

A CLINICIAN'S GUIDE



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Heart
Association.

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Helping Your Patients with PERIPHERAL ARTERY DISEASE —Lower Extremity

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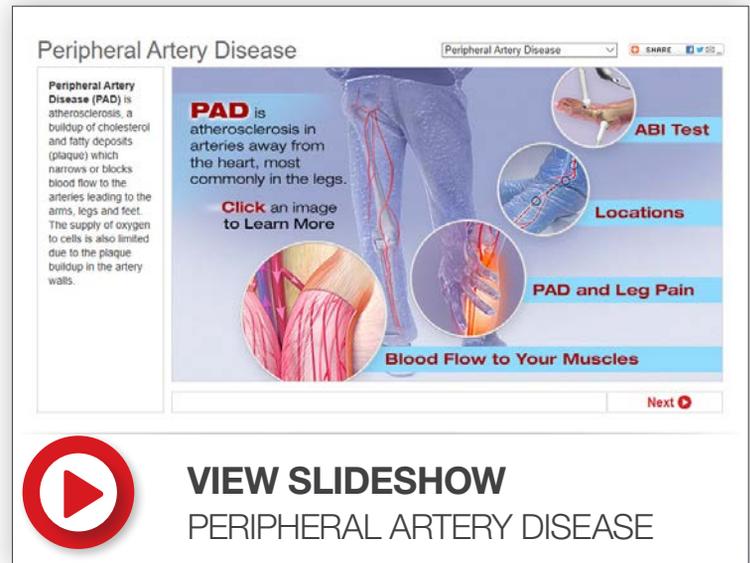
Aralez Pharmaceuticals is a proud sponsor of the American Heart Association's efforts to educate patients about Peripheral Artery Disease

A Primer on Peripheral Artery Disease— Lower Extremity

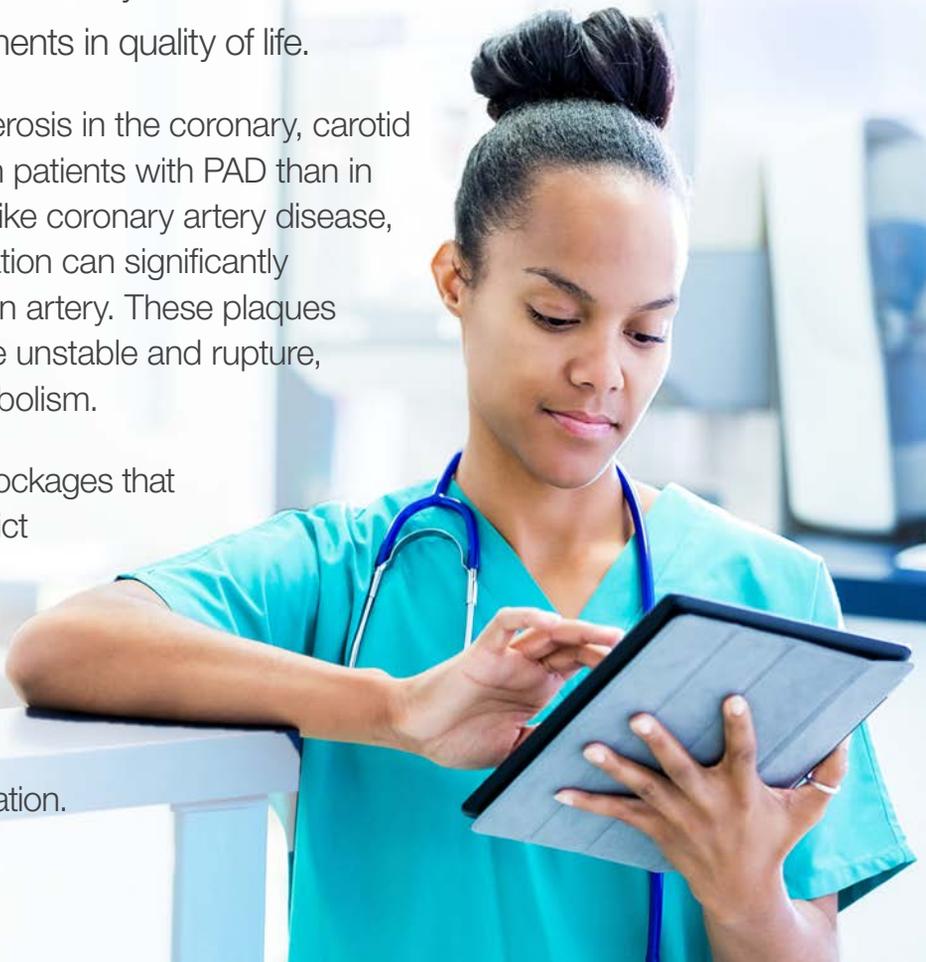
LOWER EXTREMITY PERIPHERAL ARTERY DISEASE (PAD) is a common and potentially devastating disease that affects approximately 8.5 million Americans older than the age of 40. It is caused by narrowing or blockage of the arteries in the lower extremities, most commonly in the arteries of the pelvis and legs. The underlying etiology of PAD is atherosclerosis, or a buildup of plaque in the iliac, femoral, popliteal and tibial arteries. PAD is progressive, and can lead to significant morbidity and mortality as well as impairments in quality of life.

The prevalence of atherosclerosis in the coronary, carotid and renal arteries is higher in patients with PAD than in those without PAD. In PAD, like coronary artery disease, atherosclerotic plaque formation can significantly reduce blood flow through an artery. These plaques that cause PAD can become unstable and rupture, leading to thrombosis or embolism.

