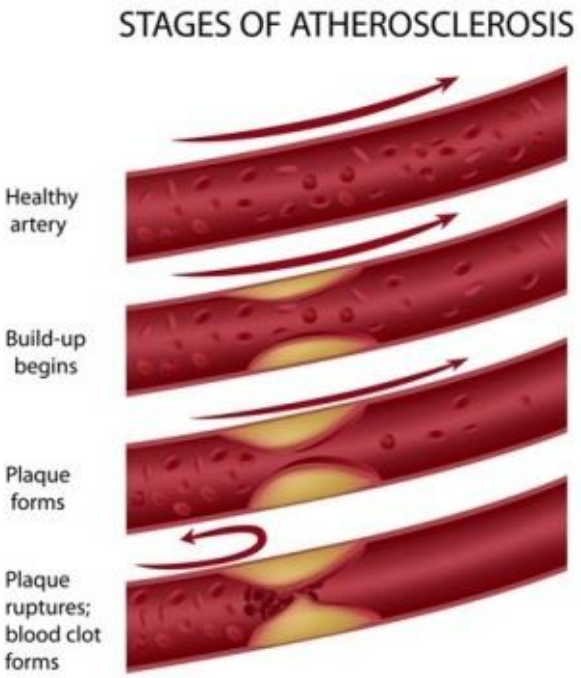
Lower Extremity Disease

The inner lining of arterial blood vessels is normally smooth, allowing blood to flow easily. In lower extremity arterial disease, the lining becomes damaged, leading to a buildup of cholesterol causing the arterial wall's inner lining to become rough and thickened. This accumulation is called atherosclerosis, or "hardening of the arteries." As the atherosclerotic process of the lower extremity arteries increases, the arteries become narrowed or blocked, causing blood flow to decrease. This can lead to discomfort, cramps, or pain in the hips, thighs or calves with walking.
This is called claudication.



Claudication typically occurs during physical activity such as walking and is promptly relieved by a brief resting period (2-5 minutes). Claudication pain always involves the same muscle groups, usually the calves, and does not change from day to day. The vascular surgeon relates the onset of claudication pain to a particular walking distance in terms of street blocks (e.g. "2-block claudication") or distance traveled before the symptom occurs. This helps to provide a standard of measuring if there has been any change before and after therapy has been initiated.

As atherosclerosis progresses and blockage becomes more severe, pain may occur in the feet even when at rest. This pain, known as rest pain, occurs because the arteries of the leg can no longer deliver adequate blood flow to the feet, even at rest. Rest pain generally worsens when the legs are elevated, such as when lying in bed at night. Relief from this pain may occur only when the feet are dangled. Gangrene or "death of tissue" may occur when nutrition needed for normal growth and repair can no longer be provided because of extensive arterial narrowing (stenosis) or complete blockage (occlusion) of lower extremity arteries.

RISK FACTORS

Smoking
High blood pressure (hypertension)
High levels of blood cholesterol or triglycerides (hypercholesterolemia, hyperlipidemia)
Obesity
Diabetes
Family history of heart disease or arterial disease

SIGNS AND SYMPTOMS

Decreased hair growth on the legs and feet
Discoloration of the affected leg or foot when dangling (from pale to bluish-red)
Diminished or absent pulses in the affected leg or foot
Temperature difference in affected leg or foot (cooler than other extremity)
Change in sensation (numbness, tingling, cramping, pain)
Presence of non-healing wound on affected lower extremity
Presence of thickened toenails

Development of gangrene

DIAGNOSTIC TESTING

If you suspect you have lower extremity arterial disease or your symptoms are worsening, the vascular surgeon will ask you certain questions, examine you, and order either non-invasive or invasive diagnostic tests.

NON-INVASIVE TESTING: These tests are performed in the clinic setting or in a vascular laboratory, most often on an outpatient basis. They are virtually painless methods of examining the blood flow to the extremities with ultrasound technology.

INVASIVE TESTING: This test is called an arteriogram or angiogram and is the most helpful imaging study used to direct treatment of symptomatic lower extremity arterial disease. Dye is injected directly into the artery and special x-rays are taken to reveal the exact location of the arterial blockage. An angiogram is only necessary when interventional or surgical treatment is being considered.

MEDICAL MANAGEMENT

The treatment of leg pain due to claudication is primarily medical management of the symptoms, with surgery reserved for severe exercise induced pain which negatively impacts an individual's lifestyle. While atherosclerosis cannot be totally cured or prevented, the progression of the disease can be controlled through risk factor modification. This involves changing one's lifestyle to include healthy habits.

