

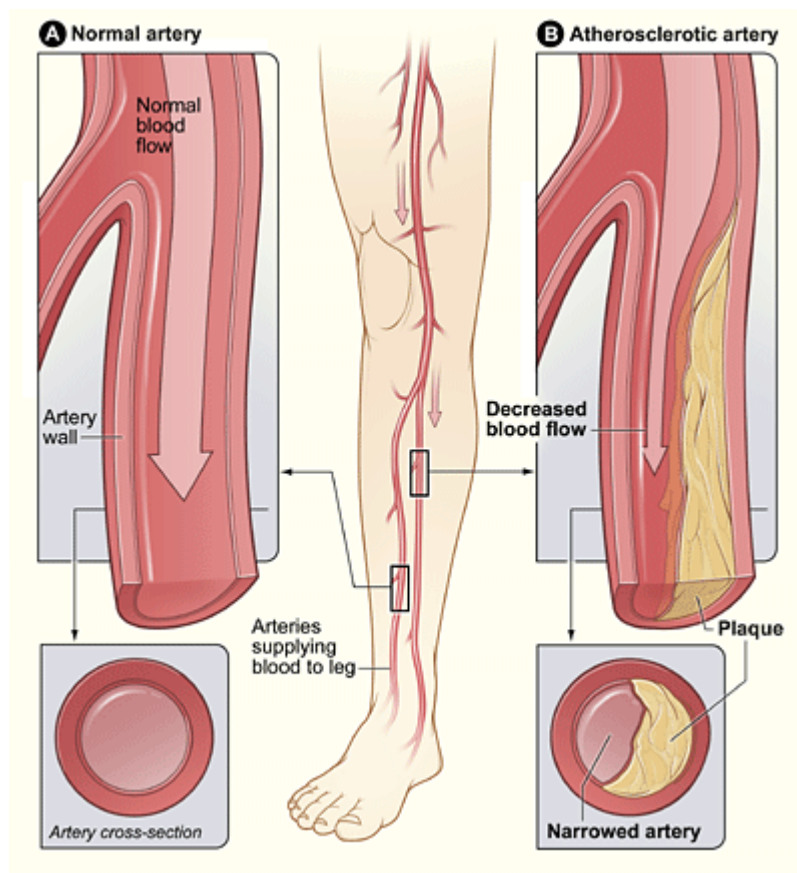
What Is Peripheral Arterial Disease?

Peripheral arterial disease (P.A.D.) is a disease in which plaque (plak) builds up in the arteries that carry blood to your head, organs, and limbs. Plaque is made up of fat, cholesterol, calcium, fibrous tissue, and other substances in the blood.

When plaque builds up in the body's arteries, the condition is called [atherosclerosis](#) (ATH-er-o-skler-O-sis). Over time, plaque can harden and narrow the arteries. This limits the flow of oxygen-rich blood to your organs and other parts of your body.

P.A.D. usually affects the arteries in the legs, but it also can affect the arteries that carry blood from your heart to your head, arms, kidneys, and stomach. This article focuses on P.A.D. that affects blood flow to the legs.

Normal Artery and Artery With Plaque Buildup



The illustration shows how P.A.D. can affect arteries in the legs. Figure A shows a normal artery with normal blood flow. The inset image shows a cross-section of the normal artery. Figure B shows an artery with plaque buildup that's partially blocking blood flow. The inset image shows a cross-section of the narrowed artery.

Overview

Blocked blood flow to your legs can cause pain and numbness. It also can raise your risk of getting an infection in the affected limbs. Your body may have a hard time fighting the infection.

If severe enough, blocked blood flow can cause gangrene (tissue death). In very serious cases, this can lead to leg amputation.

If you have leg pain when you walk or climb stairs, talk with your doctor. Sometimes older people think that leg pain is just a symptom of aging. However, the cause of the pain could be P.A.D. Tell your doctor if you're feeling pain in your legs and discuss whether you should be tested for P.A.D.

[Smoking](#) is the main risk factor for P.A.D. If you smoke or have a history of smoking, your risk of P.A.D. increases up to four times. Other factors, such as age and having certain diseases or conditions, also increase your risk of P.A.D.

Outlook

P.A.D. increases your risk of [coronary heart disease](#) (CHD; also called coronary artery disease), [heart attack](#), [stroke](#), and [transient ischemic attack](#) [🗨] ("mini-stroke"). If you have CHD, you have a 1 in 3 chance of having blocked leg arteries.

