

# Peripheral artery disease - legs

## Definition

Peripheral artery disease (PAD) is a condition of the blood vessels that supply the legs and feet. It occurs due to narrowing of the arteries in the legs. This causes decreased blood flow, which can injure nerves and other tissues.

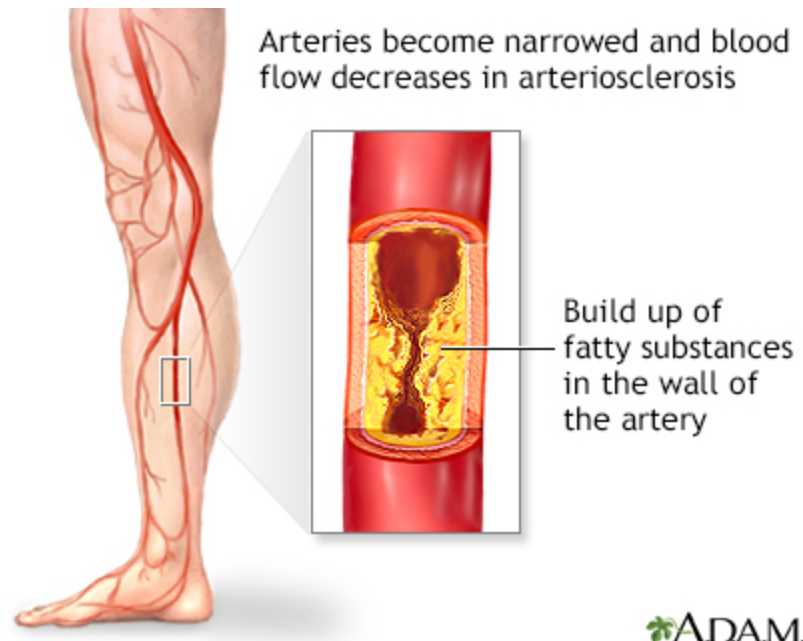
## Causes

PAD is commonly caused by atherosclerosis. This problem occurs when fatty material (plaque) builds up on the walls of your arteries and makes them narrower. The walls of the arteries also become stiffer and cannot widen (dilate) to allow greater blood flow when needed.

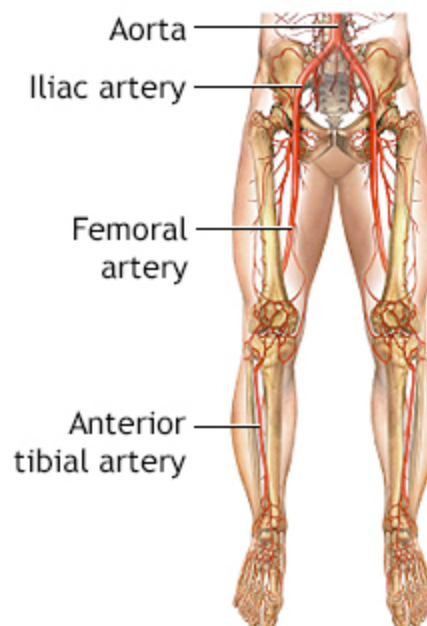
As a result, the muscles of your legs cannot get enough blood and oxygen when they are working harder (such as during exercise or walking). If PAD becomes severe, there may not be enough blood and oxygen, even when the muscles are resting.

PAD is a common disorder. It most often affects men over age 50, but women can have it as well. People are at higher risk if they have a history of:

- Abnormal blood cholesterol level
- Diabetes



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- Heart disease (coronary artery disease)
- High blood pressure (hypertension)
- Kidney disease involving hemodialysis
- Smoking
- Stroke (cerebrovascular disease)

## Symptoms

The main symptoms of PAD are pain, achiness, fatigue, burning, or discomfort in the muscles of your feet, calves, or thighs. These symptoms most often appear during walking or exercise, and go away after several minutes of rest.

- At first, these symptoms may appear only when you walk uphill, walk faster, or walk for longer distances.
- Over time, these symptoms occur more quickly and with less exercise.
- Your legs or feet may feel numb when you are at rest. The legs also may feel cool to the touch, and the skin may look pale.

