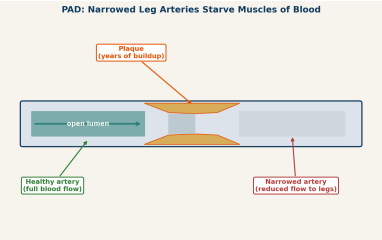
Peripheral Artery Disease

PAD — Narrowed Leg Arteries and What You Can Do About It

PAD is atherosclerosis in the legs. The same changes that clog heart arteries clog leg arteries too.



Online: https://go.riasalimd.com/pad-guide

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Names & Terms You Will Hear

Term	Meaning
Peripheral artery disease (PAD)	Narrowing of leg arteries by plaque. Also called peripheral arterial disease or PVD.
Peripheral vascular disease (PVD)	Broader term covering artery and vein problems in the limbs. PAD is the most common type.
Atherosclerosis	Plaque buildup inside artery walls. The same disease causes heart attacks, strokes, and PAD.
Claudication	Leg cramping with walking that stops with rest. Caused by too little blood reaching the muscles.
ABI (ankle-brachial index)	Blood pressure at the ankle divided by blood pressure in the arm. Below 0.90 = PAD.
Critical limb-threatening ischemia (CLTI)	Severe PAD with rest pain, wounds, or gangrene. Needs urgent care. Older name: CLI.
Fontaine classification	Four PAD stages: I = no symptoms; II = leg cramps; III = rest pain; IV = tissue loss.
Rutherford categories	A 0–6 PAD scale used by specialists. Categories 4–6 = critical limb-threatening ischemia.
TBI (toe-brachial index)	Toe blood pressure vs. arm blood pressure. Used instead of ABI when leg vessels are stiff.
Revascularization	Any procedure to reopen a blocked artery — angioplasty, stenting, or bypass surgery.
Angioplasty	A small balloon on a thin tube pushes plaque aside to widen the artery. Often adds a stent.
Bypass surgery	A vein or tube reroutes blood around the blockage. Used for long or complex blockages.
Cilostazol (Pletal)	A pill that relaxes artery walls. Approved to improve walking distance in claudication.

Term	Meaning
Supervised exercise therapy (SET)	A structured walking program, 3 times weekly. Equals stenting for claudication (CLEVER trial).

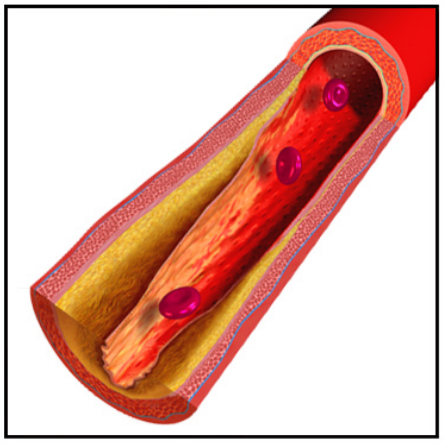
Peripheral Artery Disease?