The arterial narrowing and blockages that are features of PAD can restrict circulation not only to the limbs, but also to the brain and other organs, causing tissue damage and infection. Left untreated, PAD can lead to gangrene and limb amputation.



The screenshot shows a medical slideshow interface. The title is "Peripheral Artery Disease". On the left, there is a text box defining PAD as atherosclerosis in arteries away from the heart, most commonly in the legs. The main area features a central image of a human leg with red lines indicating blood flow. To the right of this image are three circular inset images: one showing a hand being tested (labeled "ABI Test"), one showing a leg with a red line indicating a location (labeled "Locations"), and one showing a leg with a red line indicating pain (labeled "PAD and Leg Pain"). Below these images is a section titled "Blood Flow to Your Muscles". At the bottom right of the slideshow area is a "Next" button with a right arrow icon. Below the entire slideshow area is a large red play button icon followed by the text "VIEW SLIDESHOW PERIPHERAL ARTERY DISEASE".



These complications are especially prevalent in patients who also have advanced chronic kidney disease and diabetes.

In 2014, there were approximately 13,500 deaths associated with PAD. PAD is a major risk factor for acute vascular ischemic events, including critical limb ischemia (CLI). Studies have also demonstrated that PAD is associated with inflammatory markers that are linked to the development of heart disease, including C-reactive protein and fibrinogen. Intermittent claudication symptoms—mild to severe cramping pain in the buttocks and legs that occurs during walking and is relieved by rest—is frequent in patients with PAD, and leads to significant decreases in function and quality of life.

Being aware of patients at risk for PAD can assist healthcare providers in the accurate identification and timely treatment of PAD.

 PAD Initial Symptom Checklist
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Risk factors for PAD include:

- Age ≥ 65 years
- Age 50 to 64 years with risk factors for atherosclerosis, such as diabetes mellitus, a history of smoking, hyperlipidemia, hypertension or family history of PAD
- Age < 50 years with diabetes and at least one other risk factor for atherosclerosis
- Patients with known atherosclerotic disease in another vascular bed (such as coronary, carotid, subclavian, renal), mesenteric artery stenosis or abdominal aortic aneurysm

Obstacles to Detection and Treatment

PAD and the risk factors that lead to the disease are easily diagnosed and treatable with lifestyle changes, medications and surgical procedures. Yet there are obstacles to accurate diagnoses and effective treatment. Many patients mistake the symptoms of PAD for other more minor conditions. PAD can also be asymptomatic, which makes detection far more challenging. Awareness of PAD among both healthcare providers and the general public also remains less than optimal.

A recent report from the American Heart Association (AHA) on improving vascular disease prevention, detection and treatment revealed that PAD is both underdiagnosed and undertreated. In fact, the AHA concluded that there has been little progress since a seminal 2001 study showed

that only 49 percent of primary care providers in 350 U.S. practices were aware of their patients' PAD diagnoses. Patients with PAD as their only diagnosis were also less likely to be treated for hyperlipidemia or hypertension, and less likely to be prescribed an anti-platelet agent compared with patients with coronary artery disease. Current efforts to improve the diagnosis and treatment of PAD include public awareness campaigns, sponsored by the AHA and other organizations, and the creation of consensus reports and clinical guidelines to inform physicians about best practices in managing PAD. Research and clinical trials have also increased understanding of the use and efficacy of lipid-lowering therapies, ACE inhibitors and antiplatelet drugs to prevent the complications of atherosclerosis and PAD.



ONE U.S. NATIONAL SURVEY FOUND that fewer than 1 in 4 adults with risk factors for PAD and walking impairment had any awareness of PAD, and of those aware, less than 1 in 7 knew that PAD is the most important cause of leg amputation.

Striding Forward in PAD Management

Research shows that it is vital for clinicians to remain aware of the importance of identifying PAD through a careful clinical history and diagnostic tests. Using guideline-recommended treatments for the disease is also crucial in stopping PAD in its tracks. In addition, patient education about PAD detection, prevention and treatment needs to be bolstered.

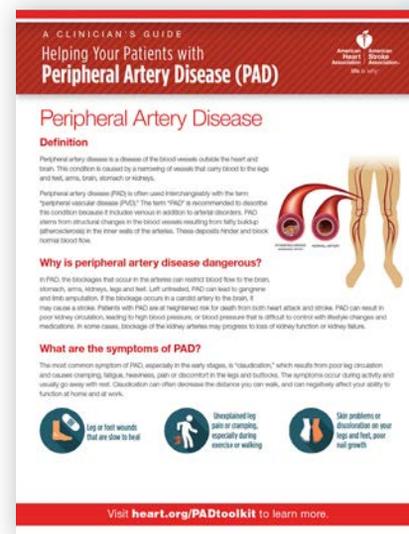
These statistics show that there is room for improvement in the prevention, detection and treatment of PAD. Healthcare professionals who have a good understanding of the diagnosis, risk factors and recommended treatments for PAD are more likely to accurately identify and treat it appropriately. Taking time to educate patients about PAD and its risk factors will increase the likelihood that they will be motivated to make heart-healthy lifestyle choices and follow recommended treatments.

Diagnosing PAD

EVALUATING A PATIENT AT INCREASED risk for PAD

should begin with a clinical history, a symptom review and physical examination. Patients may present with no symptoms, with claudication and impaired walking function, and with critical limb ischemia (CLI) in advanced disease. In CLI, patients have had more than 2 weeks of ischemic pain at rest, and/or nonhealing wounds/ulcers or gangrene in one or both legs. In diagnosing PAD, a physical exam will often yield abnormally weak lower-extremity pulses and vascular bruits.

