PERIPHERAL ARTERY DISEASE: PATIENT GUIDE



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PAD: OVERVIEW

When you think of blocked arteries, it's likely that the heart comes to mind. But, while these arteries are vitally important, the heart only represents one portion of the body where arterial hardening and blockages may occur. In patients with peripheral artery disease (PAD), hardening of arteries occurs outside of the heart, most commonly in the legs. And, just as clogged arteries in the heart raise the risk of suffering a cardiovascular event, so does PAD.

Peripheral artery disease (PAD) is a hardening of the arteries due to build-up or blockage in any area of the body other than the heart. The disease most commonly affects the legs, but it can also occur in the kidneys, neck or arms. These blockages keep extremities and organs from receiving oxygen-rich blood. PAD is a common and treatable disease, but it is often misdiagnosed as its main symptom of leg cramps is regarded by many as an inevitable consequence of aging. Ultimately, PAD can reduce mobility and be fatal if left untreated.

Many people lose limbs each year due to peripheral arterial blockage. Among those living with limb loss, the main cause is vascular disease (54%) – including diabetes and peripheral artery disease.¹ At Cardiovascular Institute of the South, we believe that early diagnosis and treatment can prevent disability and save limbs and lives. Through the development of non-surgical treatments and the advancements of leading edge technology, patients can be assured that each case is thoroughly reviewed, and all available treatment options are considered.

WHAT CAUSES PAD?

PAD is most commonly the result of atherosclerosis, a condition in which plaque builds within the arteries. Over time, this plaque hardens and reduces the flow of oxygen-rich blood. If PAD is left untreated, complications can include heart attack, stroke, or loss of limbs due to infection or injury.

While the exact cause of atherosclerosis is not known, certain conditions that damage the inner layers of arteries may be contributors or risk factors of PAD.

WHAT ARE THE RISK FACTORS OF PAD?

CIS estimates that 17-20 million Americans have PAD and this number is growing. The prevalence of PAD increases with age. According to the US Department of Health and Human Services, one in every 20 Americans over the age of 50 has PAD.¹¹ Many who suffer from the disease are never diagnosed or treated because the symptoms of PAD are often mistaken for general signs of aging.

While some hardening of the arteries and plaque build-up is normal as you grow older, certain risk factors, including behaviors, conditions, or habits, can lead to developing PAD sooner. The more risk factors you have, the higher your chances of developing PAD.ⁱⁱⁱ

SMOKERS

Those who smoke or have a history of smoking have up to four times greater risk of PAD. Exposure to tobacco raises the risk of atherosclerosis by constricting arteries and promoting inflammation. In a study conducted by Harvard University, researchers reported that smokers whose lifetime exposure to cigarettes was 10 to 29 pack-years were six times more likely to develop PAD (compared to non-smokers). Additionally, those with a lifetime exposure of thirty or more pack-years had eleven times the risk. (A pack-year is a measure of tobacco exposure: one pack of cigarettes a day for ten years, two packs a day for five years, and half a pack a day for 20 years each adds up to ten pack-years.)

DIABETES

An estimated one out of every three people with diabetes over the age of 50 has PAD. Nearly 20% of symptomatic patients with PAD have diabetes, but this percentage likely underestimates the prevalence, given that many more people with PAD are asymptomatic rather than symptomatic.

HIGH BLOOD PRESSURE

High blood pressure increases your risk of having PAD. Over time, high blood pressure damages the wall of the arteries. As a result, the arteries become thick, hard, and narrow inside making it harder for the blood to flow.

HIGH CHOLESTEROL

Cholesterol is a fatty substance that builds up in your bloodstream. Having high cholesterol (or a high LDL level) leads to a plaque buildup in your arteries. When you have too much plaque, your arteries can become narrowed and blood flow to your heart, brain, or limbs becomes limited.