SMOKING: Tobacco in any form should be avoided. Continued cigarette smoking is the most consistent adverse risk factor associated with progression of lower extremity arterial disease in patients experiencing claudication.

HIGH BLOOD PRESSURE: Untreated or uncontrolled high blood pressure (hypertension) causes the heart to work harder and creates additional stress on the arteries.

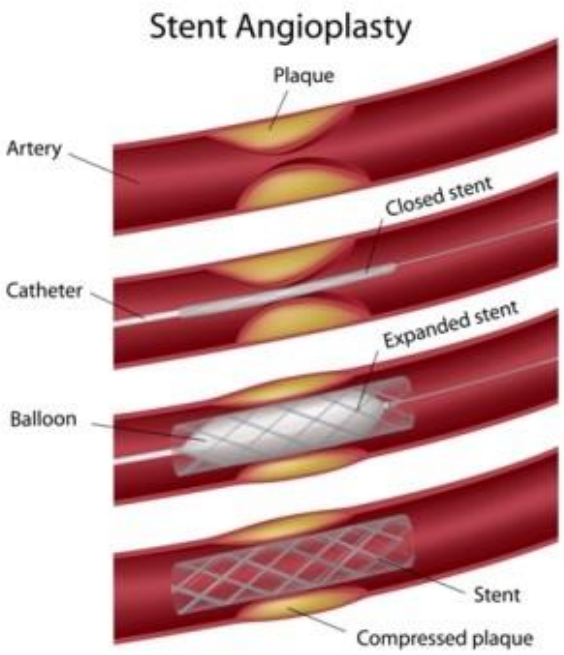
DIET: The risk of atherosclerosis can also be reduced by carefully monitoring cholesterol (found in organ and red meats, dairy products and egg yolk) and saturated fats (found in animal fat and plant oils) in the diet. In addition, a salt-restricted diet will help control high blood pressure and fluid retention associated with weight gain. If you are overweight, a general weight reduction diet is advantageous.

EXERCISE: Exercise plays a vital role in the treatment of atherosclerosis in patients with claudication. Patients with intermittent claudication often voluntarily reduce their daily walking because of pain and the fear of causing further tissue damage. This leads to an increasingly sedentary lifestyle that complicates the picture even more. Increase your walking distance gradually, stopping to rest when the leg pain develops. When it disappears, begin walking again. A regular walking program of 45-60 minutes/day is recommended.
DIABETES: Due to the important role that diabetes mellitus plays in the earlier onset and accelerated rate of atherosclerosis progression, it is crucial to follow the advice of the health care team regarding diet, medications, and treatment. Early treatment and meticulous management is paramount to controlling the effects of diabetes on arteries.

FOOT CARE: When blood flow to the lower extremities is decreased, delayed healing of sores, serious infections, and gangrene (tissue death) of the feet or toes can occur after seemingly minor injuries (e.g. hang-nail, superficial laceration). Care must be given to avoid any situation that might cause injury to the foot. Inspect your feet daily. Immediately report to your physician the detection of any foot injuries or sores.

SURGICAL MANAGEMENT

In cases where diligent medical therapy is not sufficient in resolving the symptoms or the symptoms progress at a very fast rate and have become lifestyle restricting, surgical therapy should be considered.



Once the areas of arterial blockage is determined, three treatments options are possible; angioplasty, stent placement or open surgery.

An angioplasty is when small balloon is used to dilate a narrowed segment of an artery. Typically, the balloon is inserted into the artery and placed exactly at the area of arterial narrowing. The balloon is then inflated; smashing the plaque that was inhibiting the blood flow. This procedure can be performed at the same time as the arteriogram and usually requires less than a 24-hour hospital stay.

A stent is a small mesh tube that's used to treat narrow or weak arteries. It props open an artery and is left there permanently Doctors may place stents in weak arteries to improve blood flow and help prevent the arteries from bursting.

If there is too much blockage in the arteries to treat with balloon angioplasty, an open bypass operation must be undertaken. A bypass operation involves finding a suitable blood vessel above and below the area of blockage and routing blood flow between the two vessels with the aid of a bridge (graft) carry the blood between the two vessels. The graft may be constructed from a vein in the leg or a synthetic material. The procedure usually requires 2 to 5 hours of surgery and a hospital stay of 3 to 5 days.

Angioplasty and open surgical repair are very safe procedures with excellent results. Factors that may diminish the success of each procedure include: the amount of arterial blockage present, the overall health status of the patient and, adherence to risk factor control after the intervention.