **Immobilization.** In some cases, it may be necessary to use a walking cast or to completely avoid weight-bearing.
- **Medications.** Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, help reduce pain and inflammation.
- **Physical therapy.** Ultrasound therapy or other physical therapy modalities may be used to provide temporary relief.
- **Shoe modifications.** Wearing shoes that support the arches is important for anyone who has flatfoot.

When is Surgery Necessary?

In some patients whose pain is not adequately relieved by other treatments, surgery may be considered. A variety of surgical techniques is available to correct flexible flatfoot, and one or a combination of procedures may be required to relieve the symptoms and improve foot function.

In selecting the procedure or combination of procedures for your particular case, the foot and ankle surgeon will take into consideration the extent of your deformity based on the x-ray findings, your age, your activity level, and other factors. The length of the recovery period will vary, depending on the procedure or procedures performed.

Foot Bumps

Foot bumps are boney projections that can occur anywhere on the foot. They can be a natural enlargement of a foot bone, or they can be an extra bone. They can be asymptomatic (without pain) or symptomatic (painful). If they are not painful, they can usually be accommodated by shoe gear. Painful foot bumps can be treated by the foot and ankle surgeon using a variety of conservative treatments. In some cases, surgery may be necessary.

Foot Fracture

There are 26 bones in the foot. These bones support our weight and allow us to walk and run. Certain activities or injuries can cause a **fracture**, or “break,” in one or more of these bones. Pain, swelling, redness, and even bruising are signs of a possible fracture. Fractures of the foot can be diagnosed by x-rays or other studies. A foot and ankle surgeon can determine the best treatment course. Often rest, icing, and immobilization are the treatments; however surgery is sometimes necessary to repair the fracture.

Foot Lumps

Foot lumps are soft tissue masses (not bone) that can occur anywhere on the foot. They can be caused by soft tissue swelling, sacs of fluid, fatty tissue, and nerve, vessel or muscle enlargements. Foot lumps may be without pain (asymptomatic) or they can cause pain and affect the function of the foot. Painful foot lumps can be treated by the foot and ankle surgeon using a variety of conservative treatments. In some cases, surgery may be necessary.

Foot Odor

Foot odor is a common condition in children and adults who wear shoes on a daily basis. People with smelly feet may also suffer from sweaty feet. Most people with this condition will have sweaty and smelly feet year round, not just in the hot summer months. The odor is produced by bacteria and/or fungus that grows in the shoes and attaches to the skin. Some bacteria actually eat away the top layer of the skin, producing a foul odor. Hygiene is very important to help prevent smelly feet. Feet should be washed daily with soap and water and clean dry socks worn. Some synthetic materials used in shoes, when mixed with sweat and bacteria, can produce smelly feet. The foot and ankle surgeon will recommend one of a variety of treatments for this condition.

Foot Rash

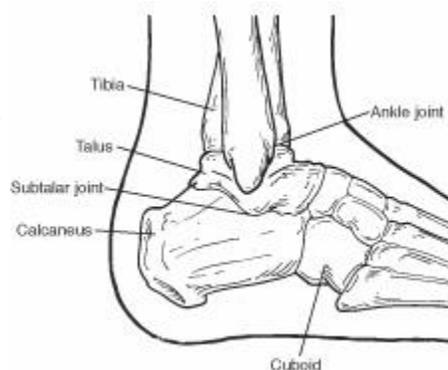
A **rash on the foot** can have a variety of causes. It may be a form of eczema, which is usually very itchy. It also may be an allergic reaction to something with which your feet have come into contact, such as materials in your shoe or poison ivy. Another common reason for a foot rash is athlete's foot, which is caused by a fungal infection. Only by having the rash examined will you be able to get a precise diagnosis. A foot and ankle surgeon will determine the cause of your rash and provide appropriate treatment.

Fractures of the Calcaneus (Heel Bone Fractures)

What is the Calcaneus?

The calcaneus, also called the heel bone, is a large bone that forms the foundation of the rear part of the foot. The calcaneus connects with the talus and cuboid bones. The connection between the talus and calcaneus forms the subtalar joint. This joint is important for normal foot function.

The calcaneus is often compared to a hard boiled egg, because it has a thin, hard shell on the outside and softer, spongy bone on the inside. When the outer shell is broken, the bone tends to collapse and become fragmented. For this reason, calcaneal fractures are severe injuries. Furthermore, if the fracture involves the joints, there is the potential for long-term consequences such as arthritis and chronic pain.

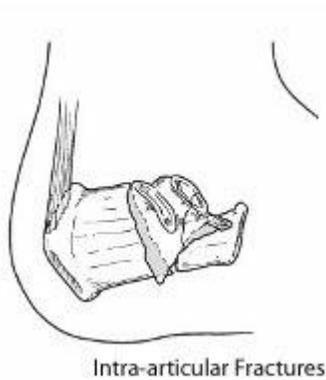


How do Calcaneal Fractures Occur?

Most calcaneal fractures are the result of a traumatic event—most commonly, falling from a height, such as a ladder, or being in an automobile accident where the heel is crushed against the floorboard. Calcaneal fractures can also occur with other types of injuries, such as an ankle sprain. A smaller number of calcaneal fractures are stress fractures, caused by overuse or repetitive stress on the heel bone.

Types of Calcaneal Fractures

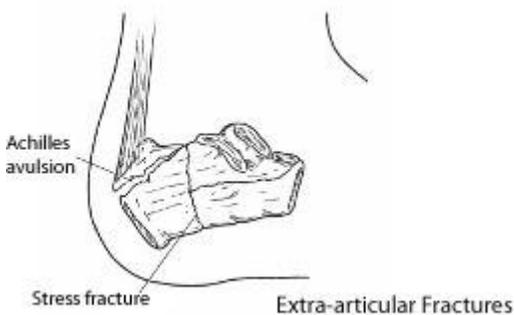
Fractures of the calcaneus may or may not involve the subtalar and surrounding joints. Fractures involving the joints (intra-articular fractures) are the most severe calcaneal fractures, and include damage to the cartilage (the connective tissue between two bones). The outlook for recovery depends on how severely the calcaneus was crushed at the time of injury.



Fractures that don't involve the joint (extra-articular fractures) include:

- Those caused by trauma, such as avulsion fractures (in which a piece of bone is pulled off of the calcaneus by the Achilles tendon or a ligament) or crush injuries resulting in multiple fracture fragments
- Stress fractures, caused by overuse or mild injury.

The severity and treatment of extra-articular fractures depend on their location and size.



Signs and Symptoms

Calcaneal fractures produce different signs and symptoms, depending on whether they are traumatic or stress fractures.

The signs and symptoms of traumatic fractures may include:

- Sudden pain in the heel and inability to bear weight on that foot
- Swelling in the heel area
- Bruising of the heel and ankle

The signs and symptoms of stress fractures may include:

- Generalized pain in the heel area that usually develops slowly (over several days to weeks)
- Swelling in the heel area

Diagnosis

To diagnose and evaluate a calcaneal fracture, the foot and ankle surgeon will ask questions about how the injury occurred, examine the affected foot and ankle, and order x-rays. In addition, advanced imaging tests are commonly required.

Treatment

Treatment of calcaneal fractures is dictated by the type of fracture and extent of the injury. The foot and ankle surgeon will discuss with the patient the best treatment—whether surgical or non-surgical—for the fracture.

For some fractures, non-surgical treatments may be used. These include:

- **Rest, ice, compression, and elevation (R.I.C.E.)** Rest (staying off the injured foot) is needed to allow the fracture to heal. Ice reduces swelling and pain; apply a bag of ice covered with a thin towel to the affected area. Compression (wrapping the foot in an elastic bandage or wearing a compression stocking) and elevation (keeping the foot even with or slightly above the heart level) also reduce the swelling.
- **Immobilization.** Sometimes the foot is placed in a cast or cast boot to keep the fractured bone from moving. Crutches may be needed to avoid weightbearing.

For traumatic fractures, treatment often involves surgery to reconstruct the joint, or in severe cases, to fuse the joint. The surgeon will choose the best surgical approach for the patient.

Rehabilitation

Whether the treatment for a calcaneal fracture has been surgical or non-surgical, physical therapy often plays a key role in regaining strength and restoring function.

Complications of Calcaneal Fractures

Calcaneal fractures can be serious injuries that may produce lifelong problems. Arthritis, stiffness, and pain in the joint frequently develop. Sometimes the fractured bone fails to heal in the proper position. Other possible long-term consequences of calcaneal fractures are decreased ankle motion and walking with a limp due to collapse of the heel bone and loss of length in the leg. Patients often require additional surgery and/or long term or permanent use of a brace or an orthotic device (arch support) to help manage these complications.

Fractures of the Fifth Metatarsal

What is a Fifth Metatarsal Fracture?

Fractures (breaks) are common in the fifth metatarsal – the long bone on the outside of the foot that connects to the little toe. Two types of fractures that often occur in the fifth metatarsal are:

- **Avulsion fracture.** In an avulsion fracture, a small piece of bone is pulled off the main portion of the bone by a tendon or ligament. This type of fracture is the result of an injury in which the ankle rolls. Avulsion fractures are often overlooked when they occur with an ankle sprain.
- **Jones fracture.** Jones fractures occur in a small area of the fifth metatarsal that receives less blood and is therefore more prone to difficulties in healing. A Jones fracture can be either a stress fracture (a tiny hairline break that occurs over time) or an acute (sudden) break. Jones fractures are caused by overuse, repetitive stress, or trauma. They are less common and more difficult to treat than avulsion fractures.



Other types of fractures can occur in the fifth metatarsal. Examples include mid-shaft fractures, which usually result from trauma or twisting, and fractures of the metatarsal head and neck.

Symptoms

Avulsion and Jones fractures have the same signs and symptoms. These include:

- Pain, swelling, and tenderness on the outside of the foot
- Difficulty walking
- Bruising may occur

Diagnosis

Anyone who has symptoms of a fifth metatarsal fracture should see a foot and ankle surgeon as soon as possible for proper diagnosis and treatment. To arrive at a diagnosis, the surgeon will ask how the injury occurred or when the pain started. The foot will be examined, with the doctor gently pressing on different areas of the foot to determine where there is pain.

The surgeon will also order x-rays. Because a Jones fracture sometimes does not show up on initial x-rays, additional imaging studies may be needed.

Non-surgical Treatment

Until you are able to see a foot and ankle surgeon, the “**R.I.C.E.**” method of care should be performed:

- **Rest:** Stay off the injured foot. Walking may cause further injury.
- **Ice:** Apply an ice pack to the injured area, placing a thin towel between the ice and the skin. Use ice for 20 minutes and then wait at least 40 minutes before icing again.
- **Compression:** An elastic wrap should be used to control swelling.
- **Elevation:** The foot should be raised slightly above the level of your heart to reduce swelling.

The foot and ankle surgeon may use one of these non-surgical options for treatment of a fifth metatarsal fracture:

- **Immobilization.** Depending on the severity of the injury, the foot is kept immobile with a cast, cast boot, or stiff-soled shoe. Crutches may also be needed to avoid placing weight on the injured foot.
- **Bone stimulation.** A pain-free external device is used to speed the healing of some fractures. Bone stimulation, most commonly used for Jones fractures, may be used as part of the treatment or following an inadequate response to immobilization.

When is Surgery Needed?

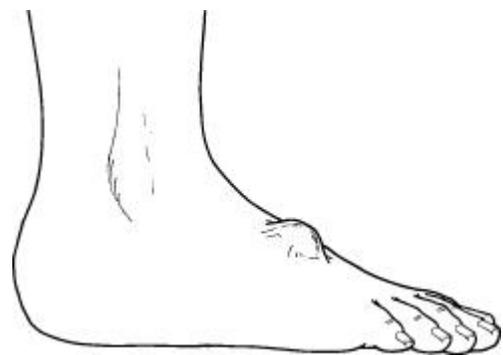
If the injury involves a displaced bone, multiple breaks, or has failed to adequately heal, surgery may be required. The foot and ankle surgeon will determine the type of procedure that is best suited to the individual patient.

Ganglion Cyst

What Is a Ganglion Cyst?

A ganglion cyst is a sac filled with a jellylike fluid that originates from a tendon sheath or joint capsule. The word “ganglion” means “knot” and is used to describe the knot-like mass or lump that forms below the surface of the skin.

Ganglion cysts are among the most common benign soft-tissue masses. Although they most often occur on the wrist, they also frequently develop on the foot – usually on the top, but elsewhere as well. Ganglion cysts



vary in size, may get smaller and larger, and may even disappear completely, only to return later.

Causes

Although the exact cause of ganglion cysts is unknown, they may arise from trauma – whether a single event or repetitive micro-trauma.

Symptoms

A ganglion cyst is associated with one or more of the following symptoms:

- A noticeable lump – often this is the only symptom experienced
- Tingling or burning, if the cyst is touching a nerve
- Dull pain or ache – which may indicate the cyst is pressing against a tendon or joint
- Difficulty wearing shoes due to irritation between the lump and the shoe

Diagnosis

To diagnose a ganglion cyst, the foot and ankle surgeon will perform a thorough examination of the foot. The lump will be visually apparent and, when pressed in a certain way, it should move freely underneath the skin. Sometimes the surgeon will shine a light through the cyst or remove a small amount of fluid from the cyst for evaluation. Your doctor may take an x-ray, and in some cases additional imaging studies may be ordered.

Non-Surgical Treatment

There are various options for treating a ganglion cyst on the foot:

- **Monitoring, but no treatment.** If the cyst causes no pain and does not interfere with walking, the surgeon may decide it is best to carefully watch the cyst over a period of time.
- **Shoe modifications.** Wearing shoes that do not rub the cyst or cause irritation may be advised. In addition, placing a pad inside the shoe may help reduce pressure against the cyst.
- **Aspiration and injection.** This technique involves draining the fluid and then injecting a steroid medication into the mass. More than one session may be needed. Although this approach is successful in some cases, in many others the cyst returns.

When is Surgery Needed?

When other treatment options fail or are not appropriate, the cyst may need to be surgically removed. While the recurrence rate associated with surgery is much lower than that experienced with aspiration and injection therapy, there are nevertheless cases in which the ganglion cyst returns.

Gout

What Is Gout?

Gout is a disorder that results from the build-up of uric acid in the tissues or a joint. It most often affects the joint of the big toe.

Causes

Gout attacks are caused by deposits of crystallized uric acid in the joint. Uric acid is present in the blood and eliminated in the urine, but in people who have gout, uric acid accumulates and crystallizes in the joints. Uric acid is the result of the breakdown of purines, chemicals that are found naturally in our bodies and in food. Some people develop gout because their kidneys have difficulty eliminating normal amounts of uric acid, while others produce too much uric acid.

Gout occurs most commonly in the big toe because uric acid is sensitive to temperature changes. At cooler temperatures, uric acid turns into crystals. Since the toe is the part of the body that is farthest from the heart, it's also the coolest part of the body – and, thus, the most likely target of gout. However, gout can affect any joint in the body.

The tendency to accumulate uric acid is often inherited. Other factors that put a person at risk for developing gout include: high blood pressure, diabetes, obesity, surgery, chemotherapy, stress, and certain medications and vitamins. For example, the body's ability to remove uric acid can be negatively affected by taking aspirin, some diuretic medications ("water pills"), and the vitamin niacin (also called nicotinic acid). While gout is more common in men aged 40 to 60 years, it can occur in younger men as well as in women.

Consuming foods and beverages that contain high levels of purines can trigger an attack of gout. Some foods contain more purines than others and have been associated with an increase of uric acid, which leads to gout. You may be able to reduce your chances of getting a gout attack by limiting or avoiding shellfish, organ meats (kidney, liver, etc.), red wine, beer, and red meat.

