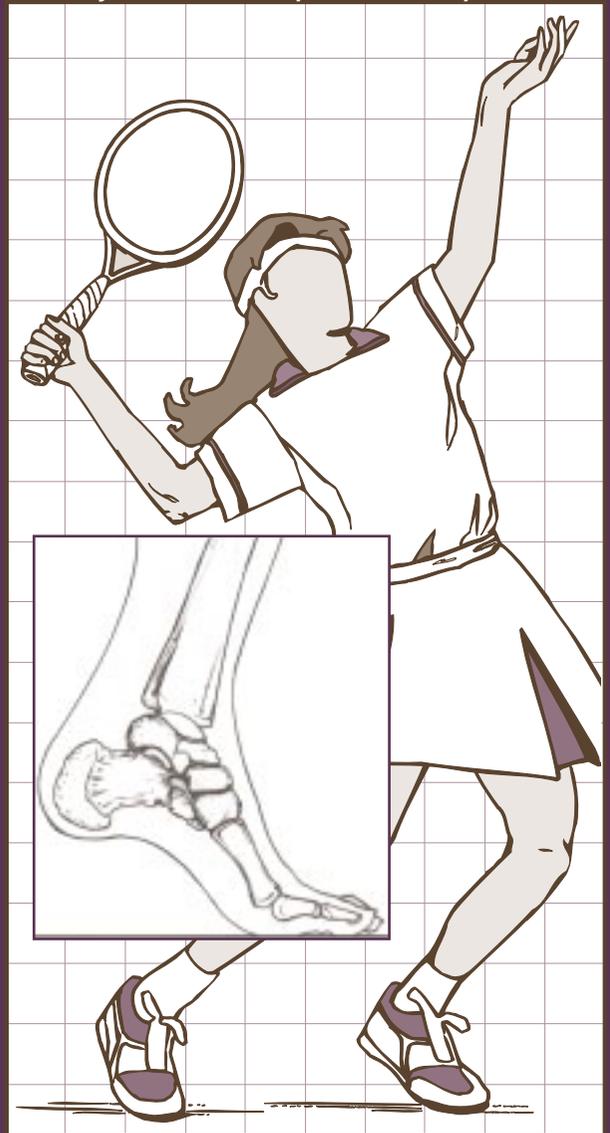

Taking Care Of Your
**FOOT and
ANKLE**

A Physical Therapist's Perspective



American Physical Therapy Association

Taking Care Of Your Foot And Ankle

“My feet are killing me!” is one of the most enduring phrases in the English language. Like most clichés, this one is grounded in day-to-day experience: the foot and ankle region is subject to constant stresses and hazards, from the effects of ill-fitting shoes to traumatic sports injuries. The results can be painful or worse. While our feet may not literally be “killing” us, foot and ankle problems can have a significant impact on our general health and well-being.

In this booklet you will learn about:

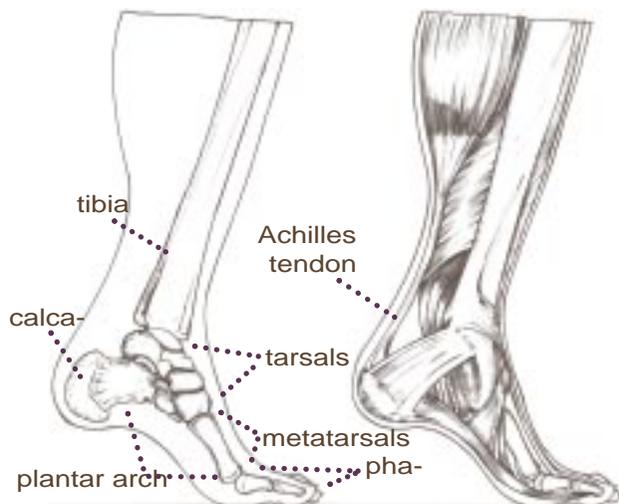
- The basic anatomy of the foot and ankle;
- Common ailments of the foot and ankle;
- Ways to reduce the risk of injury;
- Exercises to do at home; and
- Physical therapy treatments.

