



# Patient education: Foot care for people with diabetes (Beyond the Basics)

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## INTRODUCTION

Over time, diabetes can lead to various complications, many of which can be serious if they are not identified and addressed promptly. Foot problems are a common complication in people with diabetes.

In general, you can lower your risk of diabetes-related complications by keeping your blood sugar in the goal range and seeing your doctors for regular checkups. You can also lower your risk of developing foot problems by examining your feet regularly. This way, if problems do occur, you are more likely to notice them right away so you can get the proper treatment. It may take time and effort to build good foot care habits, but it is an essential part of diabetes management.

This article will discuss the foot-related complications that can happen in people with diabetes, as well as guidelines for good foot care and tips for lowering your risk of developing these problems. Other diabetes-related complications are discussed separately. (See "[Patient education: Preventing complications from diabetes \(Beyond the Basics\)](#)".)

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## RISK FACTORS

Over time, diabetes that is not carefully managed can lead to foot complications. You have an increased risk of developing foot problems if you have:

- A past foot ulcer
- Nerve damage
- Foot deformities
- Poor circulation

If you have any of these risk factors (discussed in more detail below), particularly a previous foot ulcer, you may be at increased risk of foot problems if you take medications called sodium-glucose co-transporter 2 (SGLT2) inhibitors to manage your blood sugar. SGLT2 inhibitors, particularly [canagliflozin](#), may increase your risk of requiring toe amputations. Your health care provider can talk to you about other medication options.

**Past foot ulcer** — Once you have had a foot ulcer, even if it heals completely, you are at an increased risk of developing ulcers again in the future.

**Nerve damage** — Over time, high blood sugar levels can damage the nerves that carry sensation; this nerve damage is known as "diabetic neuropathy." Because people with neuropathy may lose their ability to sense pain, they are at increased risk for injuring their feet; even a minor injury can become serious quickly if it goes unnoticed. Nerve damage can also weaken certain foot muscles and contribute to foot deformities. (See '[Signs of nerve damage](#)' below and "[Patient education: Diabetic neuropathy \(Beyond the Basics\)](#)".)

**Foot deformity** — Abnormalities in the shape of the toes, arches, or bottoms of the feet can raise the risk of complications. (See '[Deformities](#)' below.)

**Poor circulation** — Longstanding high blood sugar levels can cause damage to the blood vessels, decreasing blood flow to the feet. Smoking can also worsen blood vessel damage and reduce blood flow. Poor circulation can weaken the skin, contribute to the formation of foot ulcers, and impair wound healing. Some bacteria and fungi thrive on high levels of sugar in the bloodstream; if a wound gets infected, this can break down the surrounding skin and make ulcers worse. (See '[Signs of poor circulation](#)' below.)

More serious complications include deep skin and bone infections. Gangrene (decay and death of tissue) is a very serious complication; widespread gangrene may require amputation. Approximately 5 percent of people with diabetes eventually require amputation of a toe or foot. However, this can be prevented in most situations by managing blood sugar levels, quitting smoking if you smoke, and committing to daily foot care.

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## FOOT EXAMINATIONS

Regular foot exams to check for problems or changes are a critical part of managing your diabetes.

**Self-exams** — It is important to examine your feet every day, especially if you have any of the major risk factors for foot problems. This should include looking carefully at all parts of your feet, especially the area between the toes. Look for broken skin, ulcers, blisters, areas of increased warmth or redness, or changes in callus formation; let your health care provider know if you notice any of these changes or have any concerns. (See '[Risk factors](#)' above.)

It may help to make the foot exam a part of your daily bathing or dressing routine. You might need to use a mirror to see the bottoms of your feet clearly. If you are unable to reach your feet or see them completely, even with a mirror, ask another person (such as a family member) to help you.

**Clinical exams** — During your routine medical visits, your health care provider will check the blood flow and sensation in your feet. The frequency of these clinical exams will depend on which type of diabetes you have:

- In people with **type 1 diabetes**, annual foot exams should begin five years after diagnosis.
- In people with **type 2 diabetes**, annual foot exams should begin at the time of diagnosis.

During a foot exam, your health care provider will check for poor circulation, nerve damage, skin changes, and deformities. They will also ask you about any problems you have noticed in your feet. An exam can check for decreased or absent reflexes or decreased ability to sense pressure, vibration, pin pricks, and changes in temperature.

Special devices, including a monofilament or tuning fork, can help determine the extent of nerve damage. A monofilament is a very thin, flexible thread that is used to determine if you are able to sense pressure in different parts of the foot. A tuning fork is used to determine if you can sense vibration in different areas, especially the foot and toe joints.

