CONDITION

Arterial insufficiency

Learn how reduced blood flow through the arteries can affect the legs, including symptoms, causes, testing, treatment, and when to seek urgent care.

WHAT IT IS
Reduced oxygen-rich blood flow through an artery

BODY SYSTEM
Heart and circulation

MAIN SYMPTOMS
Leg pain during activity, cool or pale foot, weak pulses, nonhealing wounds

WHAT CAUSES IT
Usually atherosclerotic plaque buildup

HOW IT IS DIAGNOSED
Ankle-brachial index, duplex ultrasound, angiography

MAIN TREATMENT
Risk reduction, structured exercise, medicines, revascularization

CAN IT BE CURED?
No - treated arteries can narrow again

IS IT AN EMERGENCY?
Sometimes - sudden limb pain, coldness or numbness

LONG-TERM OUTLOOK
Often manageable, but limb loss, heart attack and stroke remain risks

Overview

Arterial insufficiency means that an artery is not delivering enough oxygen-rich blood to the tissue it supplies. It most often affects the legs and feet, usually because of peripheral artery disease, or PAD. PAD develops when fatty deposits called plaque narrow or block an artery.

Arterial insufficiency may develop gradually or occur suddenly. A gradual reduction in blood flow can cause leg discomfort during activity. More advanced disease may cause pain at rest, wounds that do not heal, or tissue damage. A sudden blockage can threaten the affected limb and requires emergency care.

Reduced arterial blood flow can also affect organs such as the heart, brain, kidneys, or intestines, but those problems have different symptoms and treatments. This article focuses on the limbs.

PAD also signals a higher risk of heart attack and stroke because atherosclerosis may affect arteries throughout the body. Treatment aims to improve circulation and mobility, protect the limb, and reduce cardiovascular risk.

Arterial insufficiency differs from venous insufficiency. Arterial disease often causes a cool, pale, painful foot with weak pulses. Venous disease is more likely to cause swelling, skin darkening, and ulcers near the ankle. Both conditions can occur together.

Symptoms

Some people with PAD have no noticeable symptoms. Others may mistake symptoms for arthritis, muscle strain, nerve disease, or aging.

A common symptom is intermittent claudication: aching, cramping, heaviness, fatigue, or weakness in a leg muscle during walking or exercise. It usually improves within a few minutes of rest and returns after a similar amount of activity. Disease higher in the pelvis may affect the buttock or thigh, while disease lower in the leg often causes calf discomfort.

Other possible signs include:

Rest pain and nonhealing wounds can indicate chronic limb-threatening ischemia, a severe and persistent reduction in blood flow. Rest pain may improve when the foot hangs over the bed because gravity helps blood reach it.

Acute limb ischemia is a sudden major loss of blood flow. Symptoms may include severe pain, a cold or pale limb, numbness, weakness, or an absent pulse. These are sometimes called the "six Ps": pain, pallor, pulselessness, paresthesia, paralysis, and poikilothermia, or abnormal coolness. Not every feature is always present.

Call emergency services for sudden limb pain, marked coolness or paleness, new numbness, loss of movement, or rapidly worsening symptoms. Do not wait for a routine appointment.

- One foot feeling cooler than the other
- Weak or absent foot pulses
- Pale, bluish, or shiny skin
- Reduced hair growth on the legs or toes
- Slow-growing or thickened toenails
- Numbness or weakness
- Cuts, sores, or ulcers that heal slowly

- Toe or forefoot pain at rest, especially at night

Causes and risk factors

Atherosclerosis is the most common cause of chronic arterial insufficiency. Plaque builds up in artery walls, narrowing the channel and limiting the increase in blood flow needed during exercise. Plaque can also rupture and trigger a clot.

A sudden blockage may occur when a clot forms in an already narrowed artery or travels from elsewhere in the body. The heart can be a source of traveling clots, particularly in people with the irregular rhythm atrial fibrillation.

Less common causes include arterial injury, an aneurysm, blood vessel inflammation, or compression by nearby structures. Thromboangiitis obliterans, also called Buerger disease, is a rare inflammatory condition strongly associated with tobacco exposure.

Risk factors for PAD include:

Smoking and diabetes are associated with more severe disease and poorer wound healing. Risk factors alone do not confirm arterial insufficiency, and PAD can exist without obvious symptoms.

- Cigarette smoking or other tobacco exposure
- Diabetes
- Increasing age
- High blood pressure
- High LDL cholesterol
- Chronic kidney disease
- Previous heart attack, stroke, or atherosclerosis elsewhere
- A family history of PAD or early cardiovascular disease

Diagnosis

A clinician will ask when symptoms occur, what relieves them, whether walking ability has changed, and whether there are wounds. They may also ask about tobacco use, diabetes, kidney disease, heart rhythm problems, and cardiovascular history.

