Patient Education Booklet for Peripheral Artery Disease

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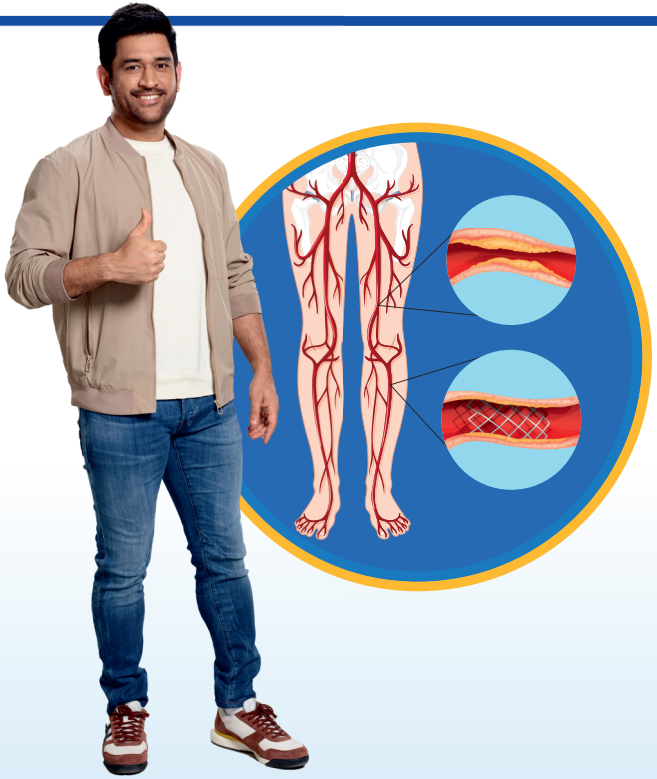
PERIPHERAL ARTERY DISEASE
ENSURE YOUR FREEDOM TO WALK!

TREATMENT ZAROORI HAI.



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Understanding the difference between Arteries, Veins & Capillaries

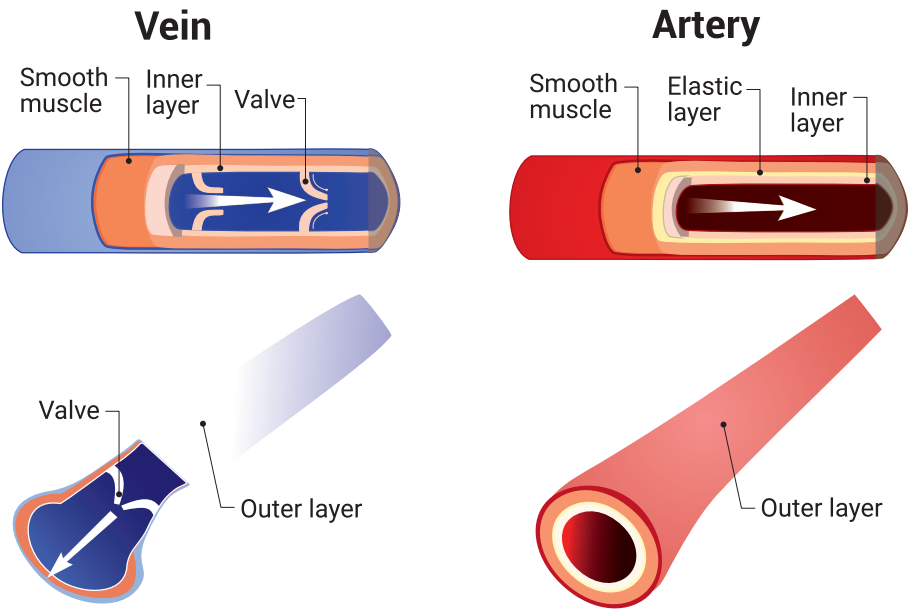
What are blood vessels?

Blood vessels are channels that carry blood throughout your body. They form a closed loop, like a circuit, that begins and ends at your heart.

There are 3 types of blood vessels:

- **Arteries:** carry oxygenated blood away from your heart.
- **Veins:** carry deoxygenated blood back towards your heart.
- **Capillaries:** the smallest blood vessels, connect arteries and veins.