**What to look for** — You and your health care provider can look for certain signs and symptoms that could indicate problems with your feet.

**Skin changes or wounds** — Excessive skin dryness, scaling, and cracking may be signs of problems. Other skin changes to look for include calluses, broken skin between the toes, and ulcers. Ulcers can start out as sores affecting just the top layer of skin ( [picture 1](#)), but if left untreated, they can go deeper into the skin and muscle.

**Signs of nerve damage** — Nerve damage may lead to unusual sensations in the feet and legs, including pain, burning, tingling, or numbness. If you notice these symptoms, keep track of when they happen; whether your feet, ankles, and/or calves are affected; and what measures relieve the symptoms.

Over years, if nerve damage becomes advanced, the foot and leg can eventually lose sensation completely. This can be very dangerous because if you cannot feel pain, you may not notice if your shoes do not fit properly, if you have something in your shoe that could cause irritation, or if you have injured your foot.

**Deformities** — The structure and appearance of the feet and foot joints can indicate diabetes-related complications. Nerve damage can lead to joint and other foot deformities. The toes may have a peculiar "claw toe" appearance ( [picture 2](#)), and the foot arch and other bones may appear collapsed. This destruction of the bones and joints is called "Charcot arthropathy" ( [picture 3](#)).

**Signs of poor circulation** — A weak pulse, cold feet, thin or blue skin, and lack of hair in the area suggest that your feet are not getting enough blood flow.

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## PREVENTING FOOT PROBLEMS IN DIABETES

There are several things you can do to reduce your chances of developing foot problems. In addition to managing your blood sugar, practicing good foot care habits and checking your feet daily are important for preventing complications.

**Avoid activities that can injure the feet** — Certain activities increase the risk of foot injury or burns and are not recommended. These include walking barefoot (since you could step on something without realizing it), using a heating pad or hot water bottle on your feet, and stepping into a hot bath before testing the temperature.

**Use care when trimming the nails** — Trim your toenails straight across, and avoid cutting them down the sides or too short ( [figure 1](#)). You can use a nail file to remove any sharp edges to prevent the toenail from digging into your skin. Never cut your cuticles or allow anyone else (eg, a manicurist) to do so. See a foot care provider (such as a podiatrist) if you need treatment for an ingrown toenail or callus.

**Wash and check your feet daily** — Use lukewarm water and mild soap to clean your feet. Thoroughly dry your feet, paying special attention to the spaces between the toes, by gently patting them with a clean, absorbent towel. Apply a moisturizing cream or lotion.

Check the entire surface of both feet for skin breaks, blisters, swelling, or redness, including between and underneath the toes where damage may not be easily visible. Do not pop blisters or otherwise break the skin on your feet. Let your health care provider know right away if you notice any changes or problems. (See '[Self-exams](#)' above.)

**Choose socks and shoes carefully** — Wear wool or cotton socks that fit well, and be sure to change your socks every day. Select shoes that are snug but not tight, with a wide toe box

( [figure 2](#)), and break new shoes in gradually to prevent any blisters. It may be helpful to rotate several different pairs of comfortable, well-fitting shoes to avoid consistent pressure on one part of your foot. If you have foot deformities or ulcers, ask your foot care provider about customized shoes; this can reduce your chances of developing foot ulcers in the future. Shoe inserts may also help cushion your step and decrease pressure on the soles of your feet.

**Be sure to get regular foot exams** — Checking for foot-related complications should be a routine part of most medical visits; however, this is sometimes overlooked. Don't hesitate to ask your provider for a foot check at least once a year, or more frequently if you have risk factors or notice any changes. (See '[Clinical exams](#)' above and '[Risk factors](#)' above.)

**Quit smoking** — Smoking can worsen heart and circulation problems and reduce circulation to the feet. If you smoke, quitting is one of the most important things you can do to improve your health and reduce your risk of complications. While this can be difficult, your health care provider can help you and provide other resources for support. (See "[Patient education: Quitting smoking \(Beyond the Basics\)](#)".)

**Walk regularly** — Regular walking helps improve blood flow in people with poor circulation. "Claudication" refers to pain, cramping, fatigue, or discomfort in the thighs or legs that occurs with walking and improves with rest. If you have symptoms of claudication, walk until the pain or discomfort becomes moderate, then rest, and start walking again, aiming to walk for 30 minutes. Of course, walking 30 minutes daily is good for your overall health as well.

