



Ankle-Brachial Index (ABI):

What you need to know about the ABI examination for peripheral artery disease (PAD)

What is the ABI?

The ankle-brachial index (ABI) is a simple and reliable means for diagnosing peripheral artery disease or PAD. Blood pressure measurements are taken at the arms and ankles using a pencil shaped ultrasound device called a Doppler (an instrument that produces sound waves not x-rays) or other specialized measuring instrument. These are considered noninvasive because they do not require the use of needles or catheters. The ABI test is simple enough to be performed in a doctor's office or vascular laboratory. Not only is the ABI one of the most reliable tests for PAD, it is also the least expensive.

The ABI exam can be used to assess whether PAD is getting worse, the severity of an individual's atherosclerosis (build up of plaque) as well as the risk of leg problems, such as development of leg rest pain, poor healing of foot wounds, the need for bypass surgery, or amputation. It can also predict the risk of future problems from atherosclerosis such as heart attack and stroke.

How is the exam given?

You will be asked to lie on your back while standard blood pressure cuffs are placed around your ankles and arms. These cuffs will be inflated briefly above your normal systolic blood pressure. Once the cuffs are deflated, blood pressure measurements are taken using a Doppler instrument or other specialized measuring instrument. The arm and ankle systolic blood pressure measurements are recorded. Then the ankle systolic pressures are divided by the highest arm pressure to establish an ABI measurement for each leg.

If you have symptoms of PAD you may be asked to walk on a treadmill or down the hallway and the ankle pressure measurements are repeated to see if they have changed.

How reliable is the exam?

Although the ABI is extremely reliable, this test may not be accurate in all patients. Some people with long-standing diabetes, kidney disease or some elderly patients, may have rigid blood vessels. These may be difficult to compress with the blood pressure cuff, and in these patients the ABI reading may not be accurate. For individuals with rigid ankle blood vessels, toe pressure measurements may be taken since toe arteries are rarely rigid. This examination is called a toe brachial index (TBI) and is a calculation based on the systolic blood pressures of the arm and the systolic blood pressures of the toes. The examination is similar to the ABI except that it is performed with a photoplethysmograph (PPG) infrared light sensor and a very small blood pressure cuff placed around the toe. A TBI of .8 or greater is considered normal. Alternatively, a leg arterial ultrasound test or pulse volume recording using pressure cuffs on the thigh can also detect PAD when the ABI cannot be performed.

Interpreting the ABI

The ABI range that is generally considered normal is 1.0-1.3.

> 1.30	Noncompressible
1.0 – 1.29	Normal
0.91 – 0.99	Borderline (equivocal)
0.41 – 0.90	Mild to moderate PAD
0.00 – 0.40	Severe PAD

About PAD

Peripheral artery disease or "PAD" is sometimes also known as peripheral vascular disease or "PVD." It is leg atherosclerosis, claudication, or just poor circulation. Arteries can slowly become narrowed or blocked as a consequence of age, smoking, high blood cholesterol or diabetes. Less blood reaching the muscles in the legs can make them hurt. PAD

can usually be effectively treated by a healthier lifestyle, daily exercise and medications to decrease leg pains and improve one's chance of avoiding heart attack or stroke. For individuals with the most severe blockages, skin ulcers, non-healing wounds, or even gangrene can occur. With prompt treatment, pain can be lessened and amputation may be avoided.

For more information about PAD, or visit www.vdf.org.



What are the symptoms?

About one half of individuals with PAD do not have symptoms. The most common symptom is a burning pain or ache which occurs in one or both legs and quickly goes away when you rest. It occurs every time you walk about the same distance. This is known as intermittent claudication.

This leg pain can be severe enough to deter a person from normal walking. Some individuals will not feel cramping or pain but might feel a numbness, weakness or heaviness in the muscles.

What are the treatments?

While there is no cure for PAD, there are many ways to prevent the progression of the disease. Good health practices such as eating a healthy diet, exercise and not smoking will slow the progress of the disease. Walking has been shown to reduce symptoms of PAD. Treatment options vary and depend on the overall health of the individual and the severity of the disease. If you have PAD, your physician should provide you with adequate information to help you understand all options.

Who is at Risk?

Over 9 million Americans are affected by PAD, yet many do not know they have it. You may be at risk for PAD if you:

- Smoke
- Have high cholesterol
- Have high blood pressure
- Are over 50 years old
- Have a family history of heart disease
- Have diabetes
- Have pain in your legs when you walk that goes away with rest



This educational resource was created by the Vascular Disease Foundation (VDF). VDF ceased operations in January 2014. In October 2014, Vascular Cures acquired most of VDF's digital assets and educational resources. VDF was founded in 1998 with the mission to provide public education and improving awareness about vascular diseases. Vascular Cures is now the only organization in the country dedicated exclusively to finding cures for vascular disease and to providing resources, information and education to patients with vascular diseases outside the heart. Please help Vascular Cures continue to make this critical educational information available. Your contribution will make saving lives a greater reality.

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