

# Diabetic Foot Care

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## Aspects of Foot Care

How often do you tell someone that you're going to jump into a project "feet first?" When was the last time you thought about how to "put your best foot forward?" How frequently have you told someone about the "fancy footwork" you had to perform because you "put your foot in your mouth?"

Perhaps feet are such a useful part of the American language because they're such an important part of our anatomy. But for people with diabetes, feet can also pose special challenges. To use another popular American phrase, they can be your "Achilles heel."

Why? Because diabetes can cause the arteries in your legs and feet to become hardened and clogged, preventing blood from circulating properly. It can also affect the nerves in your feet, causing a loss of sensation. Without adequate feeling or circulation in your feet, even minor cuts and scratches, callouses, corns and toenail injuries can become serious problems.

To protect yourself from these kinds of problems you need to carry out a daily foot care program that includes:

- washing and examining your feet each day;
- applying moisturizing creams to dry skin;
- filing toenails regularly;
- treating cuts and scratches promptly;
- taking care of corns and callouses;
- managing athlete's foot promptly;
- attending to warts; and,
- selecting footwear carefully.

## Nerve Damage and Foot Problems

The nerves are your body's communication system, carrying information back and forth between the brain and other body parts. Some nerves, called sensory nerves, carry messages of pain, touch or temperature to the brain. Other nerves, called motor nerves, carry instructions for movement from the brain down to the muscles in your legs, feet and hands.

One of the purposes of this communication system is to protect you. Let's suppose again that you cut the bottom of a foot on a piece of glass while walking on the beach. Sensory nerves would immediately send a message of pain to your brain. Your brain would then send a quick message via the

motor nerves to the muscles in the appropriate leg, telling you to pick your foot up off the sand. Almost before you were aware of what was happening, your brain would have prescribed the first step in treating the injury: "Stop walking on your cut foot!"

Diabetic neuropathy is nerve damage believed to be caused by chronic high blood sugars. If neuropathy affects your sensory nerves, you may suffer a loss of feeling in parts of your body. Frequently, the feet are affected. As a result, a cut or wound on the bottom of your foot will not hurt and may go unnoticed. You may continue walking on the injury, causing additional damage with every step, and preventing the wound from healing.

Diabetic neuropathy can also affect the motor nerves, though less frequently than the sensory nerves. The muscles in the feet and legs may be involved. In severe cases, some of the muscles may become weak, which can make walking difficult.

### Preventing Nerve Damage

Why does diabetic neuropathy occur? Scientists and clinicians currently believe that the nerves are damaged by the high levels of glucose in the blood. The nerves are constructed like electric wires. The nerve, itself, is like the metal part of a wire. Other cells surround it, just as insulation covers a wire. These cells are called Schwann cells. In people with diabetes, excess glucose gets into the Schwann cells and is changed into sorbitol. (The sorbitol produced in the Schwann cells is unrelated to the sweetener of the same name found in many dietetic foods.) It is believed that sorbitol causes the cells to swell, irritating the nerve and eventually destroying it.

Because chronic high blood sugars are believed to be the root cause of nerve damage in diabetic neuropathy, the most important thing you can do to try and prevent this condition from developing is keep blood sugars within normal ranges through good diabetes management. Even people with generally good diabetes control can develop neuropathy, however, so it is important to keep an eye out for signs of trouble.

### Signs of Diabetic Neuropathy

Numerous symptoms may occur continuously or irregularly when diabetic neuropathy affects your feet and legs. You may lose sensation and your feet may feel numb. At other times, you may feel shooting pains, prickling, tingling and/or burning on the skin so severe that they can be almost unbearable. Sometimes both sets of symptoms are present.

### Foot Care with Neuropathy

In and of itself, diabetic neuropathy is not dangerous. The danger lies in being unaware that you have lost feeling in your feet, and allowing a foot injury to be neglected as a result. If you have neu-

ropathy you need to protect yourself against this risk. Since the automatic alarm system in the foot is not functioning, replace it with a manual one – good foot care that includes regular foot inspections!