Although P.A.D. is serious, it's treatable. If you have the disease, see your doctor regularly and treat the underlying atherosclerosis.

P.A.D. treatment may slow or stop disease progress and reduce the risk of complications. Treatments include lifestyle changes, medicines, and surgery or procedures. Researchers continue to explore new therapies for P.A.D.

Other Names for Peripheral Arterial Disease

- Atherosclerotic peripheral arterial disease
 - Claudication
 - Hardening of the arteries
 - Leg cramps from poor circulation
 - Peripheral vascular disease
 - Poor circulation
 - Vascular disease
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What Causes Peripheral Arterial Disease?

The most common cause of peripheral arterial disease (P.A.D.) is [atherosclerosis](#). Atherosclerosis is a disease in which plaque builds up in your arteries. The exact cause of atherosclerosis isn't known.

The disease may start if certain factors damage the inner layers of the arteries. These factors include:

- [Smoking](#)
- High amounts of certain fats and [cholesterol](#) in the blood
- [High blood pressure](#)
- High amounts of sugar in the blood due to [insulin resistance](#) or [diabetes](#)

When damage occurs, your body starts a healing process. The healing may cause plaque to build up where the arteries are damaged.

Eventually, a section of plaque can rupture (break open), causing a blood clot to form at the site. The buildup of plaque or blood clots can severely narrow or block the arteries and limit the flow of oxygen-rich blood to your body.

Who Is at Risk for Peripheral Arterial Disease?

Peripheral arterial disease (P.A.D.) affects millions of people in the United States. The disease is more common in African Americans than any other racial or ethnic group.

The major risk factors for P.A.D. are [smoking](#), older age, and having certain diseases or conditions.

Smoking

Smoking is the main risk factor for P.A.D. Your risk of P.A.D. increases four times if you smoke or have a history of smoking.

On average, people who smoke and develop P.A.D. have symptoms 10 years earlier than people who don't smoke and develop P.A.D.

Quitting smoking slows the progress of P.A.D. Smoking even one or two cigarettes a day can interfere with P.A.D. treatments. People who smoke and people who have [diabetes](#) are at highest risk for P.A.D. complications, such as gangrene (tissue death) in the leg from decreased blood flow.

Older Age

Older age also is a risk factor for P.A.D. Plaque builds up in your arteries as you age. About 1 in every 20 Americans over the age of 50 has P.A.D. The risk continues to rise as you get older.

Older age combined with other risk factors, such as smoking or diabetes, also puts you at higher risk for P.A.D.

Diseases and Conditions

Many diseases and conditions can raise your risk of P.A.D., including:

- Diabetes. About 1 in 3 people older than 50 who has diabetes also has P.A.D.
- [High blood pressure](#) or a family history of it.
- [High blood cholesterol](#) or a family history of it.
- [Coronary heart disease](#) (CHD) or a family history of it.
- [Stroke](#) or a family history of it.
- [Metabolic syndrome](#) (a group of risk factors that raise your risk of CHD and other health problems, such as P.A.D., stroke, and diabetes).

What Are the Signs and Symptoms of Peripheral Arterial Disease?

Many people who have peripheral arterial disease (P.A.D.) don't have any signs or symptoms. Others may have many signs and symptoms.

Even if you don't have signs or symptoms, ask your doctor whether you should get checked for P.A.D. if you're:

- Aged 70 or older
- Aged 50 or older and have a history of [smoking](#) or [diabetes](#)
- Younger than 50 and have diabetes and one or more [risk factors for atherosclerosis](#)

Intermittent Claudication

People who have P.A.D. may have symptoms when walking or climbing stairs. These symptoms may include pain, numbness, aching, or heaviness in the leg muscles.

Symptoms also may include cramping in the affected leg(s) and in the buttocks, thighs, calves, and feet. Symptoms may ease after resting.

These symptoms are called intermittent claudication. During physical activity, your muscles need increased blood flow. If your blood vessels are narrowed or blocked, your muscles won't get enough blood, which will lead to symptoms. When resting, the muscles need less blood flow, so the symptoms will go away.

About 10 percent of people who have P.A.D. have claudication. This symptom is more likely in people who also have [atherosclerosis](#) in other arteries.