Symptoms

An attack of gout can be miserable, marked by the following symptoms:

- Intense pain that comes on suddenly – often in the middle of the night or upon arising
- Signs of inflammation such as redness, swelling, and warmth over the joint.

Diagnosis

To diagnose gout, the foot and ankle surgeon will ask questions about your personal and family medical history, followed by an examination of the affected joint. Laboratory tests and x-rays are sometimes ordered to determine if the inflammation is caused by something other than gout.

Treatment

Initial treatment of an attack of gout typically includes the following:

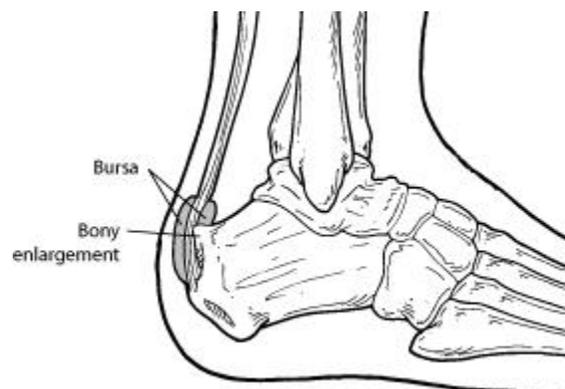
- **Medications.** Prescription medications or injections are used to treat the pain, swelling, and inflammation.
- **Dietary restrictions.** Foods and beverages that are high in purines should be avoided, since purines are converted in the body to uric acid.
- **Fluids.** Drink plenty of water and other fluids each day, while also avoiding alcoholic beverages, which cause dehydration.
- **Immobilize and elevate the foot.** Avoid standing and walking to give your foot a rest. Also, elevate your foot (level with or slightly above the heart) to help reduce swelling.

The symptoms of gout and the inflammatory process usually resolve in three to ten days with treatment. If gout symptoms continue despite the initial treatment, or if repeated attacks occur, see your primary care physician for maintenance treatment that may involve daily medication. In cases of repeated episodes, the underlying problem must be addressed, as the build-up of uric acid over time can cause arthritic damage to the joint.

Haglund's Deformity

What Is Haglund's Deformity?

Haglund's deformity is a bony enlargement on the back of the heel. The soft tissue near the Achilles tendon becomes irritated when the bony enlargement rubs against shoes. This often leads to painful



bursitis, which is an inflammation of the bursa (a fluid-filled sac between the tendon and bone).

Causes

Haglund's deformity is often called "pump bump" because the rigid backs of pump-style shoes can create pressure that aggravates the enlargement when walking. In fact, any shoes with a rigid back, such as ice skates, men's dress shoes, or women's pumps, can cause this irritation.

To some extent, heredity plays a role in Haglund's deformity. Inherited foot structures that can make one prone to developing this condition include:

- A high-arched foot
- A tight Achilles tendon
- A tendency to walk on the outside of the heel.

Symptoms

Haglund's deformity can occur in one or both feet. The symptoms include:

- A noticeable bump on the back of the heel
- Pain in the area where the Achilles tendon attaches to the heel
- Swelling in the back of the heel
- Redness near the inflamed tissue

Diagnosis

After evaluating the patient's symptoms, the foot and ankle surgeon will examine the foot. In addition, x-rays will be ordered to help the surgeon evaluate the structure of the heel bone.

Non-Surgical Treatment

Non-surgical treatment of Haglund's deformity is aimed at reducing the inflammation of the bursa. While these approaches can resolve the pain and inflammation, they will not shrink the bony protrusion. Non-surgical treatment can include one or more of the following:

- **Medication.** Oral nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, may be recommended to reduce the pain and inflammation.
- **Ice.** To reduce swelling, apply an ice pack to the inflamed area, placing a thin towel between the ice and the skin. Use ice for 20 minutes and then wait at least 40 minutes before icing again.
- **Exercises.** Stretching exercises help relieve tension from the Achilles tendon. These exercises are especially important for the patient who has a tight heel cord.
- **Heel lifts.** Patients with high arches may find that heel lifts placed inside the shoe decrease the pressure on the heel.
- **Heel pads.** Pads placed inside the shoe cushion the heel and may help reduce irritation when walking.
- **Shoe modification.** Backless or soft backed shoes help avoid or minimize irritation.
- **Physical therapy.** Physical therapy modalities, such as ultrasound, can help to reduce inflammation.
- **Orthotic devices.** Custom arch supports control the motion in the foot.
- **Immobilization.** In some cases, casting may be necessary.

When Is Surgery Needed?

If non-surgical treatment fails to provide adequate pain relief, surgery may be needed. The foot and ankle surgeon will determine the procedure that is best suited to your case. It is important to follow the surgeon's instructions for post-surgical care.

Prevention

A recurrence of Haglund's deformity may be prevented by:

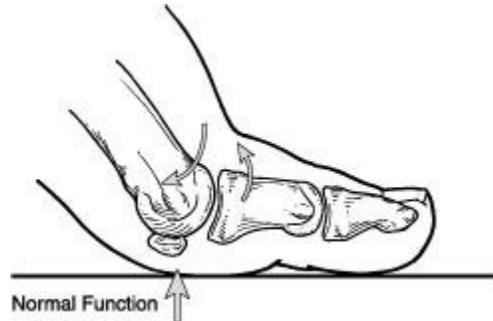
- Wearing appropriate shoes; avoid shoes with a rigid heel back
- Using arch supports or orthotic devices
- Performing stretching exercises to prevent the Achilles tendon from tightening
- Avoiding running on hard surfaces and running uphill.

Hallux Rigidus

What Is Hallux Rigidus?

Hallux rigidus is a disorder of the joint located at the base of the big toe. It causes pain and stiffness in the joint, and with time it gets increasingly harder to bend the toe. ‘Hallux’ refers to the big toe, while ‘rigidus’ indicates that the toe is rigid and cannot move. Hallux rigidus is actually a form of degenerative arthritis.

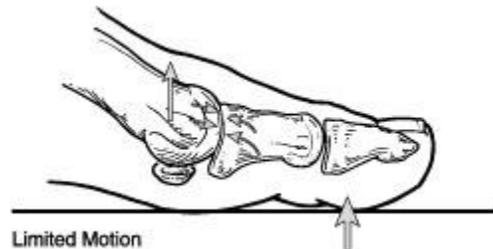
This disorder can be very troubling and even disabling, since we use the big toe whenever we walk, stoop down, climb up, or even stand. Many patients confuse hallux rigidus with a bunion, which affects the same joint, but they are very different conditions requiring different treatment.



Because hallux rigidus is a progressive condition, the toe’s motion decreases as time goes on. In its earlier stage, when motion of the big toe is only somewhat limited, the condition is called “hallux limitus.” But as the problem advances, the toe’s range of motion gradually decreases until it potentially reaches the end stage of “rigidus,” in which the big toe becomes stiff, or what is sometimes called a “frozen joint.”

Causes

Common causes of hallux rigidus are faulty function (biomechanics) and structural abnormalities of the foot that can lead to osteoarthritis in the big toe joint. This type of arthritis – the kind that results from “wear and tear” – often develops in people who have defects that change the way their foot and big toe functions. For example, those with fallen arches or excessive pronation (rolling in) of the ankles are susceptible to developing hallux rigidus.



In some people, hallux rigidus runs in the family and is a result of inheriting a foot type that is prone to developing this condition. In other cases, it is associated with overuse – especially among people engaged in activities or jobs that increase the stress on the big toe, such as workers who often have to stoop or squat. Hallux rigidus can also result from an injury, such as stubbing your toe. Or it may be caused by inflammatory diseases such as rheumatoid arthritis or gout. Your foot and ankle surgeon can determine the cause of your hallux rigidus and recommend the best treatment.

Symptoms

Early signs and symptoms include:

- Pain and stiffness in the big toe during use (walking, standing, bending, etc.)
- Pain and stiffness aggravated by cold, damp weather
- Difficulty with certain activities (running, squatting)
- Swelling and inflammation around the joint

As the disorder gets more serious, additional symptoms may develop,



including:

- Pain, even during rest
- Difficulty wearing shoes because bone spurs (overgrowths) develop
- Dull pain in the hip, knee, or lower back due to changes in the way you walk
- Limping (in severe cases)

Diagnosis

The sooner this condition is diagnosed, the easier it is to treat. Therefore, the best time to see a foot and ankle surgeon is when you first notice symptoms. If you wait until bone spurs develop, your condition is likely to be more difficult to manage.

In diagnosing hallux rigidus, the surgeon will examine your feet and move the toe to determine its range of motion. X-rays help determine how much arthritis is present as well as to evaluate any bone spurs or other abnormalities that may have formed.

Non-Surgical Treatment

In many cases, early treatment may prevent or postpone the need for surgery in the future. Treatment for mild or moderate cases of hallux rigidus may include

- **Shoe modifications.** Shoes with a large toe box put less pressure on your toe. Stiff or rocker-bottom soles may also be recommended.
- **Orthotic devices.** Custom orthotic devices may improve foot function.
- **Medications.** Oral nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, may be recommended to reduce pain and inflammation.
- **Injection therapy.** Injections of corticosteroids may reduce inflammation and pain.
- **Physical therapy.** Ultrasound therapy or other physical therapy modalities may be undertaken to provide temporary relief.

When Is Surgery Needed?

In some cases, surgery is the only way to eliminate or reduce pain. There are several types of surgery for treatment of hallux rigidus. In selecting the procedure or combination of procedures for your particular case, the foot and ankle surgeon will take into consideration the extent of your deformity based on the x-ray findings, your age, your activity level, and other factors. The length of the recovery period will vary, depending on the procedure or procedures performed.

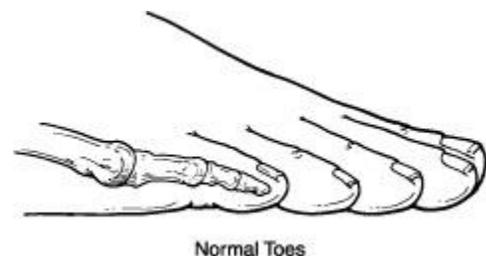
Hammertoe

What Is Hammertoe?

Hammertoe is a contracture (bending) of one or both joints of the second, third, fourth, or fifth (little) toes. This abnormal bending can put pressure on the toe when wearing shoes, causing problems to develop.

Hammertoes usually start out as mild deformities and get progressively worse over time. In the earlier stages, hammertoes are flexible and the symptoms can often be managed with noninvasive measures. But if left untreated, hammertoes can become more rigid and will not respond to non-surgical treatment.

Because of the progressive nature of hammertoes, they should receive early attention. Hammertoes never get better without some kind of intervention.

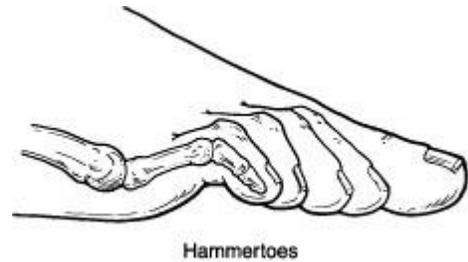


Causes

The most common cause of hammertoe is a muscle/tendon imbalance. This imbalance, which leads to a bending of the toe, results from mechanical (structural) changes in the foot that occur over time in some people.

Hammertoes may be aggravated by shoes that don't fit properly. A hammertoe may result if a toe is too long and is forced into a cramped position when a tight shoe is worn.

Occasionally, hammertoe is the result of an earlier trauma to the toe. In some people, hammertoes are inherited.



Symptoms

Common symptoms of hammertoes include:

- Pain or irritation of the affected toe when wearing shoes.
- Corns and calluses (a buildup of skin) on the toe, between two toes, or on the ball of the foot. Corns are caused by constant friction against the shoe. They may be soft or hard, depending upon their location.
- Inflammation, redness, or a burning sensation
- Contracture of the toe
- In more severe cases of hammertoe, open sores may form.

Diagnosis

Although hammertoes are readily apparent, to arrive at a diagnosis the foot and ankle surgeon will obtain a thorough history of your symptoms and examine your foot. During the physical examination, the doctor may attempt to reproduce your symptoms by manipulating your foot and will study the contractures of the toes. In addition, the foot and ankle surgeon may take x-rays to determine the degree of the deformities and assess any changes that may have occurred.

Hammertoes are progressive – they don't go away by themselves and usually they will get worse over time. However, not all cases are alike – some hammertoes progress more rapidly than others. Once your foot and ankle surgeon has evaluated your hammertoes, a treatment plan can be developed that is suited to your needs.

Non-surgical Treatment

There is a variety of treatment options for hammertoe. The treatment your foot and ankle surgeon selects will depend upon the severity of your hammertoe and other factors.

A number of non-surgical measures can be undertaken:

- **Padding corns and calluses.** Your foot and ankle surgeon can provide or prescribe pads designed to shield corns from irritation. If you want to try over-the-counter pads, avoid the medicated types. Medicated pads are generally not recommended because they may contain a small amount of acid that can be harmful. Consult your surgeon about this option.
- **Changes in footwear.** Avoid shoes with pointed toes, shoes that are too short, or shoes with high heels – conditions that can force your toe against the front of the shoe. Instead, choose comfortable shoes with a deep, roomy toe box and heels no higher than two inches.
- **Orthotic devices.** A custom orthotic device placed in your shoe may help control the muscle/tendon imbalance.
- **Injection therapy.** Corticosteroid injections are sometimes used to ease pain and inflammation caused by hammertoe.
- **Medications.** Oral nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, may be recommended to reduce pain and inflammation.
- **Splinting/strapping.** Splints or small straps may be applied by the surgeon to realign the bent toe.

When Is Surgery Needed?

In some cases, usually when the hammertoe has become more rigid and painful, or when an open sore has developed, surgery is needed.

Often patients with hammertoe have bunions or other foot deformities corrected at the same time. In selecting the procedure or combination of procedures for your particular case, the foot and ankle surgeon will take into consideration the extent of your deformity, the number of toes involved, your age, your activity level, and other factors. The length of the recovery period will vary, depending on the procedure or procedures performed.

Heel Pain (Plantar Fasciitis)

Heel pain is most often caused by plantar fasciitis, a condition that is sometimes also called heel spur syndrome when a spur is present. Heel pain may also be due to other causes, such as a stress fracture, tendonitis, arthritis, nerve irritation, or, rarely, a cyst.

Because there are several potential causes, it is important to have heel pain properly diagnosed. A foot and ankle surgeon is able to distinguish between all the possibilities and determine the underlying source of your heel pain.

What Is Plantar Fasciitis?

Plantar fasciitis is an inflammation of the band of tissue (the plantar fascia) that extends from the heel to the toes. In this condition, the fascia first becomes irritated and then inflamed, resulting in heel pain.

Causes

The most common cause of plantar fasciitis relates to faulty structure of the foot. For example, people who have problems with their arches, either overly flat feet or high-arched feet, are more prone to developing plantar fasciitis.

Wearing non-supportive footwear on hard, flat surfaces puts abnormal strain on the plantar fascia and can also lead to plantar fasciitis. This is particularly evident when one's job requires long hours on the feet. Obesity may also contribute to plantar fasciitis.

Symptoms

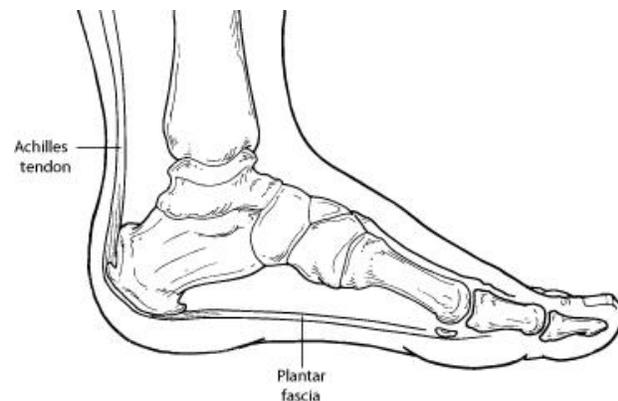
The symptoms of plantar fasciitis are:

- Pain on the bottom of the heel
- Pain that is usually worse upon arising
- Pain that increases over a period of months

People with plantar fasciitis often describe the pain as worse when they get up in the morning or after they've been sitting for long periods of time. After a few minutes of walking the pain decreases, because walking stretches the fascia. For some people the pain subsides but returns after spending long periods of time on their feet.

