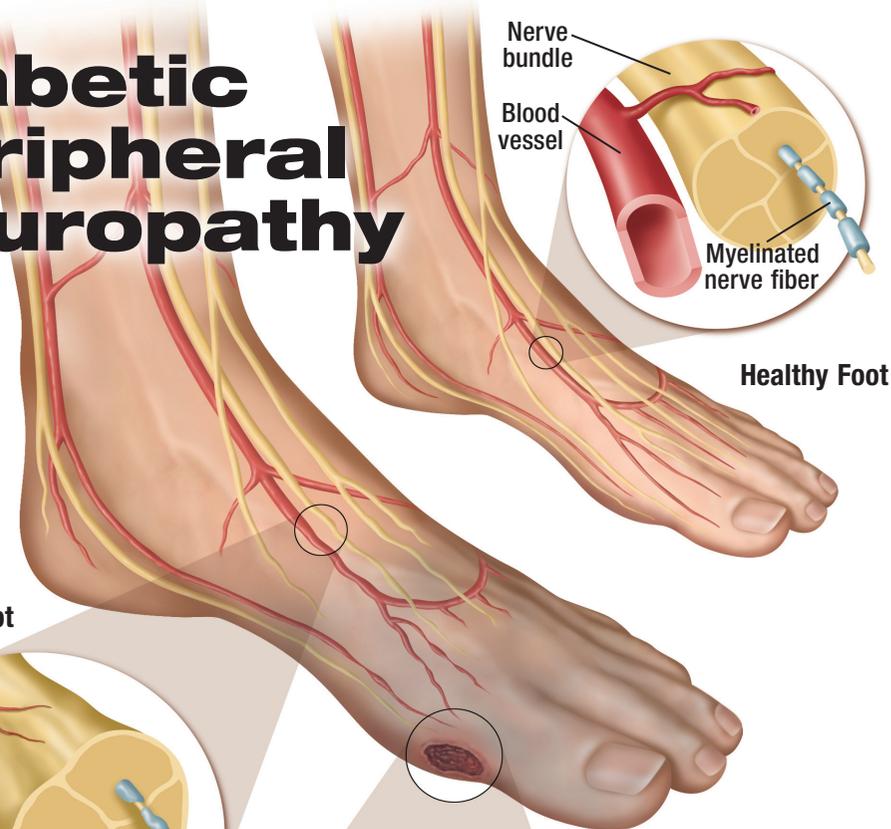


Diabetic Peripheral Neuropathy



Healthy Foot

Diabetic Foot

Damaged vessels and nerves cause loss of circulation and sensation, which can lead to increased risk of infection and ulcers

Nerve Damage Due to Diabetes

Peripheral neuropathy is damage to nerves in the peripheral nervous system, the set of connections that link nerve impulses between the central nervous system (brain and spinal cord) and the outlying areas of the body. Although it is not entirely clear why diabetes causes nerve damage, it is thought to be a result of poorly controlled blood sugar over a long period of time.

There are three general types of nerves that can be damaged in peripheral neuropathies—the sensory, autonomic, and motor nerves. Diabetic peripheral neuropathy (DPN) that affects the sensory nerves results in symptoms such as numbness, tingling, increased sensitivity to touch, and burning in the feet, legs, hands, and arms. When autonomic nerves are damaged, symptoms include problems with digestion, breathing, vision, heartbeat, sexual function, and bladder control. Motor nerve damage can be seen in patients with muscle weakness, cramping, or twitching.

The best treatment for DPN is prevention, and tightly controlling glucose levels is the key to success. It is important to maintain a healthy diet, exercise regularly, and limit alcohol. Proper foot care is essential to avoid infections. Nicotine constricts blood flow to peripheral nerves, so smoking cessation is very important to prevent the progression of diabetic nerve damage. Specific treatments are available for individual types of neuropathies, including oral and topical medications that ease pain, regulate blood pressure and heart rate, improve gastric emptying time and digestion, and enhance urinary and sexual function.

TEAR ALONG PERFORATION

MEDICAL ILLUSTRATION: KRISTEN WIENANDT MARZEJON 2013

Regular Foot Care Is Essential to Prevent Infection

High blood sugar can lead to damage of the sensory, autonomic, and motor nerves that play an important role in health. The risk of nerve damage increases with time, so most of the health consequences of long-term diabetes occur many years after diagnosis.

Eventually, more than half of all diabetics will have some degree of peripheral neuropathy, although not everyone will suffer from its symptoms. It is likely that high blood sugar, high cholesterol, hypertension, and obesity contribute to the damage of peripheral nerves.



When infection spreads to the bone, it can require amputation of the toes or foot.

Types of Nerve Damage

Diabetic peripheral neuropathy (DPN) of the *sensory nerves* signals a problem with the transmission of sensations between the brain and the distant nerves of the arms and legs. A common symptom of sensory nerve damage is numbness. When sensation is lost in the extremities, especially the toes and feet, there is no warning of injury or infection. Without proper foot care, this loss of sensation can result in serious infections that require amputation. Another form of sensory nerve damage involves increased sensitivity to touch, tingling, pins-and-needles sensations, and burning, often beginning in the feet, slowly moving up the legs, or progressing from the fingers to hands to arms.

Autonomic nerve damage can affect a variety of organs and their function. Difficulty swallowing, slowed stomach emptying, constipation, and diarrhea are potential problems with digestion that are controlled by autonomic nerves. The autonomic nerves also control heart rate and blood pressure, so heartbeats may be too fast or irregular, and dizziness can be a problem when standing up from a sitting position. Patients with diabetes have a higher risk of cataracts, glaucoma, and retinopathy, which can cause blindness. Other conditions that result from autonomic nerve damage include problems with bladder emptying and sexual function.

Motor nerve damage can be seen in the patients with muscle weakness, cramping, twitching muscles just under the skin, and paralysis.

Diagnosis of DPN is based on a thorough review of symptoms, as well as a physical examination and testing to determine the type of nerve damage and its severity.

Treatment and Prevention Options

Treatment of DPN depends on the type and severity of nerve damage. Strict blood sugar control is the most important step toward limiting the progression of nerve damage and preventing future complications. Once blood sugar is in a normal range and diet, exercise (or physical therapy), and medications are adjusted to maintain good control over blood sugar fluctuations, treatment to help relieve symptoms can begin.

Diabetic nerve pain is treated with antidepressant medications, anticonvulsant drugs, and opioid painkillers. Drugs specifically approved to treat the pain of DPN include duloxetine (Cymbalta), pregabalin (Lyrica), and tapentadol (Nucynta). Skin creams and transdermal patches are also available. Medications are also used to improve stomach emptying, blood pressure, bladder control, and sexual function.

A serious complication of DPN is infection. Regular foot care is very important in prevention and early treatment of infection, which may be missed due to lack of symptoms and poor peripheral circulation with advancing age. When a soft-tissue infection spreads to the bone, amputation of the toes or foot may be required. Prompt recognition of an infection and timely treatment can prevent many of these surgeries. Patients with diabetes should have a foot examination at least once a year to check for neuropathy. If a sensory neuropathy is detected, more frequent foot examinations should be scheduled to assist in early detection of infections, as well as their prompt treatment.