

# Keeping in Circulation

The official journal of the Vascular Disease Foundation®

Helping others with  
**Critical limb ischemia**

**Ankle-brachial index**  
A valuable tool

**Exercise rehab and PAD**

**Living Well with PAD**





Robert B. McLafferty, MD  
President  
Vascular Disease Foundation

## Dear Readers,

In honor of PAD Awareness month this September, I am proud to offer this fall issue of *Keeping in Circulation*, which is focused on peripheral arterial disease, or PAD. PAD affects between 8-10 million Americans and can have devastating affects including limb loss and death. This issue is about the many aspects of PAD including living well with PAD, medication, exercise rehabilitation and more.

If you'd like to learn more about exercise rehabilitation for PAD or maybe you're just looking to start a walking program, "Walk On" covers the many benefits of a walking rehab program. Due to pain in the legs, many patients with PAD don't walk because it hurts. This article may provide some surprising insight into walking programs in your area for PAD.

And if you suspect you have PAD but haven't been tested, learn about how the ABI test works. This is a simple, reliable way of not only detecting PAD, but also creating a baseline for monitoring your disease process. Learn about this simple blood pressure test on the legs.

VDF's annual meeting "Current Issues in Vascular Disease" was held in September 14-15 in the Washington, D.C. area. We will be providing a full update of this meeting in our winter issue. And VDF continues to grow and expand. This summer VDF initiated a new database to better, we keep you updated, would appreciate any updates you may have to your information including your name, address, etc. Please contact the office toll-free at (888) 833-4463.

I want to thank you for your continued support of Vascular Disease Foundation and its programs. If you haven't made a donation lately, please visit our Web site at [www.vdf.org](http://www.vdf.org) to make a tax-deductible donation to the Vascular Disease Foundation. Our message is important and valued support from you makes it all possible. Thank you!

Sincerely,

A handwritten signature in black ink, appearing to be "R. McLafferty". The signature is stylized and written in a cursive-like font.

Robert B. McLafferty, MD  
President  
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## Excellence in Care

If you would like to nominate someone for the Excellence in Care Award, please send us a note or e-mail with a tax-deductible donation of \$50 or more telling us who you are honoring and why he or she deserves the recognition. Nominees can be any medical professional who has helped you or your family or has shown special kindness which you feel deserves recognition.

### September is PAD awareness month!

Learn about PAD, signs and symptoms and more at [www.padcoalition.org](http://www.padcoalition.org). Or call us at (866) PAD-INFO (866-723-4636) to get a free educational pamphlet about PAD.

### November is Diabetes Awareness

**Month!** Visit the P.A.D. Coalition Web site ([www.PADCoalition.org](http://www.PADCoalition.org)) or the VDF Web site ([www.vdf.org](http://www.vdf.org)) to learn how vascular diseases relate to diabetes.

### Watch for our Annual Appeal mailing

**this fall.** Please give generously. Your gifts help us continue our programs. If you or someone you know works for the federal government, ask them to contribute to the VDF through the Combined Federal Campaign. All they need to do is to provide our charity number: 11581.

### Social Media

VDF now has interactive pages on Facebook, Twitter and YouTube! Visit us online at and stay in touch:

Facebook: VDFMan

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YouTube: [www.youtube.com/VascularDiseaseFdn](http://www.youtube.com/VascularDiseaseFdn)



## "In Memory of" and "In Honor of" Envelopes Available

VDF has created a preprinted envelope in response to request from supporters who have contributed to "In Memory of" and "In Honor of" a loved one. This will simplify and expedite your desire to memorialize or honor a special person through a donation to VDF. If you would like to receive these special envelopes, call us at (888) VDF-4INFO or contact us by e-mail at [info@vdf.org](mailto:info@vdf.org).

## Ask the Expert Live Chat

**VDF** is proud to offer live online chats with a health care professional about different areas of vascular disease. Chats occur during the second Tuesday of the month at 4 p.m. EST/3 p.m. CST/2 p.m. MST. Join us on the following dates to chat live with a medical professional:

Please visit [www.vdf.org](http://www.vdf.org) and click the "Interactive Resources" tab for more information.

**October 11**—Donna M Mendes MD, will answer your questions about women and PAD.

(Dr. Mendes is Senior Vascular Surgeon, St. Luke's & Roosevelt Hospitals, and Associate Clinical Professor of Surgery, Columbia University College of Physicians & Surgeons)

**November 8**—Marcello Gomez, MD, will answer your questions about venous insufficiency and varicose veins.

(Dr. Gomez is an associate in the department of vascular medicine for the Cleveland Clinic in Ohio)

**December 13**—Meghal Antani, MD, will answer your questions about venous insufficiency and varicose veins.

(Dr. Antani is the Medical Director for the Southern Maryland Vascular Institute (SMVI) in MD)

Can't sit in on a live chat? You can e-mail us your questions up to 30 minutes prior to each chat at [info@vdf.org](mailto:info@vdf.org) or view the transcripts online.

## WE WANT YOUR FEEDBACK!

Tell us how to improve *Keeping in Circulation*. In the next few weeks you may get a call from the OMNI Institute requesting your participation in a brief (10 minute) survey.

Please help us better meet your needs by participating in this survey effort. Thank you in advance for helping us better meet your informational needs.

## ORDER YOUR HOLIDAY CARDS AND HELP VDF!

This holiday season, order your personalized greeting cards online and support VDF! There are over 100 designs available to choose. You can personalize your card, or you can upload your photo to send a photo card. Depending on quantity ordered, prices range from \$1.75 – \$2.95 including the stamp! It's easy and fast.