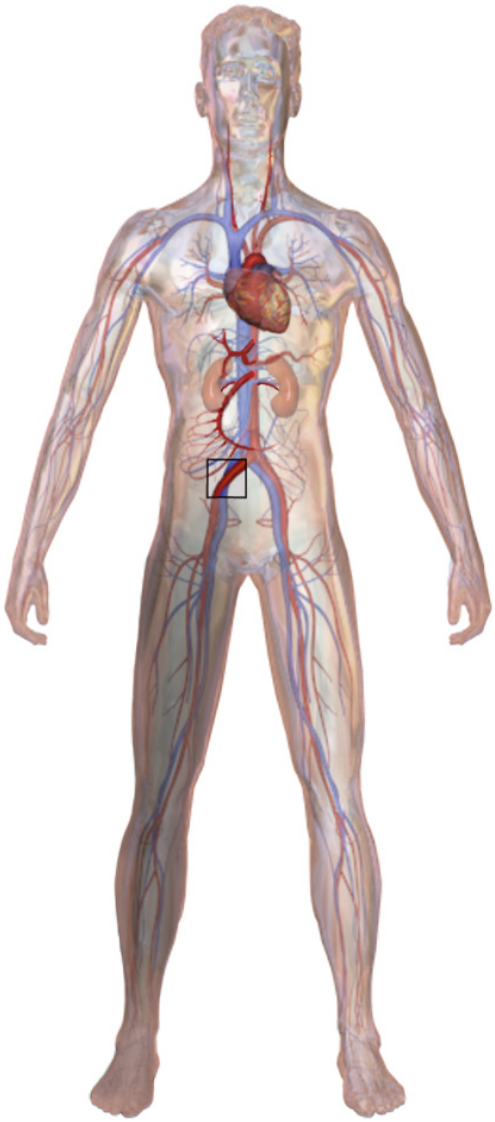
- PAD means the arteries that carry blood to your legs have narrowed. Plaque — a mix of cholesterol, calcium, and scar tissue — builds up inside the artery walls over years.
- The same process that narrows heart arteries (causing heart attacks) narrows leg arteries. PAD and coronary artery disease often occur together.
- Blood flow to the leg muscles decreases. With mild narrowing, blood flow is enough at rest but not enough during exercise — causing cramping that stops when you rest (claudication).
- With severe narrowing, blood flow is not enough even at rest. Pain occurs at night or with the feet elevated; wounds on the feet may not heal.
- About 8–12 million Americans have PAD. Many do not know they have it because leg symptoms are easy to attribute to aging or arthritis.
- The diagnosis is made with a simple bedside test — the ankle-brachial index (ABI) — which takes about 15 minutes and requires no needles.
- PAD raises the risk of heart attack and stroke even before leg symptoms appear. Treating PAD lowers that risk too.

How the ABI Score Maps to PAD Severity (Fontaine Classification)

Stage	ABI Value	What It Means
Normal	ABI ≥ 1.00	No significant narrowing
Fontaine I (Asymptomatic PAD)	ABI 0.70–0.99	Narrowing detected but no leg pain yet
Fontaine II (Claudication)	ABI 0.40–0.69	Leg cramps with walking — rest relieves them
Fontaine III–IV (Critical Limb Ischemia)	ABI < 0.40	Rest pain, non-healing wounds, or gangrene → urgent

ABI Severity Chart: An ABI below 0.90 confirms PAD. Color coding maps to Fontaine stages — green (normal), amber (asymptomatic), orange (claudication), red (critical limb ischemia).





Medical illustration showing narrowed leg arteries with plaque buildup — the same atherosclerotic process that causes heart attacks, now affecting the lower limbs. Credit: BruceBlaus / Blausen Medical 2014 (CC BY 3.0).

Fontaine Stage I — Asymptomatic PAD (ABI 0.70–0.99)

- Plaque has narrowed the artery enough to show up on the ABI test but blood flow is sufficient at rest and light activity.
- No leg cramping or pain — patients often do not know they have it.
- Found incidentally during cardiovascular risk screening or after a heart attack work-up.
- Treatment focus: aggressive risk factor control (statin, antiplatelet, smoking cessation, blood pressure, blood sugar) to prevent progression.
- Walking exercise should be encouraged — it builds collateral vessels even before symptoms appear.

Fontaine Stage II — Claudication (ABI 0.40–0.69)

- Cramping, aching, or heaviness in the calf, thigh, or buttock that comes on reliably with walking and resolves within 10 minutes of rest.
- Pain location hints at which artery is blocked: calf cramps = below-knee arteries; thigh or buttock cramps = iliac or femoral arteries.
- IIa: claudication at > 200 meters walking distance; IIb: claudication at < 200 meters (more limiting).
- First-line treatment: supervised exercise therapy + statin + antiplatelet. Cilostazol can be added for additional walking improvement.
- Revascularization (angioplasty or bypass) is offered when symptoms limit daily life despite 3 months of exercise and medications.

Fontaine Stage III — Rest Pain (ABI < 0.40)

- Pain in the foot or toes that occurs at rest — typically worse at night and relieved by hanging the foot off the bed (gravity improves flow).
- Signals that blood flow is critically insufficient to meet even resting tissue needs. This is critical limb-threatening ischemia (CLTI).
- Revascularization is urgent — the goal is to open a vessel within days to weeks to prevent tissue death.
- Medical therapy alone is not sufficient at Stage III. Both endovascular and surgical options should be evaluated by a vascular specialist.
- Risk of major amputation within 6 months without successful revascularization: approximately 25–30%.

