



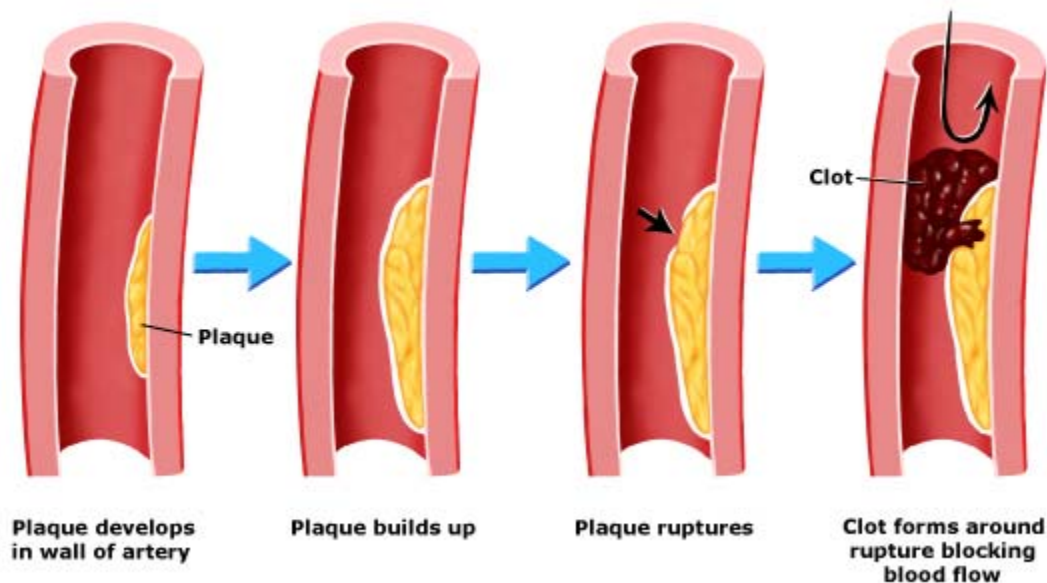
## Heart Stents and Angioplasty

### What is angioplasty?

Angioplasty, also known as percutaneous coronary intervention, is a procedure that uses a flexible plastic catheter with a balloon at the end to dilate narrowed arteries in the heart. The procedure often includes placement of a metal stent to hold the artery open. In this way, angioplasty helps to restore blood flow to the heart muscle.

### Why do I need angioplasty?

Chest pain that originates from the heart muscle is called angina pectoris. Angina is a signal that the heart muscle is not getting sufficient blood flow, specifically sufficient oxygen. Lack of oxygen is termed ischemia. Blood flow is most often reduced by coronary artery disease (CAD), which causes a narrowing of the arteries that carry blood to the heart muscle. Narrowing in the coronary arteries occurs as a result of calcium and fatty deposits, called plaques (see Figure below).





A person with narrowed arteries may develop angina during activity, exercise, or any other physical or mental stress that increases the heart's demand for blood. Angina can be "stable" or "unstable". Angina is unstable when there is a change in the usual pattern, such as a change in frequency, severity, duration, or precipitating cause. Unstable angina may be associated with damage to the heart muscle (or heart attack). The term acute coronary syndrome refers to people with unstable angina or a heart attack; these conditions require immediate evaluation in a hospital. In severe cases, heart attack can lead to heart failure or sudden cardiac death.

### Angioplasty candidates

Angioplasty may be recommended in addition to medical therapy for two groups of people with stable angina:

- People who have persistent and intolerable symptoms despite adequate medical treatment
- People who have specific patterns of arterial narrowing and a high risk of either a heart attack or death

### Notify your physician if:

- you have ever had a reaction to any contrast dye, or if you are allergic to iodine or seafood
- if you are sensitive to or are allergic to any medications, latex, tape, and anesthetic agents (local and general)
- you have a history of bleeding disorders
- you are taking any anticoagulant (blood-thinning) medications

## THE ANGIOPLASTY PROCEDURE

### Preparing for angioplasty

Blood tests and an electrocardiogram (EKG) are usually performed before angioplasty.

Most patients are told not to eat or drink anything for 6 to 8 hours before the catheterization procedure. People with diabetes should speak to their doctor about how much medication to take before the procedure. Anticoagulant medications such as warfarin may be decreased or even stopped temporarily before procedure, depending upon the reason the anticoagulant is used. However, aspirin and an antiplatelet medication (eg, clopidogrel) are usually continued.

### During the procedure

The patient is given a sedative and may be given a pain medication before the procedure. Most people do not remember the procedure as a result of these medications. A tiny catheter is inserted into an artery in the leg (the femoral artery) or in the arm (the radial artery). The catheter is moved through blood vessels to the heart. The coronary arteries are viewed by injecting a dye (contrast) through the catheter and using an x-ray machine.

Based upon the results of this test, the doctor sometimes proceeds with angioplasty if it appears reasonable to do so.