Other Signs and Symptoms

Other signs and symptoms of P.A.D. include:

- Weak or absent pulses in the legs or feet
- Sores or wounds on the toes, feet, or legs that heal slowly, poorly, or not at all
- A pale or bluish color to the skin
- A lower temperature in one leg compared to the other leg
- Poor nail growth on the toes and decreased hair growth on the legs
- Erectile dysfunction, especially among men who have diabetes

How Is Peripheral Arterial Disease Diagnosed?

Peripheral arterial disease (P.A.D.) is diagnosed based on your medical and family histories, a physical exam, and test results.

P.A.D. often is diagnosed after symptoms are reported. A correct diagnosis is important because people who have P.A.D. are at higher risk for [coronary heart disease](#) (CHD), [heart attack](#), [stroke](#), and [transient ischemic attack](#) [☞] ("mini-stroke"). If you have P.A.D., your doctor also may want to check for signs of these diseases and conditions.

Medical and Family Histories

Your doctor may ask:

- Whether you have any risk factors for P.A.D. For example, he or she may ask whether you [smoke](#) or have [diabetes](#) [☞].
- About your symptoms, including any symptoms that occur when walking, exercising, sitting, standing, or climbing.
- About your diet.
- About any medicines you take, including prescription and over-the-counter medicines.
- Whether anyone in your family has a history of heart or blood vessel diseases.

Physical Exam

During the physical exam, your doctor will look for signs of P.A.D. He or she may check the blood flow in your legs or feet to see whether you have weak or absent pulses.

Your doctor also may check the pulses in your leg arteries for an abnormal whooshing sound called a bruit (broo-E). He or she can hear this sound with a stethoscope. A bruit may be a warning sign of a narrowed or blocked artery.

Your doctor may compare blood pressure between your limbs to see whether the pressure is lower in the affected limb. He or she also may check for poor wound healing or any changes in your hair, skin, or nails that may be signs of P.A.D.

Diagnostic Tests

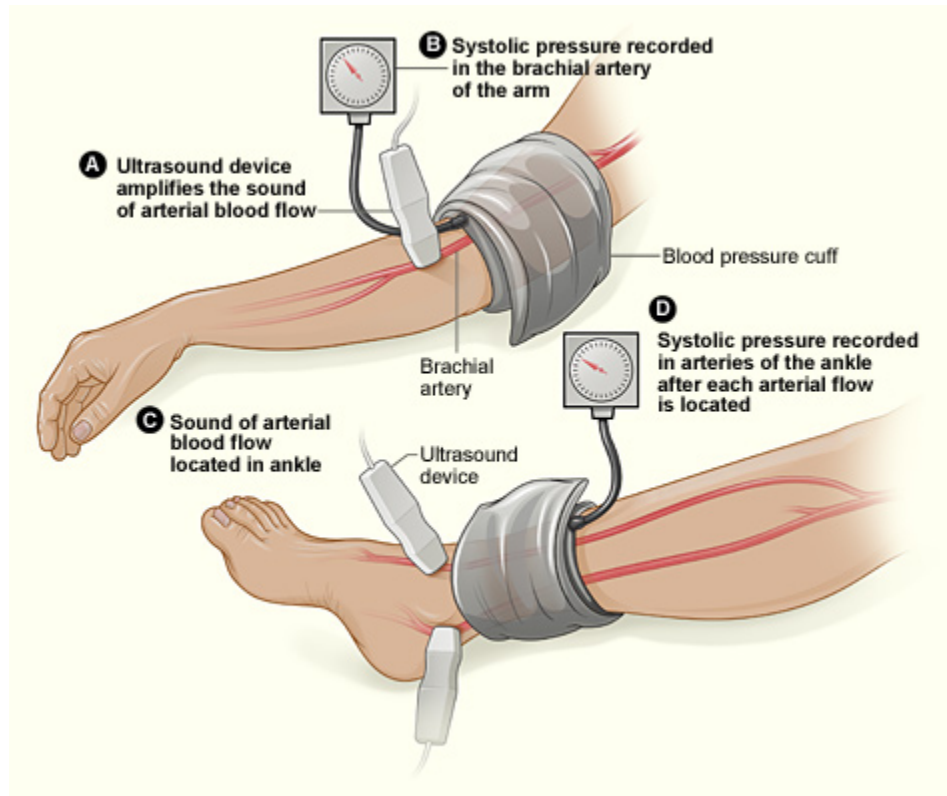
Ankle-Brachial Index

A simple test called an ankle-brachial index (ABI) often is used to diagnose P.A.D. The ABI compares blood pressure in your ankle to blood pressure in your arm. This test shows how well blood is flowing in your limbs.