In addition, we will discuss some important information that will be of special interest to people living with diabetes and other diseases. But whatever the nature of your foot/ankle problem, physical therapy can often help you recover function and keep you on the move.

Foot And Ankle Anatomy

The foot contains three main sections or functional units: the **rear foot**, **mid foot**, and **fore foot**. These three units work together to allow the foot to be flexible (such as accommodating an uneven surface) or to be fairly rigid (such as keeping the body upright as we go through the normal walking cycle).

The Foot and Ankle



Each foot contains 26 bones: 7 **tarsals** (ankle bones), 5 **metatarsals** (instep bones), and 14 **phalanges** (toe bones). The main arch of the foot is called the **plantar arch**. It runs lengthwise and touches the ground only at the heel bone and at the ball of the foot. The plantar arch is thickly padded at both ends. There is also a thick pad of fat under the heel of the foot to absorb shock. In addition to the plantar arch, the foot has two other arches: the *metatarsal arch*, which runs crosswise under the instep, and the *lateral arch*, which runs lengthwise along the outside of the foot.

The bones and joints of the foot and ankle are held together by a strong network of muscles and ligaments. The foot is connected to the ankle where one of the tarsal bones, called the **talus**, meets the lower leg bones, called the **tibia** and the **fibula**.

The ankle joint is called upon to provide both great stability (keeping us standing up) and great mobility (walking, running, jumping). These two functions need to be kept in balance if we're to keep our feet healthy and functioning.

The Way We Walk

Physical therapists refer to the motion of the foot during walking as a key part of the **gait cycle**. An individual's gait cycle consists of two phases: the *stance phase* and the *swing phase*.

In the stance phase, the foot is in contact with the ground. During the first part of the stance phase, in which the heel strikes the ground, the foot undergoes **pronation**; during the second part of the stance phase, in which the foot rotates forward onto the ball of the foot and the toes and recovers stability, the foot undergoes **supination**. The swing phase is the period during which the foot is completely off the ground.

While most of us pay little attention to this “automatic” process, problems can develop if the pronation and supination phases are not in harmony. If, for example, a person relies too heavily on the “wrong” muscles and other soft tissue to recover stability, those muscles and tissues may become stretched beyond their normal range and become inflamed.

Every person's gait cycle is somewhat different. (If you've ever noticed that the heels on your shoes wear down quickly at a particular angle, this is an indicator of your own particular style of walking.) Physical therapists sometimes videotape a patient's gait cycle to help pinpoint the source of a foot or ankle problem, particularly if the problem is not the result of injury or disease. Once the physical therapist can see exactly how a patient is walking, it's easier to design an effective therapeutic program that will improve the patient's “form.” In addition, the physical therapist will usually prescribe exercises tailored to the particular needs of the patient.

What Causes Foot And Ankle Problems?

Because we are two-footed creatures, our feet and ankles are called upon to perform a remarkable achievement of biomechanics—they keep our bodies upright and stable while permitting us to run and walk. This unique capability puts great pressure on our feet and ankles. It can also turn what were initially minor problems into major ones.

Shoes are often the culprits. The legions of women who have forsaken “heels” for athletic shoes on their daily commutes to the workplace are a vivid reminder of the effect that shoes have on our daily lives. And it’s not just women who suffer from the dictates of fashion: many men also feel compelled to squeeze their feet into fashionable European-style loafers or tight “executive” shoes at the expense of comfort and, ultimately, health.

It’s important for all of us to know what waiters and waitresses have known for years: that if you’re going to stay on your feet and keep going, *your shoes have to fit right, be comfortable, and provide*

The “Pinch Test”

Poorly fitting shoes are a major source of foot problems. The “Pinch Test” can help: if you can pinch some of the shoe’s material between your thumb and forefinger, there is adequate space between your toes and the side of the shoe.



support—and support means maximum coverage of the surface area under the plantar arch. It’s also necessary that your shoes be able to *absorb shock* while you walk, and that they provide *stability to the heel area*.