The quality and cost of the cards are competitive with those available at a card shop but with the added benefit that a portion of sales support VDF. Shop today at our VDF Web site at [www.vdf.org/cardcafe](http://www.vdf.org/cardcafe).

# A. Promise Kept.

*This is the story  
of a mother and  
daughter, and  
their vow to help  
save others who  
have critical  
limb ischemia*

By Jennifer Sellers



Betty Heck was a vibrant, healthy 80-year-old woman. She had an indomitable spirit and a passion for life. But her life ended earlier than she or her family could have known. What started with a simple foot sore ended with a leg amputation and, ultimately, her death.

“My mom had a zest for life like no one I’ve ever met,” says Heck’s daughter Tammy Leitsinger. “And except for a few conditions, she was in good health.”

Heck’s conditions were type 2 insulin-dependent diabetes and rheumatoid arthritis (RA). Diabetes is a known risk factor for peripheral arterial disease (PAD), but Heck, who was conscientious about her health, managed the disease closely—carefully following her insulin regimen and taking proper care of her feet. In addition, she had an impressive body mass index (BMI) of 21-22.

Unfortunately, Heck was one of many PAD sufferers who never exhibit symptoms of the condition until it reaches the advanced stage—critical limb ischemia (CLI). And, as it turned out, she didn’t even receive that diagnosis until late in its development.

### Missed diagnoses, missed opportunities

In November 2010, Heck started noticing pain in her left foot, which she first attributed to her RA. Then when a sore appeared, she went to her primary care doctor and podiatrist, both of whom misdiagnosed it. “She told me she had a blister on her foot, and I told her to get to a doctor right away,” says Leitsinger. “Her GP told her it was ringworm. When that treatment didn’t work, he sent her to the podiatrist, who misdiagnosed her with nail fungus.”

All the while, Heck’s sore worsened and the excruciating pain it caused continued. Although her doctors missed the red flag of a foot injury on an older woman with diabetes, her daughter didn’t. Leitsinger happens to work in the medical device industry and specializes in PAD awareness, so she knew the potential danger her mother was in.

“When she took her shoe off for me, I was stunned because she had a large, black necrotic ulcer on her foot,” says Leitsinger. “It was a horror for me. I’ve seen it so many times with my job, and I knew at that moment what we were in for—or, at least, I thought I knew. I immediately got her an appointment with Dr. Gary Ansel, a world-renowned interventional cardiologist.”

When the doctor did a diagnostic angiogram on Heck, he realized it wouldn’t be effective. “He told me he couldn’t even get below her knee, that all of her vessels were like porcelain,” remembers Leitsinger. “At that point, he said she would need to have a below-the-knee amputation.”

### Hurdles in the path

The news that she would have to lose a leg didn’t get Heck down. After a period of soul-searching, she decided to go through with it. From that point on, she committed fully to the procedure and the challenges of recovery. “Once she made the decision to have the amputation done, there was no stopping her,” says Leitsinger. “She made it clear: She was going to live, she was going to walk again and she was going to drive her car again.”

As a testament to her spirit and overall good health, she handled the surgery extremely well. “The doctor was very surprised with how she did,” says Leitsinger. “She woke up the next day in intensive care and was already wanting to start rehab. She wanted to walk.”

Of course, Heck had a little ways to go before she could try to start walking again—and soon after her surgery, she suffered a setback. “Not long after the amputation, infection set in,” says Leitsinger. “That really got to her. The antibiotics were making her really sick, and she started getting depressed. She was starting to lose her desire to live, and I felt like I was losing her.”

Once again, Heck’s physical and emotional strength won out. She recovered from the infection and started back on the road to recovery. She had a renewed sense of vitality and was planning for the future. “At that point, it was like we got her back,” remembers Leitsinger. “She was doing tremendously well. This was in April; she was already looking forward to renewing her driver’s license in July. I’ll never forget: I kind of looked at her stub and said, ‘Mom, that might not be a factor.’ Then she looked right at me and responded, ‘I don’t think I need to tell you this, but I drive with my right leg, not my left.’”

“There was nothing that was going to stop her from having a full life again,” continues Leitsinger. “And when she got fitted for her temporary prosthesis, it was like the greatest day of her life. When they first put it on her, she walked around the center five times as if it was custom-made for her. That leg was going to help her do all sorts of things. She was going to live on her own; she was going to do so much.”

Just as Heck and her family felt her health difficulties were over, one final blow was struck. Heck developed another infection—this time it was C. diff.

C. diff (known formally as *Clostridium difficile*) is a bacterial infection that can affect elderly and immune-suppressed

Betty Heck had a “zest for life,” says her daughter.



## Risk factors and symptoms of CLI

Anyone over age 70 should be considered at risk, as should people over age 50 who have one or more of the following risk factors:

- Smoking
- Diabetes
- High blood pressure
- High cholesterol
- Family history of cardiovascular disease

A major symptom of PAD is claudication, pain during walking or movement of the legs. However, not everyone with PAD exhibits symptoms. Some people don't realize they have the disease until it has advanced to the CLI stage. Signs of CLI include:

- Pain in the legs or feet at rest.
- Sores on the feet or legs that don't heal or that become black.
- Easily developing wounds.
- Feet turning red or blue when put down and turning white when put up.

people who are staying in medical facilities. It often occurs after long-term antibiotic use.

“When that happened, that was pretty much it for her,” says Leitsinger. “It took everything out of her, and she just couldn't recover from it. We brought her home on May 24, and she died on May 27.”