FAMILY HISTORY OF HEART OR VASCULAR DISEASE

A study published in the Journal of the American College of Cardiology recently followed over 2,400 men and women in the United States for four years to measure the relationship between family history and prevalence of PAD through the use of questionnaires and physical examinations.^{iv} The study revealed that adults with a family history of peripheral artery disease were 83% more likely to develop this condition, while those with a family history of severe peripheral artery disease were 2.42 times as probable to develop this condition than those without any family history of the disease.



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WHAT ARE THE COMMON SYMPTOMS OF PAD?

Data from the Centers for Disease Control (CDC) suggests that 2/3 people with PAD have no symptoms, while 1/4 have severe PAD.^v PAD can be difficult to diagnose, as many patients have no symptoms or symptoms so mild that they give them little consideration.

To the right are some of the most common symptoms of PAD:

PAINFUL CRAMPING IN LEGS DURING EXERCISE

A muscle cramp is a sudden and involuntary contraction of one or more muscles in the body. While muscle cramps are generally harmless, they could be a symptom of peripheral artery disease.

Narrowing of the arteries that deliver blood to your legs can produce cramp-like pain in your legs and feet while exercising. Because the most frequently affected artery in intermittent claudication is the popliteal artery, symptoms are most common in the calf muscles. This pain or discomfort goes away once the activity is stopped and during rest. Many people do not report this problem to their health care providers because they think it is a natural part of aging or due to some other cause.

LEG NUMBNESS

Peripheral artery disease can cause uncomfortable numbness in the legs. The restricted blood flow brought on by PAD can harm your body in a variety of ways, including damaging your nerves, which transmit messages between your brain and the rest of your body.

COLDNESS IN YOUR LOWER LEG OR FOOT

On a wintry day, one can experience cold or numb feet regularly. This is completely normal and should not be taken seriously. On the other hand, there are times when cold, pale, or bluish feet have nothing to do with the temperature outside and everything to do with poor blood circulation. When your blood is flowing at the optimal speed, it helps to keep your body temperature at a healthy and comfortable level. If your circulation is poor, the temperature levels in the body are less stable. Weak blood circulation causes chilly feelings, usually in areas with a lot of nerve endings like the hands and feet.

SORES ON TOES, FEET OR LEGS

Blood flow is critical for healing. Since PAD causes poor blood circulation to the lower legs and feet, simple foot deformities or conditions do not heal and become more significant concerns. Seemingly small problems, such as cuts, blisters or sores, can result in serious complications. When the blockage is quite severe, or the sores and infections on the feet are untreated, the foot tissue may die due to gangrene. Gangrene is a very serious condition where loss of blood supply leads to tissue death, which can lead to amputation. People with diabetes are especially at risk.

HAIR LOSS OR SLOWER HAIR GROWTH ON YOUR FEET AND LEGS

As we age, hair loss is often a normal and expected part of life. Hormonal changes and genetic influences also lead to hair loss. However, when hair loss is specific to a certain part of the body, like the legs, it is likely due to poor blood circulation. Hair loss occurs because the impaired blood supply is not able to provide optimal nutrients for hair growth.

SLOWER GROWTH OF TOENAILS

When arteries become partly or completely blocked with plaque, the flow of blood is restricted, which interferes with the delivery of oxygen and nutrients that your muscles and organs need to work properly. As the delivery of the nutrient-filled blood to the lower extremities decreases, toenails become delicate and brittle and are slow to grow.

NO PULSE OR A WEAK PULSE IN YOUR LEGS OR FEET

The answers to peripheral artery disease can be found in your feet. A trained physician should detect two pulses in each foot. A test can be performed to determine whether the blood flow to your feet is normal.

HOW IS PAD DIAGNOSED?

The most accurate and least-expensive test to assess for lower extremity PAD is called an ABI (ankle brachial index). The test will evaluate your pulses and blood pressure to determine if narrowing or blockage of an artery is present. This test compares the blood pressure in the ankle with blood pressure in the arm. Normally, the pressure in the ankle is higher than the arm. People with PAD have the opposite situation as the pressure in their ankle is lower than the arm.