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**How is angioplasty performed?**

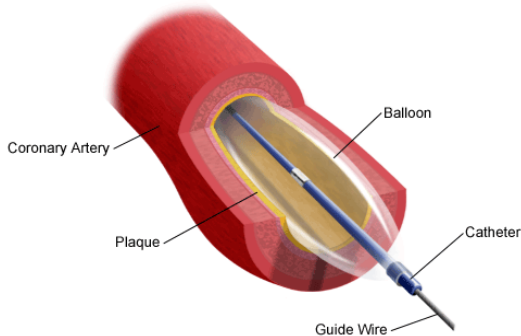
Angioplasty is usually performed in a hospital in the catheterization laboratory. The procedure usually takes between one and two hours.

To open the narrowed artery, a long, thin catheter with a deflated balloon at its end is inserted into an artery in the leg (the femoral artery) or the arm (the radial artery). The catheter is guided through blood vessels to the beginning of a narrowed coronary artery in the heart. The placement of the catheter is

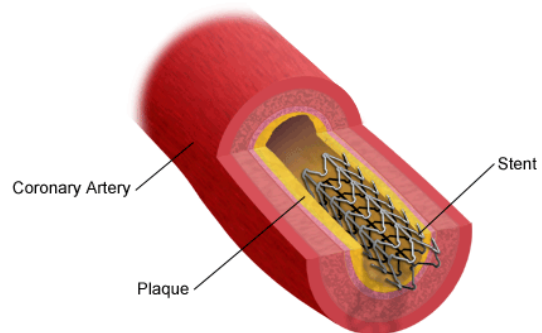
confirmed by injecting a dye into the coronary artery and using an of x-ray machine to view the catheter's position.

The balloon is then inflated, which expands the narrowed artery. A stent (an expandable metal tube usually made of wire mesh) is often placed after the vessel is expanded to reduce the risk of narrowing in the future. Some stents are coated with a medication (called drug-eluting stents) to help prevent the development of excessive tissue growth, which could potentially narrow or totally block the stented artery over time.

**Inflation of Balloon Inside a Coronary Artery**



**Stent Inside a Coronary Artery**



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## Angioplasty complications

Complications of angioplasty are relatively infrequent. The most common complications include discomfort and bleeding at the puncture site where the catheter was inserted.

Occasionally, angioplasty creates a small tear (dissection) of an internal layer in the coronary artery. Usually, the tear is small and heals by itself. In some cases the tear is corrected with a stent. If the tear is severe, causing a blockage in blood flow in the artery or loss of blood around the heart, immediate treatment is given. This usually includes a repeat angioplasty and insertion of a stent. Rarely, a person will need urgent bypass surgery.

Approximately 10 percent of patients develop chest pain within 48 hours of their procedure. In some cases this pain is caused by a lack of oxygen in the heart (ischemia) that occurs when a small tear (dissection) develops or pieces of the plaque material travel downstream (embolization).

## Care after the procedure

Following the angioplasty procedure, the catheter is removed from the artery and pressure is applied to the area. In some cases, a pressure device is used to limit bleeding from the site. In other cases the artery is sealed closed at the time the catheter is removed.

The patient must lie flat and remain still for several hours to reduce the risk of bleeding. During this time, the patient will remain monitored in a recovery area.

Most patients will remain in the hospital overnight after angioplasty. A friend or family member must be available to drive the patient home. Most patients are able to walk on the day after the angioplasty and can resume their normal activities, including returning to work, within a week. Heavy lifting and pushing or pulling is not allowed for a week or two. Specific activity restrictions should be discussed with a clinician.

## Antiplatelet medications

One of the most serious complications that can develop after stent placement is the development of a blood clot (thrombosis) inside the stent; this is called stent thrombosis. A stent thrombosis can potentially block blood flow to the heart, causing a heart attack or even death.

Fortunately, stent thrombosis is relatively uncommon because two medications, **aspirin and clopidogrel (Plavix®)**, are given before and after stent placement to reduce the risk of clot formation. **It is very important not to stop taking these medications unless told so by your doctor.**

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**When to seek help**

After angioplasty, seek immediate medical assistance if any of the following occur:

- Chest pain develops and is not relieved with two doses of sublingual (under the tongue) nitroglycerin
- The puncture site becomes very painful, swollen, warm, bleeds more than a few drops, or drains pus.
- A fever higher than 100.4° F (38° C) develops

**OTHER MEASURES TO SLOW OR REVERSE HEART DISEASE**

In all patients with coronary artery disease, it is important to follow guidelines to reduce the risk of worsening heart disease. These guidelines, which should be discussed with a healthcare provider, include the following:

- Treat high blood pressure
- Treat high cholesterol
- Quit smoking
- Lose excess weight
- Reduce stress
- Exercise regularly
- Avoid or minimize activities that provoke angina, such as exercising during cold weather or exercising vigorously, particularly after a meal

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