The resting ankle brachial index (ABI) is the initial diagnostic test for PAD, and may be the only test required to make the diagnosis. It measures systolic blood pressure in the arms and ankles in the supine position with a Doppler device, and only takes a few minutes. In patients with PAD, the ABI is ≤ 0.90 . Those with an ABI of 0.91 to 0.99 may possibly have PAD. Anormal ABI is 1.00-1.40 and values >1.40 (noncompressible) indicate that the arteries were not able to be compressed, which is more common among individuals with diabetes mellitus and/or advanced chronic kidney disease.



↓ PAD vs. PVD
 ↓ AHA Fact Sheet
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Depending on the clinical presentation and the resting ABI values, additional physiological studies may be needed, including exercise treadmill testing or measurement of the toe-brachial index. Exercise treadmill testing is important to measure the functional limitations of a patient with PAD, and is also useful in diagnosing symptomatic patients with lower-extremity PAD when the resting ABI is normal or borderline. Other imaging tests may be used in highly symptomatic patients, or in patients who may be undergoing revascularization procedures.

Peripheral Artery Disease

Peripheral Artery Disease (PAD) is atherosclerosis, a buildup of cholesterol and fatty deposits (plaque) which narrows or blocks blood flow to the arteries leading to the arms, legs and feet. The supply of oxygen to cells is also limited due to the plaque buildup in the artery walls.

The Ankle Brachial Index (ABI)

compares the blood pressure (BP) in your arms to the pressure in your ankles.

Brachial Artery

Ultrasound records BP in both arms.

Dorsalis Pedis A.

Posterior Tibial A.

BP in the ankles is recorded from one of these arteries.

VIEW SLIDE
ANKLE-BRACHIAL INDEX

These additional imaging tests include:

- **Doppler and Ultrasound (Duplex) imaging:** Provides measurement of the blood flow in the arteries via sound waves.
- **Computed Tomographic Angiography (CT) and Magnetic Resonance Imaging (MRI):** Can reveal blockages in the arteries of the abdomen, pelvis and legs.
- **Angiography:** Documents blood flow in the arteries, and pinpoints the location of any blockages in the arteries of the legs. Angiography can be combined with CT or MRI to provide a 3-dimensional reconstruction of the vessels examined.

Differential Diagnoses for PAD

IN SOME CASES, PATIENTS MAY have symptoms that appear to signal a PAD diagnosis, such as leg pain, claudication or nonhealing wounds, but physiological testing is normal, so the symptoms are not PAD-related. Following are other diagnoses that can present with leg pain, claudication or nonhealing wounds, as well as the characteristics of these conditions.

Other Diagnoses for Leg Pain or Claudication

- **Symptomatic Baker's Cyst:** Characterized by ongoing swelling and tenderness behind the knee and down the calf. The pain is present at rest and with exercise.
- **Venous Claudication:** Presents with tight bursting pain in the entire leg, although it is worse in the calf. The pain is present during walking, and only subsides with rest and elevation. Patients often have a history of iliofemoral deep vein thrombosis, edema and/or signs of venous stasis.
- **Chronic Compartment Symptom:** Seen typically in heavily muscled athletes, the symptoms are tight, bursting pain in the calf muscles after a great deal of strenuous exercise, such as jogging. The pain subsides very slowly with rest.
- **Spinal Stenosis:** Characterized by pain and weakness, usually in the bilateral buttocks and posterior leg. The pain is worse with standing and spine extension, and may be relieved by lumbar spine flexion. Pain relief is variable with rest, and it often takes a long time to recover.
- **Nerve Root Compression:** Patients usually have a history of back problems and the pain is often present at rest. It is worse when sitting, and relieved with position changes. The symptoms are sharp, stabbing pain that radiates down the leg.
- **Hip Arthritis:** The symptoms are aching discomfort in the lateral hip and thigh that is not quickly relieved by rest. However, the pain improves when the patient is not engaged in weight-bearing activities.
- **Foot and Ankle Arthritis:** Patients experience aching pain in the ankle and foot, particularly in the arch, that may be relieved when patients are not participating in weight-bearing activities. At rest, pain relief may be slow.

Other Diagnoses for Nonhealing Wounds

- **Venous Ulcer:** Patients with these ulcers often have chronic venous disease and local venous hypertension. The wounds often have wet drainage and are found in the distal leg, especially above the medial malleolus.
- **Distal Small Arterial Occlusion:** Wounds occur in the toes, feet and legs and can be due to a variety of causes, including diabetic microangiopathy, end-stage renal disease,

- **vasculitis, scleroderma, and embolic and thrombotic conditions such as cholesterol emboli or antiphospholipid antibody syndrome.**

- **Local Injury:** The wounds may be located on the toes, feet or legs, and usually occur from trauma, an insect or animal bite, or a burn.

- **Medication-related:** These skin sores can be seen on the toes, feet or legs, and may be caused by drug reactions, as in erythema multiforme, characterized by hypersensitivity to a medication. The wounds can also be due to the direct toxicity of certain medications, such as doxorubicin, hydroxyurea and some tyrosine kinase inhibitors.

- **Neuropathic:** The wounds or ulcers occur on pressure zones of the foot, and often occur in patients with peripheral neuropathy with or without diabetes.

- **Autoimmune Injury:** Characterized by wounds with or without blisters on the toes, feet and legs. They can be due to conditions such as pemphigus, pemphigoid, lupus or scleroderma.