ARTERY AND VEIN



Ref:https://my.clevelandclinic.org/health/body/21640-blood-vessels

	Arteries	Veins	Capillaries
Function	Carry oxygenated blood away from heart	Carry deoxygenated blood towards the heart	Material exchange with tissues
Pressure	High	Low	Low
Lumen Diameter	Smaller	Wide	Extremely narrow (One cell wide)
Wall Thickness	Thick	Thin	Extremely thin (Single cell thick)
Wall Layers	Three 1.Tunica adventitia 2.Tunica media 3.Tunica intima	Three 1.Tunica adventitia 2.Tunica media 3.Tunica intima	One 1.Tunica intima
Muscle & Elastic Fibers	Large amount	Small amount	None
Valve	No	Yes	No

What are the Blood Vessels Made of ?

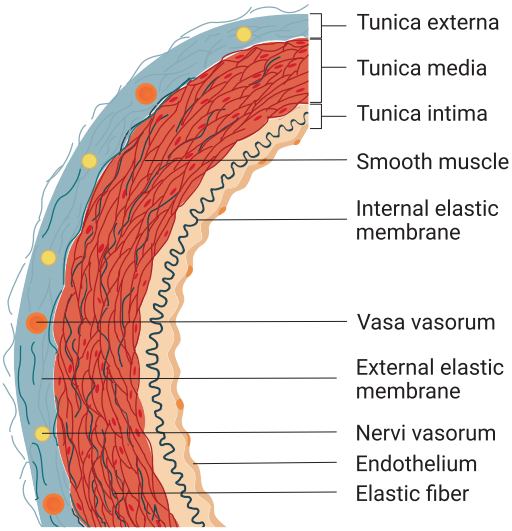
Blood vessels have three layers of tissue:

- **Tunica intima:** The inner layer surrounds the blood as it flows through your body. It regulates blood pressure, prevents blood clots and keeps toxins out of your blood. It keeps your blood flowing smoothly.

- **Media:** The middle layer contains elastic fibers that keep your blood flowing in one direction. The media also helps vessels expand and contract.

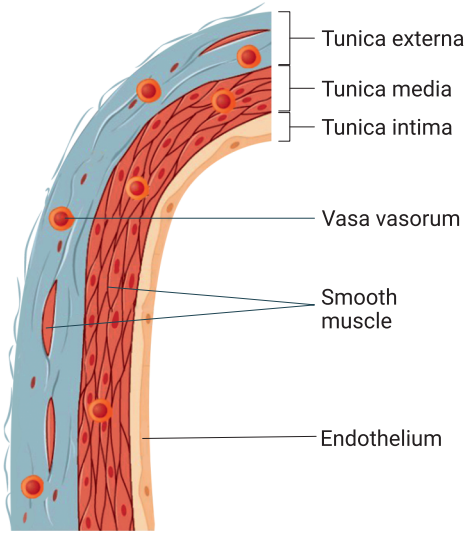
- **Adventitia:** The outer layer contains nerves and tiny vessels. It delivers oxygen and nutrients from your blood to your cells and helps remove waste. It also gives blood vessels their structure and support.

Artery



(a)

Vein



(b)