The ABI measurements are done with a Doppler probe. It is held over the ankle to listen to the blood flowing through the artery. Gel is placed on the skin over the artery. Then the Doppler probe is placed on the gel to help the healthcare professional hear the blood flow and measure the pressure. This is painless and takes only about 10 minutes.

This test, along with your symptoms, will allow the physician to determine whether or not you have PAD and the severity of the disease. With this information, a cardiologist can determine the best course of treatment for you.



HOW IS PAD TREATED?

For many, PAD is a silent disease causing no recognizable symptoms which is why only 20-30% of PAD patients are actively being treated.^{vi} The proper treatment of PAD can help slow the progression of symptoms and prevent the development or worsening of coronary artery disease. How PAD is treated depends on the severity of the disease.

Lifestyle changes, especially smoking cessation and exercise, are critical for every patient with PAD. If lifestyle changes are not enough, medication is often required to improve function and protect the heart. Depending on the severity of the PAD, minimally invasive procedures or by-pass surgery may be needed to improve blood circulation.

Here are the main treatments for Peripheral Artery Disease:

QUIT SMOKING

If you're a smoker, quit. Smoking raises your risk for PAD and other coronary diseases. Each day that you don't smoke decreases your risk for developing PAD. And if you have already quit, keep up the good work! Not only have you reduced your risk for PAD, but you have decreased your risk for other serious conditions such as heart disease, cancer and lung disease.

If you have trouble quitting smoking on your own, consider joining a support group. Many hospitals, workplaces, and community groups offer smoking-cessation programs to assist with quitting. CIS offers a comprehensive smoking cessation program called Commit to Quit which provides physician visits, medications (both over the counter and prescription) and individual and group counseling to aid patients in quitting. You can do it and we can help! **Visit www.cardio.com/treatment/smoking-cessation/**

MEDICATION

Medication is prescribed to PAD patients to slow the progress of the disease or to ease some symptoms. Some medications may be used to help control cholesterol, blood sugar, or blood pressure, while others may help prevent clots from forming within narrowed blood vessels. If medication alone does not clear the blocked arteries, additional treatment is necessary.

EXERCISE

Regular exercise may be the best medicine for PAD patients. Your doctor may recommend a program of supervised exercise training for you, also known as cardiac rehabilitation. You may have to begin slowly, but simple walking regimens, leg exercises and treadmill exercise programs can ease symptoms.^{vii}

HEALTHY DIET

PAD patients should take a smart and healthy approach with their diet. Heart-healthy eating involves consuming vegetables, fruits, whole grains, fat-free or low-fat dairy products, fish, lean meats, poultry, eggs, nuts, seeds, soy products, legumes, and vegetable oils. By eliminating foods with high saturated and trans-fat, you can help lower blood cholesterol levels and reduce inflammation in the blood vessel walls.

SPECIAL PROCEDURES

Sometimes, lifestyle changes and medication are not enough to manage the symptoms of PAD, and minimally-invasive treatments or by-pass surgery is required. A number of surgical treatment options are available for PAD patients. The most common interventions are listed below for reference.

BALLOON ANGIOPLASTY

A balloon angioplasty is a non-surgical procedure done in the catheterization laboratory. A skilled and certified physician injects a special dye through a small, thin tube called a catheter into the patient's bloodstream. The dye allows the doctor to view the arteries on an X-ray monitor. A device with a small balloon on its tip is then inserted through an artery in the leg and threaded through the arteries and is inflated once it reaches the narrowed area.

STENTING

Implanting a stent does not require open surgery. The doctor inserts a catheter into an artery in the leg, similar to the balloon angiography procedure. A stent (a small mesh support tube) is placed at the site of blockage during angioplasty and left permanently to provide a reinforced channel for blood flow.

ATHERECTOMY

Atherectomy is a procedure performed to remove the atherosclerotic plaque from diseased arteries. A specially-equipped catheter and atherectomy device (equipped with a rotating blade) are used to remove plaque from the lining of the artery.