### Not in vain

It's painful for Leitsinger to think about her mother's death. Heck was her best friend, and she lost her too soon. And, tracing the series of events backward, it's difficult for her not to feel frustration—even anger. The infection that claimed her mother's life was due to antibiotic usage. Those antibiotics were prescribed to treat an infection that set in after amputation, a surgery that was necessary due to the state of her CLI. And, of course, Heck's CLI had advanced without treatment for a period because it had been misdiagnosed.

Fortunately, Heck's story didn't end with her death. It is her daughter's hope that it will help save others. “I promised her right before she died that this would not be in vain; that we would help save other people,” says Leitsinger. “This is the message of

Mom's story: Early detection is critical. Patients need to know it; doctors need to know it, too. If someone has a problem with their foot, it isn't necessarily old age or swelling or gout. And if there are risk factors—and diabetes is a huge one—CLI must be considered. If Mom's doctor and podiatrist would have known that; if she had been diagnosed earlier, who knows where she'd be today.”

Leitsinger says that a huge part of making sure CLI doesn't get misdiagnosed or go untreated is for people to take their health care into their own hands. “Mom trusted her doctors, but doctors are human and they make mistakes,” says Leitsinger.

In Heck's case, it was her daughter—an educated layperson—who intervened and identified her illness. But not everyone is going to have a family member who works in the health industry. Therefore, Leitsinger says, they have to educate themselves on the risk factors and symptoms of PAD and CLI—in case a doctor misses it.

“She was an amazing woman; she had so much passion for life and just wanted to live,” continues Leitsinger. “So if others are helped by her story, she lives on. This is for her.” ■

## What is

# PAD?

**PAD is short for peripheral arterial disease.** People have PAD when the arteries in their legs become narrowed or clogged with fatty deposits, or plaque. The buildup of plaque causes the arteries to harden and narrow, which is called atherosclerosis. When leg arteries are hardened and clogged, blood flow to the legs and feet is reduced.

PAD occurs most often in the arteries in the legs, but it also can affect other arteries that carry blood outside the heart. This includes arteries that go to the aorta, the brain, the arms, the kidneys and the stomach.

### Who is at risk for PAD?

The chance of having PAD increases as you get older. People over age 50 have a higher risk for PAD, but the risk is increased if you:

- Smoke, or used to smoke
- Have diabetes
- Have high blood pressure
- Have abnormal blood cholesterol levels
- Are of African-American ethnicity
- Have had heart disease, a heart attack or a stroke

### What are the warning signs or symptoms of PAD?

PAD develops slowly over many years. In the early stages, most people with PAD have no symptoms. The most common signs of PAD include one or more of these problems:

- Cramps, tiredness or pain in your legs, thighs or buttocks that always happens when you walk but that goes away when you rest. This is called claudication.
- Foot or toe pain at rest that often disturbs your sleep.
- Skin wounds or ulcers on your feet or toes that are slow to heal (or that do not heal for 8 to 12 weeks).

It is important to discuss any leg or thigh pain you may be having with your health care provider since it may be a warning sign of a serious disease such as PAD.

### How do I find out if I have PAD?

If you think you have PAD, see your health care provider and talk about any symptoms you are having and go over your medical history and your risk factors for PAD. Your provider will examine the pulses in your feet and legs. If your provider finds those pulses are weak and thinks you may have PAD, your provider may order a test called the ABI, or ankle-brachial index. PAD also can be diagnosed by other tests that measure blood pressures in the leg (segmental pressure), toe pressures (toe-brachial index or TBI) or artery blood flow (with ultrasound).

### How is PAD treated?

PAD can be treated with lifestyle changes, medicines and endovascular or surgical procedures, if needed. Since people with PAD are at high risk for heart attacks and stroke, they must take charge of controlling their risk factors related to cardiovascular disease.

These life saving steps will help to prevent and control PAD:

- Get help to quit smoking and set a quit date now.
- Lower your blood pressure.
- Lower your LDL (bad) cholesterol.
- Manage your blood glucose and practice proper foot care if you have diabetes.
- Talk to your health care provider about taking anti-platelet medicines such as aspirin or clopidogrel to prevent clotting.
- Follow a healthy eating plan to control your blood pressure, cholesterol and blood glucose (for diabetes).
- Get regular exercise such as walking for 30 minutes at least 3 or 4 times per week. If you have pain or cramps in your legs, ask your health care provider to refer you to a special PAD exercise program.

Remember: Finding and treating PAD early can help keep your legs healthy, lower your risk for heart attack or stroke, and save your life and limbs.

# Life and limb

Addressing and treating the most severe state of PAD.

By Jennifer Sellers

**L**ife is good. You're retired and finally enjoying the things you've always wanted to do: relaxing, traveling and spending time with your grandkids. Then one day you notice that the sore you've had on your foot isn't healing. You go to the doctor to get it checked out and before you know it, you're in the hospital having your leg amputated.

While this is an extreme scenario, it happens more frequently than you may think. When peripheral arterial disease (PAD) goes untreated, it can result in critical limb ischemia (CLI), which causes a decrease in blood flow to an extremity and threatens limb vitality. Potential outcomes of CLI are amputation—and even death. Consider these statistics:

- Worldwide, 3 percent to 10 percent of people develop PAD.
- Of PAD patients, 10 percent will go on to develop CLI.
- About 50 percent of those with CLI will require a procedure of some kind.
- Of that 50 percent, 25 percent will have a primary operation.
- 15 percent of the patients with that operation will die due to complications.

“With CLI, there’s a high rate of death,” says Vickie Driver, associate professor of surgery at Boston University School of Medicine. “But even in survivors there’s a potential loss of independence and productivity.”

