

Job-Site Foot Injuries

What to do when you've stepped on a nail or dropped a 6x6 on your toes

by John England



Ouch! Sneakers are light and comfortable, but they can't protect feet from accidents like this the way neoprene-soled work boots can.

Do you know what your most important tool is? It's not your nuclear-powered, laser-guided hammer. It's your body. Without a healthy body, you won't be working very long. As a doctor, I've seen construction workers come in to my clinic with all kinds of gruesome injuries. But foot injuries are the most common—puncture wounds on the sole of the foot or crush injuries to the toes. In this article I'll go toe-to-toe with some myths concerning these foot injuries, and I'll walk you through their proper treatment. Don't worry; you'll be up and about in no time.

Puncture wounds—Most puncture wounds are caused by people stepping on an upturned nail because they aren't watching where they are going (photo above). Roofing nails, because of their shape, will stand straight up and often end up in carpenters' feet, as do the nails in temporary supports that have been pulled down. Always remove nails from scrap boards, or at least bend the nails over.

After the initial squealing and jumping around after they step on a nail, most workers yank out the offending object. Then the on-the-job medical committee meets. This committee consists of four or five people loudly offering conflicting and often wrong advice. Finally, the foreman decides if the company will foot the bill if the employee is taken to a doctor. Often the employee is just told to walk it off and go back to work.

To show that he's concerned about worker safety and to save on doctor bills, the foreman should have a good first-aid kit. A good kit includes tweezers to pull debris out of the wound, something to cleanse the wound, such as soap and water or hydrogen peroxide, antibiotic ointment that you can buy at the local drugstore, and many different-size bandages.

Tetanus anyone?—In my practice, where we treat many on-the-job injuries, people come in thinking, "tetanus shot." Usually they don't really need one; what they need is appropriate medical evaluation and intervention. Tetanus is a common soil bacterium that can cause a fatal disease known as lockjaw, which kills by paralyzing the breathing muscles. Perhaps this notably hideous death gives us a special fear of tetanus, but in the United States only about 60 deaths per year occur from tetanus. Most people born here are immunized against this disease early in life. There are strict indications for who needs a tetanus shot. If the puncture wound is really dirty, and it's been 10 years since your last shot, you'll need another. However, you can receive too many. An unnecessary tetanus shot causes severe redness and swelling at the injection site, as well as a really sore arm for about three weeks.

However, the major problem with a puncture wound is not necessarily tetanus or the nail it-

self; it's the debris that the nail carries into the foot. Construction workers tend to wear their oldest and grungiest-looking shoes at the job site, usually worn-out, filthy tennis shoes. Unfortunately, shoes that have been worn first around the house, then on the softball field and finally at the job site make a dream home for a particularly nasty bacterium: *pseudomonas*. Here in Florida it is safe to say that most construction workers have hot, soggy feet with a high germ count most of the year.

We know that *pseudomonas* is the major cause of soft-tissue infections in feet that have puncture wounds. Living inside the shoe, the bacterium easily travels into puncture wounds and is a much more common problem than tetanus. When you step on a nail, along with *pseudomonas* it carries dirt, a bit of sock and some of the shoe liner and sole deep into the foot. Germs happily multiply within the foot.

Not much happens for several days. Then *pseudomonas* takes hold, and redness, swelling, pain, pus and obvious red streaks up the leg develop. At this stage of the infection, the patient usually comes to the doctor to receive medical care. In general, if you catch the infection two or three days after the accident, it is easily treated with antibiotics. Perhaps 15% of puncture wounds of the feet, treated inappropriately, will go on to develop soft-tissue infections. Many times these soft-tissue infections are mildly disabling, involving

only outpatient care. In extreme cases, hospitalization is necessary. If hospitalized, you can usually expect three to six weeks of missed time from work and a hospital bill in the \$20,000 to \$50,000 range—all for a foot infection. The lesson here is the earlier treated, the better.

Treatment for puncture wounds—Proper care of puncture wounds is first of all to prevent them by wearing shoes that are appropriate for the job site. On a job site where there's lots of rough lumber lying around, a renovation for example, wear heavy, thick-soled boots. The Occupational Safety and Health Administration (OSHA) recommends a neoprene sole because it's relatively tough, making it a lot harder for a nail to get through the sole of the boot. Regardless of the shoes you wear, always watch where your feet are going.

After having the bad luck of stepping on a nail, get to a clean area and take a look at the puncture wound. Use the tweezers in the foreman's first-aid kit to pull out foreign material. Then give the wound an aggressive scrubbing with soap and water or hydrogen peroxide. It's important to cleanse the wound completely, or an infection may develop. Use a clean finger to work in antibiotic ointment, then cover the wound with a bandage. Repeat the procedure three or four times a day. Don't put on your same sweaty, dirty, stinky socks, either. Put on clean socks every time you change the dressing.

If you think the wound is still dirty, or if you see something in it that you can't remove with the tweezers, get yourself to a doctor. The doctor will ask when you had your last tetanus shot, inspect the wound and perhaps take an X ray to see if there is a piece of material in the foot. If the nail went in deep, then the wound must be explored; that is, the doctor numbs it, makes a football-shaped incision around the puncture site, extracts the tissue and looks for debris. An inspection to the full depth of the puncture should be made. After removing any foreign matter, the foot is carefully irrigated or washed with lots of water. Then the wound or incision is left open, meaning no stitches, though loosely bandaged. We don't stitch it up because closing a contaminated wound greatly increases the risk of infection.