Diagnosis

To arrive at a diagnosis, the foot and ankle surgeon will obtain your medical history and examine your foot. Throughout this process the surgeon rules out all the possible causes for your heel pain other than plantar fasciitis.



In addition, diagnostic imaging studies such as x-rays or other imaging modalities may be used to distinguish the different types of heel pain. Sometimes heel spurs are found in patients with plantar fasciitis, but these are rarely a source of pain. When they are present, the condition may be diagnosed as plantar fasciitis/heel spur syndrome.

Non-Surgical Treatment

Treatment of plantar fasciitis begins with first-line strategies, which you can begin at home:

- **Stretching exercises.** Exercises that stretch out the calf muscles help ease pain and assist with recovery.
- **Avoid going barefoot.** When you walk without shoes, you put undue strain and stress on your plantar fascia.
- **Ice.** Putting an ice pack on your heel for 20 minutes several times a day helps reduce inflammation. Place a thin towel between the ice and your heel; do not apply ice directly to the skin.
- **Limit activities.** Cut down on extended physical activities to give your heel a rest.
- **Shoe modifications.** Wearing supportive shoes that have good arch support and a slightly raised heel reduces stress on the plantar fascia.
- **Medications.** Oral nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, may be recommended to reduce pain and inflammation.

If you still have pain after several weeks, see your foot and ankle surgeon, who may add one or more of these treatment approaches:

- **Padding and strapping.** Placing pads in the shoe softens the impact of walking. Strapping helps support the foot and reduce strain on the fascia.
- **Orthotic devices.** Custom orthotic devices that fit into your shoe help correct the underlying structural abnormalities causing the plantar fasciitis.
- **Injection therapy.** In some cases, corticosteroid injections are used to help reduce the inflammation and relieve pain.
- **Removable walking cast.** A removable walking cast may be used to keep your foot immobile for a few weeks to allow it to rest and heal.
- **Night splint.** Wearing a night splint allows you to maintain an extended stretch of the plantar fascia while sleeping. This may help reduce the morning pain experienced by some patients.
- **Physical therapy.** Exercises and other physical therapy measures may be used to help provide relief.

When Is Surgery Needed?

Although most patients with plantar fasciitis respond to non-surgical treatment, a small percentage of patients may require surgery. If, after several months of non-surgical treatment, you continue to have heel pain, surgery will be considered. Your foot and ankle surgeon will discuss the surgical options with you and determine which approach would be most beneficial for you.

Long-term Care

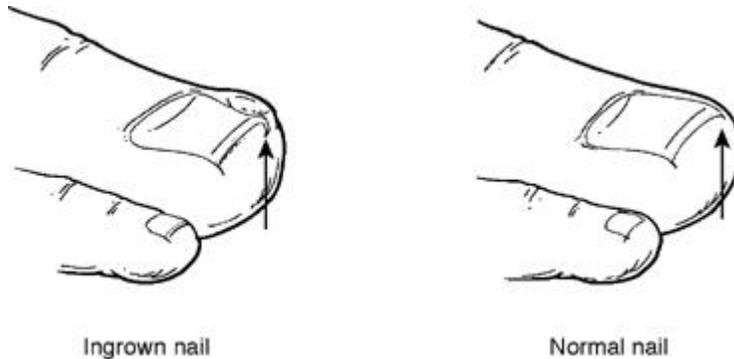
No matter what kind of treatment you undergo for plantar fasciitis, the underlying causes that led to this condition may remain. Therefore, you will need to continue with preventive measures. Wearing supportive shoes, stretching, and using custom orthotic devices are the mainstay of long-term treatment for plantar fasciitis.

Ingrown Toenail

What Is an Ingrown Toenail?

When a toenail is ingrown, it is curved and grows into the skin, usually at the nail borders (the sides of the nail). This “digging in” of the nail irritates the skin, often creating pain, redness, swelling, and warmth in the toe.

If an ingrown nail causes a break in the skin, bacteria may enter and cause an infection in the area, which is often marked by drainage and a foul odor. However, even if the toe isn't painful, red, swollen, or warm, a nail that curves downward into the skin can progress to an infection.



Causes

Causes of ingrown toenails include:

- **Heredity.** In many people, the tendency for ingrown toenails is inherited.
- **Trauma.** Sometimes an ingrown toenail is the result of trauma, such as stubbing your toe, having an object fall on your toe, or engaging in activities that involve repeated pressure on the toes, such as kicking or running.
- **Improper trimming.** The most common cause of ingrown toenails is cutting your nails too short. This encourages the skin next to the nail to fold over the nail.
- **Improperly sized footwear.** Ingrown toenails can result from wearing socks and shoes that are tight or short.
- **Nail Conditions.** Ingrown toenails can be caused by nail problems, such as fungal infections or losing a nail due to trauma.

Treatment

Sometimes initial treatment for ingrown toenails can be safely performed at home. However, home treatment is strongly discouraged if an infection is suspected, or for those who have medical conditions that put feet at high risk, such as diabetes, nerve damage in the foot, or poor circulation.

Home care:

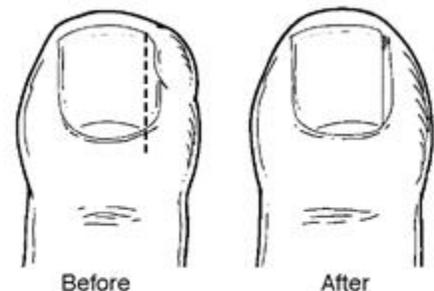
If you don't have an infection or any of the above medical conditions, you can soak your foot in room-temperature water (adding Epsom's salt may be recommended by your doctor), and gently massage the side of the nail fold to help reduce the inflammation.

Avoid attempting "bathroom surgery." Repeated cutting of the nail can cause the condition to worsen over time. If your symptoms fail to improve, it's time to see a foot and ankle surgeon.

Physician care:

After examining the toe, the foot and ankle surgeon will select the treatment best suited for you. If an infection is present, an oral antibiotic may be prescribed.

Sometimes a minor surgical procedure, often performed in the office, will ease the pain and remove the offending nail. After applying a local anesthetic, the doctor removes part of the nail's side border. Some nails may become ingrown again, requiring removal of the nail root.



Following the nail procedure, a light bandage will be applied. Most people experience very little pain after surgery and may resume normal activity the next day. If your surgeon has prescribed an oral antibiotic, be sure to take all the medication, even if your symptoms have improved.

Preventing Ingrown Toenails

Many cases of ingrown toenails may be prevented by:

- **Proper trimming.** Cut toenails in a fairly straight line, and don't cut them too short. You should be able to get your fingernail under the sides and end of the nail.
- **Well-fitted shoes and socks.** Don't wear shoes that are short or tight in the toe area. Avoid shoes that are loose, because they too cause pressure on the toes, especially when running or walking briskly.

What You Should Know About Home Treatment

- **Don't cut a notch in the nail.** Contrary to what some people believe, this does not reduce the tendency for the nail to curve downward.
- **Don't repeatedly trim nail borders.** Repeated trimming does not change the way the nail grows, and can make the condition worse.
- **Don't place cotton under the nail.** Not only does this not relieve the pain, it provides a place for harmful bacteria to grow, resulting in infection.
- **Over-the-counter medications are ineffective.** Topical medications may mask the pain, but they don't correct the underlying problem.

Joint Pain in the Foot

The foot contains 26 bones and more than 30 joints. Many people experience **pain involving one or more of these joints**. The pain may be accompanied by swelling, tenderness, stiffness, redness, bruising and/or increased warmth over the affected joints.

Joint pain may be caused by trauma, infection, inflammation, arthritis, bursitis, gout, or structural foot problems. It is initially treated with rest, elevation and limitation of walking/weight bearing on the painful foot. Use of non steroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, and ice can help to reduce local inflammation and pain. Custom orthotic devices may also be prescribed to support the foot and reduce pain. A foot and ankle surgeon can best determine the cause of joint pain and recommend the appropriate treatment.

Joint Swelling in the Foot

The foot contains 26 bones and more than 30 joints. The body's natural response to any type of joint injury is to increase blood flow to the affected area. This results in an accumulation of fluid in the tissues in and around the joint, resulting in swelling. Depending on the cause of the injury, joint swelling may be accompanied by stiffness, redness, warmth and pain.

Joint swelling may also result from inflammatory, degenerative, traumatic, infective, or crystal-forming joint diseases, such as gout. If joint swelling persists, a foot and ankle surgeon can best determine the cause and recommend the appropriate treatment.

Lisfranc Injuries

The Lisfranc Joint

The Lisfranc joint is the point at which the metatarsal bones (long bones that lead up to the toes) and the tarsal bones (bones in the arch) connect. The Lisfranc ligament is a tough band of tissue that joins two of these bones. This is important for maintaining proper alignment and strength of the joint.

How Do Lisfranc Injuries Occur?

Injuries to the Lisfranc joint most commonly occur in automobile accident victims, military personnel, runners, horseback riders, football players and participants of other contact sports, or something as simple as missing a step on a staircase.

Lisfranc injuries occur as a result of direct or indirect forces to the foot. A direct force often involves something heavy falling on the foot. Indirect force commonly involves twisting the foot.

Types of Lisfranc Injuries

There are three types of Lisfranc injuries, which sometimes occur together:

- **Sprains.** The Lisfranc ligament and other ligaments on the bottom of the midfoot are stronger than those on the top of the midfoot. Therefore, when they are weakened through a sprain (a stretching of the ligament), patients experience instability of the joint in the middle of the foot.
- **Fractures.** A break in a bone in the Lisfranc joint can be either an avulsion fracture (a small piece of bone is pulled off) or a break through the bone or bones of the midfoot.
- **Dislocations.** The bones of the Lisfranc joint may be forced from their normal positions.

Symptoms

The symptoms of a Lisfranc injury may include:

- Swelling of the foot
- Pain throughout the midfoot when standing or when pressure is applied
- Inability to bear weight (in severe injuries)
- Bruising or blistering on the arch are important signs of a Lisfranc injury. Bruising may also occur on the top of the foot.
- Abnormal widening of the foot.

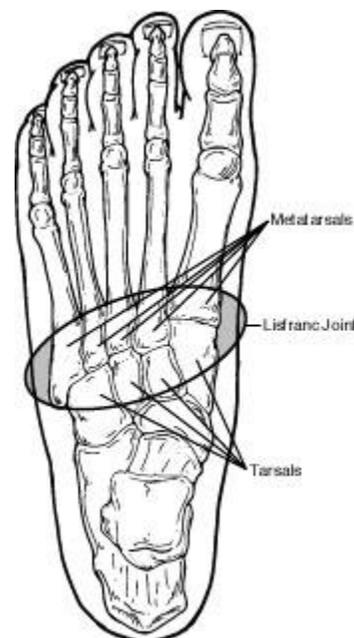
Diagnosis

Lisfranc injuries are sometimes mistaken for ankle sprains, making the diagnostic process very important. To arrive at a diagnosis, the foot and ankle surgeon will ask questions about how the injury occurred and will examine the foot to determine the severity of the injury.

X-rays and other imaging studies may be necessary to fully evaluate the extent of the injury. The surgeon may also perform an additional examination while the patient is under anesthesia to further evaluate a fracture or weakening of the joint and surrounding bones.

Non-surgical Treatment

Anyone who has symptoms of a Lisfranc injury should see a foot and ankle surgeon right away. If unable to do so



immediately, it is important to stay off the injured foot, keep it elevated (at or slightly above hip level), and apply a bag of ice wrapped in a thin towel to the area every 20 minutes of each waking hour. These steps will help keep the swelling and pain under control. Treatment by the foot and ankle surgeon may include one or more of the following, depending on the type and severity of the Lisfranc injury:

- **Immobilization.** Sometimes the foot is placed in a cast to keep it immobile, and crutches are used to avoid putting weight on the injured foot.
- **Oral medications.** Nonsteroidal anti-inflammatory medications (NSAIDs), such as ibuprofen, help reduce the pain and inflammation.
- **Ice and elevation.** Swelling is reduced by icing the affected area and keeping the foot elevated, as described above.
- **Physical therapy.** After the swelling and pain have subsided, physical therapy may be prescribed.

When is Surgery Needed?

Certain types of Lisfranc injuries require surgery. The foot and ankle surgeon will determine the type of procedure that is best suited to the individual patient. Some injuries of this type may require emergency surgery.

Complications of Lisfranc Injuries

Complications can and often do arise following Lisfranc injuries. A possible early complication following the injury is compartment syndrome, in which pressure builds up within the tissues of the foot, requiring immediate surgery to prevent tissue damage. A build-up of pressure could damage the nerves, blood vessels, and muscles in the foot.

Arthritis and problems with foot alignment are very likely to develop. In most cases, arthritis develops several months or longer following a Lisfranc injury, requiring additional treatment.

Malignant Melanoma of the Foot

What is Malignant Melanoma?

Melanoma is a cancer that begins in the cells of the skin that produce pigmentation (coloration). It is also called malignant melanoma because it spreads to other areas of the body as it grows beneath the surface of the skin. Unlike many other types of cancer, melanoma strikes people of all age groups, even the young.

Melanoma in the Foot

Melanoma that occurs in the foot or ankle often goes unnoticed during its earliest stage, when it would be more easily treated. By the time melanoma of the foot or ankle is diagnosed, it frequently has progressed to an advanced stage, accounting for a higher mortality rate. This makes it extremely important to follow prevention and early detection measures involving the feet as well as other parts of the body.

Causes

Most cases of melanoma are caused by too much exposure to ultraviolet (UV) rays from the sun or tanning beds. This exposure can include intense UV radiation obtained during short periods, or lower amounts of radiation obtained over longer periods.

Anyone can get melanoma, but some factors put a person at greater risk for developing this type of cancer. These include:

- Fair skin; skin that freckles; blond or red hair
- Blistering sunburns before the age of 18
- Numerous moles, especially if they appeared at a young age

What Should You Look For?

Melanoma can occur anywhere on the skin, even in areas of the body not exposed to the sun. Melanoma usually looks like a spot on the skin that is predominantly brown, black, or blue—although in some cases it can be mostly red or even white. However, not all areas of discoloration on the skin are melanoma.

There are four signs—known as the ABCDs of melanoma—to look for when self-inspecting moles and other spots on the body:



Asymmetry -- Melanoma is usually asymmetric, which means one half is different in shape from the other half.



Border -- Border irregularity often indicates melanoma. The border—or edge—is typically ragged, notched, or blurred.



Color -- Melanoma is typically a mix of colors or hues, rather than a single, solid color.



Diameter -- Melanoma grows in diameter, whereas moles remain small. A spot that is larger than 5 millimeters (the size of a pencil eraser) is cause for concern.

If any of these signs are present on the foot, it is important to see a foot and ankle surgeon right away. It is also essential to see a surgeon if there is discoloration of any size underneath a toenail (unless the discoloration was caused by trauma, such as stubbing a toe or having something fall on it).

Diagnosis

To diagnose melanoma, the foot and ankle surgeon will ask the patient a few questions. For example: Is the spot old or new? Have you noticed any changes in size or color? If so, how rapidly has this change occurred?

The surgeon will also examine the spot to determine whether a biopsy is necessary. If a biopsy is performed and it reveals melanoma, the surgeon will discuss a treatment plan.