## Identifying CLI

Proper management of PAD is key to helping prevent CLI. Unfortunately, nearly half of people with PAD don't experience

symptoms and therefore don't get a diagnosis until the disease reaches the CLI stage. “Managing this disease is really about early, accurate diagnosis; so deciding on the most reliable and useful test to identify it is a challenge,” says Dr. Driver, who is also the director of clinical research limb preservation, wound healing and the research fellowship and international scholars program at Boston University.

To help prevent CLI, those diagnosed with PAD and those who are at risk for it (over age 70 or over age 50 with history of diabetes, smoking, high blood pressure, high cholesterol or family history of cardiovascular disease) should follow medication and lifestyle guidelines for keeping the disease under control. (See our article on page 12 for advice on living well with peripheral arterial disease.)

You should also be on the lookout for signs of CLI, which can include:

- Rest pain (foot pain) when legs are at rest.
- Unexplained leg pain
- Sores on the feet or legs that don't heal or become black.
- Easily developing wounds on the feet or legs.
- Feet turning red when put down and turning white when up.

If you notice any of these symptoms, you should go to your doctor right away.

“Prompt referral to a vascular specialist is critical,” says Dr.





Driver. "Because of the improvements in both the diagnostic and prognostic accuracy for PAD and CLI, outcomes for limb salvage have been improved."

### **Treating CLI**

If your PAD has advanced to CLI, there are a couple of surgical treatments available: an endovascular procedure or a bypass graft. An endovascular procedure involves having a catheter inserted in the leg to restore blood flow. A stent may be used to help keep the blockage open when using the endovascular approach. A bypass can mean having an artificial tube or your own vein (from your leg or occasionally your arm) added to act as a new artery. The endovascular route is preferred but not always recommended. "Plenty of new endovascular procedures can be done at lower risk than an open bypass," explains Dr. Driver. "But some patients' conditions require bypass."

In some cases, the leg can't be saved by an endovascular procedure or bypass, and an amputation is needed.

Secondary treatments for CLI include wound management

therapies and medications such as clot-busters, which Dr. Driver says are only mildly beneficial and intended only to supplement surgical procedures.

### **On the horizon**

Fortunately, a lot of research is going into new treatments for CLI. There are ongoing studies in therapeutic angiogenesis, which is an experimental type of treatment involving stem cell and gene therapy to promote the formation of new blood vessels. Dr. Driver, who is involved in these trials, says that there is great hope that therapeutic angiogenesis will be on the market within the next 10 to 15 years.

"The preliminary findings are encouraging," she says. "Should these therapies work, they could help prevent limb loss in patients who have no other options. Those are the people we're so desperate to help."

# PAD... after the diagnosis

Advice for living well with peripheral arterial disease.

By Jennifer Sellers



**Y**ou've just been diagnosed with peripheral arterial disease (PAD). Now what?

Well, your next steps depend on what type of diagnosis you received, says Cindi Christensen, MSN, CVN, ARNP, president of the Society for Vascular Nursing. "Most of the time, people with PAD don't need any further surgical intervention," she says. "About 10 percent to 20 percent do need something else done, like a leg bypass, surgical or endovascular treatment, or—in approximately 3 percent of PAD patients—leg amputation."

For the 80 percent who have a standard diagnosis, there are some core steps for staying healthy and keeping PAD in check.

## The basics

When you have a challenging condition like PAD, the last thing you want to do is to make it worse or to add other health complications onto it. So when your health care provider suggests changes like exercising and eating better, it isn't just empty advice he or she is required to tell you. Lifestyle modifications are meant to make your life better, not worse; and suggestions for change should be taken seriously.

Here are four key aspects of PAD management you should follow:

- **Smoking cessation:** If you're a smoker, quitting is by far the most important thing you can do to treat your condition. You should also quit chewing tobacco, if that's a problem. "Not only are nicotine and smoking bad for your lungs, but they cause your blood to be thicker and make it easier for plaque to build inside the

arteries,” says Christensen. “Both of these cause less blood to get through the arteries and to the muscles that need it.”

- **Exercise:** Your instinct may be to avoid exercise because of the pain it can cause in your legs. However, not only is it good for you, but also, over time it can reduce the pain you experience. The best strategy is to walk as much as you can, then rest when you experience pain. When the pain subsides, start walking again. “If you continue letting yourself walk and rest over and over again, it can allow you to walk farther without pain,” suggests Christensen, who is a nurse practitioner in Des Moines, Iowa. “Doing so allows the body to adapt and be able to push itself a little farther.”

Christensen says that arm exercises can also help you. “A study that had patients using an arm ergometer (a bicycle-like device for the arms) showed that their PAD symptoms improved,” she says. “The researchers found that arm ergotomy helped improve blood flow in the legs as well.”

- **Diet:** A healthy, low-cholesterol, low-sodium diet is ideal. Blood pressure and cholesterol management are crucial for PAD patients, and diet can help keep those issues in check. Another advantage of healthy eating is that it can help you manage your weight. By maintaining a healthy weight, you will feel better and possibly keep other conditions, like diabetes, under better control. Of course, many who suffer with PAD already have diabetes. If this applies to you, a diabetic diet may also be necessary.

- **Medication compliance:** In addition to diet, prescribed medications can help keep your blood pressure and cholesterol levels in a healthy range. Blood-thinning (anti platelet) medications are also important for people with PAD. “These

drugs keep platelets from sticking together and make it easier for blood to flow,” explains Christensen. There are some prescription medications, like clopidogrel, that can do this job. However, your health care provider may recommend that you simply take an aspirin a day.