Fortunately, it’s no longer necessary to sacrifice style for comfort and health—several shoe companies now specialize in making “healthy” shoes in styles that are virtually indistinguishable from “regular” shoes. When buying new shoes, remember that lace-up shoes are generally preferable. They tend to provide a snugger fit than slip-ons and more stability to the heel; lace-ups also give you more control over the fit. If you’re not ready to invest in new shoes, the inexpensive shoe inserts available in drugstores can provide a degree of softness and shock absorption.

Foot And Ankle Injuries

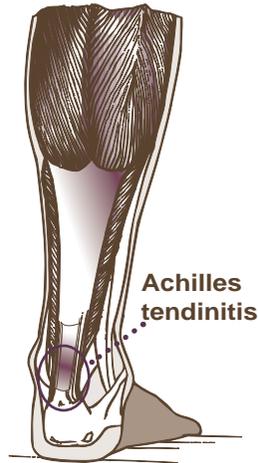
The most commonly reported injuries in the foot/ankle region are **ankle sprains**. A sprained ankle simply means that the *ligaments* (the strong bands of tissue that connect the bones of the foot) are stretched beyond their normal limits, resulting in inflammation, tearing, or rupture of the tissue.

Sprained ankles run the gamut from minor to serious. If you’re in pain for more than a day or two, or if the pain is intense, you should see a physical therapist or physician. If physical therapy is required, the sprained ankle will be immobilized for a short period to prevent further damage and to give the tissue a chance to heal. After that, therapy progresses quickly with exercises designed to restore stability and strength to the muscles. It is also crucial that the patient’s sense of balance be restored or enhanced through exercise.

“**Shin splints**” is a catch-all phrase for a number of foot and ankle problems, including overuse of the muscles and tendons of the foot and ankle.

Tendons are the strong fibrous cords that attach muscles to bones. The *Achilles tendon*, which takes its name from ancient mythology, is easily felt at the back of the ankle. **Achilles tendinitis**

is an inflammation of this tendon, often resulting from sports (such as basketball or aerobic dancing) that require a great deal of jumping.



Plantar fasciitis is an irritation of the plantar fascia—the tough tissue on the very bottom of the foot that begins at the heel and is attached to the toes. It can result in pain and lead to a **heel spur**, a bony growth on the underside, forepart of the heel bone. This kind of pain is usually at its worst in the morning, then gradually diminishes during the day. Heel spurs are caused by straining the foot muscles, stretching the long band of tissue connecting the heel and the ball of the foot, and by repeated tearing of the lining of the membrane that covers the heel bone.



“RICE”

“**RICE**”— which stands for **R**est, **I**ce, **C**ompression, and **E**levation— is shorthand for the steps *you* can take immediately (up to 2-3 days) following a foot or ankle injury. Remember: RICE is not a substitute for professional care; it’s a way to reduce the risk of further injury until you can see your physical therapist or physician.

1. **Rest:** Stay off your feet if you can, and take it easy.
2. **Ice:** Fill a plastic bag with ice or wrap ice in a towel. Gently place the ice over the affected area in a 20-minute-on, 40-minute-off cycle.
3. **Compression:** Lightly wrap the injured area with a compression bandage. Make sure the bandage isn’t too tight.
4. **Elevation:** To reduce swelling and pain, sit in a position that elevates your foot higher than your waist.

Metatarsalgia is pain in the forefoot, usually caused by the over-prominence of one of the metatarsal heads, i.e., the heads of the bones in the ball of the foot. All of these overuse conditions can be aggravated by excessive pronation.