Prevention and Early Detection

Everyone should practice strategies that can help prevent melanoma—or at least aid in early detection, so that early treatment can be undertaken.

Precautions to avoid getting melanoma of the foot and ankle, as well as general precautions, include:

- Wear water shoes or shoes and socks—flip flops do not provide protection!
- Use adequate sunscreen in areas that are unprotected by clothing or shoes. Be sure to apply sunscreen on the soles as well as the tops of feet.
- Inspect all areas of the feet daily—including the soles, underneath toenails, and between the toes.

- If you wear nail polish, remove it occasionally so that you can inspect the skin underneath the toenails. Avoid UV radiation during the sun's peak hours (10 a.m. to 4 p.m.), beginning at birth. While sun exposure is harmful at any age, it is especially damaging to children and adolescents.
- Wear sunglasses that block 100% of all UV rays—both UVA and UVB.
- Wear a wide-brimmed hat.

Remember: Early detection is crucial with malignant melanoma. If you see any of the ABCD signs—or if you have discoloration beneath a toenail that is unrelated to trauma—be sure to visit a foot and ankle surgeon as soon as possible.

Morton's Neuroma

What Is a Neuroma?

A neuroma is a thickening of nerve tissue that may develop in various parts of the body. The most common neuroma in the foot is a Morton's neuroma, which occurs between the third and fourth toes. It is sometimes referred to as an intermetatarsal neuroma. "Intermetatarsal" describes its location in the ball of the foot between the metatarsal bones. Neuromas may also occur in other locations in the foot.

The thickening, or enlargement, of the nerve that defines a neuroma is the result of compression and irritation of the nerve. This compression creates enlargement of the nerve, eventually leading to permanent nerve damage.

Causes

Anything that causes compression or irritation of the nerve can lead to the development of a neuroma. One of the most common offenders is wearing shoes that have a tapered toe box, or high-heeled shoes that cause the toes to be forced into the toe box.

People with certain foot deformities – bunions, hammertoes, flatfeet, or more flexible feet – are at higher risk for developing a neuroma. Other potential causes are activities that involve repetitive irritation to the ball of the foot, such as running or court sports. An injury or other type of trauma to the area may also lead to a neuroma.

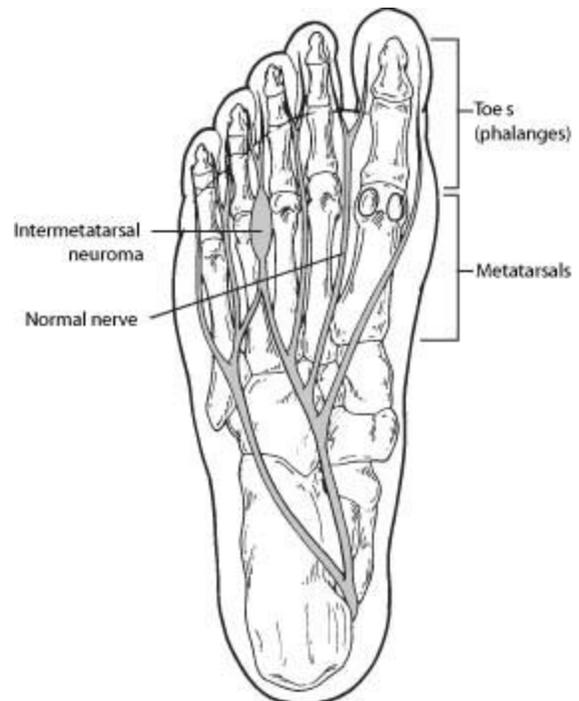
Symptoms

If you have a Morton's neuroma, you may have one or more of these symptoms where the nerve damage is occurring:

- Tingling, burning, or numbness
- Pain
- A feeling that something is inside the ball of the foot
- A feeling that there's something in the shoe or a sock is bunched up

The progression of a Morton's neuroma often follows this pattern:

- The symptoms begin gradually. At first they occur only occasionally, when wearing narrow-toed shoes or performing certain aggravating activities.
- The symptoms may go away temporarily by removing the shoe, massaging the foot, or by avoiding aggravating shoes or activities.
- Over time the symptoms progressively worsen and may persist for several days or weeks.



- The symptoms become more intense as the neuroma enlarges and the temporary changes in the nerve become permanent.

Diagnosis

To arrive at a diagnosis, the foot and ankle surgeon will obtain a thorough history of your symptoms and examine your foot. During the physical examination, the doctor attempts to reproduce your symptoms by manipulating your foot. Other tests or imaging studies may be performed.

The best time to see your foot and ankle surgeon is early in the development of symptoms. Early diagnosis of a Morton's neuroma greatly lessens the need for more invasive treatments and may avoid surgery.

Non-surgical Treatment

In developing a treatment plan, your foot and ankle surgeon will first determine how long you've had the neuroma and evaluate its stage of development. Treatment approaches vary according to the severity of the problem.

For mild to moderate neuromas, treatment options may include:

- **Padding.** Padding techniques provide support for the metatarsal arch, thereby lessening the pressure on the nerve and decreasing the compression when walking.
- **Icing.** Placing an icepack on the affected area helps reduce swelling.
- **Orthotic devices.** Custom orthotic devices provided by your foot and ankle surgeon provide the support needed to reduce pressure and compression on the nerve.
- **Activity modifications.** Activities that put repetitive pressure on the neuroma should be avoided until the condition improves.
- **Shoe modifications.** Wear shoes with a wide toe box and avoid narrow-toed shoes or shoes with high heels.
- **Medications.** Oral nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, may be recommended to reduce pain and inflammation.
- **Injection therapy.** Treatment may include injections of cortisone, local anesthetics or other agents.

When Is Surgery Needed?

Surgery may be considered in patients who have not responded adequately to non-surgical treatments. Your foot and ankle surgeon will determine the approach that is best for your condition. The length of the recovery period will vary, depending on the procedure performed.

Regardless of whether you've undergone surgical or nonsurgical treatment, your surgeon will recommend long-term measures to help keep your symptoms from returning. These include appropriate footwear and modification of activities to reduce the repetitive pressure on the foot.

Nail Fungus

A fungus is an organism that lives in warm moist areas. Fungus of the toenails is a common problem that can affect people of all ages, although it most commonly affects individuals who are older.

Toenail fungus often begins as an infection in the skin called tinea pedis (also known as athlete's foot). The fungus often starts under the nail fold at the end of the nail. Over time it grows underneath the nail and causes changes to its appearance, such as a yellow or brownish discoloration. It can also cause thickening and deformity of the toenail.

Many people have difficulty with their toenails and need assistance in caring for them. A foot and ankle surgeon can diagnose the cause of toenail problems and recommend treatments.

Os Trigonum Syndrome

What is the Os Trigonum?

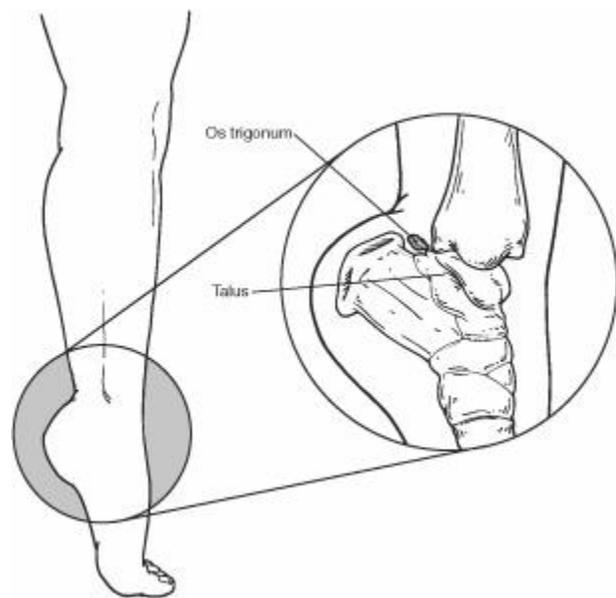
The os trigonum is an extra (accessory) bone that sometimes develops behind the ankle bone (talus). It is connected to the talus by a fibrous band. The presence of an os trigonum in one or both feet is congenital (present at birth). It becomes evident during adolescence when one area of the talus does not fuse with the rest of the bone, creating a small extra bone. Only a small number of people have this extra bone.

What is Os Trigonum Syndrome?

Often, people don't know they have an os trigonum if it hasn't caused any problems. However, some people with this extra bone develop a painful condition known as os trigonum syndrome.

Os trigonum syndrome is usually triggered by an injury, such as an ankle sprain. The syndrome is also frequently caused by repeated downward pointing of the toes, which is common among ballet dancers, soccer players and other athletes.

For the person who has an os trigonum, pointing the toes downward can result in a "nutcracker injury." Like an almond in a nutcracker, the os trigonum is crunched between the ankle and heel bones. As the os trigonum pulls loose, the tissue connecting it to the talus is stretched or torn and the area becomes inflamed.



Signs and Symptoms of Os Trigonum Syndrome

The signs and symptoms of os trigonum syndrome may include:

- Deep, aching pain in the back of the ankle, occurring mostly when pushing off on the big toe (as in walking) or when pointing the toes downward
- Tenderness in the area when touched
- Swelling in the back of the ankle

Diagnosis

Os trigonum syndrome can mimic other conditions such as an Achilles tendon injury, ankle sprain, or talus fracture. Diagnosis of os trigonum syndrome begins with questions from the doctor about the development of the symptoms. After the foot and ankle are examined, x-rays or other imaging tests are often ordered to assist in making the diagnosis.

Treatment: Non-surgical Approaches

Relief of the symptoms is often achieved through treatments that can include a combination of the following:

- Rest. It is important to stay off the injured foot to let the inflammation subside.
- Immobilization. Often a walking boot is used to restrict ankle motion and allow the injured tissue to heal.

- Ice. Swelling is decreased by applying a bag of ice covered with a thin towel to the affected area. Do not put ice directly against the skin.
- Oral medication. Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, may be helpful in reducing the pain and inflammation.
- Injections. Sometimes cortisone is injected into the area to reduce the inflammation and pain.

When is Surgery Needed?

Most patients' symptoms improve with non-surgical treatment. However, in some patients, surgery may be required to relieve the symptoms. Surgery typically involves removal of the os trigonum, as this extra bone is not necessary for normal foot function.

Osteoarthritis of the Foot and Ankle

What is Osteoarthritis?

Osteoarthritis is a condition characterized by the breakdown and eventual loss of cartilage in one or more joints. Cartilage (the connective tissue found at the end of the bones in the joints) protects and cushions the bones during movement. When cartilage deteriorates or is lost, symptoms develop that can restrict one's ability to easily perform daily activities.

Osteoarthritis is also known as degenerative arthritis, reflecting its nature to develop as part of the aging process. As the most common form of arthritis, osteoarthritis affects millions of Americans. Some people refer to osteoarthritis simply as arthritis, even though there are many different types of arthritis.

Osteoarthritis appears at various joints throughout the body, including the hands, feet, spine, hips, and knees. In the foot, the disease most frequently occurs in the big toe, although it is also often found in the midfoot and ankle.

Causes

Osteoarthritis is considered a "wear and tear" disease because the cartilage in the joint wears down with repeated stress and use over time. As the cartilage deteriorates and gets thinner, the bones lose their protective covering and eventually may rub together, causing pain and inflammation of the joint.

An injury may also lead to osteoarthritis, although it may take months or years after the injury for the condition to develop. For example, osteoarthritis in the big toe is often caused by kicking or jamming the toe, or by dropping something on the toe. Osteoarthritis in the midfoot is often caused by dropping something on it, or by a sprain or fracture. In the ankle, osteoarthritis is usually caused by a fracture and occasionally by a severe sprain.

Sometimes osteoarthritis develops as a result of abnormal foot mechanics such as flat feet or high arches. A flat foot causes less stability in the ligaments (bands of tissue that connect bones), resulting in excessive strain on the joints, which can cause arthritis. A high arch is rigid and lacks mobility, causing a jamming of joints that creates an increased risk of arthritis.

Symptoms

People with osteoarthritis in the foot or ankle experience, in varying degrees, one or more of the following:

- Pain and stiffness in the joint
- Swelling in or near the joint
- Difficulty walking or bending the joint

Some patients with osteoarthritis also develop a bone spur (a bony protrusion) at the affected joint. Shoe pressure may cause pain at the site of a bone spur, and in some cases blisters or calluses may form over its surface. Bone spurs can also limit the movement of the joint.

Diagnosis

In diagnosing osteoarthritis, the foot and ankle surgeon will examine the foot thoroughly, looking for swelling in the joint, limited mobility, and pain with movement. In some cases, deformity and/or enlargement (spur) of the joint may be noted. X-rays may be ordered to evaluate the extent of the disease.

Non-surgical Treatment

To help relieve symptoms, the surgeon may begin treating osteoarthritis with one or more of the following non-surgical approaches:

- **Oral medications.** Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, are often helpful in reducing the inflammation and pain. Occasionally a prescription for a steroid medication is needed to adequately reduce symptoms.
- **Orthotic devices.** Custom orthotic devices (shoe inserts) are often prescribed to provide support to improve the foot's mechanics or cushioning to help minimize pain.
- **Bracing.** Bracing, which restricts motion and supports the joint, can reduce pain during walking and help prevent further deformity.
- **Immobilization.** Protecting the foot from movement by wearing a cast or removable cast-boot may be necessary to allow the inflammation to resolve.
- **Steroid injections.** In some cases, steroid injections are applied to the affected joint to deliver anti-inflammatory medication.
- **Physical therapy.** Exercises to strengthen the muscles, especially when the osteoarthritis occurs in the ankle, may give the patient greater stability and help avoid injury that might worsen the condition.

When Is Surgery Needed?

When osteoarthritis has progressed substantially or failed to improve with non-surgical treatment, surgery may be recommended. In advanced cases, surgery may be the only option. The goal of surgery is to decrease pain and improve function. The foot and ankle surgeon will consider a number of factors when selecting the procedure best suited to the patient's condition and lifestyle.

Pediatric Flatfoot

What Is Pediatric Flatfoot?

Flatfoot is common in both children and adults. When this deformity occurs in children, it is referred to as "pediatric flatfoot." Although there are various forms of flatfoot, they all share one characteristic – partial or total collapse of the arch.

Pediatric flatfoot can be classified as symptomatic or asymptomatic. Symptomatic flatfeet exhibit symptoms such as pain and limitation of activity, while asymptomatic flatfeet show no symptoms. These classifications can assist your foot and ankle surgeon in determining an appropriate treatment plan.

Symptoms

Flatfoot can be apparent at birth or it may not show up until years later. Most children with flatfoot have no symptoms, but some have one or more of the following symptoms:

- Pain, tenderness, or cramping in the foot, leg, and knee
- Outward tilting of the heel



Pediatric flatfoot



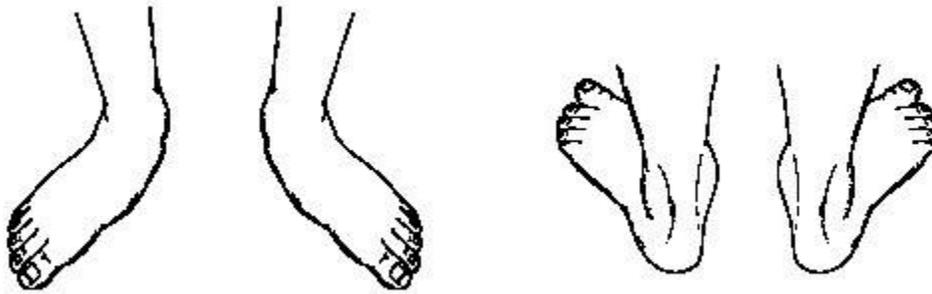
Normal pediatric foot

- Awkwardness or changes in walking
- Difficulty with shoes
- Reduced energy when participating in physical activities
- Voluntary withdrawal from physical activities

Diagnosis

In diagnosing flatfoot, the foot and ankle surgeon examines the foot and observes how it looks when the child stands and sits. The surgeon also observes how the child walks and evaluates the range of motion of the foot. Because flatfoot is sometimes related to problems in the leg, the surgeon may also examine the knee and hip.