### Feet first

Beyond the basic measures mentioned above, you’ll need to also monitor your condition regularly. By keeping an eye out for potential changes in your body—particularly your feet—you can detect the disease’s advancement and contact your doctor before the problem worsens.

An indicator of PAD progression is rest pain, says Christensen. “This happens when a person’s feet have a pain when they lie down at night and put their feet up,” she says. “The person will feel a little better when they dangle their legs over the edge of the bed or get up and walk. That’s because gravity helps pull down some of the blood.”

Other indicators on the feet that can signal advanced PAD are sores that don’t heal, unusual pain or a purple spot. “These are all signs that there might be an artery blockage,” says Christensen.

In addition to monitoring the condition of your feet, you should try to avoid damage to them. “If you don’t have an injury, you don’t have to worry as much that you don’t have the blood to heal it,” says Christensen. “Make sure you avoid ingrown toenails as well as cuts and scrapes to your feet. To do this, just be extra careful with your feet. Don’t walk barefoot; don’t wear thong-style flip-flops.”

All of these measures can help control your condition. “The main goal of PAD treatment, along with keeping yourself healthy, is simple: You should try to prevent any new problem that will have to be fixed,” says Christensen. ■

By maintaining a healthy weight, you will feel better and possibly keep other conditions, like diabetes, under better control.



# Early, easy and effective

The ankle-brachial index can be a valuable tool in the detection of peripheral arterial disease.

By Jennifer Sellers

**P**eople with peripheral arterial disease (PAD) are at an increased risk for heart disease and stroke. However, the earlier the condition is caught, the better chance patients and their doctors have to keep it—and its risk factors—under control. So far so good, right?

Unfortunately, there's a slight flaw in the plan: Not everyone who has the disease knows it. Some people have asymptomatic PAD, meaning they don't experience claudication—the pain in the leg that occurs during walking and eases when the leg is at rest.

"Approximately 50 percent of individuals who have PAD do not complain of symptoms; yet, the asymptomatic form of the disease is still quite dangerous in terms of being associated with a significantly increased risk of heart attack and stroke," says Diane Treat-Jacobson, PhD, RN, associate professor at the University of Minnesota School of Nursing. "So the benefit of finding PAD in asymptomatic people is that we could treat it earlier and more effectively; and we could reduce the likelihood of progression of the disease as well as the risk of heart attack and stroke."

The great news is that there is a way to detect asymptomatic PAD. The ankle-brachial index (ABI) can help health care providers effectively diagnose the disease in asymptomatic patients, and it's as easy as getting your blood pressure checked.

## How the ABI works

The ABI is the ratio of the systolic blood pressure in the ankle to the systolic blood pressure in the arm. "The normal ratio of ankle pressure over arm pressure is 1," explains Treat-Jacobson. "If the ratio is .90 or below, meaning that the leg pressure is at least 10 percent lower than the arm pressure, we consider that to be diagnostic for PAD."



To achieve a systolic blood pressure reading in the ankle is simple. All that's needed is a regular—not automated—blood pressure cuff and a small handheld Doppler, says Treat-Jacobson. "The great thing about the ABI is that the test can very easily be done in any clinician's office," she says.

### Will it help you?

Because there are many people who experience asymptomatic PAD, the ABI offers a great way to detect the disease in those who are at risk but aren't exhibiting symptoms. This includes anyone over age 70—or people over age 50 who have one of the following risk factors:

- Smoking
- Diabetes
- High blood pressure
- High cholesterol
- Family history of cardiovascular disease

"Patients with these risk factors, regardless of their symptoms, should have an ABI done to see if they have PAD," says Treat-Jacobson. "About 20 percent of people over age 70 have the disease, and there are others who are prone to it because of their medical history. If these people are asymptomatic or their symptoms haven't been recognized as PAD, then ABI lets you document the disease and change their course of treatment."

### The need for increased ABI testing

While it's been proven that ABI is effective at diagnosing PAD—and can therefore lead to improved treatment of the

disease—it's still not a common test in primary care settings. "Unfortunately, right now the test isn't reimbursed for people who are asymptomatic," says Treat-Jacobson. "This is problematic because people with PAD often don't have their risk factors managed as well as people with other kinds of atherosclerosis. So, there's a lot of work to be done in this regard. Being able to measure the ABI in people who are at risk is something that's needed in our health care system."

Unfortunately, a person is not likely to be referred to a vascular specialist for an ABI unless they are experiencing claudication (the symptom of pain when walking). Once again, this leaves people with asymptomatic PAD at risk of not being diagnosed.

While we wait for the ABI to become a more widely administered test in people with risk factors for PAD, Treat-Jacobson suggests that a person at high risk for the disease ask their doctor if they should be evaluated for PAD. She also urges anyone who is experiencing symptoms to seek care as soon as possible. "If you're comfortable at rest but get aching, cramping or even fatigue in your leg muscles (the calf, thigh or buttock) when you walk—and it keeps building until you stop—you should notify your physician and say, 'I need to be evaluated for PAD.'" ■

## Another valuable use for ABI

**D**iane Treat-Jacobson, associate professor at the University of Minnesota School of Nursing, says that the ABI can also be a useful tool for monitoring existing PAD patients who've undergone procedures. "For example, if someone has a low ABI and undergoes a revascularization procedure, we can measure the change in the ABI after the procedure," she says. "If the ABI increases, then we have a new baseline value and can continue to monitor over time to watch for improvement or worsening of the patient's condition."

## PAD Exercise Training Toolkit

A guide for health care professionals; an exercise program for patients with PAD.

