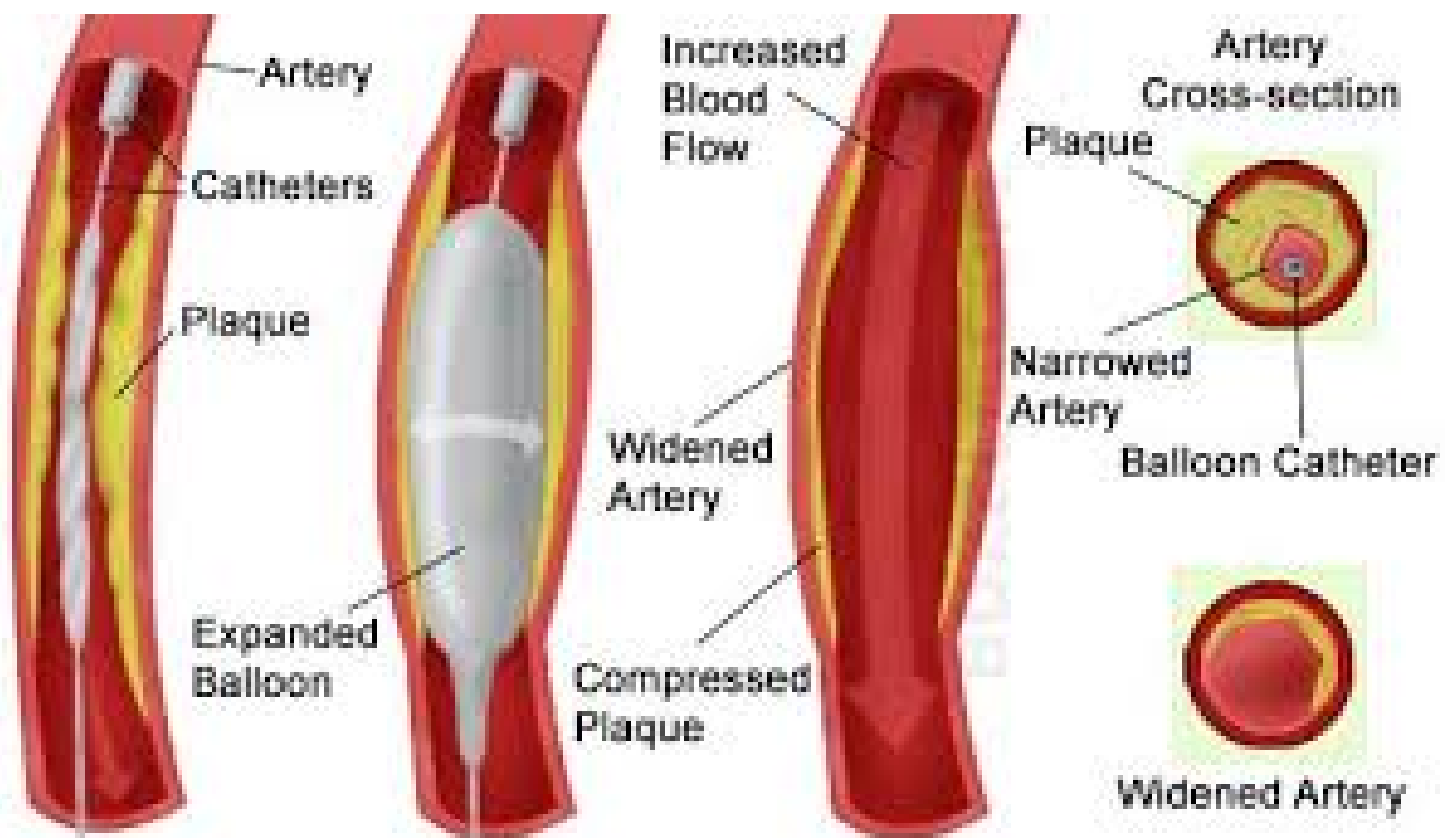


Angiography and Angioplasty for Arterial Narrowing or Blockage.



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The Disease

Arteries take blood, carrying vital **oxygen and nutrients**, to the tissues of the body.

The leg has several main arteries and a network of smaller arteries (called collaterals). The main arteries can be likened to the highways and the collaterals can be likened to side roads.

If there is insufficient blood supply, the tissues are deprived of oxygen and nutrients. This can cause **pain and dysfunction** during activity or in more severe cases **pain at rest, ulceration** and tissue death including **gangrene**.

The commonest cause of narrowing and blockage of the arteries is **atherosclerosis** (hardening of the arteries). Atherosclerosis is a complex deposition of fats and calcium in the artery wall.

Symptoms and Complications

- **Claudication** - Pain in the leg muscles during exercise.
- **Rest Pain** – often at night. This is more often in the foot near the toes. It is often relieved by hanging the leg down.
- **Ulceration/Non Healing Wounds** - This occurs when the blood supply is insufficient to keep the skin alive, especially in areas of increased load or after wounding.
- **Neurological** change such as tingling or numbness or even paralysis. Severe pain, numbness, tingling or paralysis is an **emergency** requiring immediate treatment.
- **Colour** changes in the foot/toes

Claudication can be a minor annoyance or a **debilitating** symptom. The risk of ultimate limb loss is small in people suffering only claudication.

Rest pain, ulceration and gangrene can signal impending limb loss. This is critical limb ischaemia and is a strong indication for treatment.