The examination may include checking skin color and temperature, inspecting the feet, and

feeling pulses in the groin, behind the knee, and at the ankle or foot. A clinician may listen for a bruit, a whooshing sound caused by turbulent flow through a narrowed artery.

The ankle-brachial index, or ABI, is a common first test. Blood pressures measured at the ankles and arms are compared. An ABI of 0.90 or lower supports a diagnosis of PAD. An exercise ABI may help when symptoms suggest PAD but the resting result is normal or borderline.

Arteries can become stiff and difficult to compress, especially in people with diabetes or chronic kidney disease, producing a falsely high ABI. A toe-brachial index may be more reliable in this situation.

Duplex ultrasound can identify narrowed or blocked areas and assess blood flow. Computed tomography angiography and magnetic resonance angiography provide detailed arterial maps. Catheter angiography uses a thin tube inserted into an artery and is generally used when urgent treatment or a procedure is being considered.

Blood tests may assess cholesterol, blood sugar, kidney function, and other cardiovascular risks. Sudden symptoms require immediate assessment rather than routine outpatient testing.

Treatment and management

Treatment depends on the blockage, symptom severity, effect on daily life, and whether the limb is threatened. Care commonly combines cardiovascular risk reduction, exercise when appropriate, foot protection, medicines, and procedures.

Stopping tobacco use is one of the most important steps for people who smoke. Counseling, quit-support programs, and appropriate medicines can improve the chance of success.

Structured exercise can improve walking ability in people with stable claudication. Supervised programs typically alternate walking with rest. A structured home or community program may be an alternative. People with rest pain, foot wounds, or sudden symptoms should obtain clinical guidance before starting exercise.

A heart-healthy eating pattern can support cholesterol, blood pressure, and diabetes management. Patients should inspect their feet regularly, wear well-fitting shoes, and report blisters, cracks, color changes, or wounds early. People with poor circulation should not cut corns or calluses at home.

Medicines may include an antiplatelet drug such as aspirin or clopidogrel, a cholesterol-lowering statin like atorvastatin or simvastatin , and treatments for high blood pressure or diabetes. For selected patients, clinicians may consider low-dose rivaroxaban with aspirin. This combination can reduce some cardiovascular and limb events but increases

bleeding risk and is not appropriate for everyone.

Cilostazol may improve walking distance in some people with claudication, but it must not be used in people with heart failure . A clinician should review bleeding risk, kidney function, heart conditions, and other medicines before selecting treatment.

Revascularization restores blood flow. An endovascular procedure may use a balloon, stent, or another catheter-based method to open an artery. Surgical bypass creates a route around the blockage using a vein or artificial graft. These procedures may be considered for chronic limb-threatening ischemia or activity-limiting claudication that has not improved enough with exercise and medical care.

Acute limb ischemia requires emergency hospital treatment. Care may include an anticoagulant like warfarin or apixaban to prevent further clotting and an urgent procedure to remove or dissolve the clot or bypass the blockage. Treatment depends partly on symptom duration and whether nerves and muscles are affected.

Complications

Poor circulation can limit walking and independence and contribute to muscle weakness. Persistent low blood flow may cause rest pain, ulcers, infection, or gangrene, meaning tissue death. Severe damage can require amputation, although prompt wound care and restored blood flow may help preserve the limb.

A treated artery can narrow again, and stents or bypass grafts can become blocked. Follow-up remains important even if symptoms improve.

PAD is also a marker of atherosclerosis elsewhere in the body. Heart attack, stroke, and cardiovascular death are major risks. Managing tobacco use, cholesterol, blood pressure, diabetes, physical activity, and prescribed medicines helps reduce them.

Restoring blood flow to a severely ischemic limb can occasionally cause swelling, bleeding, or metabolic changes as injured tissue receives blood again. Hospital teams monitor for these complications after urgent treatment.

Follow up

Follow-up may include review of walking ability, foot symptoms, medicines, tobacco use, blood pressure, cholesterol, and diabetes control. After revascularization, clinicians may check pulses, ABI measurements, or ultrasound findings. The schedule depends on the procedure, symptoms, and overall health.

Contact a clinician promptly for a new foot wound, increasing redness or drainage, skin color changes, new rest pain, or a clear decline in walking ability. People with diabetes or reduced sensation may not feel an injury, making regular visual foot checks especially important.

Seek emergency care for:

Routine appointments are appropriate for stable symptoms and ongoing risk-factor care. Sudden loss of circulation is an emergency, not a routine follow-up issue.

- Sudden severe pain in an arm or leg
- A limb that abruptly becomes cold, pale, blue, or numb
- New weakness or inability to move the limb
- Rapid worsening of an existing circulation problem
- Chest pressure, severe shortness of breath, or stroke signs such as facial drooping, arm weakness, or difficulty speaking

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