The Vascular Disease Foundation's PAD Exercise Training Toolkit is a resource for cardiac rehabilitation and other exercise and rehabilitation health care professionals to improve access to supervised exercise programs for people with intermittent claudication resulting from peripheral arterial disease (PAD).

The toolkit includes information that enables exercise and rehabilitation professionals to implement appropriate and safe supervised exercise programs. It also includes practical tools such as sample brochures plus participant and staff education materials.

The PAD Exercise Training Toolkit is only available online at [www.vdf.org/rehab-toolkit](http://www.vdf.org/rehab-toolkit).



# Walk on

Supervised exercise rehabilitation is a first-line treatment for symptoms of PAD.

By Jennifer Sellers

**Y**our body has many ways of letting you know when something is wrong with it. Pain is one of its indicators. And often, when something hurts you should stop doing it. So when your peripheral arterial disease (PAD) makes walking painful and resting comfortable, it's only natural that you would want to avoid walking.

As instinctual as it may seem to steer clear of the pain, remaining sedentary is not the answer for managing the symptoms of PAD. Over time, a rehabilitative walking routine can actually lessen the pain you feel in your legs when they're active—allowing you to walk longer and for greater distances.

"The strategy for exercise rehabilitation is to actually walk until you get some pain, then stop, wait for the pain to go away and repeat the cycle," explains Kerry Stewart, professor of medicine and director of clinical and research exercise physiology at Johns Hopkins University. "Exercise has been shown to reduce the severity of claudication (*the leg pain associated with PAD*), and people can walk for longer periods of time without pain. It's not that the blockage goes away; it's that you're able to do much more activity before getting pain."

## A supervised therapy

After clearance from the doctor, anyone with PAD can start walking on their own. And if you're reading this and make that decision: Good for you! You're one step closer to improved quality of life. However, many people with claudication find that a walking program is difficult to follow. That's where supervised exercise rehabilitation comes in.

“When people get pain, they tend to avoid it—that’s normal,” says Stewart. “It takes a lot of motivation on the part of the patient. But in a supervised program, under a trained specialist, they are more likely to do the work and do it to a level that produces benefits.”

Supervised exercise rehab sessions are usually one hour several times a week for up to six months. “A patient can expect to see significant improvement in two to three months,” says Stewart. “Maximum benefits are usually attained within six months. After that there’s a plateau and that’s where maintenance begins.”

A person can choose to continue walking on his or her own to maintain benefits—or they can continue to do the exercise in a supervised environment. Either way, the important thing is to keep it up, says Stewart. “If you stop doing it, the benefits are lost,” he says. “Fortunately, by the maintenance phase you are usually feeling a lot better and are able to do a lot more. At that point, you can see the value of exercise in your life.”

### An alternative to surgery

After discussion of treatment options with a doctor, most people with mild to moderate forms of PAD should consider an exercise program. Not only can an exercise program make you feel better but there is some evidence that it may do a better job than surgical intervention at improving claudication over the long run. However, invasive interventions are usually the recommended treatment when the disease becomes more severe.

“Small studies have shown that exercise rehab is the most effective therapy available for reducing the symptoms of claudication—it’s a first-line treatment in the vast majority of people who have PAD,” says Stewart. “A current large-scale study, which will be available within the next few years, will give a final answer on this.”

While stents and surgery can create instant relief from claudication, they can also fail to treat it as time goes by. “Surgery and stents treat a small segment of a blocked artery whereas exercise treats the whole body and the risk factors that led to the disease in the first place,” continues Stewart. “And the beauty of exercise is that it has virtually no complications.”

The evidence in favor of exercise is so strong that all major cardiovascular organizations endorse it as the initial treatment for claudication in patients with mild to moderate PAD who are physically able to walk.

### Choosing exercise rehab

While supervised exercise rehab is a highly desirable treatment option for people with claudication, there are some obstacles. A primary one, unfortunately, is that Medicare does not pay for the programs.

“That’s been one of the challenges,” says Stewart. “Even though this is a recognized, valuable treatment for claudication, it’s therapy that’s conducted by nurses and physiologists, and for that reason Medicare won’t reimburse it. That’s why such a valuable therapy as exercise rehab is so underutilized. Despite being a superior treatment, Medicare rules do not allow payment to nurses or physiologists. Some private insurance companies will cover the service, however, so it is important to check with your insurer if you have a private policy.”

So if you choose supervised exercise rehab, you should know that you may have to pay on your own. And to achieve maximal benefit, it will require a lot of motivation and commitment to the program. However, it will also be the most positive, effective thing you can do for your claudication. In the long run, it may prove to be a better option than surgery. The choice is yours. ■

## Find a supervised exercise rehab clinic in your area

To find a program in your area, call your local hospital. or log on to the rehabilitation program director of the American Association of Cardiovascular and Pulmonary Rehabilitation: <http://www.aacvpr.org/Resources/SearchableCertifiedProgramDirectory/tabid/113/Default.aspx> or call (888) 833-4463.



# A work in progress

It takes a variety of drugs to help patients live with PAD, and there's always room for improvement.

By Wes Isley



**M**edications prescribed to treat atherosclerosis, or peripheral arterial disease (PAD) in particular, tackle a host of contributing conditions, such as high cholesterol and smoking, as well as ailments that can make PAD worse, like high blood pressure and diabetes. These drugs treat the risk factors that accompany PAD, such as an increased risk for heart attack or stroke, and symptoms such as leg pain.