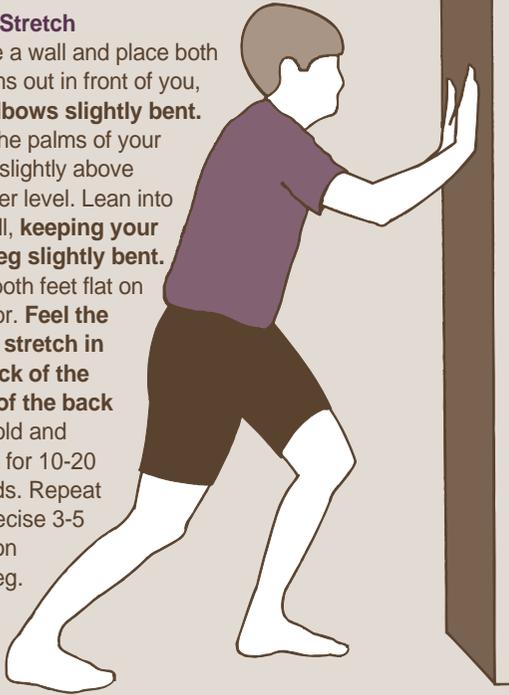
Most people associate **repetitive motion injuries** with the hand and wrist—but did you know that your feet and ankles are also vulnerable? People who are on their feet all day—salespeople, trial lawyers, teachers, nurses, athletes—are at risk for a variety of foot and ankle disorders, including **tarsal tunnel syndrome**. While not as well-

Ankle Stretch

Face a wall and place both arms out in front of you, with elbows slightly bent.

Keep the palms of your hands slightly above shoulder level. Lean into the wall, **keeping your back leg slightly bent.**

Keep both feet flat on the floor. **Feel the gentle stretch in the back of the ankle of the back leg.** Hold and stretch for 10-20 seconds. Repeat the exercise 3-5 times on each leg.

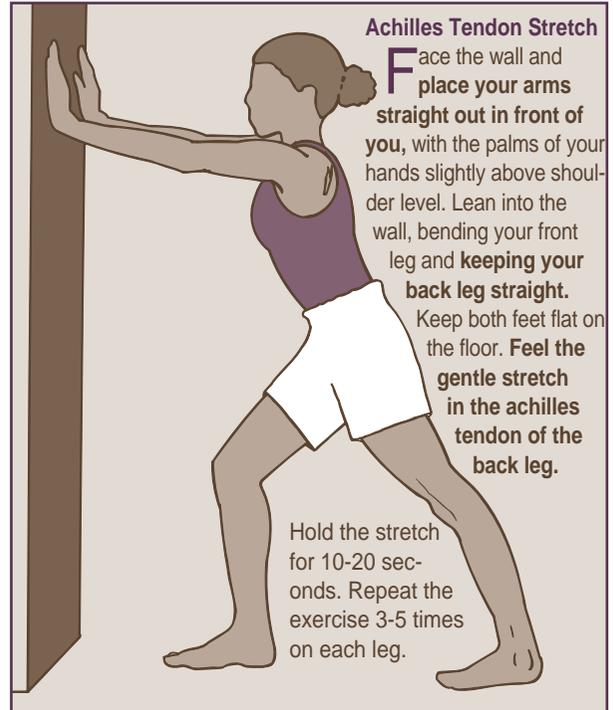


Achilles Tendon Stretch

Face the wall and place your arms straight out in front of you, with the palms of your hands slightly above shoulder level. Lean into the wall, bending your front leg and **keeping your back leg straight.**

Keep both feet flat on the floor. **Feel the gentle stretch in the achilles tendon of the back leg.**

Hold the stretch for 10-20 seconds. Repeat the exercise 3-5 times on each leg.



known as its “cousin” carpal tunnel syndrome (in the wrist), tarsal tunnel syndrome can be just as painful. As with many foot problems, tarsal tunnel syndrome can often be blamed on shoes that do not provide enough arch support and heel stability. Ill-fitting shoes cause the foot to pronate excessively; when this happens, one of the thick ligaments running from the ankle to the bottom of the foot can become stretched and inflamed. This in turn can irritate a major nerve running just behind the ligament, resulting in tingling and numbness. If the standard treatments for heel pain are ineffective, a physician should be consulted about the possibility of other treatment options.

Flat feet, also called “pancake feet,” is a condition in which the arch is judged to be lower than normal. There are many degrees of “flat feet,” and some physical therapists will point out that curve of a “normal” arch is a subjective judgment. Nevertheless, flat feet can cause dis-

comfort, and sometimes can lead to plantar fasciitis or other problems.