Ref:https://my.clevelandclinic.org/health/body/21640-blood-vessels

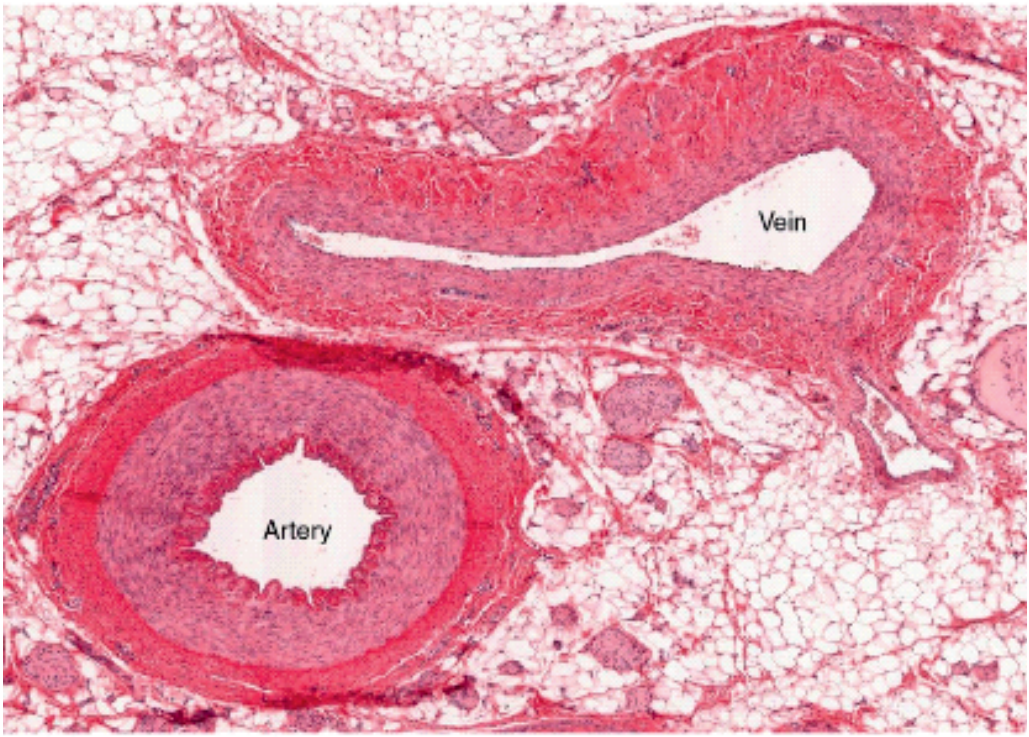


Figure 2. (a) Arteries and (b) veins share the same general features, but the walls of arteries are much thicker because of the higher pressure of the blood that flows through them. (c)A micrograph shows the relative differences in thickness. LM x 160. (Micrograph provided by the Regents of the University of Michigan Medical School © 2012)

Ref:https://courses.lumenlearning.com/suny-ap2/chapter/structure-and-function-of-blood-vessels

Common disorders that affect blood vessels?

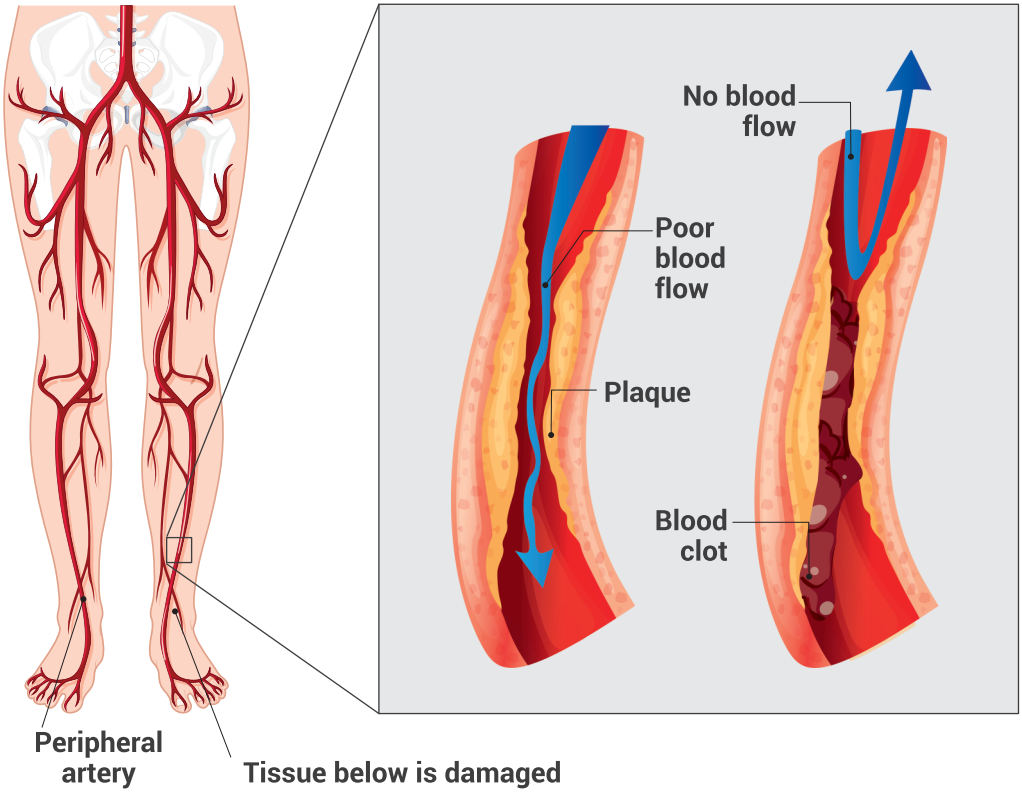
- **Aneurysm:** Ballooning of the segment of the artery due to weakness in the segment of all arteries.
- **Arterial diseases:** Includes coronary artery disease, carotid artery disease and peripheral artery disease (PAD). These diseases cause arteries to narrow, usually due to atherosclerosis.
- **Atherosclerosis:** It is the buildup of plaque (cholesterol, fat, and other substances) inside your arteries. It can lead to a heart attack or Leg attack and or stroke .
- **Blood clots:** These are clumps of blood that form inside veins or arteries. Clots block blood flow and can lead to deep vein thrombosis (DVT), pulmonary embolism, stroke, or occlusion of an artery.
- **Raynaud's disease:** This causes arteries that supply blood to your skin to get very narrow in response to cold temperatures.
- **Varicose veins:** These are twisted and enlarged veins that usually form in the legs or feet.
- **Vasculitis:** It is blood vessel inflammation. Blood vessel walls can thicken and narrow, which prevents blood from flowing freely.

