

date visited 01/03/13



UC Davis Vascular Center

Lower extremity physiologic testing

Peripheral artery disease (<http://www.ucdmc.ucdavis.edu/vascular/diseases/pad.html>) (PAD) is common, and the prevalence increases with age. Symptoms may include intermittent claudication (muscle pain, aching or fatigue with walking) or in severe cases critical limb ischemia (<http://www.ucdmc.ucdavis.edu/vascular/diseases/cli.html>), which may lead to chronic pain, non-healing wounds on the feet, or gangrene.

Evaluation of the arterial supply to the lower limbs is done by measuring blood pressures at various levels and by evaluation of the arterial-pulse characteristics. Blood flow is evaluated with an ultrasound Doppler flow detector. Arterial pressures in the lower extremities are compared to the pressures measured in the arms. These tests are usually referred to as segmental pressure measurements and pulse volume recording (PVR).

When the pressures are measured at only a single level in the lower extremities — the ankle — they may be reported as the ratio of the ankle pressure to the arm pressure. The ankle/brachial index (ABI), also known as the ankle/arm index (AAI), is a very useful general measure of PAD severity. A normal ABI is usually 1.0 to 1.1. An ABI of 0.90 or less indicates PAD is present. Critical limb ischemia may be present if the ABI is less than 0.50.

A lower extremity arterial physiologic study may be requested to determine whether peripheral artery disease is present, what vessels are affected, and how severely the blood flow is impaired. A study may be ordered prior to an initial consultation with a vascular specialist for patients referred for evaluation of PAD.

No special preparation is required. A complete non-invasive study usually takes about 60 minutes. Inflatable cuffs are applied to the thighs, legs and toes to take measurements at different levels. People with diabetes may have calcification of their lower extremity arteries. Some of the cuff measurements may not be accurate in such cases, but arterial waveforms and pressures from the level of the toes may still be useful.

In some cases, additional Vascular Laboratory evaluations may include treadmill exercise testing (<http://www.ucdmc.ucdavis.edu/vascular/lab/exams/treadmill.html>) or peripheral arterial duplex scanning (http://www.ucdmc.ucdavis.edu/vascular/lab/exams/peripheral_arterial.html).

PAD treatments offered by specialists in the Vascular Center include medical management, catheter-based interventions (angioplasty or stent placement) and surgical therapies. Vascular Laboratory testing may identify PAD that does not require immediate intervention, but may need follow-up. People with diabetes and PAD may be at particular risk for developing foot problems, and Vascular Laboratory testing may be useful in assessing the likelihood of future problems and this information may be considered in determining what follow-up is optimal.

See also:

Diseases, conditions and their treatments: Peripheral artery disease (<http://www.ucdmc.ucdavis.edu/vascular/diseases/pad.html>) (PAD)

Diseases, conditions and their treatments: Critical limb ischemia (<http://www.ucdmc.ucdavis.edu/vascular/diseases/cli.html>)

Vascular Laboratory exams: Bypass graft evaluation (http://www.ucdmc.ucdavis.edu/vascular/lab/exams/vein_graft.html)

Vascular Laboratory exams: Peripheral arterial duplex scanning (http://www.ucdmc.ucdavis.edu/vascular/lab/exams/peripheral_arterial.html)

Vascular Laboratory exams: Treadmill exercise testing (<http://www.ucdmc.ucdavis.edu/vascular/lab/exams/treadmill.html>)

Vascular Laboratory exams: Vein mapping (<http://www.ucdmc.ucdavis.edu/vascular/lab/exams>)

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