BYPASS

If there's a long portion of artery in your leg that's completely blocked and you're having severe symptoms, bypass surgery may be necessary to reroute blood around the closed artery.

A healthcare professional will discuss the appropriate options and help choose the right procedure for your situation.



AMPUTATIONS

Approximately 185,000 Americans undergo amputation annually. There are an estimated 2 million Americans living with an amputation.^{viii} PAD is an epidemic of uncontrolled proportions, and the only way to restrain these alarming rates is by changing the behavior of both patients and physicians.

85% of amputations are preventable.

DEATH RATE - Nearly half of the individuals who have an amputation due to vascular disease will die within five years. This is higher than the five-year mortality rates for breast cancer, colon cancer, and prostate cancer.^{ix} Alternative interventional methods should be a priority for both the patient and the physician.

MORBIDITY - The morbidity of patients who have amputations is significant. With lower extremity amputations, patients cannot walk, experience phantom limb pain, and are far more susceptible to infections.

OUTLOOK & AWARENESS

PAD is one of the most common cardiovascular diseases, but the public awareness levels for the disease are extremely low. A telephone survey of over 2500 adults age 50 and older revealed that only 26% of those surveyed were familiar with PAD. Merely 14% of survey participants were aware that PAD could lead to amputation.^x

Early diagnosis and clinically appropriate intervention of PAD are critically important for patients. If undiagnosed and untreated, PAD patients may face limb loss as a result of their disease.

Over the last few years, there has been a revolution in endovascular therapy. We are now able to treat calcified and smaller vessels, which leads to significantly improved blood flow in limbs that once weren't considered salvageable. This fact magnifies the importance of awareness and early detection for PAD, because it can save lives.

ENDOVASCULAR THERAPY

The ultimate goal of PAD treatment is to keep arteries open and avoid potential complications such as tissue loss. However, a secondary goal is to accomplish this treatment using the most minimally invasive methods possible for both the comfort and safety of the patient. After exhausting options such as medication, exercise, and lifestyle changes, endovascular therapy will typically be the next recommended course of action.

Endovascular therapies are performed within the arteries affected by PAD through the use of a long, thin tube called a catheter. These minimally invasive procedures are performed by placing a small incision in the groin and carefully guiding the catheter to the area of blockage. From here, a physician may place a stent, perform a balloon angioplasty, or use an atherectomy device to open the blocked artery or clear away plaque.

Because these treatments are performed via catheterization, patients can count on less downtime and a far simpler recovery than more invasive procedures require. They are also often a sound and effective option for those who have been deemed too high risk for an open procedure.

HEALTHCARE INDUSTRY VETERAN SEEKS TREATMENT AT LOUISIANA CLINIC

Fred's Story



76-year-old Fred Goad of Brentwood, Tennessee did not mind driving 10 hours to see Dr. Craig Walker—because that trip saved his leg and ultimately, his quality of life.

Goad has more than 40 years of experience in managing and growing healthcare companies. In April of 2016, he noticed a wound on his left foot, and was diagnosed with peripheral arterial disease (PAD). But after trying a myriad of treatments, nothing worked to heal the wound. He began preparing for what he felt was an inevitable amputation. Surprisingly, he did not suffer from heart disease or diabetes.

Goad traveled to Houma, Louisiana to visit Dr. Craig Walker, founder, president and medical director of Cardiovascular Institute of the South (CIS). After a series of tests, Dr. Walker explained his plan to open the 18-inch occlusion—a series of three stents in two of the arteries. "After one conversation with Dr. Walker, I could tell that he knew the subject of PAD so well, and he was so passionate about treating it," said Goad. "He was different than any other physician I had seen before."

Goad's recovery was quick and he immediately noticed a difference. "It is amazing that Dr. Walker was able to get through and prevent the amputation of my leg and foot. He is a superior doctor, and I am most grateful."