Ref:https://my.clevelandclinic.org/health/body/21640-blood-vessels

Overview of Peripheral Artery Disease

Peripheral artery disease is a common condition in which the arteries are narrowed due to deposition of cholesterol & fatty substances on the inner layer of the artery. This leads to reduced blood flow & oxygen supply to the tissue. This may cause pain, Ulcer or Gangrene.

Peripheral Artery Disease



How does peripheral artery disease affect human body?

The typical symptom of Peripheral Artery Disease is called claudication, a medical term for pain in your leg that starts with walking or exercise and goes away with rest. The pain occurs because your leg muscles aren't getting enough blood supply and oxygen.

The dangers of PAD extend well beyond difficulties in walking. Peripheral artery disease increases the risk of getting a nonhealing sore of your legs or feet. In cases of severe PAD, these sores can turn into areas of dead tissue (gangrene) that make it necessary to ampute your foot or leg.

What are the stages of peripheral artery disease?

- Asymptomatic (without symptoms).
- Mild claudication (leg pain during exercise).
- Moderate to severe claudication.
- Ischemic rest pain (pain in your legs when you're at rest).
- Ulcers or gangrene.

What is considered the first symptom of peripheral artery disease?

The first symptom of PAD is usually pain, cramping or discomfort in your legs or buttocks (intermittent claudication). This happens when you're walking and goes away when you're resting.

Ref:https://my.clevelandclinic.org/health/diseases/17357-peripheral-artery-disease-pad

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BLOCKAGES ARE NOT ALWAYS IN YOUR HEART!

Peripheral Arteries which carry blood from your heart to rest of the body may develop blockage as well.

CLASSICAL SYMPTOMS

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Causes of Peripheral Artery Disease

In most cases the cause is atherosclerosis, the build-up of fatty deposits within the blood vessel that reduces blood flow to the area. Commonly this occurs in the body where a blood vessel kinks or subdivides.

Apart from fatty deposits, other causes of peripheral vascular disease include:

- **Diabetes -** high blood sugar damages and weakens blood vessels, causing them to narrow.
- **Obstruction** - a blood clot (thrombus) may lodge within the blood vessel & cause of obstruction to the flow of blood.
- **Infection -** can cause scarring and narrowing of the blood vessels. Syphilis or salmonellosis, for example, can lead to peripheral vascular disease.
- **Arteritis -** inflammation of arteries. Some autoimmune diseases can cause arteritis.
- **Blood vessel defects -** narrow blood vessel at birth. The cause is unknown.
- **Blood vessel spasms -** conditions such as Raynaud's disease may cause narrowing of blood vessels in response to certain factors, including cold temperatures or stress.

Ref:https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/peripheral-vascular-disease#causes-of-peripheral-vascular-disease

Peripheral Artery Disease in Diabetics

Diabetics & Smoking are the risk factor that help to develop atherosclerotic process in the arteries.

Peripheral Vascular Disease (PVD) in diabetes is complicated by peripheral neuropathy and susceptibility to infection, which leads to foot ulceration, gangrene and amputation of the affected extremity.