When PAD becomes severe, you may have:

- Impotence
- Pain and cramps at night
- Pain or tingling in the feet or toes, which can be so severe that even the weight of clothes or bed sheets is painful
- Pain that is worse when you elevate your legs, and improves when you dangle your legs over the side of the bed
- Skin that looks dark and blue
- Sores that do not heal

## Exams and Tests

During an exam, the health care provider may find:

- A whooshing sound when the stethoscope is held over the artery (arterial bruits)
- Decreased blood pressure in the affected limb
- Weak or absent pulses in the limb

When PAD is more severe, findings may include:

- Calf muscles that shrink (wither or atrophy)
- Hair loss over the legs, feet, and toes
- Painful, non-bleeding sores on the feet or toes (most often black) that are slow to heal
- Paleness of the skin or blue color in the toes or foot (cyanosis)

- Shiny, tight skin
- Thick toenails

Blood tests may show high cholesterol or diabetes.

Tests for PAD include:

- Angiography of the legs
- Blood pressure measured in the arms and legs for comparison (ankle/brachial index, or ABI)
- Doppler ultrasound exam of an extremity
- Magnetic resonance angiography or CT angiography

## Treatment

Things you can do to control PAD include:

- Balance exercise with rest. Walk or do another activity to the point of pain and alternate it with rest periods. Over time, your circulation may improve as new, small blood vessels form. Always talk to the provider before starting an exercise program.
- Stop smoking. Smoking narrows the arteries, decreases the blood's ability to carry oxygen, and increases the risk for forming clots (thrombi and emboli).
- Take care of your feet, especially if you also have diabetes. Wear shoes that fit properly. Pay attention to any cuts, scrapes, or injuries, and see your provider right away. Tissues heal slowly and are more likely to get infected when there is decreased circulation.
- Make sure your blood pressure is well-controlled.
- If you are overweight, reduce your weight.
- If your cholesterol is high, eat a low-cholesterol and low-fat diet.
- Monitor your blood sugar level if you have diabetes, and keep it under control.

Medicines may be needed to control the disorder, including:

- Aspirin or a medicine called clopidogrel (Plavix), which keeps your blood from forming clots in your arteries. DO NOT stop taking these medicines without first talking with your provider.
- Cilostazol, a drug that works to enlarge (dilate) the affected artery or arteries for moderate-to-severe cases that are not candidates for surgery.
- Medicine to help lower your cholesterol.
- Pain relievers.

If you are taking medicines for high blood pressure or diabetes, take them as your provider has prescribed.

Surgery may be performed if the condition is severe and is affecting your ability to work or do important activities, you are having pain at rest, or you have sores or ulcers on your leg

that do not heal. Options are:

- Procedure to open narrowed or blocked blood vessels that supply blood to your legs
- Surgery to reroute the blood supply around a blocked artery

Some people with PAD may need to have the limb removed (amputated).

## Outlook (Prognosis)

Most cases of PAD of the legs can be controlled without surgery. Although surgery provides good symptom relief in severe cases, angioplasty and stenting procedures are being used in place of surgery more and more often.

## Possible Complications

Complications may include:

- Blood clots or emboli that block small arteries
- Coronary artery disease
- Impotence
- Open sores (ischemic ulcers on the lower legs)
- Tissue death (gangrene)
- The affected leg or foot may need to be amputated

## When to Contact a Medical Professional

Contact your provider if you have:

- A leg or foot that becomes cool to the touch, pale, blue, or numb
- Chest pain or shortness of breath with leg pain
- Leg pain that does not go away, even when you are not walking or moving (called rest pain)
- Legs that are red, hot, or swollen
- New sores/ulcers
- Signs of infection (fever, redness, general ill feeling)
- Symptoms of arteriosclerosis of the extremities

## Prevention

There is no screening test recommended to identify PAD in patients without symptoms.