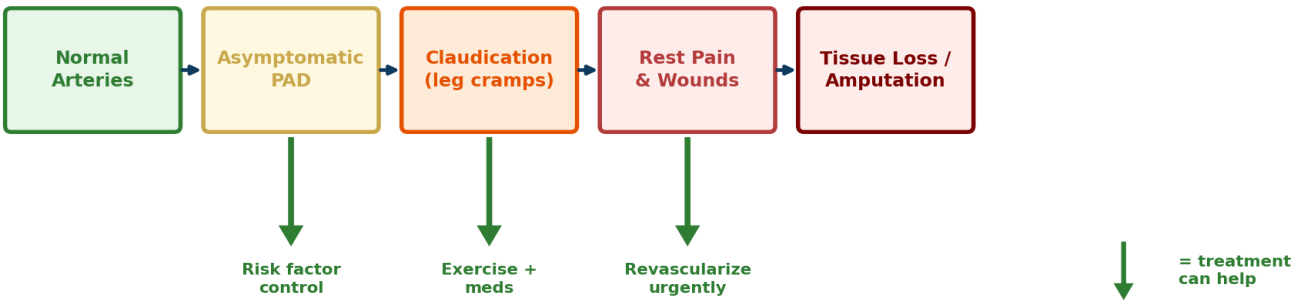
Fontaine Stage IV — Tissue Loss / Gangrene (ABI < 0.40)

- Non-healing wounds (ulcers) on the toes, heel, or foot, or frank gangrene (black, dead tissue) — the most advanced stage.
- In diabetes, this stage may be the first presentation because neuropathy prevented earlier pain warnings.
- Requires emergency multidisciplinary care: vascular surgery / interventional cardiology, wound care, podiatry, infectious disease if infected.
- Even small wounds on the toes must be taken seriously: the 'minor cut' that becomes a major amputation in PAD patients almost always began as something that appeared trivial.
- Toe-brachial index (TBI) is essential in diabetics at this stage — ABI is unreliable due to non-compressible vessels.

Why It Matters

- Untreated PAD can progress to critical limb-threatening ischemia (CLTI) — rest pain, open wounds, and gangrene. Amputation is a real risk.
- People with PAD have a 2–3 times higher risk of heart attack or stroke than people without it. PAD is a heart disease warning flag.
- Most PAD is caused by the same modifiable risk factors as heart disease — smoking, diabetes, high blood pressure, and high cholesterol. Controlling them slows PAD.
- Supervised exercise therapy can double walking distance in 6–12 weeks and is as effective as stenting for claudication (CLEVER trial).
- Early diagnosis matters: treating PAD before tissue loss preserves the limb, avoids amputation, and saves the heart at the same time.
- Diabetes makes PAD harder to detect. Nerve damage (neuropathy) masks the leg pain — so diabetes patients can reach advanced stages without knowing it.

PAD Progression: How It Worsens and Where Treatment Helps



PAD Progression Pipe: Disease advances left to right. Green arrows show where treatment can slow or reverse progression — risk factor control at asymptomatic stage, exercise and medications at claudication, urgent revascularization at rest pain and tissue loss.

Risk Factors

Some patients are more likely to develop this condition. Knowing your risk helps your care team take extra precautions.

Risk Factor	Why It Increases Risk
Smoking (current or past)	Strongest single risk factor. Tobacco injures artery walls and speeds plaque buildup. Smokers with PAD progress faster.
Diabetes	Raises PAD risk 2–4×. High blood sugar damages artery walls and leg nerves. Nerve damage hides the pain — 'silent PAD.'
High blood pressure	Sustained high pressure stiffens arteries and promotes plaque formation over years.
High LDL cholesterol	LDL is the raw material of plaque. Higher levels over more years = more narrowing in legs and heart.
Age 65 or older (or 50 or older with diabetes or smoking)	PAD rises from < 3% at age 40 to > 20% by age 75. Ask about ABI screening at your next visit.
Chronic kidney disease (CKD)	Speeds atherosclerosis throughout the body. PAD is common and aggressive with CKD.
Prior heart attack or stroke	Means systemic atherosclerosis is already active. PAD is often found alongside heart disease.
Physical inactivity and obesity	Worsen all metabolic risk factors. Less activity = fewer collateral vessels the body can build.