X-rays are often taken to determine the severity of the deformity. Sometimes additional imaging and other tests are ordered.



Non-surgical Treatment

If a child has no symptoms, treatment is often not required. Instead, the condition will be observed and re-evaluated periodically by the foot and ankle surgeon.

Custom orthotic devices may be considered for some cases of asymptomatic flatfoot.

When the child has symptoms, treatment is required. The foot and ankle surgeon may select one or more of the following non-surgical approaches:

- **Activity modifications.** The child needs to temporarily decrease activities that bring pain as well as avoid prolonged walking or standing.
- **Orthotic devices.** The foot and ankle surgeon can provide custom orthotic devices that fit inside the shoe to support the structure of the foot and improve function.
- **Physical therapy.** Stretching exercises, supervised by the foot and ankle surgeon or a physical therapist, provide relief in some cases of flatfoot.
- **Medications.** Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, may be recommended to help reduce pain and inflammation.
- **Shoe modifications.** The foot and ankle surgeon will advise you on footwear characteristics that are important for the child with flatfoot.

When Is Surgery Needed?

In some cases, surgery is necessary to relieve the symptoms and improve foot function. The surgical procedure or combination of procedures selected for your child will depend on his or her type of flatfoot and degree of deformity.

Peripheral Arterial Disease (P.A.D.)

What is Peripheral Arterial Disease?

Commonly referred to as “poor circulation,” Peripheral Arterial Disease (P.A.D.) is the restriction of blood flow in the arteries of the leg. When arteries become narrowed by plaque (the accumulation of cholesterol and other materials on the walls of the arteries), the oxygen-rich blood flowing through the arteries cannot reach the legs and feet.

The presence of P.A.D. may be an indication of more widespread arterial disease in the body that can affect the brain, causing stroke, or the heart, causing a heart attack.

Signs and Symptoms

Most people have no symptoms during the early stages of P.A.D. Often, by the time symptoms are noticed, the arteries are already significantly blocked.

Common symptoms of P.A.D. include:

- Leg pain (cramping) that occurs while walking (intermittent claudication)
- Leg pain (cramping) that occurs while lying down (rest pain)
- Leg numbness or weakness
- Cold legs or feet
- Sores that won't heal on toes, feet, or legs
- A change in leg color
- Loss of hair on the feet and legs
- Changes in toenails—color and thickness

If any of these symptoms are present, it is important to discuss them with a foot and ankle surgeon. Left untreated, P.A.D. can lead to debilitating and limb-threatening consequences.

Risk Factors of P.A.D.

Because only half of those with P.A.D. actually experience symptoms, it is important that people with known risk factors be screened or tested for P.A.D.

The risk factors include:

- Being over age 50
- Smoking (currently or previously)
- Diabetes
- High blood pressure
- High cholesterol
- Personal or family history of P.A.D., heart disease, heart attack, or stroke
- Sedentary lifestyle (infrequent or no exercise)

Diagnosis of P.A.D.

To diagnose P.A.D., the foot and ankle surgeon obtains a comprehensive medical history of the patient. The surgeon performs a lower extremity physical examination that includes evaluation of pulses, skin condition, and foot deformities to determine the patient's risk for P.A.D. If risk factors are present, the foot and ankle surgeon may order further tests.

Several non-invasive tests are available to assess P.A.D. The ankle-brachial index (ABI) is a simple test in which blood pressure is measured and compared at the arm and ankle levels. An abnormal ABI is a reliable indicator of underlying P.A.D. and may prompt the foot and ankle surgeon to refer the patient to a vascular specialist for additional testing and treatment as necessary.

General Treatment of P.A.D.

Treatment for P.A.D. involves lifestyle changes, medication and, in some cases, surgery.

- Lifestyle changes. These include smoking cessation, regular exercise, and eating a heart-healthy diet.
- Medications. Medicines may be used to improve blood flow, help prevent blood clots, or to control blood pressure, cholesterol, and blood glucose levels.
- Surgery. In some patients, small incision (endovascular) procedures or open (bypass) surgery of the leg are needed to improve blood flow.

P.A.D. and Foot Problems

Simple foot deformities (hammertoes, bunions, bony prominences) or dermatologic conditions such as ingrown or thickened fungal nails often become more serious concerns when P.A.D. is present. Because the legs and feet of someone with P.A.D. do not have normal blood flow—and because blood is necessary for healing—seemingly small problems such as cuts, blisters, or sores can result in serious complications.

Having both diabetes and P.A.D. further increases the potential for foot complications. People with diabetes often have neuropathy (nerve damage that can cause numbness in the feet), so they don't feel pain when foot problems occur. When neuropathy occurs in people with P.A.D., ulcers can develop over foot deformities and may never heal. For this reason, P.A.D. and diabetes are common causes of foot or leg amputations in the United States.

Once detected, P.A.D. may be corrected or at least improved. The foot and ankle surgeon can then correct the underlying foot deformity to prevent future problems should the circulation become seriously restricted again.

Avoiding P.A.D. Complications

Getting regular foot exams—as well as seeking immediate help when you notice changes in the feet—can keep small problems from worsening. P.A.D. requires ongoing attention.

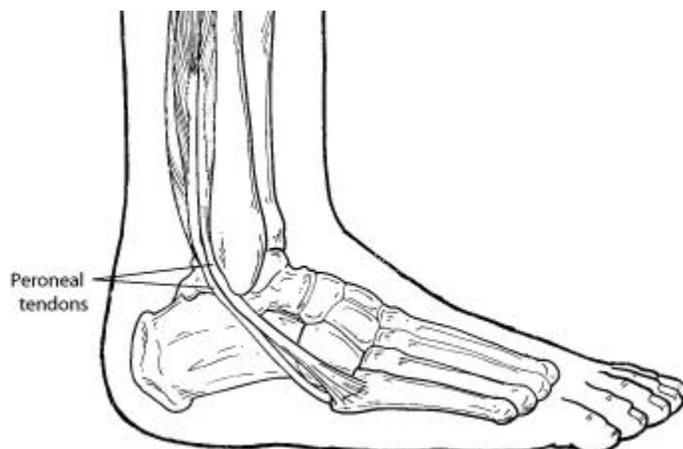
To avoid complications, people with this disease should follow these precautions:

- Wash your feet daily. Use warm (not hot) water and a mild soap. Dry your feet—including between the toes—gently and well.
- Keep the skin soft. For dry skin, apply a thin coat of lotion that does not contain alcohol. Apply over the top and bottom of your feet, but not between the toes.
- Trim toenails straight across and file the edges. Keep edges rounded to avoid ingrown toenails, which can cause infections.
- Always wear shoes and socks. To avoid cuts and abrasions, never go barefoot—even indoors.
- Choose the right shoes and socks. When buying new shoes, have an expert make sure they fit well. At first, wear them just for a few hours daily to help prevent blisters and examine the feet afterward to check for areas of irritation. Wear seamless socks to avoid getting sores.
- Check your feet—every day. Check all over for sores, cuts, bruises, breaks in the skin, rashes, corns, calluses, blisters, red spots, swelling, ingrown toenails, toenail infections, or pain.
- Call your foot and ankle surgeon. If you develop any of the above problems, seek professional help immediately. Do not try to take care of cuts, sores, or infections yourself.

Peroneal Tendon Injuries

What Are the Peroneal Tendons?

A tendon is a band of tissue that connects a muscle to a bone. The two peroneal tendons in the foot run side-by-side behind the outer ankle bone. One peroneal tendon attaches to the outer part of the midfoot, while the other tendon runs under the foot



and attaches near the inside of the arch. The main function of the peroneal tendons is to stabilize the foot and ankle and protect them from sprains.

Causes and Symptoms of Peroneal Tendon Injuries

Peroneal tendon injuries may be *acute* (occurring suddenly) or *chronic* (developing over a period of time). They most commonly occur in individuals who participate in sports that involve repetitive ankle motion. In addition, people with higher arches are at risk for developing peroneal tendon injuries. Basic types of peroneal tendon injuries are tendonitis, tears, and subluxation.

Tendonitis is an inflammation of one or both tendons. The inflammation is caused by activities involving repetitive use of the tendon, overuse of the tendon, or trauma (such as an ankle sprain). Symptoms of tendonitis include:

- Pain
- Swelling
- Warmth to the touch

Acute tears are caused by repetitive activity or trauma. Immediate symptoms of acute tears include:

- Pain
- Swelling
- Weakness or instability of the foot and ankle

As time goes on, these tears may lead to a change in the shape of the foot, in which the arch may become higher.

Degenerative tears (tendonosis) are usually due to overuse and occur over long periods of time – often years. In degenerative tears, the tendon is like taffy that has been overstretched until it becomes thin and eventually frays. Having high arches also puts you at risk for developing a degenerative tear. The symptoms of degenerative tears may include:

- Sporadic pain (occurring from time to time) on the outside of the ankle
- Weakness or instability in the ankle
- An increase in the height of the arch

Subluxation – one or both tendons have slipped out of their normal position. In some cases, subluxation is due to a condition in which a person is born with a variation in the shape of the bone or muscle. In other cases, subluxation occurs following trauma, such as an ankle sprain. Damage or injury to the tissues that stabilize the tendons (retinaculum) can lead to chronic tendon subluxation. The symptoms of subluxation may include:

- A snapping feeling of the tendon around the ankle bone
- Sporadic pain behind the outside ankle bone
- Ankle instability or weakness

Early treatment of a subluxation is critical, since a tendon that continues to sublux (move out of position) is more likely to tear or rupture. Therefore, if you feel the characteristic snapping, see a foot and ankle surgeon immediately.

Diagnosis

Because peroneal tendon injuries are sometimes misdiagnosed and may worsen without proper treatment, prompt evaluation by a foot and ankle surgeon is advised. To diagnose a peroneal tendon injury, the surgeon will examine the foot and look for pain, instability, swelling, warmth, and weakness on the outer side of the ankle. In addition, an x-ray or other advanced imaging studies may be needed to fully evaluate the injury. The foot and ankle surgeon will also look for signs of an ankle sprain and other related injuries that sometimes accompany a peroneal tendon injury. Proper diagnosis is important because prolonged discomfort after a simple sprain may be a sign of additional problems.

Non-Surgical Treatment

Treatment depends on the type of peroneal tendon injury. Options include:

- **Immobilization.** A cast or splint may be used to keep the foot and ankle from moving and allow the injury to heal.
- **Medications.** Oral or injected anti-inflammatory drugs may help relieve the pain and inflammation.
- **Physical therapy.** Ice, heat, or ultrasound therapy may be used to reduce swelling and pain. As symptoms improve, exercises can be added to strengthen the muscles and improve range of motion and balance.
- **Bracing.** The surgeon may provide a brace to use for a short while or during activities requiring repetitive ankle motion. Bracing may also be an option when a patient is not a candidate for surgery.

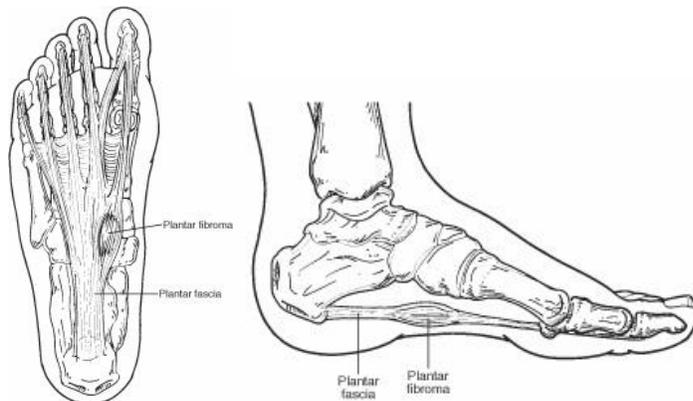
When is Surgery Needed?

In some cases, surgery may be needed to repair the tendon or tendons and perhaps the supporting structures of the foot. The foot and ankle surgeon will determine the most appropriate procedure for the patient's condition and lifestyle. After surgery, physical therapy is an important part of rehabilitation.

Plantar Fibroma

What is the Plantar Fibroma?

A plantar fibroma is a fibrous knot (nodule) in the arch of the foot. It is embedded within the plantar fascia, a band of tissue that extends from the heel to the toes on the bottom of the foot. A plantar fibroma can develop in one or both feet, is benign (non-malignant), and usually will not go away or get smaller without treatment. Definitive causes for this condition have not been clearly identified.



Signs and Symptoms

The characteristic sign of a plantar fibroma is a noticeable lump in the arch that feels firm to the touch. This mass can remain the same size or get larger over time, or additional fibromas may develop.

People who have a plantar fibroma may or may not have pain. When pain does occur, it is often caused by shoes pushing against the lump in the arch, although it can also arise when walking or standing barefoot.

Diagnosis

To diagnose a plantar fibroma, the foot and ankle surgeon will examine the foot and press on the affected area. Sometimes this can produce pain that extends down to the toes. An MRI or biopsy may be performed to further evaluate the lump and aid in diagnosis.

Treatment Options

Non-surgical treatment may help relieve the pain of a plantar fibroma, although it will not make the mass disappear. The foot and ankle surgeon may select one or more of the following non-surgical options:

- **Steroid injections.** Injecting corticosteroid medication into the mass may help shrink it and thereby relieve the pain that occurs when walking. This reduction may be only temporary and the fibroma could slowly return to its original size.
- **Orthotic devices.** If the fibroma is stable, meaning it is not changing in size, custom orthotic devices (shoe inserts) may relieve the pain by distributing the patient's weight away from the fibroma.
- **Physical therapy.** The pain is sometimes treated through physical therapy methods that deliver anti-inflammatory medication into the fibroma without the need for injection.

If the mass increases in size or pain, the patient should be further evaluated. Surgical treatment to remove the fibroma is considered if the patient continues to experience pain following non-surgical approaches.

Surgical removal of a plantar fibroma may result in a flattening of the arch or development of hammertoes. Orthotic devices may be prescribed to provide support to the foot. Due to the high incidence of recurrence with this condition, continued follow-up with the foot and ankle surgeon is recommended.

Plantar Wart (Verruca Plantaris)

What is a Plantar Wart?

A wart is a small growth on the skin that develops when the skin is infected by a virus. Warts can develop anywhere on the foot, but typically they appear on the bottom (plantar side) of the foot. Plantar warts most commonly occur in children, adolescents, and the elderly.

There are two types of plantar warts:

- A *solitary* wart is a single wart. It often increases in size and may eventually multiply, forming additional "satellite" warts.
- *Mosaic* warts are a cluster of several small warts growing closely together in one area. Mosaic warts are more difficult to treat than solitary warts.

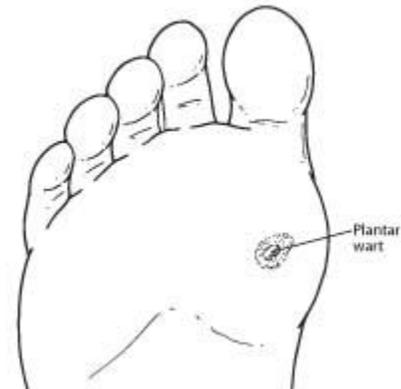
Causes

Plantar warts are caused by direct contact with the human papilloma virus (HPV). This is the same virus that causes warts on other areas of the body.