ABI can show whether P.A.D. is affecting your limbs, but it won't show which blood vessels are narrowed or blocked.

A normal ABI result is 1.0 or greater (with a range of 0.90 to 1.30). The test takes about 10 to 15 minutes to measure both arms and both ankles. This test may be done yearly to see whether P.A.D. is getting worse.

Ankle-Brachial Index



The illustration shows the ankle-brachial index test. The test compares blood pressure in the ankle to blood pressure in the arm. As the blood pressure cuff deflates, the blood pressure in the arteries is recorded.

Doppler Ultrasound

A Doppler ultrasound looks at blood flow in the major arteries and veins in the limbs. During this test, a handheld device is placed on your body and passed back and forth over the affected area. A computer converts sound waves into a picture of blood flow in the arteries and veins.

The results of this test can show whether a blood vessel is blocked. The results also can help show the severity of P.A.D.

Treadmill Test

A treadmill test can show the severity of symptoms and the level of exercise that brings them on. You'll walk on a treadmill for this test. This shows whether you have any problems during normal walking.

You may have an ABI test before and after the treadmill test. This will help compare blood flow in your arms and legs before and after exercise.

Arteriogram

An arteriogram provides a "road map" of the arteries. Doctors use this test to find the exact location of a blocked artery.

For this test, dye is injected through a needle or catheter (tube) into one of your arteries. This may make you feel mildly flushed. After the dye is injected, an x ray is taken. The x ray can show the location, type, and extent of the blockage in the artery.

Some doctors use a newer method of arteriogram that uses tiny ultrasound cameras. These cameras take pictures of the insides of the blood vessels. This method is called intravascular ultrasound.

Blood Tests

Your doctor may recommend [blood tests](#) to check for P.A.D. risk factors. For example, blood tests can help diagnose conditions such as [diabetes](#) and [high blood cholesterol](#).

How Is Peripheral Arterial Disease Treated?

Treatments for peripheral arterial disease (P.A.D.) include lifestyle changes, medicines, and surgery or procedures.

The overall goals of treating P.A.D. include reducing symptoms, improving quality of life, and preventing complications. Treatment is based on your signs and symptoms, risk factors, and results from a physical exam and tests.

Lifestyle Changes

Treatment often includes making long-lasting lifestyle changes, such as:

- Quitting [smoking](#). Your risk of P.A.D. increases four times if you smoke. Smoking also raises your risk for other diseases, such as [coronary heart disease](#) (CHD). Talk with your doctor about programs and products that can help you quit smoking. Also, try to avoid secondhand smoke.
- Lowering [blood pressure](#). This lifestyle change can help you avoid the risk of [stroke](#), [heart attack](#), [heart failure](#), and [kidney disease](#).
- Lowering [high blood cholesterol](#). Lowering cholesterol can delay or even reverse the buildup of plaque in your arteries.
- Lowering blood glucose (sugar) levels if you have [diabetes](#). A hemoglobin A1C test can show how well you have controlled your blood sugar level over the past 3 months.
- Being [physically active](#). Talk with your doctor about taking part in a supervised exercise program. This type of program has been shown to reduce P.A.D. symptoms.

Follow a healthy eating plan that's low in total fat, saturated fat, *trans* fat, cholesterol, and sodium (salt). Include fruits, vegetables, and low-fat dairy products in your diet. If you're [overweight or obese](#), work with your doctor to create a reasonable weight-loss plan.

Two examples of healthy eating plans are [Therapeutic Lifestyle Changes \(TLC\)](#) and [Dietary Approaches to Stop Hypertension](#) (DASH).

Medicines

Your doctor may prescribe medicines to:

- Treat unhealthy cholesterol levels and high blood pressure
- Prevent blood clots from forming due to low blood flow
- Help ease leg pain that occurs when you walk or climb stairs

Surgery or Procedures

Bypass Grafting

Your doctor may recommend bypass grafting surgery if blood flow in your limb is blocked or nearly blocked. For this surgery, your doctor uses a blood vessel from another part of your body or a man-made tube to make a graft.

This graft bypasses (that is, goes around) the blocked part of the artery. The bypass allows blood to flow around the blockage.

This surgery doesn't cure P.A.D., but it may increase blood flow to the affected limb.