Why Diabetes Makes PAD Harder to Detect

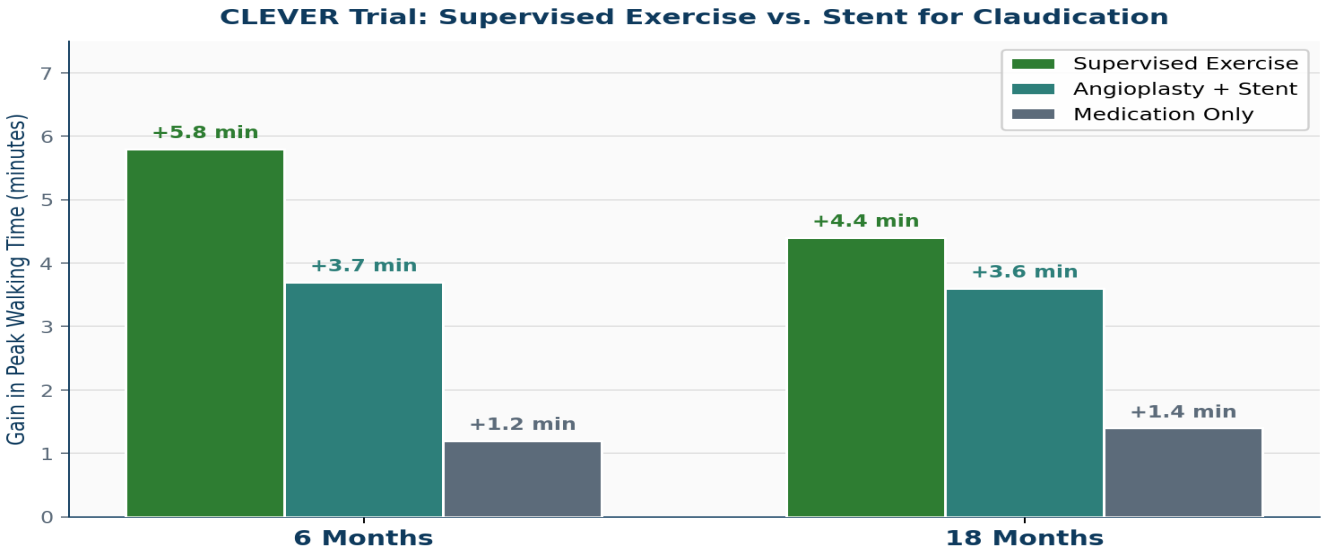
Diabetes harms two systems at once: leg arteries (PAD) and leg nerves (neuropathy). Nerve damage blocks the normal pain signal. A patient can have an ABI of 0.35 and feel no leg cramps at all.

The first sign of PAD in a diabetic is often a foot wound that won't heal — already Stage IV. Key rules:

- Annual foot exam is required for all diabetic patients.
- Start ABI screening at age 50 (not 65) if you have diabetes.
- A foot wound not improving in 2 weeks needs a vascular check, not just wound care.
- ABI above 1.4 in diabetes means stiff vessels — ask for a toe-brachial index (TBI) instead.

Treatment Options

- **Step 1 — Risk factor control (always first):** Stop smoking (most impactful single action), control blood pressure to < 130/80 mmHg, bring LDL cholesterol to < 70 mg/dL with a statin, and manage diabetes to target HbA1c.
- **Antiplatelet therapy:** Aspirin (81 mg daily) or clopidogrel is standard for all symptomatic PAD patients to lower heart attack and stroke risk. Both are reasonable options; clopidogrel may be preferred for PAD specifically.
- **Statin (cholesterol medicine):** Mandatory for all PAD patients, even if cholesterol seems acceptable. Statins slow plaque growth, stabilize existing plaque, and lower cardiovascular events.
- **Supervised exercise therapy (SET):** A structured walking program, typically 3 sessions/week for 12 weeks. Walking to near-maximal pain, resting, then walking again trains muscles to use oxygen more efficiently and builds collateral vessels. First-line for claudication.
- **Cilostazol (Pletal) for claudication:** A medication that relaxes blood vessel walls and has mild blood-thinning properties. Can improve walking distance 40–60% in claudication. Not used if heart failure is present.
- **Revascularization (angioplasty or bypass):** Considered when exercise and medications do not control claudication limiting daily life, or always for critical limb-threatening ischemia (CLTI). Type of procedure depends on the location and length of blockage.
- **Wound care and podiatry:** Essential for diabetic patients with PAD. Daily foot inspection, proper footwear, and prompt treatment of any wound reduce amputation risk dramatically.