- **Infection:** Wounds can form after bacterial, fungal, mycobacterial, parasitic and viral infections. They can be located on the toes, feet and legs.

- **Malignancy:** These wounds may appear on the toes, feet and legs, and are caused by a primary skin malignancy, a metastatic malignancy or malignant transformation of an ulcer.

- **Inflammatory:** Patients usually have conditions such as necrobiosis lipoidica, pyoderma gangrenosum or granuloma annulare. The wounds occur on the toes, feet or legs.

Commonly Observed Symptoms

Test your knowledge



What are the intermittent signs of claudication?



What is the cause of ischemic pain?



What can cause pale or discolored (e.g., dark red, bluish to black) toes and feet?



What can cause wounds to heal slowly or not at all?



VIEW MICRO LEARNING UNIT

SYMPTOMS OF PAD

Treatments for PAD

PATIENTS WITH PAD OFTEN NEED a goal-directed, comprehensive treatment program that includes medications, structured exercise and other lifestyle modifications to improve function and to protect against cardiovascular ischemic events. Smoking cessation is also vital for patients who smoke, and a weight-loss program should be discussed with patients who are overweight or obese. A guideline-based program of pharmacotherapy should be customized to each patient and their risk factors, such as diabetes and hypertension.

Medication Recommendations

The following treatment guidelines can be used when deciding on medical therapies and medications to help manage PAD and its symptoms, prevent complications and control conditions that can worsen PAD:

- If the patient with PAD is asymptomatic, but has an ABI ≤ 0.90 , antiplatelet therapy is reasonable.
- In patients with symptomatic PAD, treatment with antiplatelet medications such as aspirin or clopidogrel can reduce the risk of myocardial infarction, stroke or death.
- Dual antiplatelet therapy (aspirin and clopidogrel) may be reasonable to reduce the risk of limb-related events in patients with symptomatic PAD after lower extremity revascularization.
- Statin medications should be prescribed for all patients with PAD.
- In patients with both hypertension and PAD, angiotensin-converting enzyme inhibitors or angiotensin-receptor blockers can be effective to reduce the risk of MI, stroke, heart failure and cardiovascular death.
- Cilostazol is an effective therapy to improve symptoms and increase walking distance in patients with claudication. Cilostazol is contraindicated in patients with heart failure.

Other Therapies for PAD:

- The usefulness of anticoagulation to improve patency after lower extremity autogenous vein or prosthetic bypass is uncertain. Anticoagulation should not be prescribed in patients with PAD to reduce the risk of cardiovascular events.
- Pentoxifylline is not an effective treatment of claudication.
- Chelation therapy (e.g., ethylenediaminetetraacetic acid) is not beneficial for the treatment of claudication and does not improve symptoms.
- B-complex vitamin supplements are not recommended to lower homocysteine levels and prevent cardiovascular events in patients with PAD.

2016 AHA/ACC Guideline
Lower Extremity PAD Classes
of Recommendation and

Level of Evidence – Page 7
 Download PDF

Helping Your Patients Make Lifestyle Changes to Control PAD

INITIATING DISCUSSIONS WITH YOUR PATIENTS who have been diagnosed with PAD can make a significant impact on their symptoms, risk for cardiovascular events and overall health. Be prepared to educate your patients thoroughly about why lifestyle changes matter in PAD, and to make specific recommendations for programs that can aid them in establishing a heart-healthy lifestyle. By taking time for these discussions, it's more likely that your patients will adhere to your recommendations.

AHA's Lifestyle Recommendations

It is well established that lifestyle changes can reduce high cholesterol, even if it is due to genetics. The four most important lifestyle changes to discuss with your patients are

following a heart-healthy diet, avoiding tobacco smoke, regular exercise and losing weight if your patient is overweight or obese.

But what specific changes and programs should you advise for your patients?

Here are some tips:

Heart-Healthy Diet

- Tell your patients to choose a heart-healthy diet that emphasizes vegetables, fruits and whole grains high in dietary fiber; includes low-fat or fat-free dairy products, poultry, fish, legumes, nontropical (not coconut or palm kernel oil) vegetable oils and nuts; and limits intake of sweets, sugar-sweetened beverages (SSBs), salty or highly processed foods, and fatty or processed meats (choose lean or extra-lean meats instead). These recommended food choices will help them reduce saturated fat, trans fat, dietary sodium and sugar intake. This diet can be adapted to the cultural, ethnic and food preferences of your patients.
- Be sure to emphasize to your patients the importance of reducing saturated fat, trans fats and sodium in their diets. The AHA recommends avoidance of trans fat and that for patients at cardiovascular risk, saturated fat should be limited to <6% of total calories. Additionally, for some individuals (e.g., those with elevated LDL-C), reduced intake of egg yolks (180 mg cholesterol per yolk) may be appropriate. Sodium intake should be reduced to $\leq 2,300$ mg/day (1,500 mg/d if hypertensive or prehypertensive).

Smoking Cessation

- Discuss quitting smoking with your patients. Tobacco smoking is a major risk factor for CVD and stroke. Smoking creates a higher risk for PAD and decreases HDL (good) cholesterol.



Exercise

- Advise patients that an individualized safe exercise prescription is necessary. Structured exercise therapy is an important component of care for the patient with PAD and helps improve functional status and decrease symptoms.

Weight Management

- Point out the importance of losing weight and becoming more physically active if your patients are sedentary or overweight or obese. Weight loss is crucial for control of CVD risk factors. Encourage patients to lose approximately 5%-10% of baseline weight within 6 months.