High arches, as opposed to flat feet, is a condition in which the arches are higher than normal. The main concern here is to make sure that the shoes have enough surface contact and support for the arches; otherwise, the stresses put on the foot and ankle can move “up the chain” through the legs and spinal column. In some cases, high arches may require custom orthopedic shoe inserts to prevent more serious problems.

Disease-Related Foot Problems

Physical therapists commonly treat foot problems associated with diseases such as diabetes or arthritis. Diabetes can lead to **peripheral neuropathy**, a condition in which feeling is reduced in the foot. This numbness is a serious condition that can lead

to injuries and ulcers on the foot—and, in the most extreme cases, amputation. Because the patient can't feel pain or pressure, a simple blister can turn into an ulcer, infection can set in, and, in severe cases, this can be followed by gangrene and amputation of the foot or leg.

There is now a simple screening procedure that can tell you instantly if you are at high risk for peripheral neuropathy and its complications. Physical therapists and physicians use a simple device that resembles a toothbrush with a single long bristle. As the various areas of the foot are touched by the “bristle,” the patient indicates if he or she can feel it. In addition, physical therapists and physicians can measure the amount of feeling in a particular area by the degree to which the bristle bends. If there are parts of your foot that are numb and at risk for injury, you'll know exactly where they are, giving you a head start in protecting the area.

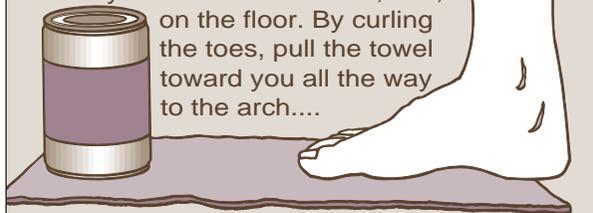
Physical therapy cannot reverse peripheral neuropathy, but it can lessen its impact and ultimately help prevent amputations. While physical therapy can help improve blood flow to the feet, it is most important that the patient learn to use his or her other senses (particularly sight and touch) to detect trouble spots, and to protect the feet with the right shoes.

You should also use your mirror and ask for assistance from family members to help you detect injuries you may have overlooked. In addition to using your eyes, feel your feet with your hands—if one foot seems colder than the other, it may be getting less blood circulation and require more attention. Using this combination of professional and home care, it is now estimated that as many as 50% of foot amputations due to peripheral neuropathy can be avoided.

Charcot's arthropathy is a very serious (and fairly rare) condition that involves a disruption or disintegration of some of the joints of the foot and ankle. Redness,

Toe-Crunch Exercise For Strength And Mobility

Lay a hand towel on the floor. Put half of your heel on the towel, half, on the floor. By curling the toes, pull the towel toward you all the way to the arch....



...Do 10 repetitions to start and increase gradually over time. A soup can (as shown in the illustrations) can be used to make the exercise more challenging.



swelling, and deformity of the foot may follow. The cause of Charcot's arthropathy is not well understood, though (like peripheral neuropathy) it is often linked with diabetes.

Your physician must be involved in the treatment of Charcot's arthropathy, which will include immobilization of the foot in a cast to prevent further trauma to the foot. A physical therapist will often be called upon to help the patient maintain mobility of the joints through exercise.

Arthritis is the inflammation and swelling of the cartilage and the lining of the joints. The foot and ankle region is especially susceptible to arthritis because of the large numbers of joints at risk (33 in each foot) coupled with the tremendous weight-bearing load on the feet.

It's difficult to generalize about the causes of arthritis. Heredity plays a role in some cases, traumatic injury or infections in others. People over 50 are most at risk. It's

A Word To The Wise

It's absolutely necessary for people at high risk for disease-related foot problems to wear the right shoes. Make sure you buy from a store that has a professional fitter on staff, and that you buy for arch support, comfort, stability, and protection.

Medicare now provides patients with diabetes and peripheral neuropathy one pair of therapeutic shoes and two pairs of custom inserts a year.

important that you seek professional care if you suspect that you have arthritis; left untreated, arthritis can be a debilitating or even crippling disorder. The most common form of arthritis, **osteoarthritis**, is a degenerative “wear-and-tear” disease associated with aging, injury, or overuse. A more serious form of the disease is **rheumatoid arthritis**, an autoimmune disorder that is thought to be hereditary.