CLEVER Trial Results (Murphy et al., JACC 2012): Supervised exercise (green) achieves greater gains in peak walking time than stenting (teal) at both 6 and 18 months. Medication alone (gray) produces the least benefit. Exercise is first-line for claudication.

Core Medications for PAD — All Patients Need Both

Medication	What It Does	Key Points
Statin (e.g., atorvastatin)	Lowers LDL; stabilizes plaque; reduces artery inflammation	Required for all PAD patients. Target LDL < 70 mg/dL. Cuts heart attack risk ~20%.
Aspirin 81 mg daily	Stops platelets from clumping in narrowed arteries	Standard first-line antiplatelet. Take with food.
Clopidogrel (Plavix) 75 mg daily	Same effect as aspirin; often preferred for PAD	Can substitute or combine with aspirin after procedures. Do not stop without asking your doctor.
Cilostazol (Pletal) 100 mg twice daily	Relaxes artery walls; improves walking distance	For claudication only. Do not use if you have heart failure. Improves walking 40–60%.
BP medicine (ACE inhibitor or ARB)	Lowers blood pressure; protects artery walls	Target < 130/80 mmHg. Ramipril shown to cut events in PAD patients.

Medication	What It Does	Key Points
GLP-1 or SGLT2 inhibitor (if diabetes)	Lowers blood sugar; reduces cardiovascular events	Both classes cut limb events in diabetic PAD. Ask your cardiologist.

Comfort Measures at Home (No Medication Needed)

These simple steps support healing and ease symptoms. Use them alongside any medication your doctor prescribes.

- Walk to near-discomfort daily — supervised or structured home programs both help. Stopping at the first twinge of pain misses the training benefit.
- Keep legs warm and avoid cold exposure, which causes arteries to constrict further.
- Elevate the head of your bed 6–8 inches if you have rest pain at night. Gravity helps blood flow to the feet.
- Inspect your feet daily (mirror or caregiver help) for cuts, blisters, or redness — neuropathy may prevent you from feeling early wounds.
- Wear well-fitting, cushioned shoes. Avoid going barefoot. Ask your doctor about referral to a podiatrist.
- Avoid heating pads or hot water bottles on the feet — reduced sensation means burns happen before you feel them.

Risks, Benefits, and Alternatives

Every choice has trade-offs. Use this table to start the shared decision conversation.

Option	Risks	Benefits	Alternatives
Supervised exercise (12-week program)	Muscle soreness early on. Time commitment: 3 sessions per week.	Doubles walking distance. Equals stenting at 6 and 18 months. No procedure risk. Improves heart fitness.	Cilostazol; home walking; angioplasty
Antiplatelet + statin (medicines)	Aspirin: GI bleeding risk. Statins: rare muscle ache. Very rare: severe muscle breakdown.	Cuts heart attack and stroke risk ~20%. Slows plaque growth. Required for all PAD patients.	Clopidogrel instead of aspirin. Statin switch if muscle ache occurs.
Cilostazol (Pletal) for leg cramps	Headache, palpitations, upset stomach (~20%). Cannot be used if heart failure is present.	Improves walking distance 40–60%. Can be added to exercise for extra benefit.	Supervised exercise; angioplasty if cramps limit daily life.
Endovascular (angioplasty ± stent)	Small bruise at the access site. Rare vessel injury. Contrast dye can stress kidneys. Re-narrowing over 1–5 years.	Same-day recovery. Works well for shorter blockages. Bypass option preserved if needed later.	Exercise + meds for claudication. Bypass for long or complex blockages.
Surgical bypass	Major surgery under anesthesia. Wound infection risk. Recovery 2–4 weeks. Graft can fail over years.	More lasting than stenting for long blockages in younger patients. Best for CLTI with long blocked segments.	Angioplasty if anatomy allows. Hybrid stent + bypass. Amputation only if no revascularization is possible.