Health care providers start with the underlying disease process—hardening of the arteries. “Our first goal is to reduce the patient’s risk for having a heart attack or a stroke and dying,” says William R. Hiatt, MD, a professor of medicine in the division of cardiology at the University of Colorado School of Medicine in Denver. “We do that through smoking cessation, controlling blood pressure and controlling cholesterol.”

In addition, physicians routinely prescribe antiplatelet medications to prevent clots in arteries that lead to heart attacks and strokes.

But just because a drug prevents blood clots, as aspirin does, doesn’t mean it will be effective in treating PAD, explains Dr. Hiatt. “We know an aspirin a day helps patients with heart disease, but in people with PAD, the evidence for that is not as strong,” he says, citing a study that compared aspirin and clopidogrel (Plavix) in patients with severe PAD. The results showed clopidogrel was more effective than aspirin alone and more effective by itself than combining the two drugs. However, it is critical that your physician does prescribe an antiplatelet drug if you have peripheral arterial disease.

## More options needed

Health care providers’ second goal is to relieve and/or manage PAD symptoms, the most common being leg pain or fatigue, also known as claudication. Although cilostazol (Pletal) is currently the only drug approved to treat claudication, Dr. Hiatt says that the science shows it works. “The evidence is pretty strong ... that it improves patients’ exercise performance on a treadmill and improves their quality of life.”



## Medications for PAD treatment

Drugs prescribed to treat peripheral arterial disease (PAD) target contributing conditions and symptoms, and work in a variety of ways to prevent further progression of the disease.

**Diabetes:** Based on the kind of diabetes you have, drugs may include insulin or various medications to maintain healthy blood sugar levels.

**High blood pressure:** Different classes of medications can treat this condition and they work in different ways, depending on the underlying cause. These include ACE inhibitors, alpha-blockers, beta-blockers, calcium channel blockers, diuretics, nervous system inhibitors, vasodilators, among others.

**High cholesterol:** Statins, including simvastatin (Zocor), atorvastatin (Lipitor) and rosuvastatin (Crestor).

**Increased risk for heart attack or stroke:** Antiplatelet drugs such as aspirin, clopidogrel (Plavix) and others.

**Leg pain (claudication):** Cilostazol (Pletal).

**Smoking:** Over-the-counter nicotine replacement therapies (gum, inhalers, lozenges, patches) or prescriptions such as bupropion (Zyban) and varenicline (Chantix).

While health care providers are limited in what they can prescribe to treat claudication, the drug options for patients suffering from critical limb ischemia (CLI), the most severe form of PAD, are nonexistent. CLI may result in the amputation of the feet or legs—and there isn't a single drug available to slow or reverse tissue damage.

"Absolutely, this is a big area of unmet need," says Dr. Hiatt. "There has been some research in Europe on prostaglandins [substances found in most of the body's tissues and organs], and they have been associated with the relief of pain in the limb and the healing of ulcers, but they haven't shown any association with prevention of limb loss or in preventing amputation."

### The future of PAD treatment

To help patients at risk for CLI, researchers are conducting clinical trials to explore the promise of gene therapies and stem cell therapies. Dr. Hiatt serves as president of CPC Clinical Research, a nonprofit aca-

demical research organization that is part of the University of Colorado.

He says gene therapy trials are not seeing much success yet in developing medications to treat CLI. Dr. Hiatt participated in one such trial earlier this year, and the results of the gene therapy studied didn't show any evidence of reducing amputation or death in patients with CLI.

Dr. Hiatt sees a much better outcome for clinical trials of CLI therapies developed from stem cells. "We've had some promising results with stem cells. However, the studies are still in their early stages, so it will be a few years before we have anything significant to report." ■



# Stick to the program

Exercising and taking your medications are key in the treatment of PAD

By Erica Stacy

It raises the risk of heart attack and stroke. It limits blood flow to the limbs—especially the legs. It affects African Americans nearly twice as often as Caucasians.

What is it?

Peripheral arterial disease (PAD).

It is a common disease that develops when extra cholesterol and other fats in blood build up in the walls of the arteries that provide blood flow to the arms and legs. Over time, this buildup, called plaque, narrows the arteries, slowing or even blocking the flow of the blood.

## Treatment based on severity of symptoms

Typically, PAD is diagnosed in the legs, but it can be present in the arteries of the arm. Individuals with PAD may complain of fatigue, cramping, pain in the legs or feet that may interrupt sleep, sores or wounds that will not heal, color changes in the skin of the legs or feet, poor nail growth or decreased hair growth on toes and legs.

However, some people with PAD do not have any symptoms at all. More often, they overlook warning signs believing they are simply a natural part of aging or are related to other health problems.



Quitting smoking, making healthy food choices and adding moderate exercise will help patients feel better and enable them to continue to lead independent, active lives.

“Patients with PAD are at risk of two major medical problems. First, because of limited blood flow to the legs, they can get discomfort in the leg muscles when they walk and can develop sores or ulcers that might require amputation. Second, they can also get blockages in the blood vessels to the heart (which can lead to a heart attack) and those supplying blood to the brain (which can cause a stroke),” explains Dr. Reena Pande, associate physician Brigham and Women’s Hospital.

“As physicians, we have to focus on both of these issues. The standard of care for treating the symptoms in the legs really depends on how severe the symptoms are. We will often recommend an exercise program and may recommend a medication that can improve walking. If necessary, for individuals with life-limiting symptoms, a procedure to restore blood flow to the legs might be recommended. To address the high risk of heart attack and stroke, physicians may also recommend medications and lifestyle changes to make sure that patients are no longer smoking, and that their blood pressure, cholesterol and diabetes are all under excellent control.”

Quitting smoking, making healthy food choices and adding moderate exercise will help patients feel better and enable them to continue to lead independent, active lives.