Many people lose limbs each year due to peripheral arterial blockage, but CIS believes that early diagnosis and interventional treatment can prevent disability and save limbs and lives. "You owe it to yourself and to your family to go see Dr. Walker before you make the decision to amputate," said Goad. "I'm just excited about living a normal life."

PREVENT PAD BY KNOWING THE SIGNS

Frank's Story

"I was totally debilitated— I couldn't carry my grandkids, fish, work on my farm, or walk without being in extreme pain," said Frank Lagarde, Jr, age 62 and an attorney in Metairie, of the pain he felt in his legs.

Prior to his first surgical procedure, Lagarde's leg was a grayish-yellow color from the knee down, showing no signs of circulation. Due to the large blockage, Lagarde chose to receive an artificial graft to create a bypass channel for blood flow around the blocked vessel. This procedure put blood flow and color back into Lagarde's leg and foot, but he had contracted a serious staff infection and remained in the hospital for about seven months. Shortly before his daughter's wedding, the decision was made to remove the artificial graft, which was the source of the infection. The cardiovascular surgeon informed Lagarde's family that, without the graft, there was a very high probability that the leg would have to be amputated.

Lagarde had surgery to remove the infected graft. Afterwards, to the complete surprise of the surgical staff, Frank's leg was warm and pink instead of cold and yellow! "I promised my daughter I would be out of the hospital in time to walk her down the aisle," he said. But what his daughter didn't know was that he was meeting with a physical therapist that week in hopes that he could walk her down the aisle without a wheelchair or walker.

"The marriage coordinator panicked when I told her I wanted to walk," he laughed. "My daughter didn't notice I was walking by myself until I had walked about 15 feet. She started crying, and we all were crying."



After a year, Lagarde realized that his leg was not improving and he knew that he needed to do something more to treat his leg. "I was still getting painful cramps, and the pains felt like a knife in the ball of my foot," he said. "The pain got especially bad during the night or when driving—whenever I was at rest." After receiving recommendations, Lagarde made the decision to travel to Cardiovascular Institute of the South in Houma to see Dr. Craig Walker.

At his first visit, a painless, ultrasound test was performed to determine the amount of blood flow in his leg—which was about 5-10 percent at the time. Dr. Walker treated him using a combination of laser treatment, plaque-busting medication, and stents—allowing for 95 percent blood flow. "My leg has its color back, and the pain is almost gone completely," explained Lagarde.

When asked about his experience with peripheral arterial disease, Lagarde said he is thankful to CIS and to Dr. Walker. He recommends that if you suspect you may have PAD, you should ask your primary care physician or cardiologist about your risk. "All of these symptoms start very gradually, and you may attribute them to something else," explained Lagarde. "But they are all classic symptoms of PAD." Lagarde also notes that he was not a smoker or a diabetic.

He added, "It's so easy to have an ultrasound on your leg to see where the blockages are—the test is painless! If I had not done it, I would have lost my leg! I never dreamed that my pain was due to a circulation problem."



PAD DOES NOT DISCRIMINATE

Angela's Story

PAD can affect any gender and any age—just ask 28-year-old Angela Mullins. Mullins, from Ocean Springs, Mississippi, is one of nearly 12 million Americans who suffer from peripheral arterial disease.

Mullins first noticed signs of PAD as a teenager while on vacation with her family. She experienced trouble walking, and the pain continued after the trip. Doctors treated her for tendinitis and inflammation, but her condition did not improve. One night after wearing high heels, her feet developed ulcers that would not heal, and after several more doctors and treatments. her condition still worsened. At age 21, Mullins was finally diagnosed with PAD and was told she had blockages behind both of her knees. She underwent bypass surgery on both legs which gave her some relief but did not eliminate the pain. "The pain was so unbearable, I could only sleep 30 minutes at a time before the pain woke me up," explained Mullins. "I couldn't work or spend time at my son's school activities." Mullins learned that both of her legs were blocked and her left leg had no blood flow. She went through another round appointments and treatments, but nothing seemed to help. "I was told that the only way to save my life was to amputate both of my legs," she said. "My family and I could not believe that amputation was the only answer, so in an effort to save my legs, I visited many doctors until I was referred to Cardiovascular Institute of the South in south Louisiana."