Common Misconceptions

Myth	Reality
MYTH: Leg cramps when walking are just a normal part of aging.	FACT: Cramping that reliably comes on with walking and goes away with rest is claudication — a classic PAD symptom — not normal aging. It warrants ABI testing. Ignoring it misses the chance to catch systemic atherosclerosis early.
MYTH: If I have PAD, I should rest my legs and avoid walking.	FACT: Walking is the treatment. Supervised exercise therapy is the most evidence-backed first-line therapy for claudication. Walking to near-maximal discomfort and then resting builds collateral blood vessels and trains muscles to use oxygen better.
MYTH: My doctor would have found PAD if I had it.	FACT: Most routine physicals do not include an ABI test. PAD is often asymptomatic at first. Screening is recommended for adults 65 and older, or 50 and older with diabetes or smoking history. Ask for it specifically.
MYTH: Because I have diabetes, my leg pain is nerve pain, not a blood-flow problem.	FACT: Diabetes causes both neuropathy and PAD simultaneously. Many diabetics have severe PAD without typical claudication because the neuropathy masks the ischemic pain. A wound that does not heal or a cold, discolored foot needs an ABI even without leg pain.
MYTH: An ankle-brachial index above 1.0 rules out PAD in a diabetic patient.	FACT: In diabetes and kidney disease, artery walls become stiff and incompressible, giving falsely high ABI values — even above 1.4. A toe-brachial index (TBI) is the correct test in these patients.
MYTH: Once I have a stent, my PAD is cured.	FACT: Stents treat the narrowing but do not address the underlying atherosclerosis. Stents can re-narrow (restenosis), and new blockages can form elsewhere. Lifelong risk factor control — statin, antiplatelet, smoking cessation, exercise — is essential after any procedure.

Myth	Reality
MYTH: PAD only affects the legs. It is not a heart problem.	FACT: PAD is atherosclerosis in the leg arteries. The same plaque process affects the heart arteries, carotid arteries, and aorta. PAD patients are at 2–3× higher risk of heart attack and stroke. A vascular specialist and a cardiologist both have a role.

Possible Complications

Knowing what can go wrong helps you spot problems early. Most complications are uncommon, especially with treatment.

Where / What	What Can Happen
Cardiovascular — heart attack and stroke	PAD signals systemic atherosclerosis. PAD patients have 2–3× the heart attack and stroke risk of people without PAD. Treating PAD risk factors lowers this risk.
Limb — critical limb-threatening ischemia (CLTI)	PAD can worsen to rest pain, non-healing wounds, or gangrene (Fontaine Stage III–IV). Without revascularization, major amputation is needed.
Limb — amputation	About 25–30% of CLTI patients who cannot be revascularized need major amputation. Survival after major amputation is poor. Prevention is far better than treatment.
Wound — non-healing foot ulcers	Poor blood flow slows healing. A small blister can become a chronic wound, especially in diabetes. Wound care, vascular work, and podiatry must work together.
Procedure-related — restenosis	Arteries opened by angioplasty can re-narrow over months to years. More common in long blockages and small vessels. Drug-coated balloons and stents reduce this risk.
Graft failure — bypass	Bypass grafts, especially synthetic ones, can clot or narrow over time. Ultrasound checks after bypass are standard to catch problems early.

Critical Limb-Threatening Ischemia (CLTI) — Act Fast

CLTI is a vascular emergency. Unlike claudication, which is stable for months, CLTI gets worse in days to weeks. Time windows are short:

- **Rest pain, skin intact:** revascularize within days to weeks.
- **Non-healing ulcer:** urgent vascular referral — same week.
- **Gangrene or spreading infection:** call 911 or go to the ER now.

Acute limb ischemia — sudden blockage by a clot: severe leg pain, cold pale skin, no pulse = 911. Limb survival window: 4–6 hours.

Points to Know

If you remember nothing else, remember these key points.

- An ABI below 0.90 means PAD is present. Below 0.40 means blood flow is critically low — seek urgent evaluation.
- Supervised exercise walking programs are the best first treatment for leg cramping (claudication) — evidence shows they equal stenting at 6 and 18 months.
- All PAD patients need a statin and antiplatelet medicine to reduce heart attack and stroke risk, regardless of leg symptoms.
- If you have diabetes and a foot wound that is not healing after 2 weeks, call your doctor the same week — do not wait.
- Smoking is the single most powerful modifiable driver of PAD. Quitting slows progression more than any medication.
- Diabetics may have severe PAD without leg cramps because neuropathy masks ischemic pain — foot inspection and ABI testing matter more than waiting for pain.
- PAD is not just a leg problem. It signals atherosclerosis throughout the body. Treating PAD lowers heart attack and stroke risk too.
- Rest pain in the foot at night that is relieved by hanging the leg off the bed is a warning sign of Stage III PAD — call your doctor promptly.