Investigations

There are multiple investigations used for the investigation of arterial disease. These include:-

- **Duplex Ultrasound Scan**
- **Doppler pressure studies** with an ultrasound probe and blood pressure cuff applied to the arm, leg and toes.
- **Exercise Doppler pressure studies** – pressure studies are done before and after exercise.
- **Angiography** with X-Ray contrast injection into the artery
- **CT or MRI Scans**

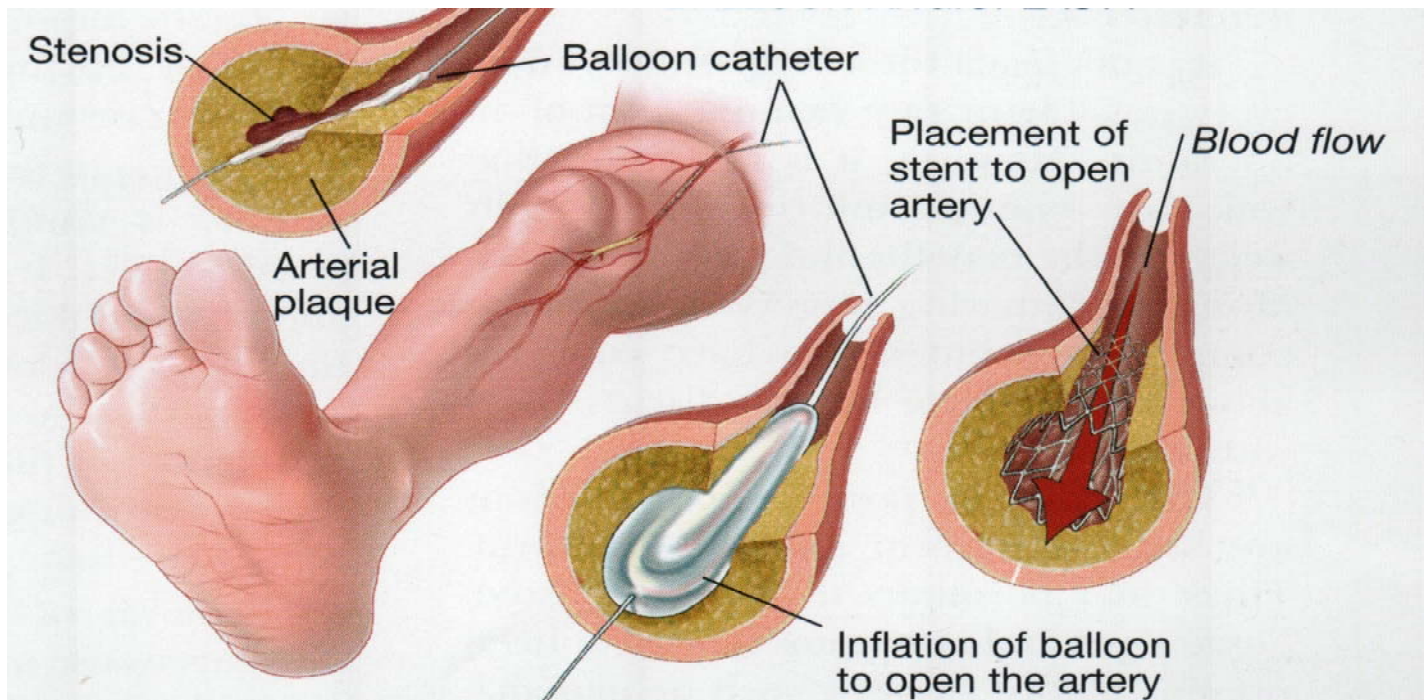


Figure 1. Femoral Artery Angioplasty.



Angioplasty +/- Stent

Angioplasty with or without stent placement offers a treatment without major surgery. It is done in combination with **angiography**. More and more arterial disease is amenable to **minimally invasive** angiographic treatment.

Angioplasty widens the vessel by expanding a **balloon** in the narrow part of the vessel. This cracks the plaque and allows the vessel to be widened to allow more flow (See *Figure 1 and front cover*).

Angioplasty is performed in a specialized **angiography suite** under sterile conditions. It is usually performed under local anaesthetic. A catheter (tiny tube) is placed in the artery through a needle (usually in the groin) and this allows injected contrast to show the narrowing or short blockage. Under X-Ray guidance, a wire is passed through the blockage and over this, a deflated **balloon** is passed until it is in position across the narrowing. The balloon is carefully **inflated**, then deflated and **removed**. The result is checked with another contrast injection, and if necessary a **stent** is placed in the same manner and left in place to hold the vessel open.

The procedure should only cause minor discomfort. The contrast can cause a warm feeling, and a sensation that the patient has wet themselves, but this soon passes. Moderate to severe pain should be reported immediately.

Expectations

The results from angioplasty depend on a number of factors, including:-

- The extent of atherosclerosis
 - The quality, size and number of the vessels above and below the blockage
 - The length of the required angioplasty – shorter is better
 - The symptoms suffered by the patient.
- Usually, good results are achieved.

Side effects and Complications

Unfortunately, no treatment is perfect or without risk. While not exhaustive, the more common and important risks are outlined below.

Potential risks include the general risks of anaesthesia and surgery:-

- **Death**
- **Renal Failure**
- **Deep Venous Thrombosis**
- **Pulmonary Embolus**
- **Severe Allergic Reaction**

The specific risks of the surgery include:-

- **Failure** to improve the blood supply.

- **Worsening of blood flow** to the leg with possible major amputation requirement.
 - Sudden thrombosis of the vessel.
 - Dissection of the vessel.
- **Bleeding from the puncture wound**
- **False Aneurysm Formation** – a bulge in the artery at the puncture site.
- **Renal Failure**, occasionally requiring permanent dialysis
- **Recurrence** of the narrowing or blockage.
- **Progression of disease** in arteries above or below the original narrowing.
- **Emergency Surgery** for complications is required in approximately 5%.