A practical way to set up a manual alarm system is to change shoes and socks every three to four hours. There are three advantages to doing this.

- If you have limited or no sensation in your feet, this gives you frequent opportunities to look for any problems which may occur. If you find a foot injury, it can be treated immediately.
- By changing your shoes several times a day, you can shift the pressure points on your feet that the shoes cause.
- Changing shoes and socks every three or four hours can help to eliminate damage to the skin and reduce the risk of infection and sores which the friction of continually worn shoes can cause. (All shoes begin to allow the foot to slide parallel to the sole of the shoes after three to four hours of continuous use. This increases friction which may cause blistering and skin breakdown.)

### The Musculoskeletal System and Foot Problems

The musculoskeletal system includes the bones and joints and the muscles, tendons and ligaments that connect muscle to bone or bone to bone. The system gives form and shape to your bone and enables you to move around.

Any problem in the structure of the musculoskeletal system – such as a birth deformity – may disrupt the smooth-gliding joint actions, exert abnormal forces on various parts of the feet and lead to further changes in foot structure and shape.

### Signs of Problems

Some of the more frequent changes which occur are hammertoes, bunions and metatarsal deformities. A hammertoe is a condition in which the toe is contracted (drawn together) at one or more joints. A bunion is a deformity in which the big toe has moved laterally toward the other toes and the first joint of the toe bulges outward. A metatarsal deformity is a problem in one of the five large metatarsal bones behind the toes which make up the center of the foot. Common metatarsal deformities such as flat feet and high arches cause pain and discomfort in and around the ball of the foot. They may also cause heel spurs.

### Preventing Further Foot Problems

Walking on deformed feet or trying to wear shoes which are designed for normally shaped feet may be painful and can lead to further foot damage. If you have diabetic neuropathy, you may not feel the pain, and be unaware of additional damage. If you have foot deformities along with poor circulation and/or loss of sensation, seek professional foot care on a regular basis.

Most musculoskeletal conditions can be managed without surgery. Wearing appropriate shoes, taking

care of your feet each day, and getting regular professional care, will in most cases enable you to do all you like doing without problems. Surgery should be used for musculoskeletal problems only if the pain is disabling or further damage is occurring.

### Charcot Foot – a Special Problem

Charcot foot is musculoskeletal condition which affects approximately one of every 700 people who have diabetes. It is usually limited to people who have moderate to severe loss of feeling in their feet. Charcot foot is more common among people who are overweight, but can occur in thin people.

No one is quite sure how Charcot foot begins. However, it is thought to be caused by either an incidental trauma or a misstep or twist of the foot which injures some of the ligaments that support the arch or the foot. Once the ligaments have been damaged, the bones begin grinding against one another and the arch may collapse. The damage often goes unnoticed because the person has already lost feeling in the foot. With the collapse of the bones in the arch, the weightbearing is distributed differently along the sole of the foot, causing irritation and blistering, which may lead to sores and infection.

If your foot swells without explanation and is warm to the touch with no apparent break in the skin, there is a good possibility you have Charcot foot. When these symptoms occur, be sure your physician or podiatrist examines your foot.

Rest is the primary treatment for Charcot foot. Depending on the severity of the damage, no weight should be placed on your foot for eight to 16 weeks. If both feet are affected, you may not be able to walk at all until the damage heals. Permanent foot deformities may be avoided if the condition is diagnosed and treated early. If a significant permanent deformity does occur, you will need special molded shoes to protect your foot.

### Your Skin and Foot Problems

The skin is your body's barrier against infection, so potential and actual skin injuries need immediate attention. This is especially important if you have diabetes because poor circulation may have decreased your body's infection-fighting and healing capacity. Small wounds that lead to infections and larger non-healing wounds can eventually result in the loss of a part or all of a foot.

### Preventing Skin Problems

A system of regular foot care will help you prevent many of the minor skin problems that, if untreated, can lead to major problems.

### Washing Your Feet

To protect your skin, wash your feet each day and check your skin for injuries. Wash your feet in warm, soapy water. Don't soak your feet – that will soften your skin and make it more susceptible to

infection. Use a mild hand soap and don't use hot water. Test the water temperature with your wrist so you don't scald your feet if you have neuropathy and have lost sensation in your feet. Rinse your feet well after washing and dry them carefully, especially between the toes.