Dr. Craig Walker, founder, president and medical director at Cardiovascular Institute of the South (CIS), performed a series of three laser treatments on her legs. Afterwards, Mullins' symptoms quickly ceased and she began walking two miles a day. She now can get around easily and does not experience any pain.

"I have gone back to work and can once again spend time with my son at school," said Angela. "I can even do things that I could not do right after my bypass surgery. I feel like I have my life back!"

CARDIOVASCULAR INSTITUTE OF THE SOUTH

Cardiovascular Institute of the South (CIS) was founded in 1983 by Dr. Craig Walker, who first established the company as a one-physician practice in Houma, Louisiana. At that time, the city was experiencing one of the highest cardiovascular disease mortality rates in the nation. Driven by a desire to serve and heal people in his community, Dr. Walker envisioned CIS as a leader in the development of new techniques and technologies in the treatment of both coronary and peripheral artery diseases.

Expanding upon Dr. Walker's vision, CIS has grown to become a world-renowned practice. This commitment to growth and excellence has earned CIS recognition as a leader in research development and state-of-the-art cardiovascular care, as well as garnered international acclaim for its significant contributions to the advancement of non-surgical treatments for cardiovascular disease.

Today, CIS continues to grow and expand to multiple locations, striving to make the most advanced cardiovascular care accessible to a wide spectrum of communities across Louisiana and Mississippi. We believe in our unwavering dedication to the CIS mission of providing our patients the highest quality cardiovascular care available.



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REFERENCES

i Ziegler-Graham K, MacKenzie EJ, Ephraim PL, Travison TG, Brookmeyer R. Estimating the Prevalence of Limb Loss in the United States: 2005 to 2050. Archives of Physical Medicine and Rehabilitation2008;89(3):422-9.

ii NIH Publication No. 06-5837, August 2006.

iii Medtronic. Understanding Peripheral Arterial Disease and the Drug-Coated Balloon Procedure: A Patient's Guide.

iv Journal of the American College of Cardiology, Family History of Peripheral Artery Disease Is Associated With Prevalence and Severity of Peripheral Artery Disease, September 20, 2011 | Vol. 58 No. 13.

v Centers for Disease Control and Prevention (CDC). Lower extremity disease among persons aged > or = 40 years with and without diabetes: United States, 1999-2002. MMWR Morb Mortal Wkly Rep. 2005;54:1158-1160.

vi Bhatt DL, Steg PG, Ohman EM, Hirsch AT, Ikeda Y, Mas JL, Goto S, Liau CS, Richard AJ, Röther J, Wilson PW; REACH Registry Investigators. International prevalence, recognition, and treatment of cardiovascular risk factors in outpatients with atherothrombosis. JAMA. 2006 Jan 11;295(2):180-9.

vii American Heart Association. www.heart.org

viii Endovascular Today. Intervention vs Amputation: Striving for success in CLI cases previously deemed impossible, August 2011.

ix Robbins JM, Strauss G, Aron D, Long J, Kuba J, Kaplan Y. Mortality Rates and Diabetic Foot Ulcers. Journal of the American Podiatric Medical Association2008 November 1, 2008;98(6):489-93.

x Hirsch AT, Murphy TP, Lovell MB, Twillman G, Treat-Jacobson D, Harwood EM, Mohler ER 3rd, Creager MA, Hobson RW 2nd, Robertson RM, Howard WJ, Schroeder P, Criqui MH; Peripheral Arterial Disease Coalition. Gaps in public knowledge of peripheral arterial disease: the first national PAD public awareness survey. Circulation. 2007;116:2086-2094.