Symptoms

The symptoms of a plantar wart may include:

- **Thickened skin.** Often a plantar wart resembles a callus because of its tough, thick tissue.
- **Pain.** Walking and standing may be painful. Squeezing the sides of the wart may also cause pain.
- **Tiny black dots.** These often appear on the surface of the wart. The dots are actually dried blood contained in the capillaries (tiny blood vessels).



Plantar warts grow deep into the skin. Usually this growth occurs slowly, with the wart starting small and becoming larger over time.

Diagnosis and Treatment

To diagnose a plantar wart, the foot and ankle surgeon will examine the patient's foot and look for signs and symptoms of a wart.

Although plantar warts may eventually clear up on their own, most patients desire faster relief. The goal of treatment is to completely remove the wart.

The foot and ankle surgeon may use topical or oral treatments, laser therapy, cryotherapy (freezing), acid treatments, or surgery to remove the wart.

Regardless of the treatment approaches undertaken, it is important that the patient follow the surgeon's instructions, including all home care and medication that has been prescribed, as well as follow-up visits with the surgeon. Warts may return, requiring further treatment.

If there is no response to treatment, further diagnostic evaluation may be necessary. In such cases, the surgeon can perform a biopsy to rule out other potential causes for the growth.

Although there are many folk remedies for warts, patients should be aware that these remain unproven and may be dangerous. Patients should never try to remove warts themselves. This can do more harm than good.

Podiatrist

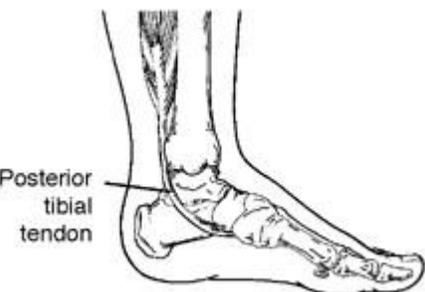
A **podiatrist** is a physician whose practice focuses on preventing, diagnosing, and treating conditions of the foot and ankle. Achieving the Doctor of Podiatric Medicine degree (DPM) requires four years of training in an accredited podiatric medical school, followed by a hospital-based residency.

Posterior Tibial Tendon Dysfunction (PTTD)

What Is PTTD?

The posterior tibial tendon serves as one of the major supporting structures of the foot, helping it to function while walking. Posterior tibial tendon dysfunction (PTTD) is a condition caused by changes in the tendon, impairing its ability to support the arch. This results in flattening of the foot.

PTTD is often called "adult acquired flatfoot" because it is the most common type of flatfoot developed during adulthood. Although this condition typically occurs in only one foot, some people may develop it in both feet. PTTD is usually progressive, which means it will keep getting worse, especially if it isn't treated early.



Causes

Overuse of the posterior tibial tendon is often the cause of PTTD. In fact, the symptoms usually occur after activities that involve the tendon, such as running, walking, hiking, or climbing stairs.

Symptoms

The symptoms of PTTD may include pain, swelling, a flattening of the arch, and an inward rolling of the ankle. As the condition progresses, the symptoms will change.

For example, when PTTD initially develops, there is pain on the inside of the foot and ankle (along the course of the tendon). In addition, the area may be red, warm, and swollen.

Later, as the arch begins to flatten, there may still be pain on the inside of the foot and ankle. But at this point, the foot and toes begin to turn outward and the ankle rolls inward.

As PTTD becomes more advanced, the arch flattens even more and the pain often shifts to the outside of the foot, below the ankle. The tendon has deteriorated considerably and arthritis often develops in the foot. In more severe cases, arthritis may also develop in the ankle.



Non-surgical Treatment

Because of the progressive nature of PTTD, early treatment is advised. If treated early enough, your symptoms may resolve without the need for surgery and progression of your condition can be arrested.

In contrast, untreated PTTD could leave you with an extremely flat foot, painful arthritis in the foot and ankle, and increasing limitations on walking, running, or other activities.

In many cases of PTTD, treatment can begin with non-surgical approaches that may include:

- **Orthotic devices or bracing.** To give your arch the support it needs, your foot and ankle surgeon may provide you with an ankle brace or a custom orthotic device that fits into the shoe.
- **Immobilization.** Sometimes a short-leg cast or boot is worn to immobilize the foot and allow the tendon to heal, or you may need to completely avoid all weight-bearing for a while.
- **Physical therapy.** Ultrasound therapy and exercises may help rehabilitate the tendon and muscle following immobilization.
- **Medications.** Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, help reduce the pain and inflammation.
- **Shoe modifications.** Your foot and ankle surgeon may advise changes to make with your shoes and may provide special inserts designed to improve arch support.

When Is Surgery Needed?

In cases of PTTD that have progressed substantially or have failed to improve with non-surgical treatment, surgery may be required. For some advanced cases, surgery may be the only option. Your foot and ankle surgeon will determine the best approach for you.

Puncture Wounds

What Is a Puncture Wound?

Puncture wounds are not the same as cuts. A puncture wound has a small entry hole caused by a pointed object, such as a nail that you've stepped on. In contrast, a cut is an open wound that produces a long tear in the skin. Puncture wounds require different treatment from cuts because these small holes in the skin can disguise serious injury.

Puncture wounds are common in the foot, especially in warm weather when people go barefoot. But even though they occur frequently, puncture wounds of the foot are often inadequately treated. If not properly treated, infection or other complications can develop.

Proper treatment within the first 24 hours is especially important with puncture wounds because they carry the danger of embedding the piercing object (foreign body) under the skin. Research shows that complications can be prevented if the patient seeks professional treatment right away.

Foreign Bodies in Puncture Wounds

A variety of foreign bodies can become embedded in a puncture wound. Nails, glass, toothpicks, sewing needles, insulin needles, and seashells are some common ones. In addition, pieces of your own skin, sock, and shoe can be forced into the wound during a puncture, along with dirt and debris from the object. All puncture wounds are dirty wounds because they involve penetration of an object that isn't sterile. Anything that remains in the wound increases your chance of developing other problems, either in the near future or later.

Severity of Wounds

There are different ways of determining the severity of a puncture wound. Depth of the wound is one way to evaluate it. The deeper the puncture, the more likely it is that complications such as infection will develop. Many patients cannot judge how far their puncture extends into the foot. Therefore, if you've stepped on something and the skin was penetrated, seek treatment as soon as possible.

The type and the "cleanliness" of the penetrating object also determine the severity of the wound. Larger or longer objects can penetrate deeper into the tissues, possibly causing more damage. The dirtier an object, such as a rusty nail, the more dirt and debris are dragged into the wound, increasing the chance of infection.

Another thing that can determine wound severity is if you were wearing socks and shoes, particles of which can get trapped in the wound.

Treatment

A puncture wound must be cleaned properly and monitored throughout the healing process to avoid complications.

Even if you have gone to an emergency room for immediate treatment of your puncture wound, see a foot and ankle surgeon for a thorough cleaning and careful follow-up. The sooner you do this, the better: within 24 hours after injury, if possible.

The surgeon will make sure the wound is properly cleaned and no foreign body remains. He or she may numb the area, thoroughly clean inside and outside the wound, and monitor your progress. In some cases, x-rays may be ordered to determine whether something remains in the wound or if bone damage has occurred. Antibiotics may be prescribed if necessary.

Avoiding Complications

Follow the foot and ankle surgeon's instructions for care of the wound to prevent complications (see "Puncture Wounds: What You Should Do").

Infection is a common complication of puncture wounds that can lead to serious consequences. Sometimes a minor skin infection evolves into a bone or joint infection, so you should be aware of signs to look for. A minor skin infection may develop in two to five days after injury. The signs of a minor infection that show up around the wound include soreness, redness, and possibly drainage, swelling, and warmth. You may also develop a fever. If these signs have not improved, or if they reappear in 10 to 14 days, a serious infection in the joint or bone may have developed.

Other complications that may arise from inadequate treatment of puncture wounds include painful scarring in the area of the wound or a hard cyst where the foreign body has remained in the wound.

Although the complications of puncture wounds can be quite serious, early and proper treatment can play a crucial role in preventing them.

Puncture Wounds: What You Should Do

- Seek treatment right away.
- Get a tetanus shot if needed (usually every ten years).
- See a foot and ankle surgeon within 24 hours.
- Follow your doctor's instructions:
 - Keep your dressing dry.
 - Keep weight off of the injured foot.
 - Finish all your antibiotics (if prescribed).
 - Take your temperature regularly.
 - Watch for signs of infection (pain, redness, swelling, fever). Call your doctor if these signs appear.

Restless Legs

An uncontrolled urge to move one's legs is referred to as "**restless legs**." This can happen while trying to sleep, while traveling, or any time the legs are at rest. There is no known test to diagnose the problem; instead, the foot and ankle surgeon considers the individual's history to determine possible causes of the symptoms.

Rheumatoid Arthritis in the Foot and Ankle

What is Rheumatoid Arthritis?

Rheumatoid arthritis (RA) is a disease in which certain cells of the immune system malfunction and attack healthy joints.

RA causes inflammation in the lining (synovium) of joints, most often the joints of the hands and feet. The signs of inflammation can include pain, swelling, redness, and a feeling of warmth around affected joints. In some patients, chronic inflammation results in damage to the cartilage and bones in the joint. Serious damage can lead to permanent joint destruction, deformity, and disability.

When joints become inflamed due to RA, the synovium thickens and produces an excess of joint fluid. This overabundance of fluid, along with inflammatory chemicals released by the immune system, causes swelling and damage to the joint's cartilage and bones.

Symptoms Affecting the Foot and Ankle

Foot problems caused by RA commonly occur in the forefoot (the ball of the foot, near the toes), although RA can also affect other areas of the foot and ankle. The most common signs and symptoms of RA-related foot problems, in addition to the abnormal appearance of deformities, are pain, swelling, joint stiffness, and difficulty walking.

Deformities and conditions associated with RA may include:

- Rheumatoid nodules (lumps), which cause pain when they rub against shoes or, if they appear on the bottom of the foot, pain when walking

- Dislocated toe joints
- Hammertoes
- Bunions
- Heel pain
- Achilles tendon pain
- Flatfoot
- Ankle pain

Diagnosis

RA is diagnosed on the basis of a clinical examination as well as blood tests.

To further evaluate the patient's foot and ankle problems, the surgeon may order x-rays and/or other imaging tests.

Treatment by the Foot and Ankle Surgeon

While treatment of RA focuses on the medication prescribed by a patient's primary doctor or rheumatologist, the foot and ankle surgeon will develop a treatment plan aimed at relieving the pain of RA-related foot problems. The plan may include one or more of the following options:

- **Orthotic devices.** The surgeon often fits the patient with custom orthotic devices to provide cushioning for rheumatoid nodules, minimize pain when walking, and give needed support to improve the foot's mechanics.
- **Accommodative shoes.** These are used to relieve pressure and pain and assist with walking.
- **Aspiration of fluid.** When inflammation flares up in a joint, the surgeon may aspirate (draw out) fluid to reduce the swelling and pain.
- **Steroid injections.** Injections of anti-inflammatory medication may be applied directly to an inflamed joint or to a rheumatoid nodule.

When is Surgery Needed?

When RA produces pain and deformity in the foot that is not relieved through other treatments, surgery may be required. The foot and ankle surgeon will select the procedure best suited to the patient's condition and lifestyle.

Sesamoid Injuries in the Foot

What is a Sesamoid?

A sesamoid is a bone embedded in a tendon. Sesamoids are found in several joints in the body. In the normal foot, the sesamoids are two pea-shaped bones located in the ball of the foot, beneath the big toe joint.

Acting as a pulley for tendons, the sesamoids help the big toe move normally and provide leverage when the big toe "pushes off" during walking and running. The sesamoids also serve as a weight-bearing surface for the first metatarsal bone (the long bone connected to the big toe), absorbing the weight placed on the ball of the foot when walking, running, and jumping.

Sesamoid injuries can involve the bones, tendons, and/or surrounding tissue in the joint. They are often associated with activities requiring increased pressure on the ball of the foot, such as running, basketball, football, golf, tennis, and ballet. In addition, people with high arches are at risk for developing sesamoid problems. Frequent wearing of high-heeled shoes can also be a contributing factor.



Types of Sesamoid Injuries in the Foot

There are three types of sesamoid injuries in the foot:

- **Turf toe.** This is an injury of the soft tissue surrounding the big toe joint. It usually occurs when the big toe joint is extended beyond its normal range. Turf toe causes immediate, sharp pain and swelling. It usually affects the entire big toe joint and limits the motion of the toe. Turf toe may result in an injury to the soft tissue attached to the sesamoid or a fracture of the sesamoid. Sometimes a “pop” is felt at the moment of injury.

- **Fracture.** A fracture (break) in a sesamoid bone can be either acute or chronic.

- An *acute* fracture is caused by trauma – a direct blow or impact to the bone. An acute sesamoid fracture produces immediate pain and swelling at the site of the break, but usually does not affect the entire big toe joint.
- A *chronic* fracture is a stress fracture (a hairline break usually caused by repetitive stress or overuse). A chronic sesamoid fracture produces longstanding pain in the ball of the foot beneath the big toe joint.



The pain, which tends to come and go, generally is aggravated with activity and relieved with rest.

- **Sesamoiditis.** This is an overuse injury involving chronic inflammation of the sesamoid bones and the tendons involved with those bones. Sesamoiditis is caused by increased pressure to the sesamoids. Often, sesamoiditis is associated with a dull, longstanding pain beneath the big toe joint. The pain comes and goes, usually occurring with certain shoes or certain activities.

Diagnosis

In diagnosing a sesamoid injury, the foot and ankle surgeon will examine the foot, focusing on the big toe joint. The surgeon will press on the big toe, move it up and down, and may assess the patient’s walking and evaluate the wear pattern on the patient’s shoes. X-rays are ordered, and in some cases, advanced imaging studies may be ordered.

Non-Surgical Treatment

Non-surgical treatment for sesamoid injuries of the foot may include one or more of the following options, depending on the type of injury and degree of severity:

- **Padding, strapping, or taping.** A pad may be placed in the shoe to cushion the inflamed sesamoid area, or the toe may be taped or strapped to relieve that area of tension.
- **Immobilization.** The foot may be placed in a cast or removable walking cast. Crutches may be used to prevent placing weight on the foot.
- **Oral medications.** Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, are often helpful in reducing the pain and inflammation.
- **Physical therapy.** The rehabilitation period following immobilization sometimes includes physical therapy, such as exercises (range-of-motion, strengthening, and conditioning) and ultrasound therapy.
- **Steroid injections.** In some cases, cortisone is injected in the joint to reduce pain and inflammation.
- **Orthotic devices.** Custom orthotic devices that fit into the shoe may be prescribed for long-term treatment of sesamoiditis to balance the pressure placed on the ball of the foot.

When is Surgery Needed?

When sesamoid injuries fail to respond to non-surgical treatment, surgery may be required. The foot and ankle surgeon will determine the type of procedure that is best suited to the individual patient.

Shin Splints

“**Shin splints**” is a term to describe pain and swelling in the front of the lower legs. The pain usually appears after and is aggravated by repetitive activities such as running or walking. Contributing causes are flat feet, calf tightness, improper training techniques, worn out or improper shoes/sneakers, as well as running or walking on uneven surfaces. The inflammation in the shin results from the repeated pull of a muscle in the leg from the shin bone (tibia).

This condition usually occurs bilaterally (both legs) and can be alleviated by rest, use of non steroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, icing, a change in training habits, stretching exercises, and properly fitted shoes. A foot and ankle surgeon can treat the condition, recommend proper shoe gear, and evaluate whether orthotics are needed. If not treated, shin splints may eventually result in a stress fracture of the shin bone.

Shoe Inserts

Arch supports and shoe inserts are devices that are placed inside of shoes to support and align the foot and lower extremities (knees, hips, and lower back), thus preventing the progression of a foot deformity, improving the function of the foot, and diminishing or eliminating pain.

