Do you have discomfort in the calf muscle when walking that is relieved with rest? If yes, you may have peripheral artery disease (PAD). This disease of the blood circulation affects as many as 10 million people in the United States. The classic symptom of PAD is discomfort or pain in the muscle of the leg with walking, called claudication in medical terminology. The discomfort in the leg is typically relieved within 10 minutes of rest. The claudication is due to a blocked leg artery, most commonly from cholesterol buildup resulting in plaque that blocks blood flow and oxygen, the fuel of muscle. A blocked artery and poor circulation may also occur in the carotid artery in the neck or in the kidney artery.

People who are most susceptible to developing PAD smoke cigarettes or have diabetes mellitus, high blood pressure, or high cholesterol (Table 1). PAD is equally prevalent in men and women. It is common for people with PAD to have a blocked heart artery or a blocked carotid artery that predisposes to heart or stroke, respectively. All patients with PAD should be carefully evaluated for heart and carotid artery disease. The good news is that if properly treated, most patients with PAD will not need amputation.

How Is PAD Diagnosed?
The physical examination shows reduced or absent pulses in the legs and feet. The legs and feet of those with PAD are the same color as the legs and feet of people with normal blood circulation, but they become pale more quickly when elevated above the horizontal position. However, the diagnosis of PAD is ultimately made with measurement of the leg blood pressure taken at the ankle level (Figure). If the ankle pressure is less than the arm pressure, a blocked artery is present in the leg. The pressure in the leg is not measured with a stethoscope but with a machine that uses ultrasound to detect the pressure. The ultrasound machine is based on a concept first put forth by a scientist named Christian Doppler and is informally called a Doppler probe. The majority of people develop bilateral leg pain, but some may have only 1 leg with claudication. The ratio of the leg to arm pressure is normally 1.0, but a ratio of less than 0.9 indicates that a significant blockage is present in leg artery. This leg pressure test is called the ankle brachial index. The ankle brachial index test is noninvasive and feels the same as an arm blood pressure measurement. The severity of ankle brachial index reduction roughly correlates with severity of disease, with mild disease being 0.71 to 0.9, moderate disease being 0.5 to 0.7, severe disease being less than 0.5. Critical disease is present if symptoms progress where pain occurs at rest and/or if a foot ulcer develops as a result of extremely poor circulation.

Who Should Be Screened for PAD?
According to American and international guidelines, people older than 50 years of age with a history of diabetes mellitus or smoking should have an ankle blood pressure test. In addition, anyone older than 65 years of age should undergo an ankle blood pressure test to evaluate for PAD. The guidelines are the same for men and women.

How Is PAD Treated?
The treatment of PAD involves treating risk factors for PAD and improving
ing walking ability (Table 2). It is imperative that cholesterol level, blood pressure, and blood sugar level be treated to reduce the progression of disease. Perhaps the most important modifiable risk factor is the cessation of smoking.

The central treatment for claudication is exercise, optimally a supervised treadmill walking rehabilitation program. A Food and Drug Administration–approved medication, cilostazol, may improve pain-free walking time but does not reduce the progression of disease. If the aforementioned approach is not effective and claudication is lifestyle limiting, a procedure to improve blood flow and walking ability may be an option, depending on where the blockage is located and how many areas are blocked.

The procedures to improve blood flow are categorized as either an invasive catheter treatment (endovascular procedure) or a surgical bypass graft. The endovascular procedure involves placement of a catheter in the artery of the leg and dilation of the blockage with an angioplasty balloon, along with a stent to keep the artery propped open. The surgical approach involves an incision of the leg and the use of a vein from another part of the body (most commonly the opposite leg) to act as a bypass around the blockage. In some circumstances, an endovascular procedure and surgical procedure may be combined (hybrid approach) to maximize blood flow. People with critical disease having pain at rest with or without a foot ulcer should be immediately evaluated and treated, and if possible, with a procedure to improve blood flow. Although the initial success of these procedures is high, a recurrent blockage several years later is common, especially in people who continue to smoke. Current research is focused on developing new approaches to open the artery and to maintain long-term patency. In addition, studies are underway to determine whether cell therapy will result in the development of new blood vessels and improve blood flow to the legs.

### Additional Resources

For further information, please consult the following sources:

- Mohler ER, Hirsch AT. 100 Questions and Answers about Peripheral Artery Disease (PAD). Burlington, MA: Jones and Bartlett Publishers; 2010.

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