Controlling Hypertension

Lifestyle changes and adhering to medication prescriptions can help your patients conquer hypertension. Here are some tips for instructing your patients about controlling hypertension:

- Advise your patients to eat a heart-healthy diet, reduce sodium intake to 1,500 mg/day for enhanced BP lowering and limit alcohol.
- Point out the importance of participating in regular physical activity, and maintaining a healthy weight.
- Caution your patients that over-the-counter medications like decongestants may raise blood pressure and react with hypertension medications.
- Be sure to emphasize that patients should take hypertension medications exactly as prescribed for as long as prescribed.
- Discuss any over-the-counter medicines and prescription drugs that your patients take, and advise your patients about any cautions for using these medicines. It's important to specifically ask your patients about dietary supplements they may use.
- Talk to your patients about the side effects of their hypertension medication, and recommend that they report any side effects.
- If they can't afford their prescriptions, offer information about assistance programs or generic forms of hypertension medication.

Glycemic Control and Stop Smoking Programs

Two of the most important health risks for patients with PAD are diabetes and exposure to tobacco smoke. Here are the recommended guidelines for smoking cessation and glycemic control in patients with PAD:

- Advise your patients who smoke to quit the tobacco habit at every visit.
- Help your patients who smoke to devise a plan for quitting. This plan may include pharmacotherapy such as varenicline, bupropion, and/or nicotine replacement, and/or referral to a smoking cessation program.
- Patients with PAD should be told of the dangers of secondhand smoke, and advised to avoid exposure to environmental tobacco smoke at work, at home and in public places.
- The presence of diabetes mellitus increases the risk of adverse outcomes among patients with PAD, including progression to CLI, amputation and death.
- Management of patients with PAD and diabetes should be coordinated between all members of the patient's healthcare team.
- A comprehensive care plan for patients with PAD and diabetes mellitus is important and may include diet and weight management, pharmacotherapy for glycemic control and management of other cardiovascular risk factors, and foot care and ulcer prevention.
- Achieving glycemic control is beneficial in all patients with diabetes, and can reduce limb-related outcomes in patients with CLI. Evidence has demonstrated that patients with PAD and a hemoglobin A1c level <6.5% had lower odds of major amputation compared to patients with PAD and Hg A1c 6.5% to 9.5% and Hg A1c >9.5%.

Prescribed Exercise Programs

Structured exercise therapy is an important element of care in the patient with PAD, according to the latest treatment guidelines from the AHA and the American College of Cardiology. The data supporting the efficacy of supervised exercise programs as an initial treatment for claudication continue to develop and remain convincing, building on many

earlier randomized controlled trials. Trials with long-term follow-up from 18 months to 7 years have demonstrated a persistent benefit of supervised exercise in patients with claudication.

Supervised exercise has benefits and is safe for patients with PAD, even when they have contraindications to exercise, such as cardiovascular disease, amputation, wheelchair confinement and other major comorbidities that would preclude exercise. The efficacy of structured community- or home-based exercise programs in patients with PAD is supported by strong research evidence, which is more recent and convincing than studies on supervised exercise programs in clinics or healthcare institutions. Unstructured community or home-based programs providing general recommendations to patients with claudication to simply walk more, are not effective for relieving claudication, although increasing activity can be beneficial in ameliorating the risk factors for PAD.

Following are recommendations for structured exercise therapy:

- **In patients with claudication, recommend a supervised exercise program to improve leg symptoms, function and quality of life.**
- **A supervised exercise program should be discussed as a treatment option before recommending revascularization.**
- **In patients with claudication, alternative strategies of exercise including upper-body ergometry, cycling and low-intensity walking that avoids moderate to maximum claudication is advised.**

The Elements of Structured Community- or Home-Based Exercise

Structured exercise programs that take place in the patient's home or community should provide oversight of the patient's activities as well as encouragement for behavior change.

- **Although the programs are self-directed, the clinician provides regular guidance.**
- **The elements of the exercise program should include activity for 30- to 45-minute sessions 3 times a week for a minimum of 12 weeks.**
- **Exercise training involves intermittent bouts of walking to achieve moderate to maximum claudication, which are alternated with periods of rest.**

- Warm-up and cool-down periods precede and follow each session of walking.
- Patient counseling should be provided on how to start and maintain an exercise program, and how to increase the patient's activity level by adding distance or greater speed.
- Behavioral change techniques that help ensure that patients stick with an exercise program include health coaching and the use of activity monitors should be included.

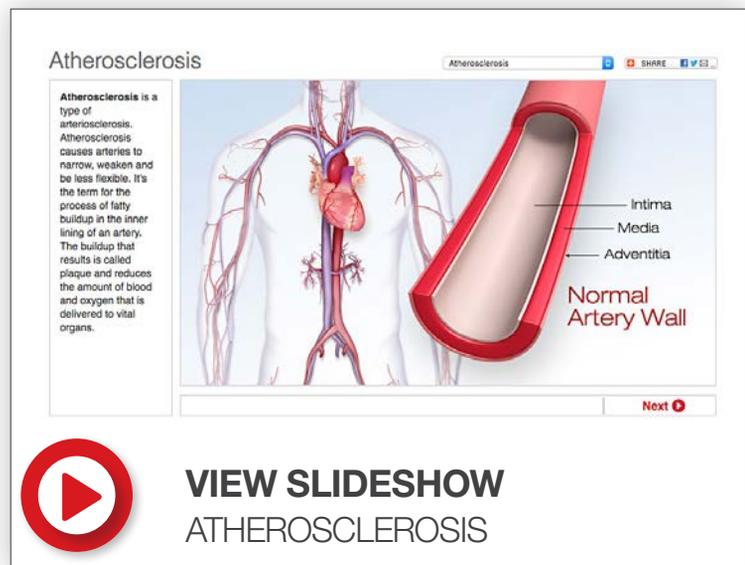
Minimizing Tissue Loss in Patients with PAD