When to Call Us - and When to Call 911

If you are not sure, call. We would rather hear from you twice than miss a real problem.

- **Call 911 immediately:** sudden severe leg pain with cold, pale, or blue-tinged skin and no pulse — this is acute limb ischemia (the leg equivalent of a heart attack) and requires emergency care within hours.
- **Call your doctor the same day:** a new wound, sore, or blister on the foot or toe that is not healing after several days — especially if you have diabetes.
- **Call your doctor within the week:** foot or leg pain at rest, especially at night or when lying flat, that is relieved by dangling the foot off the bed.
- **Schedule an appointment:** cramping, aching, or fatigue in the calf, thigh, or buttock that comes on consistently with walking and resolves within 10 minutes of rest.
- **Schedule an appointment:** coolness, numbness, or color change (pale or bluish) in one foot compared to the other.
- **Schedule an appointment:** if you are 65 or older (or 50+ with diabetes or smoking history) and have never had an ABI test.

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Trusted Resources

The links below are the trusted resources Dr. Ali used to write this guide and that he recommends you visit for more information. Each is a clickable link in the digital version and a Short.io tracked URL on the printed version.

- AHA — Peripheral Artery Disease - American Heart Association overview of PAD, risk factors, and treatment
- Cleveland Clinic — PAD - Detailed patient education with diagnosis and treatment options
- NIH MedlinePlus — PAD - NIH curated resource list and plain-language overview
- ACC/AHA PAD Guideline Summary (2024) - Full guideline for providers; patient-accessible summary in supplementary material
- Vascular Cures — PAD Patient Resources - Patient advocacy group with walking program locators and support

Sources Used to Build This Guide

Every recommendation in this guide is grounded in one or more of the studies, guidelines, or trusted resources below. Short links are tracked so Dr. Ali can see which references patients are reading; nothing personally identifying is captured.

- AHA/ACC 2024 Guideline for the Management of Lower Extremity PAD *[Guideline]*
  Primary guideline source for ABI thresholds, Fontaine staging, revascularization criteria, and medical therapy recommendations
- Cleveland Clinic – Peripheral Arterial Disease *[Patient Education]*
  Plain-language framing of symptoms, risk factors, and treatment options for lay audience
- Mayo Clinic – Peripheral Artery Disease *[Patient Education]*
  Competitor benchmark for symptom descriptions and patient-facing messaging
- NIH MedlinePlus – Peripheral Arterial Disease *[Patient Education]*
  NIH authoritative plain-language overview and lay-term definitions
- CLEVER Trial (Murphy et al., JACC 2012) – Exercise vs Stent for PAD *[Clinical Trial]*
  Primary evidence for supervised exercise therapy equaling stenting outcomes in claudication at 6 and 18 months
- AHA – Peripheral Artery Disease Patient Information *[Patient Education]*
  AHA patient-facing messaging on PAD risk and lifestyle modification
- TASC II Consensus Document on PAD – Norgren et al., J Vasc Surg 2007 *[Guideline]*
  Fontaine and Rutherford classification systems; anatomic TASC lesion grading for revascularization decisions
- Blausen Medical Illustration – Peripheral Artery Disease *[Image]*
  CC-BY 3.0 anatomic illustration showing leg artery plaque and ischemia; used as photorealistic cover image

About This Guide

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Reviewer note: Reviewed against AHA Heart.org PAD, Cleveland Clinic PAD, and Mayo Clinic PAD. This guide adds: color-coded ABI / Fontaine stage chart; CLEVER trial exercise-vs-stent bar graph; silent PAD callout for diabetics; CLTI emergency timeline; four-row RBA table separating exercise, meds, angioplasty, and bypass; toe-brachial index explainer.

Disclaimer

This guide is for educational purposes only and does not replace medical advice from your physician. Recommendations may not apply to every patient. Always follow the specific instructions of Dr. Ali and your care team. In an emergency call 911 or go to the nearest emergency department.

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