#### **Make an appointment with yourself**

For some people, making lifestyle changes can be difficult. “Compliance with lifestyle changes is challenging, and the strategies for achieving success are different for every patient I meet,” says Dr. Pande. “To encourage exercise, I urge patients to make an appointment for themselves. Book a time, put in on the calendar, and don’t miss your appointment—just as you wouldn’t miss an appointment with your doctor. Start slow and work your way up. Ten minutes is better than zero minutes, and everyone

can find 10 minutes in their day to get off the sofa and move.”

Sometimes, physicians prescribe medications to manage the symptoms of PAD and to address some of the underlying causes. These may include medications to lower cholesterol and blood pressure, control leg pain or manage diabetes. Patients with PAD are also often prescribed blood-thinning medications such as aspirin.

Dr. Pande encourages patients to carefully follow medication instructions. “I try my best to make medication regimens easier for patients, such as prescribing medications that only need to be taken once or at most two times a day. I suggest patients find way to remind themselves about taking medications, like using a pillbox, or keeping medications next to your toothbrush or the coffee maker so you don’t forget to take them. We have to find whatever works best for each individual patient.”

#### **Make the changes and stay healthy**

Getting serious about good health means tackling the tough challenges like quitting smoking, losing weight and remembering to schedule regular physicals and follow through on physician recommendations. Diseases like PAD can be controlled or prevented, but it takes time and effort.

If you smoke, quit now. If you have diabetes, get it treated now. If you are overweight, get healthy through diet and exercise and lose weight now. And if you have high blood pressure or high cholesterol, get these treated now. Prevention is hard, but it works. If you are concerned or want to learn more, talk to your doctor now.

Get serious about your health today. Tomorrow may be too late. ■

**Q. How common is it for a stent to close up? If it starts to close up, can it be cleaned out or do they have to put in another stent, and how would they get rid of the old one?**

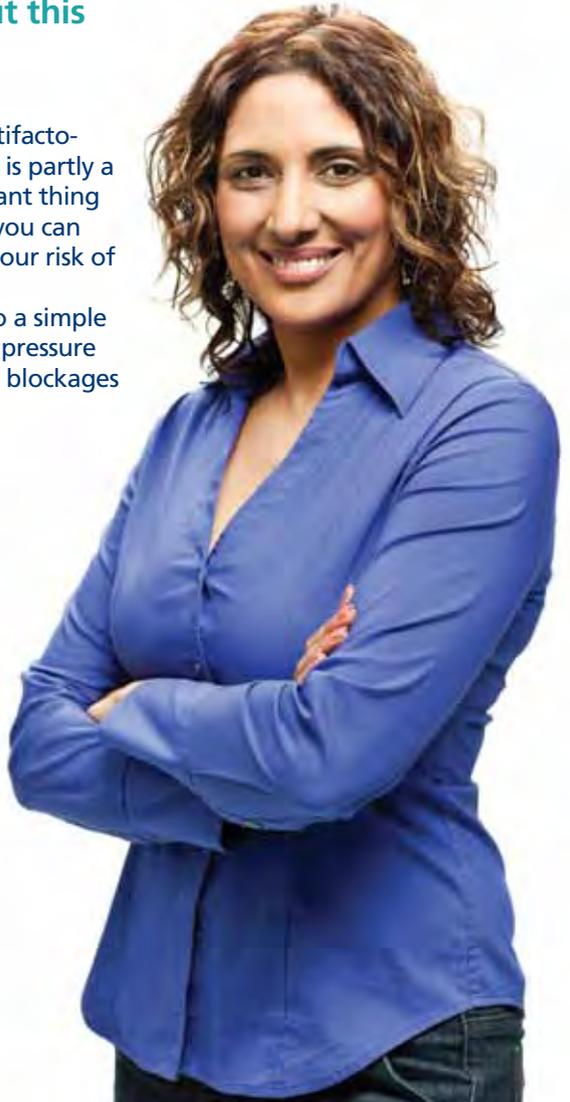
**A.** Stents are commonly used for treating peripheral arterial disease, or PAD. They are great for getting vessels open but don't last forever. In short, stents in the larger vessels tend to last a very long time while stents in smaller vessels tend not to last so long. If your stent is in your pelvis in the iliac artery it is very likely to stay open for many years. If it is in the thigh in the femoral artery, then about 80 percent are open at one year.

When they do start to close down, there are many tools to get them open again. If someone has a stent that becomes severely narrowed, we usually start with balloon angioplasty. If that doesn't work or if we don't think that is going to work, we have sometimes tried laser therapy, or a device that scrapes the lining of a vessel called atherectomy, or sometimes place another stent. It just depends on what your doctor sees on your arterial studies. Sometimes the best solution to a narrowed stent is a bypass operation.

**Q. What causes PAD? I've read that smoking and high blood pressure cause it, is that true? I'm 63 and in OK shape (don't exercise much) and am worried about this pain I have in my legs. What should I do?**

**A.** Atherosclerosis is the underlying disease. Atherosclerosis is multifactorial: It's partly due to diet and other risk factors (like smoking) but also is partly a normal part of aging and tends to run in families. In short, the important thing to know is keep track of the risk factors for PAD—they are the things you can do something about! Control your risk factors and you will minimize your risk of atherosclerosis and PAD.

You should also get tested for PAD. Your health care provider can do a simple test called an ankle brachial index, or ABI. It is a measure of the blood pressure in your legs. If the blood pressure in the legs is too low, it is a sign that blockages are developing and further testing is indicated.



# frequently asked questions

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