Prevention of wounds through patient education, foot examination and prompt recognition of foot infection can minimize tissue loss in patients with PAD. The important actions to take are:

- Educate patients about healthy foot behaviors, including daily foot inspection, wearing both socks and shoes, avoidance of walking barefoot and the selection of proper footwear.
- Discuss the importance of seeking prompt medical attention for new foot problems.
- Be especially aware of the need for education in patients with PAD who also have diabetes with peripheral neuropathy.
- Any untreated foot infection in a patient with PAD can lead to tissue loss and gangrene, so clinicians should be diligent about checking for signs of infection, and provide prompt referral to an interdisciplinary care team that includes vascular medicine specialists, nurses, orthopedic surgeons and podiatrists, infectious disease and vascular imaging specialists, and orthotics and prosthetic specialists.
- Signs of foot infection in a patient with PAD can include local pain or tenderness, periwound erythema or edema, induration or fluctuance, pretibial edema, any discharge, a foul odor, visible bone or a wound close to the bone, and signs of systemic inflammation such as elevated or decreased temperature, elevated heart rate, elevated respiratory rate and an elevated or decreased white blood cell count.

Revascularization for Claudication and Atherosclerosis

Claudication does not commonly progress to critical limb ischemia, so the aim of most revascularization procedures is improvement in claudication symptoms, function and quality of life, rather than limb salvage. Revascularization should be considered when a patient with PAD has been treated with a comprehensive program, including medical therapy and a structured exercise program, but is still experiencing persistent claudication that limits the patient's function and lifestyle. If a strategy of revascularization for claudication is undertaken, the revascularization strategy should be evidence-based and can include endovascular revascularization, surgery or both. Patients should be selected for revascularization procedures and surgeries based on the severity of their symptoms, as well as patient comorbidities, response to previous therapies, patient goals and the likelihood of achieving durable symptom relief.



Endovascular Revascularization Procedures

Endovascular techniques to treat arterial blockages and claudication include angioplasty, stents and atherectomy. The specific technique chosen for revascularization should be based on the lesion characteristics and the surgeon's or clinician's experience. Following are some guidelines to keep in mind when assessing patients for endovascular revascularization:

- **Revascularization should be performed in lesions that are hemodynamically significant. Stenoses appropriate for endovascular treatment limit perfusion to the distal limb.**
- **Stenoses of 50 to 75% diameter by angiography may not be hemodynamically significant. Provoked or resting intravascular pressure measurements can be used to determine whether a lesion is significant enough for an endovascular procedure.**

- Effectiveness of the procedure can depend on the location of the stenosis. Long-term patency is often greater after endovascular procedures in the aortoiliac than the femoropopliteal segment.
- In femoropopliteal disease, durability of the revascularization is reduced with greater lesion length, occlusion rather than stenosis, the presence of multiple diffuse lesions, diabetes, chronic kidney disease, renal failure and smoking.

Surgical Revascularization for Claudication and Atherosclerosis

Surgical procedures can be an effective treatment for claudication, and can improve quality of life and walking ability. However, there is little evidence that surgical procedures are superior to other treatment. Although symptoms may improve more with surgery than endovascular procedures, there is also a greater risk for perioperative events. Thus, surgery should be reserved for patients who have not derived benefits from nonsurgical therapy, have arterial anatomy favorable to obtaining a durable result, and do not have symptoms or comorbidities that significantly increase the risk for perioperative complications.

Following are guidelines for selecting which type and when to perform surgical revascularization:

- **Femoral-popliteal artery bypass is one of the most common surgeries, and successful outcomes often depend on the conduit and site of popliteal anastomosis (i.e., above versus below the knee).**
- Recent reviews and meta-analyses show more favorable and consistent patency outcomes with autogenous vein versus prosthetic grafts for popliteal artery bypass.
- Femoral-tibial artery bypasses with prosthetic graft material should not be used for the treatment of claudication.
- Surgery should not be performed solely to prevent progression to critical limb ischemia.

Critical Limb Ischemia: Surgical or Endovascular Revascularization

The goal of revascularization for CLI is to provide in-line blood flow to the foot through at least one patent artery. This helps decrease ischemic pain, aids wound healing and helps preserve a functional limb. Recent randomized controlled trials have demonstrated that endovascular revascularization is a more effective treatment option than open surgery. Treatment guidelines provide these recommendations for using revascularization procedures for CLI.



The thumbnail shows a web browser window with the title "Preventing and Treating PAD". The main image depicts a male doctor in a light blue shirt with a stethoscope around his neck, smiling and gesturing with his hands while talking to a female patient. Below the image is a red play button icon and the text "VIEW MICRO LEARNING UNIT PREVENTING AND TREATING PAD".

- In patients with CLI, revascularization should be performed whenever possible to reduce tissue loss. Endovascular procedures for patients with CLI should be considered in the setting of nonhealing wounds and gangrene.
- Before amputation in a patient with CLI, an evaluation for revascularization should be conducted by an interdisciplinary care team.
- Evaluation of lesion characteristics is useful for selecting the appropriate endovascular approach for a patient with CLI.
- For patients with CLI and nonhealing wounds or gangrene, use of angiosome-directed endovascular therapy may be reasonable. More research is needed to fully understand the benefits and risks of this approach.