These devices can range from generic over-the-counter inserts to prescription devices custom made for the individual's foot and/or foot problem.

Smelly Feet

A **smelly foot** is a common condition in children and adults who wear shoes on a daily basis. People with smelly feet may also suffer from sweaty feet. Most people with this condition will have sweaty and smelly feet year round, not just in the hot summer months. The odor is produced by bacteria and/or fungus that grows in the shoes and attaches to the skin. Some bacteria actually eat away the top layer of the skin, producing a foul odor. Hygiene is very important to help prevent smelly feet. Feet should be washed daily with soap and water and clean dry socks worn. Some synthetic materials used in shoes, when mixed with sweat and bacteria, can produce smelly feet. The foot and ankle surgeon will recommend one of a variety of treatments for this condition.

Soft Tissue Biopsy

What is a Soft Tissue Biopsy?

A soft tissue biopsy is the removal and microscopic examination of a small sample of soft tissue for diagnostic purposes. “Soft tissue” includes the skin, fat, muscle, and tendons that surround, connect, or support other tissues or organs.

Soft tissue biopsies require little time or involvement from the patient. They enable the foot and ankle surgeon to reach an accurate diagnosis and determine the best treatment for the specific condition.

Conditions Identified by Soft Tissue Biopsies

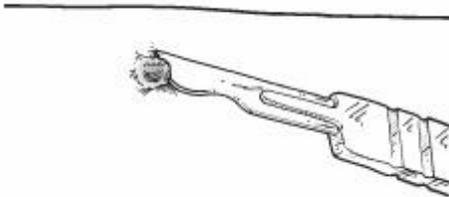
Non-surgical treatment may help relieve the pain of a plantar fibroma, although it will not make the mass disappear. The foot and ankle surgeon may select one or more of the following non-surgical options:

- Freckles (macules)
- Benign pigmented, or colored, spots (moles or nevus)
- Fungal or bacterial infections
- Rashes (such as eczema or dermatitis)
- Lesions related to a disease affecting the entire body (such as diabetes)
- Nodular conditions (such as a ganglion cyst, lipoma, or fibroma)
- Toenail conditions (onychomycosis, psoriasis)
- Wart-like growths on the skin (benign keratoses)
- Premalignant conditions (actinic and seborrheic keratoses)

What Does the Biopsy Involve?

A biopsy involves removal of a small piece of tissue, and takes just a few minutes. The procedure performed will depend on the tissue to be sampled. After numbing the area, the surgeon performs one of the following:

Shave biopsy. A thin piece of tissue is shaved off.



Shave biopsy

Punch biopsy. A small, round instrument removes a tiny core of tissue. Stitches may be needed.



Punch biopsy

Incisional or excisional biopsy. A piece, or the entire lesion, is removed. Stitches are often needed.



Excisional biopsy

Once the sample is obtained, the surgeon sends it to a clinical laboratory so that the condition can be identified. The specimen will be examined by a pathologist who specializes in evaluating soft tissue biopsies.

After the Biopsy

Patients should follow the instructions provided by the surgeon for care of the biopsy site. If the area has stitches, an appointment will be scheduled for their removal.

It usually takes several days for the lab results to arrive at the surgeon's office. If the patient has not heard about the results after 10 days, the surgeon's office should be contacted. Biopsy results, as well as additional treatment that may be required, will then be discussed.

Stress Fracture in the Foot

Stress fractures are tiny, hairline breaks that can occur in the bones of the foot. They can be caused by overtraining or overuse, improper training habits or surfaces, improper shoes, flatfoot or other foot deformities, and even osteoporosis. These tiny breaks in the bones of the feet can lead to a complete break if left untreated.

Pain, swelling, redness, and possibly bruising can be signs of a stress fracture. The fracture can occur almost anywhere in the foot. X-rays and other studies are used to diagnose the stress fracture. A foot and ankle surgeon should be seen as early as possible to start treatment and possibly shorten the recovery time. Possible treatments include rest and possible immobilization of the foot. In some cases, surgery may be required to stabilize the stress fracture or to repair a stress fracture that has progressed to a fracture.

Sweaty Feet

The number of sweat glands is most dense at the feet and hands. **Sweaty feet** are a common disorder in which the sweat glands of the feet produce excessive sweat. Persons with this condition usually have a genetic predisposition or are under stress, which activates the brain to produce more sweat to keep the body cool.

Athlete's foot or smelly feet may accompany sweaty feet. The foot and ankle surgeon can recommend one of a variety of treatments for this condition.

Swollen Ankles

Swelling of the ankles may be due to many factors, including trauma, infection, tumor, varicose veins, improper function of the lymphatic system, poor circulation, hypertension, and congestive heart failure, to name a few. The foot and ankle surgeon will recommend treatment based on examination and diagnosis of the cause of the swelling.

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Tailor's Bunion (Bunionette)

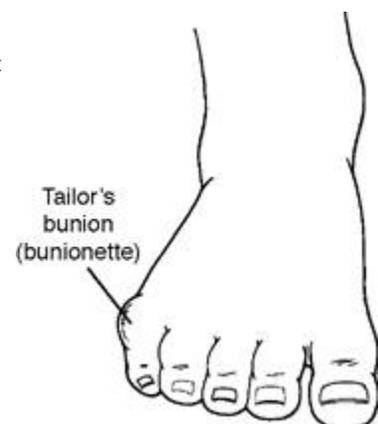
What Is a Tailor's Bunion?

Tailor's bunion, also called a bunionette, is a prominence of the fifth metatarsal bone at the base of the little toe. The metatarsals are the five long bones of the foot. The prominence that characterizes a tailor's bunion occurs at the metatarsal "head," located at the far end of the bone where it meets the toe. Tailor's bunions are not as common as bunions, which occur on the inside of the foot, but they are similar in symptoms and causes.

Why is it called a tailor's bunion? The deformity received its name centuries ago, when tailors sat cross-legged all day with the outside edge of their feet rubbing on the ground. This constant rubbing led to a painful bump at the base of the little toe.

Causes

Often a tailor's bunion is caused by an inherited faulty mechanical structure of the foot. In these cases, changes occur in the foot's bony framework, resulting in the development of an enlargement. The fifth metatarsal bone starts to protrude outward, while the little toe moves inward. This shift creates a bump on the outside of the foot that becomes irritated whenever a shoe presses against it.



Sometimes a tailor's bunion is actually a bony spur (an outgrowth of bone) on the side of the fifth metatarsal head.

Regardless of the cause, the symptoms of a tailor's bunion are usually aggravated by wearing shoes that are too narrow in the toe, producing constant rubbing and pressure.

Symptoms

The symptoms of tailor's bunions include redness, swelling, and pain at the site of the enlargement. These symptoms occur when wearing shoes that rub against the enlargement, irritating the soft tissues underneath the skin and producing inflammation.

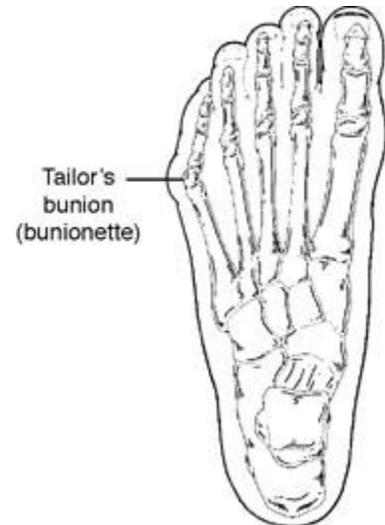
Diagnosis

Tailor's bunion is easily diagnosed because the protrusion is visually apparent. X-rays may be ordered to help the foot and ankle surgeon determine the cause and extent of the deformity.

Non-Surgical Treatment

Treatment for tailor's bunion typically begins with non-surgical therapies. Your foot and ankle surgeon may select one or more of the following:

- **Shoe modifications.** Choose shoes that have a wide toe box, and avoid those with pointed toes or high heels.
- **Padding.** Bunionette pads placed over the area may help reduce pain.
- **Oral medications.** Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, may help relieve the pain and inflammation.
- **Icing.** An ice pack may be applied to reduce pain and inflammation. Wrap the pack in a thin towel rather than placing ice directly on your skin.
- **Injection therapy.** Injections of corticosteroid may be used to treat the inflamed tissue around the joint.
- **Orthotic devices.** In some cases, custom orthotic devices may be provided by the foot and ankle surgeon.



When Is Surgery Needed?

Surgery is often considered when pain continues despite the above approaches. In selecting the procedure or combination of procedures for your case, the foot and ankle surgeon will take into consideration the extent of your deformity based on the x-ray findings, your age, your activity level, and other factors. The length of the recovery period will vary, depending on the procedure or procedures performed.

Talar Dome Lesion

What is a Talar Dome Lesion?

The ankle joint is composed of the bottom of the tibia (shin) bone and the top of the talus (ankle) bone. The top of the talus is dome-shaped and is completely covered with cartilage—a tough, rubbery tissue that enables the ankle to move smoothly. A talar dome lesion is an injury to the cartilage and underlying bone of the talus within the ankle joint. It is also called an osteochondral defect (OCD) or osteochondral lesion of the talus (OLT). “Osteo” means bone and “chondral” refers to cartilage.

Talar dome lesions are usually caused by an injury, such as an ankle sprain. If the cartilage doesn't heal properly following the injury, it softens and begins to break off. Sometimes a broken piece of the damaged cartilage and bone will “float” in the ankle.



Signs and Symptoms

Unless the injury is extensive, it may take months, a year, or even longer for symptoms to develop. The signs and symptoms of a talar dome lesion may include:

- Chronic pain deep in the ankle—typically worse when bearing weight on the foot (especially during sports) and less when resting
- An occasional “clicking” or “catching” feeling in the ankle when walking
- A sensation of the ankle “locking” or “giving out”
- Episodes of swelling of the ankle—occurring when bearing weight and subsiding when at rest

Diagnosis

A talar dome lesion can be difficult to diagnose, because the precise site of the pain can be hard to pinpoint. To diagnose this injury, the foot and ankle surgeon will question the patient about recent or previous injury and will examine the foot and ankle, moving the ankle joint to help determine if there is pain, clicking, or limitation of motion within that joint.

Sometimes the surgeon will inject the joint with an anesthetic (pain-relieving medication) to see if the pain goes away for a while, indicating that the pain is coming from inside the joint.

X-rays are taken, and often an MRI or other advanced imaging tests are ordered to further evaluate the lesion and extent of the injury.

Treatment: Non-Surgical Approaches

Treatment depends on the severity of the talar dome lesion. If the lesion is stable (without loose pieces of cartilage or bone), one or more of the following non-surgical treatment options may be considered:

- **Immobilization.** Depending on the type of injury, the leg may be placed in a cast or cast boot to protect the talus. During this period of immobilization, non-weightbearing range-of-motion exercises may be recommended.
- **Oral medications.** Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, may be helpful in reducing the pain and inflammation.
- **Physical therapy.** Range-of-motion and strengthening exercises are beneficial once the lesion is adequately healed. Physical therapy may also include techniques to reduce pain and swelling.
- **Ankle brace.** Wearing an ankle brace may help protect the patient from re-injury if the ankle is unstable.

When is Surgery Needed?

If non-surgical treatment fails to relieve the symptoms of talar dome lesions, surgery may be necessary. Surgery may involve removal of the loose bone and cartilage fragments within the joint and establishing an environment for healing. A variety of surgical techniques is available to accomplish this. The surgeon will select the best procedure based on the specific case.

Complications of Talar Dome Lesions

Depending on the amount of damage to the cartilage in the ankle joint, arthritis may develop in the joint, resulting in chronic pain, swelling and limited joint motion. Treatment for these complications is best directed by a foot and ankle surgeon, and may include one or more of the following

- Non-steroidal or steroidal anti-inflammatory medications
- Physical therapy
- Bracing
- Surgical intervention

Tarsal Coalition

What is a Tarsal Coalition?

A tarsal coalition is an abnormal connection that develops between two bones in the back of the foot (the tarsal bones). This abnormal connection, which can be composed of bone, cartilage, or fibrous tissue, may lead to limited motion and pain in one or both feet.

The tarsal bones include the calcaneus (heel bone), talus, navicular, cuboid, and cuneiform bones. These bones work together to provide the motion necessary for normal foot function.

Causes

Most often, tarsal coalition occurs during fetal development, resulting in the individual bones not forming properly. Less common causes of tarsal coalition include infection, arthritis, or a previous injury to the area.

Symptoms

While many people who have a tarsal coalition are born with this condition, the symptoms generally do not appear until the bones begin to mature, usually around ages 9 to 16. Sometimes there are no symptoms during childhood. However, pain and symptoms may develop later in life.

The symptoms of tarsal coalition may include one or more of the following:

- Pain (mild to severe) when walking or standing
- Tired or fatigued legs
- Muscle spasms in the leg, causing the foot to turn outward when walking
- Flatfoot (in one or both feet)
- Walking with a limp
- Stiffness of the foot and ankle

Diagnosis

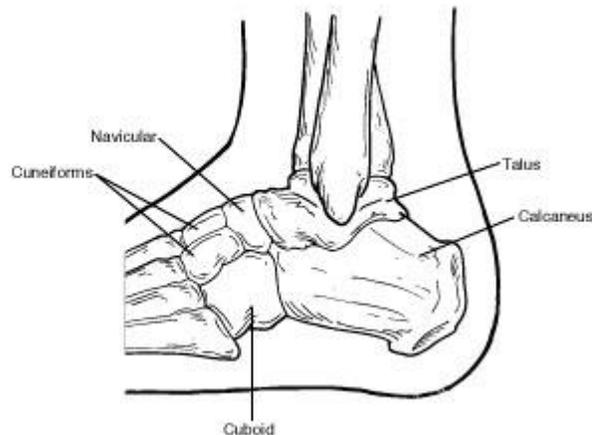
A tarsal coalition is difficult to identify until a child's bones begin to mature. It is sometimes not discovered until adulthood. Diagnosis includes obtaining information about the duration and development of the symptoms as well as a thorough examination of the foot and ankle. The findings of this examination will differ according to the severity and location of the coalition.

In addition to examining the foot, the surgeon will order x-rays. Advanced imaging studies may also be required to fully evaluate the condition.

Non-surgical Treatment

The goal of non-surgical treatment of tarsal coalition is to relieve the symptoms and reduce the motion at the affected joint. One or more of the following options may be used, depending on the severity of the condition and the response to treatment:

- **Oral medications.** Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, may be helpful in reducing the pain and inflammation.
- **Physical therapy.** Physical therapy may include massage, range-of-motion exercises, and ultrasound therapy.



- **Steroid injections.** An injection of cortisone into the affected joint reduces the inflammation and pain. Sometimes more than one injection is necessary.
- **Orthotic devices.** Custom orthotic devices can be beneficial in distributing weight away from the joint, limiting motion at the joint and relieving pain.
- **Immobilization.** Sometimes the foot is immobilized to give the affected area a rest. The foot is placed in a cast or cast boot, and crutches are used to avoid placing weight on the foot.
- **Injection of an anesthetic agent.** Injection of an anesthetic into the leg may be used to relax spasms and is often performed prior to immobilization.

When is Surgery Needed?

If the patient's symptoms are not adequately relieved with nonsurgical treatment, surgery is an option. The foot and ankle surgeon will determine the best surgical approach based on the patient's age, condition, arthritic changes, and activity level.