**Importance of blood sugar management** — In general, you can reduce your risk of all diabetes-related complications, including foot problems, by keeping your blood sugar levels as close to your target as possible. Careful management of blood sugar levels can reduce the risk of circulation problems and nerve damage that often lead to foot complications.

Managing your blood sugar requires seeing your doctor regularly, making healthy diet and lifestyle changes, and taking your medications as directed. More information about managing your diabetes is available separately. (See "[Patient education: Type 1 diabetes: Insulin treatment \(Beyond the Basics\)](#)" and "[Patient education: Type 2 diabetes: Treatment \(Beyond the Basics\)](#)" and "[Patient education: Glucose monitoring in diabetes \(Beyond the Basics\)](#)" and "[Patient education: Preventing complications from diabetes \(Beyond the Basics\)](#)".)

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## TREATMENT OF FOOT ULCERS

If you do get a foot ulcer, the treatment will depend on how deep the ulcer extends beneath the skin.

**Superficial ulcers** — Superficial ulcers involve only the top layers of skin ( [picture 1](#)). Treatment usually includes cleaning the ulcer and removing dead skin and tissue by a health care provider; this is called "debridement." It often involves using a scalpel or scissors, although different providers use different techniques. After debridement, the area is covered with a dressing to keep it clean and moist.

If the foot is infected, you will get antibiotics. You should clean the ulcer and apply a clean dressing twice daily or as instructed by your foot care provider; you may need to have someone help you with this. Keep weight off the affected foot as much as possible and elevate it when you are sitting or lying down. Depending on the location of the ulcer, you might also get a cast or other device to take pressure off the area when you walk. Your health care provider should check your ulcer at least once per week to make sure that it is healing properly.

**More extensive ulcers** — Ulcers that extend into the deeper layers of the foot, involving muscle and bone ( [picture 4](#)), usually require treatment in the hospital. Laboratory tests and X-rays may be done, and intravenous (IV) antibiotics are often given. In addition to debridement to remove dead skin and tissue, surgery may be necessary to remove infected bone. You may also get something called "negative pressure wound therapy"; this involves covering the ulcer with a bandage and using a special vacuum device to help increase blood flow and speed healing.

If part of the toes or foot becomes severely damaged, causing areas of dead tissue (gangrene), partial or complete amputation may be required. Amputation is reserved for wounds that do not heal despite aggressive treatment, or times when health is threatened by the gangrene. Untreated gangrene can be life threatening.

Some people with severe foot ulcers and peripheral vascular disease (poor circulation) may require a procedure to restore blood flow to the foot. (See "[Patient education: Peripheral artery disease and claudication \(Beyond the Basics\)](#)".)

While foot problems in diabetes are common and can be serious, keep in mind that there are things you can do to help prevent them. Quitting smoking, if you smoke, is one of the most important things you can do for your overall health and to prevent foot problems. In addition, while daily self-care can be challenging, managing your diabetes from day to day, including foot care, is the best way to reduce your risk of developing complications. (See '[Preventing foot problems in diabetes](#)' above.)

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## WHERE TO GET MORE INFORMATION

Your health care provider is the best source of information for questions and concerns related to your medical problem.

A booklet on foot care for people with diabetes can be found at

<https://www.govinfo.gov/app/details/GOVPUB-HE20-PURL-gpo118664>.

This article will be updated as needed on our website ( [www.uptodate.com/patients](http://www.uptodate.com/patients)).

Related topics for patients, as well as selected articles written for health care professionals, are also available. Some of the most relevant are listed below.

**Patient level information** — UpToDate offers two types of patient education materials.

**The Basics** — The Basics patient education pieces answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials.

[Patient education: Foot care for people with diabetes \(The Basics\)](#)

[Patient education: Type 2 diabetes \(The Basics\)](#)

[Patient education: Nerve damage caused by diabetes \(The Basics\)](#)

[Patient education: The ABCs of diabetes \(The Basics\)](#)

[Patient education: Gangrene \(The Basics\)](#)

[Patient education: Diabetes and infections \(The Basics\)](#)

[Patient education: Diabetic foot ulcer \(The Basics\)](#)

**Beyond the Basics** — Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are best for patients who want in-depth information and are comfortable with some medical jargon.