Some of the risks for artery disease that you CAN change are:

- Not smoking. If you do smoke, quit.
- Controlling your cholesterol through diet, exercise, and medicines.
- Controlling high blood pressure through diet, exercise, and medicines, if needed.
- Controlling diabetes through diet, exercise, and medicines, if needed.
- Exercising at least 30 minutes a day.
- Keeping to a healthy weight by eating healthy foods, eating less, and joining a weight loss program, if you need to lose weight.
- Learning healthy ways to cope with stress through special classes or programs, or things like meditation or yoga.
- Limiting how much alcohol you drink to 1 drink a day for women and 2 a day for men.

Peripheral vascular disease; PVD; PAD; Arteriosclerosis obliterans; Blockage of leg arteries; Claudication; Intermittent claudication; Vaso-occlusive disease of the legs; Arterial insufficiency of the legs; Recurrent leg pain and cramping; Calf pain with exercise

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Reviewed By: Deepak Sudheendra, MD, MHCI, RPVI, FSIR, Founder and CEO, 360 Vascular Institute, with an expertise in Vascular Interventional Radiology & Surgical Critical Care, Columbus, OH. Review provided by VeriMed Healthcare Network. Also reviewed by David C. Dugdale, MD, Medical Director, Brenda Conaway, Editorial Director, and the A.D.A.M. Editorial team.



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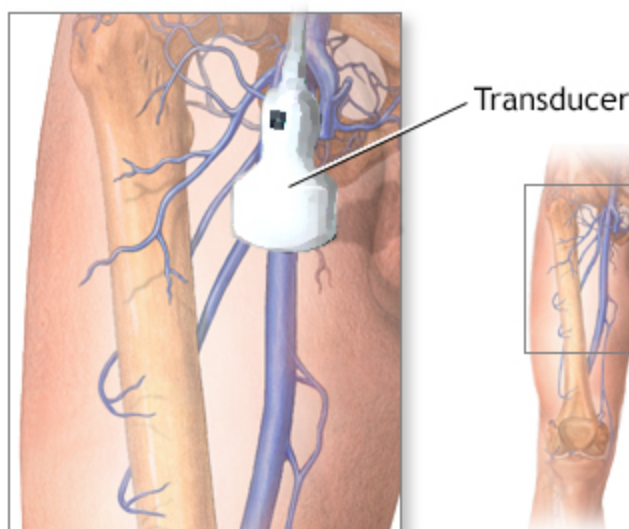
# Doppler ultrasound exam of an arm or leg

## Definition

This test uses ultrasound to look at the blood flow in the large arteries and veins in the arms or legs.

## How the Test is Performed

The test is done in the ultrasound or radiology department, a hospital room, or in a peripheral vascular lab.



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During the exam:

- A water-soluble gel is placed on a handheld device called a transducer. This device directs high-frequency sound waves to the artery or veins being tested.
- Blood pressure cuffs may be put around different parts of the body, including the thigh, calf, ankle, and different points along the arm.

## How to Prepare for the Test

You will need to remove clothes from the arm or leg being examined.

## How the Test will Feel

Sometimes, the person performing the test will need to press on the vein to make sure it does not have a clot. Some people may feel slight pain from the pressure.

## Why the Test is Performed

This test is done as the first step to look at arteries and veins. Sometimes, arteriography and venography may be needed later. The test is done to help diagnose:

- Arteriosclerosis of the arms or legs
- Blood clot (deep vein thrombosis)
- Venous insufficiency

The test may also be used to:

- Look at injury to the arteries
- Monitor arterial reconstruction and bypass grafts

## Normal Results

A normal result means the blood vessels show no signs of narrowing, clots, or closure, and the arteries have normal blood flow.

## What Abnormal Results Mean

Abnormal results may be due to:

- Blockage in an artery by a blood clot
- Blood clot in a vein (DVT)
- Narrowing or widening of an artery
- Spastic arterial disease (arterial contractions brought on by cold or emotion)
- Venous occlusion (closing of a vein)
- Venous reflux (blood flow going the wrong direction in veins)
- Arterial occlusion from atherosclerosis

This test may also be done to help assess the following conditions:

- Atherosclerosis of the extremities
- Deep venous thrombosis
- Superficial thrombophlebitis

## Risks

There are no risks from this procedure.

## Considerations

Cigarette smoking may alter the results of this test. Nicotine can cause the arteries in the extremities to constrict.