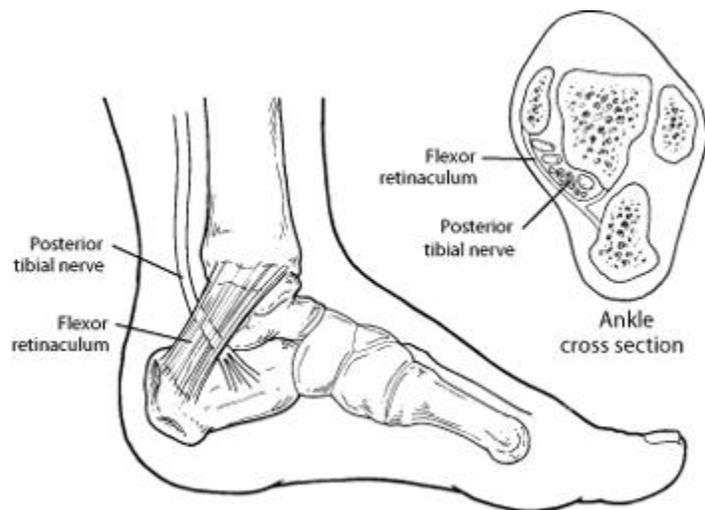
Tarsal Tunnel Syndrome

What Is the Tarsal Tunnel?

The tarsal tunnel is a narrow space that lies on the inside of the ankle next to the ankle bones. The tunnel is covered with a thick ligament (the flexor retinaculum) that protects and maintains the structures contained within the tunnel—arteries, veins, tendons, and nerves. One of these structures is the posterior tibial nerve, which is the focus of tarsal tunnel syndrome.

What Is Tarsal Tunnel Syndrome?

Tarsal tunnel syndrome is a compression, or squeezing, on the posterior tibial nerve that produces symptoms anywhere along the path of the nerve running from the inside of the ankle into the foot.



Tarsal tunnel syndrome is similar to carpal tunnel

syndrome, which occurs in the wrist. Both disorders arise from the compression of a nerve in a confined space.

Causes

Tarsal tunnel syndrome is caused by anything that produces compression on the posterior tibial nerve, such as:

- A person with flat feet is at risk for developing tarsal tunnel syndrome, because the outward tilting of the heel that occurs with “fallen” arches can produce strain and compression on the nerve.
- An enlarged or abnormal structure that occupies space within the tunnel can compress the nerve. Some examples include a varicose vein, ganglion cyst, swollen tendon, and arthritic bone spur.
- An injury, such as an ankle sprain, may produce inflammation and swelling in or near the tunnel, resulting in compression of the nerve.
- Systemic diseases such as diabetes or arthritis can cause swelling, thus compressing the nerve.

Symptoms

Patients with tarsal tunnel syndrome experience one or more of the following symptoms:

- Tingling, burning, or a sensation similar to an electrical shock
- Numbness
- Pain, including shooting pain

Symptoms are typically felt on the inside of the ankle and/or on the bottom of the foot. In some people, a symptom may be isolated and occur in just one spot. In others, it may extend to the heel, arch, toes, and even the calf.

Sometimes the symptoms of the syndrome appear suddenly. Often they are brought on or aggravated by overuse of the foot, such as in prolonged standing, walking, exercising, or beginning a new exercise program.

It is very important to seek early treatment if any of the symptoms of tarsal tunnel syndrome occur. If left untreated, the condition progresses and may result in permanent nerve damage. In addition, because the symptoms of tarsal tunnel syndrome can be confused with other conditions, proper evaluation is essential so that a correct diagnosis can be made and appropriate treatment initiated.

Diagnosis

The foot and ankle surgeon will examine the foot to arrive at a diagnosis and determine if there is any loss of feeling. During this examination, the surgeon will position the foot and tap on the nerve to see if the symptoms can be reproduced. He or she will also press on the area to help determine if a small mass is present.

Advanced imaging studies may be ordered if a mass is suspected or if initial treatment does not reduce the symptoms. Studies used to evaluate nerve problems—electromyography and nerve conduction velocity (EMG/NCV)—may be ordered if the condition shows no improvement with non-surgical treatment.

Non-surgical Treatment

A variety of treatment options, often used in combination, are available to treat tarsal tunnel syndrome. These include:

- **Rest.** Staying off the foot prevents further injury and encourages healing.
- **Ice.** Apply an ice pack to the affected area, placing a thin towel between the ice and the skin. Use ice for 20 minutes and then wait at least 40 minutes before icing again.
- **Oral medications.** Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, help reduce the pain and inflammation.
- **Immobilization.** Restricting movement of the foot by wearing a cast is sometimes necessary to enable the nerve and surrounding tissue to heal.
- **Physical therapy.** Ultrasound therapy, exercises, and other physical therapy modalities may be prescribed to reduce symptoms.
- **Injection therapy.** Injections of a local anesthetic provide pain relief, and an injected corticosteroid may be useful in treating the inflammation.
- **Orthotic devices.** Custom shoe inserts may be prescribed to help maintain the arch and limit excessive motion that can cause compression of the nerve.
- **Shoes.** Supportive shoes may be recommended.
- **Bracing.** Patients with flatfoot or those with severe symptoms and nerve damage may be fitted with a brace to reduce the amount of pressure on the foot.

When is Surgery Needed?

Sometimes surgery is the best option for treating tarsal tunnel syndrome. The foot and ankle surgeon will determine if surgery is necessary and will select the appropriate procedure or procedures based on the cause of the condition.

Thick Toenails

Toenails will often become thick as an individual grows older. Thickening may also occur as a result of trauma to the toenail, such as when it repeatedly hits the end of a shoe that is too short. Sometimes when something is dropped on the toenail, the nail will fall off. When a new toenail grows back it will often be thicker than it was previously.

Thick toenails can also be seen in individuals with nail fungus (onychomycosis), psoriasis, and hypothyroidism. Those who have problems with the thickness of their toenails should consult a foot and ankle surgeon for proper diagnosis and treatment.

Tingly Feet

"**Tingly feet**" can be a sign of nerve loss. The nerves in the feet come from the lower back. Pressure or chemical change in the nerve can cause a tingling sensation in the feet. Any sensation that is out of the ordinary can be an early sign of neurologic or vascular problems. In addition to tingling, feet may feel numb or feel like they are "falling asleep." There may also be a burning sensation in the feet.

Diabetes is one of the most common medical conditions with which "tingly feet" can be associated. A thorough evaluation by a foot and ankle surgeon is advised to determine the cause of "tingly feet."

Tired Feet

"**Tired feet**" are not a medical condition, but are a common complaint related to various medical conditions. Abnormal foot structure (flatfoot or high arched foot) can overburden the foot, resulting in muscle fatigue. Obesity, improper footwear, pregnancy, leg swelling, increased activity level, or compensation from an injury (through overuse of other parts of the foot and/or the opposite foot) are other potential factors in the development of tired feet.

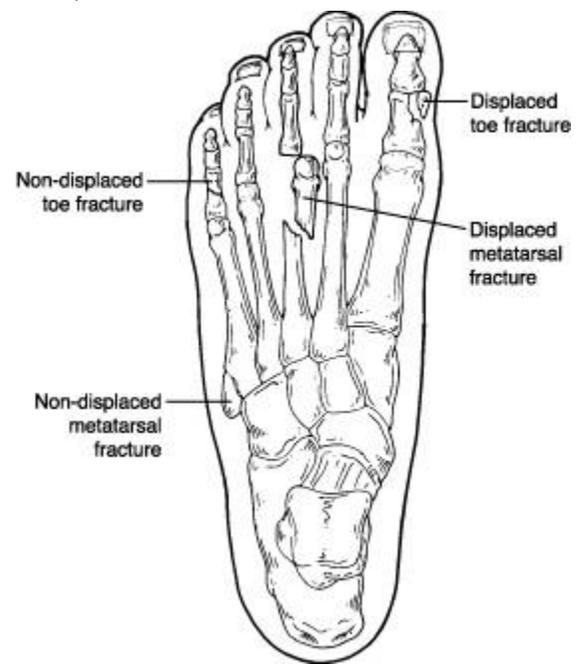
Toe and Metatarsal Fractures (Broken toes)

The structure of the foot is complex, consisting of bones, muscles, tendons, and other soft tissues. Of the 26 bones in the foot, 19 are toe bones (phalanges) and metatarsal bones (the long bones in the midfoot). Fractures of the toe and metatarsal bones are common and require evaluation by a specialist. A foot and ankle surgeon should be seen for proper diagnosis and treatment, even if initial treatment has been received in an emergency room.

What Is a Fracture?

A fracture is a break in the bone. Fractures can be divided into two categories: traumatic fractures and stress fractures.

Traumatic fractures (also called acute fractures) are caused by a direct blow or impact, such as seriously stubbing your toe. Traumatic fractures can be *displaced* or *non-displaced*. If the



fracture is displaced, the bone is broken in such a way that it has changed in position (dislocated).

Signs and symptoms of a traumatic fracture include:

- You may hear a sound at the time of the break.
- “Pinpoint pain” (pain at the place of impact) at the time the fracture occurs and perhaps for a few hours later, but often the pain goes away after several hours.
- Crooked or abnormal appearance of the toe.
- Bruising and swelling the next day.
- It is not true that “if you can walk on it, it’s not broken.” Evaluation by a foot and ankle surgeon is always recommended.

Stress fractures are tiny, hairline breaks that are usually caused by repetitive stress. Stress fractures often afflict athletes who, for example, too rapidly increase their running mileage. They can also be caused by an abnormal foot structure, deformities, or osteoporosis. Improper footwear may also lead to stress fractures. Stress fractures should not be ignored. They require proper medical attention to heal correctly.

Symptoms of stress fractures include:

- Pain with or after normal activity
- Pain that goes away when resting and then returns when standing or during activity
- “Pinpoint pain” (pain at the site of the fracture) when touched
- Swelling, but no bruising

Consequences of Improper Treatment

Some people say that “the doctor can’t do anything for a broken bone in the foot.” This is usually not true. In fact, if a fractured toe or metatarsal bone is not treated correctly, serious complications may develop. For example:

- A deformity in the bony architecture which may limit the ability to move the foot or cause difficulty in fitting shoes
- Arthritis, which may be caused by a fracture in a joint (the juncture where two bones meet), or may be a result of angular deformities that develop when a displaced fracture is severe or hasn’t been properly corrected
- Chronic pain and deformity
- Non-union, or failure to heal, can lead to subsequent surgery or chronic pain.

Treatment of Toe Fractures

Fractures of the toe bones are almost always traumatic fractures. Treatment for traumatic fractures depends on the break itself and may include these options:

- **Rest.** Sometimes rest is all that is needed to treat a traumatic fracture of the toe.
- **Splinting.** The toe may be fitted with a splint to keep it in a fixed position.
- **Rigid or stiff-soled shoe.** Wearing a stiff-soled shoe protects the toe and helps keep it properly positioned.
- **“Buddy taping”** the fractured toe to another toe is sometimes appropriate, but in other cases it may be harmful.
- **Surgery.** If the break is badly displaced or if the joint is affected, surgery may be necessary. Surgery often involves the use of fixation devices, such as pins.

Treatment of Metatarsal Fractures

Breaks in the metatarsal bones may be either stress or traumatic fractures. Certain kinds of fractures of the metatarsal bones present unique challenges.

For example, sometimes a fracture of the first metatarsal bone (behind the big toe) can lead to arthritis. Since the big toe is used so frequently and bears more weight than other toes, arthritis in that area can make it painful to walk, bend, or even stand.

Another type of break, called a Jones fracture, occurs at the base of the fifth metatarsal bone (behind the little toe). It is often misdiagnosed as an ankle sprain, and misdiagnosis can have serious consequences since sprains and fractures require different treatments. Your foot and ankle surgeon is an expert in correctly identifying these conditions as well as other problems of the foot.

Treatment of metatarsal fractures depends on the type and extent of the fracture, and may include:

- **Rest.** Sometimes rest is the only treatment needed to promote healing of a stress or traumatic fracture of a metatarsal bone.
- **Avoid the offending activity.** Because stress fractures result from repetitive stress, it is important to avoid the activity that led to the fracture. Crutches or a wheelchair are sometimes required to offload weight from the foot to give it time to heal.
- **Immobilization, casting, or rigid shoe.** A stiff-soled shoe or other form of immobilization may be used to protect the fractured bone while it is healing.
- **Surgery.** Some traumatic fractures of the metatarsal bones require surgery, especially if the break is badly displaced.
- **Follow-up care.** Your foot and ankle surgeon will provide instructions for care following surgical or non-surgical treatment. Physical therapy, exercises and rehabilitation may be included in a schedule for return to normal activities.

Turf Toe

What is Turf Toe?

Turf toe is a sprain of the big toe joint resulting from injury during sports activities. The injury usually results from excessive upward bending of the big toe joint. The condition can be caused from either jamming the toe, or repetitive injury when pushing off repeatedly when running or jumping. Although this injury is most commonly reported in football players, participants in soccer, basketball, wrestling, gymnastics and dance also are at risk.

Causes

The name “turf toe” comes from the fact that this injury is especially common among athletes who play on artificial turf. When playing sports on artificial turf the foot can stick to the hard surface, resulting in jamming of the big toe joint. There has also been some indication that less-supportive flexible shoes worn on artificial turf are also to blame.

Symptoms

The signs and symptoms of turf toe can include pain, swelling, and limited joint movement.

If turf toe is caused by repetitive actions that cause injury, the signs and symptoms will usually begin slowly and can gradually worsen. Turf toe can also be caused by a direct injury leading to damage of the bone beneath the cartilage. If direct injury is the cause, the signs and symptoms may begin suddenly and get worse over a 24-hour period.

Diagnosis

To arrive at a diagnosis, the foot and ankle surgeon will obtain your medical history and examine your foot. X-rays are typically ordered to rule out any broken bone. Other advanced imaging studies may also be helpful for proper diagnosis.

Treatment

Initial treatments include rest, ice, compression, and elevation. (RICE), as well as a change to less-flexible footwear. Operative treatment is reserved for individuals with severe cases and prolonged pain.

Varicose Veins

Varicose veins are usually due to improperly functioning valves within the veins. The veins typically appear prominent or look "raised." The condition can cause swelling of the legs, ankles, and feet. The skin may become discolored due to leakage of blood into the surrounding tissues, and ulcers may form on the skin. The foot and ankle surgeon may advise use of compression stockings or other treatments.

Weak Ankles

Weak ankles may be a result of previous ankle injuries, but in some cases they are a congenital (at birth) condition. The ankles are sore, and "give way" easily while standing, walking, or doing other activities.

When an ankle is injured, it may take a few weeks to many months to fully heal. Often, the injured ankle remains weaker and less stable than the uninjured one. A foot and ankle surgeon can assess ankle stability and may obtain medical imaging studies to evaluate the ankle for further damage.

Treatment for weak ankles usually includes physical therapy and bracing. Surgery may be recommended depending on the degree of instability and the response to non-surgical approaches.

White Toenails

White toenails can develop for several reasons.

Trauma, such as when an object is dropped on a toenail, often causes bleeding under the nail because of blood vessels being broken. This would cause a black toenail. If the trauma does not cause broken blood vessels, a white spot may appear under the nail. The spot will slowly grow out with the normal growth of the toenail.

Sometimes white lines appear within the toenail. These may be caused by recurring trauma, such as when a runner wears shoes that are too small and the toe hits the end of the shoe.

White lines may also occur due to a medical illness or trauma that has occurred elsewhere in the body, causing protein to be deposited within the nail bed.

A fungal infection that affects the outermost layer of the toenail may cause a bright white discoloration of the toenail.

A white area close to the nail fold (the lunula) varies in size from one person to another. This is a normal aspect of the nail.

It is recommended that you see a foot and ankle surgeon for the diagnosis and possible treatment of white toenails.

Yellow Toenails

The most common cause of yellow discoloration in the toenails is a fungal infection. The fungus often develops underneath the nail, resulting in it becoming thick, raised, and yellow in color.

Other potential causes for yellow discoloration of the nail include diabetes mellitus and lymphedema (chronic leg swelling). Yellow staining of the nails can also occur in individuals who use nail polish. A stained nail may take several months to grow out.