Angioplasty and Stenting

Your doctor may recommend [angioplasty](#) (AN-jee-oh-plas-tee) to restore blood flow through a narrowed or blocked artery.

During this procedure, a catheter (thin tube) with a balloon at the tip is inserted into a blocked artery. The balloon is then inflated, which pushes plaque outward against the artery wall. This widens the artery and restores blood flow.

A [stent](#) (a small mesh tube) may be placed in the artery during angioplasty. A stent helps keep the artery open after angioplasty is done. Some stents are coated with medicine to help prevent blockages in the artery.

Atherectomy

Atherectomy (ath-eh-REK-to-me) is a procedure that removes plaque buildup from an artery. During the procedure, a catheter is used to insert a small cutting device into the blocked artery. The device is used to shave or cut off plaque.

The bits of plaque are removed from the body through the catheter or washed away in the bloodstream (if they're small enough).

Doctors also can do atherectomy using a special laser that dissolves the blockage.

Other Types of Treatment

Researchers are studying cell and gene therapies to treat P.A.D. However, these treatments aren't yet available outside of clinical trials.

For more information about clinical trials, go to the ["Clinical Trials"](#) section of this article or the Health Topics [Clinical Trials](#) article.

How Can Peripheral Arterial Disease Be Prevented?

Taking action to control your [risk factors](#) can help prevent or delay peripheral arterial disease (P.A.D.) and its complications.

Know your family history of health problems related to P.A.D. If you or someone in your family has the disease, be sure to tell your doctor.

If you smoke, quit. Smoking is the main risk factor for P.A.D. Your risk of P.A.D. increases four times if you smoke or have a history of smoking. Talk with your doctor about programs and products that can help you quit smoking. Also, try to avoid secondhand smoke.

The Health Topics [Smoking and Your Heart](#) article and the National Heart, Lung, and Blood Institute's (NHLBI's) ["Your Guide to a Healthy Heart"](#) both include information about how to quit smoking.

Follow a healthy diet that includes a variety of fruits, vegetables, and whole grains. A healthy diet also includes lean meats, poultry, fish, beans, and fat-free or low-fat milk or milk products. A healthy diet is low in saturated fat, *trans* fat, cholesterol, sodium (salt), and added sugar.

The National Heart, Lung, and Blood Institute's (NHLBI's) [Therapeutic Lifestyle Changes \(TLC\)](#) and [Dietary Approaches to Stop Hypertension \(DASH\)](#) are two programs that promote healthy eating.

If you're [overweight or obese](#), work with your doctor to create a reasonable weight-loss plan. Also, try to be physically active. Physical activity can improve your fitness level and your health. Talk with your doctor about the types of activity that are safe for you.

The Health Topics [Physical Activity and Your Heart](#) article and the NHLBI's ["Your Guide to Physical Activity and Your Heart"](#) include information about physical activity. Although these resources focus on heart health, they also apply to general health and well-being.

The lifestyle changes described above can reduce your risk of P.A.D. These changes also can help prevent and control conditions that can lead to P.A.D., such as [diabetes](#), [high blood pressure](#), [high blood cholesterol](#), [coronary heart disease](#), and [stroke](#).

Living With Peripheral Arterial Disease

If you have peripheral arterial disease (P.A.D.), you're more likely to also have [coronary heart disease](#) (CHD), [heart attack](#), [stroke](#), and [transient ischemic attack](#) [🔗] ("mini-stroke"). However, you can take steps to treat and control P.A.D. and lower your risk for these other conditions.

Living With Peripheral Arterial Disease Symptoms

If you have P.A.D., you may feel pain in your calf or thigh muscles after walking. Try to take a break and allow the pain to ease before walking again. Over time, this may increase the distance that you can walk without pain.

Talk with your doctor about taking part in a supervised exercise program. This type of program has been shown to reduce P.A.D. symptoms.

Check your feet and toes regularly for sores or possible infections. Wear comfortable shoes that fit well. Maintain good foot hygiene and have professional medical treatment for corns, bunions, or calluses.

Ongoing Health Care Needs and Lifestyle Changes

See your doctor for checkups as he or she advises. If you have P.A.D. without symptoms, you should still see your doctor regularly. Take all medicines as your doctor prescribes.

Lifestyle changes can help prevent or delay P.A.D. and other related problems, such as CHD, heart attack, stroke, and transient ischemic attack. Lifestyle changes include quitting [smoking](#), controlling risk factors, being [physically active](#), and following a healthy diet.