Quitting smoking lowers the risk for problems with the heart and circulatory system. Most smoking-related deaths are caused by cardiovascular problems, not lung cancer.

PVD - Doppler; PAD - Doppler; Blockage of leg arteries - Doppler; Intermittent claudication - Doppler; Arterial insufficiency of the legs - Doppler; Leg pain and cramping - Doppler; Calf pain - Doppler; Venous Doppler - DVT

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Reviewed By: Jason Levy, MD, FSIR, Northside Radiology Associates, Atlanta, GA. Also reviewed by David C. Dugdale, MD, Medical Director, Brenda Conaway, Editorial Director, and the A.D.A.M. Editorial team.



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# Peripheral artery disease of the legs - self-care

## Description

Peripheral artery disease (PAD) is a narrowing of the blood vessels that bring blood to the legs and feet. It can occur when cholesterol and other fatty material (atherosclerotic plaque) build-up on the walls of your arteries.

PAD is mostly seen in people above 65 years of age. Diabetes, smoking, and high blood pressure increase the risk for PAD.

The symptoms of PAD include cramps in the legs mostly during physical activities (intermittent claudication). In severe cases, there may also be pain when the leg is at rest.

Managing the risk factors can reduce the risk of further cardiovascular damage. Treatment mainly includes medicines and rehabilitation. In severe cases, surgery or other procedures may also be done.

## Walking Improves Blood Flow

A regular walking program will improve blood flow as new, small blood vessels form. The walking program is mainly as follows:

- Warm up by walking at a pace that does not cause your normal leg symptoms.
- Then walk to the point of mild-to-moderate pain or discomfort.
- Rest until the pain goes away, then try walking again.

Your goal over time is to be able to walk 30 to 60 minutes. Always talk with your health care provider before you start an exercise program. Call your provider right away if you have any of these symptoms during or after exercise:

- Chest pain
- Breathing problems
- Dizziness
- An uneven heart rate

Make simple changes to add walking to your day.

- At work, try taking the stairs instead of the elevator, take a 5-minute walk break every hour, or add a 10- to 20-minute walk during lunch.
- Try parking at the far end of the parking lot, or even down the street. Even better, try walking to the store.
- If you ride the bus, get off the bus 1 stop before your normal stop and walk the rest of the way.

## Lifestyle Changes

Stop smoking. Smoking narrows your arteries and increases the risk for atherosclerotic plaque or blood clots forming. Other things you can do to stay as healthy as possible are to:

- Make sure your blood pressure is well-controlled.
- Reduce your weight, if you are overweight.
- Eat a low-cholesterol and low-fat diet.
- Test your blood sugar if you have diabetes, and keep it under control.

## Take Care of Your Feet

Check your feet every day. Inspect the tops, sides, soles, heels, and between your toes. If you have vision problems, ask someone to check your feet for you. Use a moisturizer to keep your skin healthier. Look for:

- Dry or cracked skin
- Blisters or sores
- Bruises or cuts
- Redness, warmth, or tenderness
- Firm or hard spots

Call your provider right away about any foot problems. Do not try to treat them yourself first.

## What Else?

If you are taking medicines for high blood pressure, high cholesterol, or diabetes, take them as prescribed. If you are not taking medicine for high cholesterol, ask your provider about them as they may still help you even if your cholesterol is not high.

Your provider may prescribe the following medicines to control your peripheral artery disease:

- Aspirin, clopidogrel (Plavix), or other medicines which keep your blood from forming clots
- Cilostazol, a medicine that widens (dilates) the blood vessels

Do not stop taking these medicines without first talking with your provider.

# When to Call the Doctor

Contact your provider if you have:

- A leg or foot that is cool to the touch, pale, blue, or numb
- Chest pain or shortness of breath when you have leg pain
- Leg pain that does not go away, even when you are not walking or moving (called rest pain)
- Legs that are red, hot, or swollen
- New sores on your legs or feet
- Signs of infection (fever, sweats, red and painful skin, general ill feeling)
- Sores that do not heal

Peripheral vascular disease - self-care; Intermittent claudication - self-care

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