Arthritis can't be cured (although rheumatoid arthritis sometimes goes through periods of remission). Your physician may suggest taking medication to reduce inflammation. And your physical therapist has many options to help you maintain function and mobility. With the right professional care, you can minimize the effects of arthritis.

If you are at risk for disease-related foot problems, try to find a **multidisciplinary foot clinic** for treatment. Such clinics have physicians, physical therapists, orthotists, and pedorthists (to make customized shoe inserts) on staff. Regrettably, these clinics are not yet found in all parts of the country; they are, however, an ideal setting

for someone facing serious foot complications.

How Physical Therapy Can Help

While physical therapy is by definition tailored to the individual's problems and needs, certain procedures are common in dealing with foot and ankle disorders. Typically, your physical therapist will begin your rehabilitation by taking a **detailed history and evaluation** of your foot and ankle problem. Related problems such as diabetes, arthritis, and vascular disease are assessed during this initial phase.

The second part of your therapy is often **gait analysis**, in which the physical therapist observes you as you walk or, in some cases, run. The physical therapist will take detailed notes, sometimes using video cameras as a diagnostic tool.

At this point the physical therapist may assess your **range of motion**—how far and in what directions you can move your foot and ankle, with and without the assistance of the physical therapist. The physical therapist may also perform tests to assess the **strength, sensation, and blood circulation** in your foot and ankle.

Special tests may be performed as needed, including assessments of individual joints and ligaments. A **biomechanical assessment** can determine how the foot and ankle align with the lower extremities.

Physical therapists may choose from an array of options in treating you, including exercises for flexibility, stability, balance, strength, coordination, and restoration of range of motion, as well as massage, electrical stimulation, ultrasound, traction or mobilization, or heat or cold. These tools allow the physical therapist to create a program of rehabilitation that is custom-designed for your particular problem. In addition, the physical therapist may consult with other health care practitioners to provide special bandages, braces, supports, casts, or shoe inserts.

To avoid or overcome a foot or ankle problem you may need to learn some new habits or modify your current level of physical activity, whether it involves work, recreation, or both. Once your physical therapy goals are met, your physical therapist will help you continue therapy on your own with a home program designed to fit your needs. The goal of physical therapy is to return you to normal activity as quickly as possible, with the knowledge you need to prevent reinjury or disability.

About APTA

The American Physical Therapy Association (APTA) is a national professional organization that represents more than 70,000 physical therapists, physical therapist assistants, and students throughout the United States.

Physical therapists are vital members of the multidisciplinary health care team. They provide treatment and can refer clients to other health care specialists. APTA serves its members and the public by promoting understanding of the physical therapist's increasing role in the health care system. APTA also promotes excellence in the field with advancements in physical therapy education, research, and practice.

Acknowledgements

Thomas McPoil, PT, PhD, ATC
Michael Mueller, PT, PhD
Steve Reischl, PT, OCS
Joe Tomaro, PT, MS, ATC

Other APTA Brochures

- Fitness: A Way Of Life
- Fit Kids
- Fit Teens
- For The Young At Heart: Exercise Tips
For Seniors
- For Women Of All Ages
- Taking Care Of Your Back
- Taking Care Of Your Hand, Wrist, And Elbow
- Taking Care Of Your Knees
- Taking Care Of Your Shoulder
- The Secret Of Good Posture
- What Young People & Their Parents Need To
Know About Scoliosis
- What You Need To Know About Carpal
Tunnel Syndrome
- What You Need To Know About Arthritis
- What You Need To Know About Balance And Falls
- What You Need To Know About Osteoporosis
- You Can Do Something About Incontinence

Bulk quantities available. Send your order via Internet at www.apta.org or request an APTA Resource Catalog by writing to APTA, 1111 North Fairfax Street, Alexandria, VA 22314-1488.

Prepared as a public service by the



American Physical Therapy Association

1111 North Fairfax Street
Alexandria, VA 22314-1488