Treatment of Peripheral Artery Disease

Treatment options may include:

- **Medications:** It helps to treat atherosclerosis, such as medicines to lower LDL cholesterol and antihypertensive drugs to lower blood pressure.
- **Drugs to treat blood clots:** Treatment may include various medications (including anticoagulants and anti-platelet drugs) to prevent blood clots from developing and medications (including thrombolytics) that dissolve existing blood clots.
- **Angioplasty:** This procedure, usually performed under sedation and local anaesthesia, involves inserting a thin tube (catheter) into the narrowed blood vessel through a needle puncture, usually in the leg. Once the catheter reaches the narrowed or blocked site, the small balloon on its tip is inflated. This widens the blood vessel and improves blood flow. Angioplasty is usually considered as a temporary measure.
- **Endovascular deployment of a stent:** A stent is a metal 'sleeve' that is implanted inside the narrowed blood vessel during an angioplasty procedure to keep the blood vessel open. The Metal tube (spring device) may be impregnated with medications that help to prevent scar tissue formation and thereby prevent narrowing of the treated area of the blood vessel.
- **Atherectomy:** This procedure involves cutting and extracting the fatty plaque obstruction with a small scalpel-like instrument.
- **Bypass surgery:** This procedure is usually only considered in severe cases that do not respond to other treatments or in cases that involve large sections of the diseased blood vessel. A section of healthy Artery / Vein is extracted from somewhere else in the body and surgically grafted to re-route blood flow around the blockage in the affected blood vessel. A surgeon may sometimes use a piece of synthetic tubing to detour blood flow.

Ref:https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/peripheral-vascular-disease#causes-of-peripheral-vascular-disease

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TREAT PERIPHERAL VASCULAR DISEASE WITHOUT DELAY!

CONSIDER ANGIOPLASTY TREATMENT!

Angioplasty and Stenting to overcome blockage in arteries of the leg to improve blood supply & oxygen to the tissues of the leg.

POTENTIAL BENEFITS INCLUDE

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How Peripheral Artery Disease is being Diagnoised?

Along with a complete medical history and physical exam, other tests may also include:

Doctor may ask for these tests to evaluate Peripheral Vascular Disease :-

- **Ankle-brachial index (ABI):** An ABI is a comparison of the blood pressure in the ankle with the blood pressure in the arm using a regular blood pressure cuff and a Doppler ultrasound device.
- **Doppler ultrasound flow studies:** This uses high-frequency sound waves and a computer to create images of blood vessels, tissues, and organs. Your doctor may use the Doppler technique to measure and assess the flow of blood. Faintness or absence of sound may mean blood vessels are blocked.
- **CT Angiogram:** Non-invasive test, where dye is injected into the veins. As the dye flows through the blood vessels, images are generated.
- **Magnetic resonance angiography (MRA):** This noninvasive test uses a combination of a large magnet, radio frequencies, and a computer to produce detailed images of organs and structures in the body. Your doctor injects a special dye during the procedure so that blood vessels are more visible.
- **Angiogram:** This is an running X-ray of the arteries and veins to detect blockage or narrowing. This procedure involves inserting a thin, flexible tube into an artery / vein in the leg and injecting a contrast dye. The contrast dye makes the arteries and veins visible on the X-ray.
- **Treadmill test (TMT):** For this test, you will have to walk on a treadmill so that your doctor can monitor blood circulation during exercise.

- **Photoplethysmography (PPG):** This exam is comparable to the ankle brachial index except that it uses a very tiny blood pressure cuff around the toe and a PPG sensor (infrared light to evaluate blood flow near the surface of the skin) to record waveforms and blood pressure measurements. Your doctor can then compare these measurements to the systolic blood pressure in the arm.

- **Pulse volume recording (PVR) waveform analysis:** Your doctor uses this technique to calculate blood volume changes in the legs using a recording device that displays the results as a waveform.

- **Reactive hyperemia test:** This test is similar to an ABI or a treadmill test but used for people who can't walk on a treadmill. While you are lying on your back, your doctor takes comparative blood pressure measurements on the thighs and ankles to determine any difference between the sites.

Vascular Specialists:-

- Interventional Radiologist
- Vascular Surgeon
- Interventional Cardiologist

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CLEAR THE BLOCK, RECLAIM THE WALK

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