Health Literacy

HEALTH LITERACY IS DEFINED AS the skills (both cognitive and social) that allow a person to access, understand and use information that benefits their health. Only 12% of Americans have health literacy that can be described as “proficient.” In addition, most patients read at or below a 6th grade level. It is clear that lack of health literacy can interfere with a patient’s understanding of and adherence to a PAD or cardiovascular disease treatment plan.

Active Listening and Motivational Interviewing

Key to understanding the patient’s issues in adhering to a treatment plan is active listening. This requires avoiding distractions and keeping the focus on the patient while he or she is talking. This technique should include asking relevant questions, making the appropriate level of eye contact (without staring, which can be intimidating), remaining nonjudgmental, carefully reflecting what the patient says with thoughtful paraphrasing, and summarizing the patient’s statements.

Motivational interviewing is a technique that can be used along with active listening to increase compliance. This process involves exploring the benefits of adhering to a self-management plan and the patient’s obstacles to adherence, as well as what can be done about those obstacles. Once a mutual understanding of these issues and solutions is found, the clinician can offer medical advice that is targeted to the patient’s needs.



GEARING PATIENT EDUCATION ABOUT PAD to the individual patient’s situation and literacy level can help improve outcomes in PAD management.

The following steps outline the process of motivational interviewing:

- Gain permission to discuss the condition and treatment plan with the patient.
- Begin the discussion with an open-ended question.
 - How are you feeling today?

- How are you spending your days?
- Is there anything troubling you about your condition or treatment plan?
- When the patient states an opinion, reflect it back to him or her to show your understanding.
- Discuss the importance of the condition and the treatment plan, but from the patient's point of view.

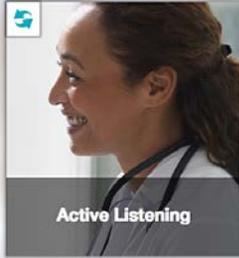
Engaging with PAD Patients

Talking to patients about PAD should encourage engagement in their treatment plan.

Test your knowledge



Understanding



Active Listening



Motivational Interviewing



VIEW MICRO LEARNING UNIT
ENGAGING WITH PAD PATIENTS

- Ask what might affect that importance, either positively or negatively.
- Explore how confident the patient is that he or she can make changes if needed.
- Ask what might affect that confidence, either positively or negatively.
- Discuss the patient's ambivalence about the treatment program and its goals.
- Once the patient has indicated readiness, collaborate on a treatment plan.

The Behavior Change Model

Patients need to feel ready and able to make healthy changes to follow their treatment and self-management plan. The behavior change model suggests that people who are modifying their behavior move through a series of stages, from contemplation to action.

- **Precontemplation:** Not thinking about the change
- **Contemplation:** Thinking about the change, but not ready to make it
- **Preparation:** Ready to make the change
- **Action:** Actively changing
- **Maintenance:** Preventing relapse



A CLINICIAN'S GUIDE
Helping Your Patients with
Peripheral Artery Disease (PAD)

Talking to your Patients about PAD

Educating your patients about PAD and its treatments should begin with explaining the disease and its risks. Patient-centered communication in which the clinician aims to understand the individual patient's symptoms and healthcare goals can help patients feel at ease with their care management plan. Knowledgeable patients are much more likely to discuss PAD symptoms and treatment recommendations with their healthcare provider. Thoroughly answering patient questions, and listening to patients about their concerns, can also help improve their adherence to medical treatments and lifestyle changes. Here's how to use patient education to help prevent and manage PAD.

Discuss the Important Facts About PAD

- PAD is a serious disease, but can be easily diagnosed with simple methods.
- PAD is caused by atherosclerosis, a buildup of plaque in the walls of the peripheral arteries. In PAD, plaque narrows or blocks the peripheral arteries, reducing blood flow.
- People with PAD have an increased risk for coronary artery disease, heart attack and stroke, and lower limb tissue injury.
- Untreated PAD can greatly increase a patient's risk for more serious conditions, such as kidney disease and gangrene, which can lead to leg amputation. It can also decrease one's ability to function and participate in daily activities. Symptoms such as intermittent claudication, which causes pain with walking, can be debilitating and reduce quality of life.
- Some cases of PAD can be successfully treated with lifestyle modifications and medications, although surgery is sometimes necessary.

Patients Can Help Control PAD

The risk factors for PAD include age, sex, a personal or family history of PAD, or a previous history of cardiovascular disease and other—yet controllable—noncardiovascular risk factors. However, as a healthcare provider, you should discuss with your patients the controllable risk factors for PAD that your patients can modify with simple steps, such as:

- **Cigarette smoking**—Smokers may have twice the risk for PAD. A plan for quitting smoking should include pharmacotherapy (nicotine, bupropion, and/or varenicline), behavioral therapy and/or a smoking cessation program.
- **Diabetes mellitus**—High and uncontrolled blood sugar levels and managing diabetes are important steps to avoid PAD, wound complications and other cardiovascular diseases.
- **Hypertension**—Adhering and controlling hypertension with medications and/with healthy lifestyle changes can significantly decrease the risk for PAD and its progression.
- **High blood cholesterol**—High blood cholesterol contributes to the buildup of plaque in the arteries that causes PAD. Managing high cholesterol with medications, diet and nutrition is key for preventing and controlling PAD.
- **Obesity**—People who are obese or at higher risk for obesity have an increased risk for heart disease and stroke, even without PAD. Your weight loss program can be personalized to your symptoms and overall health, as well as your dietary preferences.
- **Physical inactivity**—Physical inactivity is a major risk factor for cardiovascular disease and stroke. Physical activity helps control cholesterol, blood pressure and weight. The patients with claudication, stroke and vascular therapy programs can increase the distance they can walk without pain. Patients can work with their healthcare provider to develop or follow an exercise program at home or in the community, and clinicians can also refer patients with PAD to structured exercise programs at clinics or hospitals.