After you have washed and dried your feet, examine them closely in a good light. If you cannot bend over to see the bottom of your feet, place a hand mirror on the floor and hold each foot, in turn, over it so that you can see the reflection in the mirror. If you have poor eyesight, ask someone to examine your feet for you. Keep an eye out for the common problems that often threaten the protective function of your skin. These include dry skin, toenail injuries, cuts and scratches, callouses and corns, dermatitis (athlete's foot), and warts. Descriptions of these problems and how to care for them appear below.

### Dry Skin

Dry skin may lead to cracks which bleed and become infected. The moisture content of a person's skin depends on heredity and environmental factors. Some people have skin that rarely needs moisturizers. Others need to use creams several times a day to prevent the skin from drying.

Creams such as Nivea, Eucerin, or Alpha-Keri help restore moisture to the skin. Creams are better than lotions because they hold moisture in the skin for a longer period of time. Apply cream starting at the heel and work towards your toes. This will help you avoid leaving excess amounts of cream between the toes which can lead to a wearing away of the skin and possible infection.

Dry skin around the edges of your heels is especially prone to cracking. Sometimes dry heels are treated by applying a liberal amount of cream to the dry areas before going to bed, covering the area with a piece of clear plastic wrap and wearing a sock over the wrap during the night. This procedure can be repeated two or three times a week, depending on the degree of dryness. If severe dryness persists, consult your podiatrist or a dermatologist.

If your feet perspire, use talcum, baby powder or a mild foot powder to absorb the moisture. Be sure the powder doesn't collect between your toes.

### Toenails

Most people with diabetes can care for their own toenails. However, you should probably have someone else care for your nails if you have poor circulation, have lost sensation in your feet, have extremely poor eyesight or have severe arthritis in your hands and back. Ask a family member or friend to help you or have regular appointments with a podiatrist.

If you, a family member or a friend care for your toenails, file them with a diamond-type file (Emery board). A scissors or clippers should not be used since any instrument which will cut your nails could also cut your skin. File nails to the ends of your

toes, but no shorter. Shape them according to the contours of your toes and the toes next to them.

If abnormal toenail growth leads to ingrown toenails and infections, seek help from a podiatrist. An infected ingrown toenail can become a serious problem if not treated appropriately. Often it requires removal of a portion of the nail, drainage of the infection, antibiotics and bandaging with frequent dressing changes until healed.

Fungal infections which lead to the discoloration and thickening of toenails should also be treated by a podiatrist. Treatment usually involves regular trimming and filing in order to keep the nails as thin as possible. Sometimes surgery is necessary to remove the nail in order to prevent continuing pain and infections. Over-the-counter remedies for these fungal infections are usually not effective. There are effective oral medications, but the side effects do not warrant their use unless the fungal infection has spread over large portions of your body. They should be used only in consultation with your podiatrist or physician.

#### Cuts and Scratches

If you have a cut or scratch on your foot, wash the affected area with warm water and soap promptly. Do not soak. Apply a mild antiseptic such as ST/37, Bactine, or Johnson's First Aid Cream. never use strong antiseptics such as iodine, Betadine (unless diluted according to the instructions of your physician), mercurochrome, boric acid, Epsom salts, creosol or carbolic acid. Cover the affected area with a dry sterile dressing. Secure the dressing with paper tape or a Telfa bandage. Do not use adhesive tape, including band-aids, on your skin. Do not apply heat treatments such as a hot water bottle or heating pad to the cut or scratch. Stay off your feet as much as possible and call your physician if the affected areas do not improve within 24 to 30 hours. If redness, swelling, increased warmth or a yellowish drainage occurs, contact your physician immediately. Do not assume the condition is improved just because there is no pain.

