

## Introduction

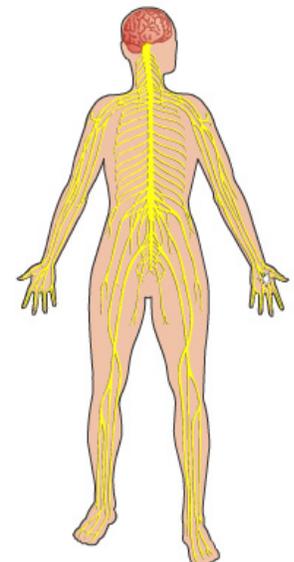
Neuropathy, also called peripheral neuropathy, is caused by nerve damage. It can lead to weakness, numbness and pain that usually affects the hands and feet. It may also happen in other parts of your body. In many cases, neuropathy symptoms improve over time, especially if the neuropathy is caused by a condition that can be treated. Medications can be used to reduce the painful symptoms of neuropathy.

This reference summary explains neuropathy. It covers symptoms and causes of the condition, as well as diagnosis and treatment options.

## Anatomy of the Peripheral Nerves

The brain and spinal cord make up the central nervous system. The nerves in the rest of the body make up the peripheral nervous system. The brain is the command center of the body. You use your brain to think and feel. The brain also receives information and sends orders to different parts of the body. Orders from the brain travel through the spinal cord. The spinal cord sends the orders to the rest of the body through the peripheral nerves.

Healthy nerves send and receive messages about movement. They also send and receive messages about sensation, or feeling. If you burn your hand while cooking, the nerves in the skin send pain signals to your brain. If the nerves become damaged, they cannot send and receive messages normally. This can cause movement and sensation problems.



Nervous System

Nerve damage can happen anywhere in the body. Organs can also be affected by nerve problems. Disorders that affect the peripheral nerves change or interrupt the messages between the brain and the rest of the body. There are more than 100 kinds of peripheral nerve disorders. They can affect one nerve or many nerves.

## Symptoms

Nerves that may be affected by neuropathy include:

- Autonomic nerves. These control your blood pressure, heart rate, digestion and bladder function.
- Motor nerves. These nerves control how your muscles move.
- Sensory nerves that receive sensations such as heat, pain or touch.

Symptoms of neuropathy are often minor at first. Most nerve damage happens gradually over several years. Mild cases may go unnoticed for a long time.

Symptoms of neuropathy vary. They depend on which types of nerves are affected. Signs and symptoms may include:

- Gradual numbness and tingling in your feet or hands, which may spread upward into your legs and arms.
- Burning pain.
- Sharp or jabbing pain that feels like an electrical shock.

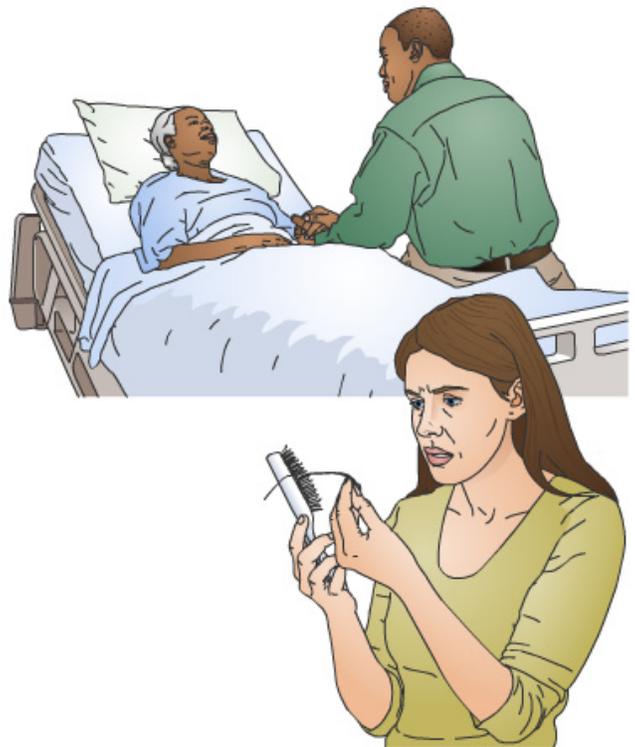
Other symptoms of neuropathy may include:

- Lack of coordination.
- Muscle weakness or paralysis.
- Sensitivity to touch.
- Skin dryness, hair loss or nail changes.

Other symptoms of neuropathy may include:

- Bowel, bladder or digestive problems.
- Changes in blood pressure, causing dizziness or lightheadedness.
- Sensitivity to heat.

People generally describe the pain of neuropathy as tingling or burning. The loss of sensation may feel like wearing a thin stocking or glove.



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## Causes

It's not always easy to diagnose the cause of neuropathy. It can be caused by different factors.