[Patient education: Type 1 diabetes: Overview \(Beyond the Basics\)](#)

[Patient education: Exercise and medical care for people with type 2 diabetes \(Beyond the Basics\)](#)

[Patient education: Type 2 diabetes: Overview \(Beyond the Basics\)](#)

[Patient education: Hypoglycemia \(low blood glucose\) in people with diabetes \(Beyond the Basics\)](#)

[Patient education: Preventing complications from diabetes \(Beyond the Basics\)](#)

[Patient education: Diabetic neuropathy \(Beyond the Basics\)](#)

[Patient education: Glucose monitoring in diabetes \(Beyond the Basics\)](#)

[Patient education: Quitting smoking \(Beyond the Basics\)](#)

[Patient education: Peripheral artery disease and claudication \(Beyond the Basics\)](#)

**Professional level information** — Professional level articles are designed to keep doctors and other health professionals up-to-date on the latest medical findings. These articles are thorough, long, and complex, and they contain multiple references to the research on which



they are based. Professional level articles are best for people who are comfortable with a lot of medical terminology and who want to read the same materials their doctors are reading.

[Screening for diabetic polyneuropathy](#)

[Evaluation of the diabetic foot](#)

[Management of diabetic foot ulcers](#)

The following organizations also provide reliable health information.

- National Library of Medicine  
( [www.nlm.nih.gov/medlineplus/healthtopics.html](http://www.nlm.nih.gov/medlineplus/healthtopics.html))
- National Institute of Diabetes and Digestive and Kidney Diseases  
( [www.niddk.nih.gov](http://www.niddk.nih.gov))
- American Diabetes Association (ADA)  
(800)-DIABETES (800-342-2383)  
( [www.diabetes.org](http://www.diabetes.org))
- The Endocrine Society  
( [www.endo-society.org](http://www.endo-society.org))

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## Topic 1739 Version 18.0

## GRAPHICS

### Superficial diabetic foot ulcer



This picture shows a "superficial" foot ulcer in a person with diabetes. The ulcer affects the top layer of the skin but does not go deeper.

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*Courtesy of David McCulloch, MD.*

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Graphic 52333 Version 4.0

## Full thickness diabetic foot ulcer and claw toe



This picture shows a foot ulcer that goes through all layers of the skin. Nerve damage has also caused the toes to bend more than usual (arrow). This is sometimes called "claw toe."

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*Courtesy of David McCulloch, MD.*

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Graphic 64087 Version 3.0

## Charcot arthropathy



This person with diabetes has joint and bone damage called Charcot arthropathy. The arch of the person's foot has collapsed and been replaced by a bony growth (see arrow). Several factors contribute to this painless condition, including the loss of muscle, decreased sensation, and inappropriate weight distribution.

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*Courtesy of David McCulloch, MD.*

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Graphic 50500 Version 2.0

## Trim your toenails

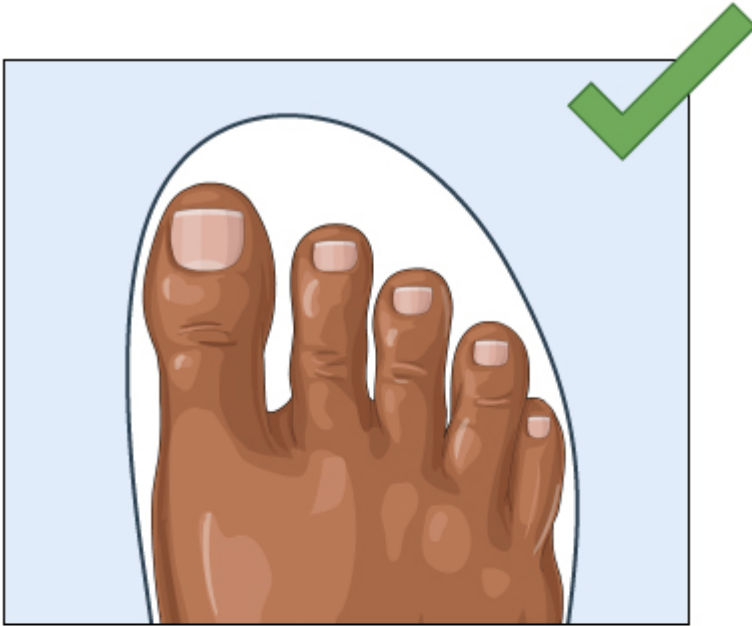


Trim your toenails straight across and smooth them with a nail file.

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Graphic 80053 Version 2.0

## Correct shoe shape



Choose shoes that fit the right way and are not too tight or too loose. Your shoes should have plenty of room for your toes.

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Graphic 79305 Version 2.0

## Deep diabetic foot ulcer involving bone



This picture shows a severe foot ulcer that goes through the skin and muscle, all the way to the bone.

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*Courtesy of Paul Thottingal, MD.*

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Graphic 75848 Version 5.0