#### Callouses and Corns

Callouses and corns are caused by friction on the foot from the sole or toebox of a shoe. They usually occur because of faulty foot mechanics or because deformities such as bunions and hammer-toes have caused parts of your foot to rub against the shoe. The thickened skin characteristic of callouses and corns can be painful for people with normal sensation in the feet. The pain can be relieved by thinning the callous or corn, wearing shoes which leave room for crooked toes, and using toe pads to minimize friction. If you have lost feeling in your feet, you may not notice any pain from callouses and corns. If you neglect them, however,

they may blister, break and become infected. Further neglect may lead to sores which can quickly affect the bone.

Blisters should be treated by immediately removing the cause of the friction and applying antiseptics. Avoid walking when you have blisters on the bottom of your feet. Open sores require strict bed rest, antibiotics, dressing changes and sometimes hospitalization. Sores should never be soaked.

#### Dermatitis (Athlete's Foot)

Dermatitis is a skin disease which reduces the skin's ability to provide a barrier against bacteria and to fight infection. Any dermatitis condition on the feet needs to be identified, treated and cured in order to prevent a breakdown of the skin.

One of the more common forms of dermatitis is athlete's foot, which causes the skin between the toes to redden. Blisters may form, accompanied by fluid drainage and painful itching. Over-the-counter antifungal agents such as Tinactin and Desinex are usually sufficient to heal the condition. If these remedies don't help after seven to 10 days, consult a dermatologist or podiatrist. A stronger medication such as Halotex, Lotrimin or Loprox may be needed. You will need a prescription for these drugs.

#### Warts

Warts are caused by a virus which has a tendency to grow in the skin. Plantar warts occur on the plantar or bottom surface of the foot. You may have difficulty distinguishing between a wart and thick callous. Ask your physician or podiatrist if you have a growth and are not certain whether it is a wart or callous.

Warts will usually disappear if left alone. For this reason, and since many of the methods used to remove warts are worse than the condition itself, it is best not to treat warts unless they begin to spread or become painful to walk on.

None of the methods used to treat warts are 100% effective. The most successful methods are surgical removal and caustic acid therapy, but they are only 80 to 90% effective. Sometimes several methods must be used before warts can be successfully and permanently removed.

#### Shoes and Slippers

Wearing sturdy, appropriate footwear is another important way to protect the skin covering your feet from injury.

Most of the surfaces you walk on, such as concrete and asphalt, are hard. Unlike walking in the sand, where the foot sinks into the surface and the ground comes up to meet it, a foot walking on a hard surface tends to collapse down on to the surface. The best shoes for use on hard surface are those that are soft and supportive. They provide an interface between the foot and the walking surface. Athletic shoes with soft uppers, cushioned soles and firm counters around the heel provide the nec-

essary support. However, all shoes begin to lose their cushioning and supportive capability after four to five hours of continuous wear.

For this reason, it is best to change shoes in the middle of the day to help maintain maximum cushioning and support.

Although they may be the height of fashion, do not wear sandals, clogs or flipflops. Avoid pointed shoes which squeeze the toes together. Break new shoes in gradually. This will prevent blisters from forming. When you wear slippers around your home, make certain they have sturdy toes in order to prevent stubbing your toes. While the temptation may be strong, do not go barefoot at the beach or anywhere else for that matter.

You will need specifically molded shoes with extra room in the toebox if your feet are significantly deformed. Your podiatrist or physician will advise you about the kind of shoes you need.

#### Socks and Stockings

Cotton and wool socks or stockings, or hosiery made from combining cotton and wool along with synthetics are best if you have diabetes. They provide some additional degree of cushioning and also help to prevent friction between the shoes and prominent bony protrusions on the feet. Wear a clean pair each day. Socks and stockings should be correct size and free of seams and darns. You should avoid wearing socks or stockings with constricting tops that might further slow circulation. Constricting garters and girdles are a no-no too. If your feet sweat, change your socks several times a day.

#### A Last Word

Foot care takes a little more time and attention if you have diabetes than if you don't. But like everything about having this condition, the extra attention now is well worth the longterm return. Just because you have diabetes doesn't mean you can't do all the things you want to do. And healthy feet will take you wherever you want to go - up a mountain, across a continent...or just around the corner.

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