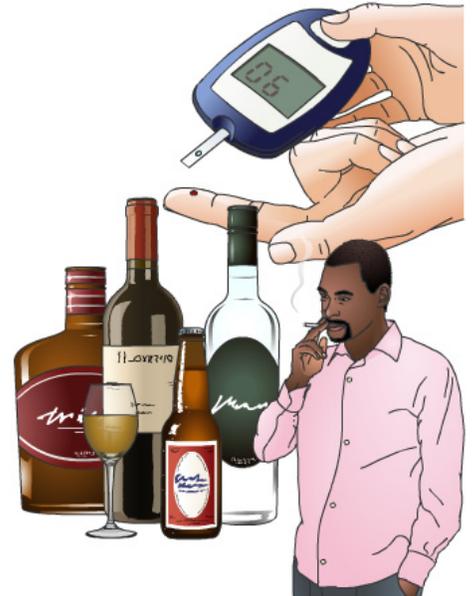
Factors that may lead to neuropathy include:

- Diabetes.
- Alcohol abuse.
- Autoimmune diseases.
- Exposure to poisons.
- Smoking tobacco products.

Autoimmune diseases cause the body's immune system to attack healthy cells in the body by mistake.

Other factors that may lead to neuropathy include:

- Medications.
- Infections.
- Inherited disorders.
- Traumatic injuries or pressure on the nerve.
- Tumors.



When damage affects several nerves, the cause is frequently diabetes. At least half of all people with diabetes develop some type of neuropathy.

Paraneoplastic syndromes may develop when substances released by cancer cells disrupt the normal function of surrounding cells and tissue. The cancer cells can also cause neuropathy. Paraneoplastic syndromes are a group of rare disorders. They are triggered by an abnormal immune system response to a cancerous tumor.

B vitamins are needed to keep nerves healthy. Vitamin E and niacin are also needed. Not having enough of these vitamins in your system may cause neuropathy.



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Certain diseases can cause neuropathy. These include:

- Amyloidosis.
- Connective tissue disorders.
- Kidney disease.
- Liver disease.
- Underactive thyroid gland.

Amyloidosis is a group of diseases. They cause protein to build up in certain organs or throughout the body. Repetitive motions and cramped positions can also lead to nerve damage.

Complications of neuropathy may include:

- Reduced feeling and sensation.
- Infection.

Because parts of your body may be numb, you may be less likely to feel temperature changes or pain. This can increase your risk of burns or skin trauma.



## Diagnosis

Neuropathy is a symptom with many potential causes. It can be hard to diagnose. Your health care provider will need to determine where the nerve damage is and what's causing it. Your health care provider will perform a physical exam. He or she will ask you questions about your personal and family medical history.

To diagnose neuropathy, your health care provider will also perform a neurological exam. He or she may check your:

- Ability to feel certain sensations.
- Muscle strength and tone.
- Posture and coordination.
- Tendon reflexes.



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Other tests may also be done. These may include:

- Blood tests.
- Imaging tests.
- Lumbar puncture.
- Skin biopsy.

Blood tests can measure your vitamin and blood sugar levels. They can also check how well your thyroid, liver and kidney are functioning. A lumbar puncture, or spinal tap, may be done to examine your cerebrospinal fluid.

Other tests used to diagnose neuropathy include:

- Nerve function tests.
- Nerve biopsy.

## Treatment

The goal of treatment for neuropathy is to manage the condition that is causing it and relieve symptoms. Mild symptoms may be relieved by over-the-counter pain medications. For severe symptoms, your health care provider may recommend prescription painkillers. Medications also can help relieve neuropathy pain.

Transcutaneous electrical nerve stimulation, or TENS may be recommended. During TENS, adhesive electrodes are placed on the skin. A gentle electrical current is sent through the electrodes. The current prevents nerve pain from reaching your brain. TENS should be done for 30 minutes daily for about a month.



People with certain inflammatory conditions may benefit from procedures such as plasma exchange and intravenous immune globulin. These therapies help suppress the immune system. In plasma exchange, a machine filters immune cells from your blood. In immune globulin therapy, you're given high levels of proteins that work as antibodies. The antibodies can help reduce your immune system's activity.

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Try using hand or foot braces to help support your movement if you have muscle weakness. You may also need physical therapy. If you have neuropathy caused by pressure on your nerves, you may need surgery to reduce the pressure.



If you have neuropathy, it's important that you check your feet and other areas that lack normal feeling and sensation. You need to treat minor injuries before they become infected.

This is especially important for people with diabetes, since they tend to heal more slowly.

Regular exercise, such as walking 3 times a week, may reduce neuropathy pain, improve your muscle strength and help control blood sugar levels. Yoga and tai chi also may help prevent neuropathy pain.

Cigarette smoking can affect circulation, increasing the risk of neuropathy complications. If you smoke, talk to your health care provider about quitting. Eat healthy meals. If you're at high risk for neuropathy or have a chronic medical condition, healthy eating can help you get the vitamins and minerals you need. Choose low-fat meats and dairy products. Include lots of fruits, vegetables and whole grains in your diet. Avoid alcohol. Alcohol may worsen neuropathy.



If you have diabetes, it's important that you monitor your blood glucose levels. Keeping your blood glucose under control may help improve your neuropathy.

Massage your hands and feet, or have someone massage them for you. Massage helps improve circulation, stimulates nerves and may temporarily relieve pain. Don't keep your legs crossed or lean on your elbows for long periods of time. Doing so may cause new nerve damage.

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## Summary

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If nerves become damaged, they cannot send and receive messages normally. This can cause movement and sensation problems. Nerve damage can happen anywhere in the body. Organs can also be affected by nerve problems.

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