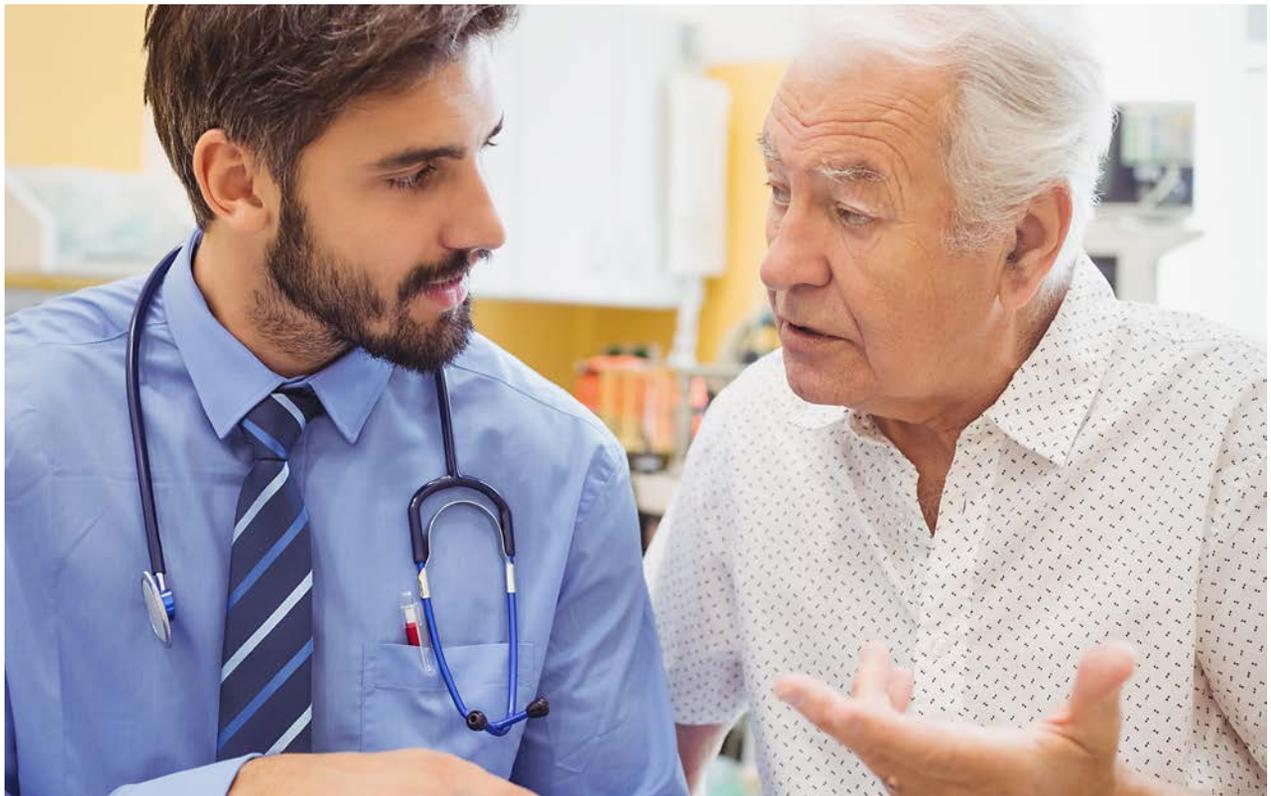
Visit hearL.org/PADtoolkit to learn more.

Talking to Your Patient
 About PAD
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When engaging with patients, healthcare professionals should take time to establish the stage at which a patient might be to help determine whether he or she is motivated. Using a positive and patient tone, ask the patient:

- **What they know about PAD**
- **To list their personal reasons and specific goals for managing PAD**
- **What you (as the provider) can do to help**

If a patient is not ready to change, it is best to begin with more education about their condition and the benefits of symptom management. Remind patients why change is important. Also, continue to teach them the skills they need to manage their PAD.



Long-Term Follow-Up for Patients with PAD

PAD is a lifelong medical condition, and clinicians need to develop a comprehensive care plan for patients with PAD. This follow-up plan should include regular clinical evaluations by a healthcare provider with experience in treatment of PAD patients. Ongoing care for patients with PAD will involve cardiovascular risk reduction with medical therapy and lifestyle changes, optimizing patient function with structured exercise, and when needed, revascularization.

The continued reevaluation of patients with PAD is necessary to assess cardiovascular risk factors, limb symptoms and functional status. It is recommended that patients with PAD who have undergone lower extremity revascularization should have periodic clinical evaluations and ABI measurements. A change in ABI of 0.15 is considered clinically significant. Duplex ultrasound imaging tests can be valuable in the routine surveillance of patients who have undergone infrainguinal, autogenous vein bypass grafts and for those who have had endovascular procedures.

The bottom line and good news for clinicians is that their efforts to promptly identify and treat PAD, and to educate their patients about the disease, will result in more durable control of the disease and prevention of complications.