Some doctors prescribe antibiotics for people immediately after they've been injured; others believe such treatment is overkill and may even be harmful. Personally, I treat the wound and wait to see if the patient gets an infection. If one develops, I take a culture, identify the germ, then start the patient on an antibiotic orally or, in severe cases, via injection. If patients have any health problems, such as diabetes or poor circulation in the feet, they may need to be hospitalized that day. Diabetics get more infections because increased blood sugar means more food in the tissues for bacteria to survive and multiply, and poor circulation means less healing.

Tetanus needs to be addressed. If you've not received immunization, a dose of tetanus antibodies triggers immediate immunity and is followed by a three-shot series of the tetanus toxoid. If it's been 10 or more years since your last tetanus shot, or if the wound is particularly dirty,

you'll get a booster shot to stimulate growth of your own antibodies.

The crush injury—It doesn't take an M. D. to figure out that you can crush your foot by dropping something heavy on it. Of course, the best protection is not to drop those hammers, timbers and concrete blocks, but the second-best protection is to wear steel-toed shoes.

The best of these shoes are relatively lightweight and quite comfortable, have absorbent liners, and some even have fiberglass toe shields, which don't transmit cold the way steel does. Another complaint with a steel-toed boot is the possibility that if you drop something on your

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foot, it will stay pinched in it even after removing the offending object. However, the amount of force it takes to accomplish this is so great that it rarely occurs. If the object is heavy enough to bend the steel, then you've probably got broken bones, so see a physician. Although in 16 years of medical practice I've never seen such an injury, everyone's heard stories of people's toes being severed after something dropped on their steel-toed boot. I wouldn't worry about losing toes this way; I'll guarantee a crush injury will be more severe if you're not wearing steel-toed shoes.

Draining the nail bed—Crush injuries involving the tips of the toes will often create a subungual hematoma, where blood accumulates beneath the toenail and causes pain. The simple treatment for this is to drain the blood through the toenail. It's a very quick procedure: just a few seconds. I use an electric-filament cautery, a battery-operated device with a fine wire that heats up to burn holes through the toenail, but a paper clip or thin wire held with pliers and heated with a cigarette lighter works well enough. However, anything that has a larger diameter than the filament of the electric cautery requires that you push harder, which increases the pain. Make at least two holes, preferably five, around the toenail to be sure the nail bed drains completely. There are other methods of making holes, but they are more painful. So I wouldn't consider using anything but an electric-filament cautery.

Make the holes as soon as possible, preferably the same day. Getting rid of the blood collected under the toenail will alleviate the pain from the pressure and save the toenail.

I believe that every job site should have an electric-filament cautery in its first-aid kit. You can

pick one up at a drugstore or an industrial clinic for about \$8. I keep one at home in my workshop. Who among us has not had a crushed digit with a subungual hematoma? Once in my teenage years while roofing a tin barn, I beat my thumb up so badly that I finally resorted to holding the nails with pliers to get them started.

If you don't have the means or the stomach to drain blood from beneath your own nail, the procedure is performed at most clinics and hospital emergency rooms. Sometimes the holes clot too quickly, and the blood reaccumulates. Therefore, a subungual hematoma is the only fresh injury that we treat by swirling in warm water. The warm water washes out the blood from beneath the nail. We don't use ice right away because putting ice on the injured toe clots the blood and clogs up the holes, creating another accumulation.

Elevate the foot—Another simple yet often overlooked treatment of any recent foot injury is elevating the injured extremity. Gravity creates a swelling in the feet far beyond that sustained by the upper body. Most shoe salesmen say that the best time to buy shoes is late afternoon when your feet are at their biggest. If your foot has been injured, check out how the pain increases as you lower your foot. Ice also limits swelling, inflammation and bruising. We routinely advise ice and elevation. A plastic bag of ice cubes in a towel should be held on the area until it feels too cold, generally 15 to 20 minutes for each hour. Ice is effective for up to 36 hours after the injury. Elevate the foot as soon as possible and as much as possible until the injury is healed.

If you're able to walk after a crush injury, you still may have broken bones. Severe, prolonged pain, swelling, deformity or an open wound may indicate a broken bone, and you need to see a physician. Ignore these symptoms, and you risk several complications, such as nonunion, where a broken bone heals as two separate bones and must be surgically corrected. When dealing with crush injuries of the toes, most physicians will take X rays, assess skin contamination and the need for tetanus immunization, and treat subungual hematoma. A day or so of rest, elevation and ice often means a quick return to work. But ignoring symptoms, continuing to work and wearing hot, dirty footwear can result in a prolonged disability. As with puncture wounds, early medical attention means an early cure.

In conclusion, if a puncture wound seems significant, and you can't remember your last tetanus shot, go to a competent physician and follow his or her guidelines. If you have a crush injury, and the pain lasts for more than a few minutes, you may have a problem that needs medical attention. Puncture wounds and crush injuries can be prevented by good shoes and by keeping your eyes open and your hands on the job. If you need any medical care, have it done right the first time so that you can get back on the job. There's work afoot! □

John England is a board-certified emergency physician and runs a clinic in Panama City, Fla.