Balloon angioplasty (percutaneous transluminal coronary angioplasty or PTCA)
Stable angina...

**History:**
- A man > 50 years.
- A woman > 60 years.
- Pain with physical & emotional exertion.
- Last to 5-10 min.
Coronary artery disease

- Open artery
- Plaque buildup
- Hardened artery

Microvascular disease

- Open microvessel
- Constricted microvessel
Heart - Pathology

- Normal
- Atherosclerosis
- Fixed Coronary Obstruction (Typical angina)
- Platelet aggregate
- Healing
- Plaque Disruption
- Severe Fixed Coronary Obstruction (Chronic ischemic heart disease)
- Thrombus
- Mural Thrombus with Variable Obstruction (Unstable angina or acute subendocardial myocardial infarction or sudden death)
- Occlusive Thrombus (Acute transmural myocardial infarction or sudden death)

Acute Coronary Syndromes

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Insufficient blood flow to the heart muscle from narrowing of coronary artery may cause chest pain.
Ischemic Heart Disease

Clot stops flow of blood

Plaque buildup on vessel walls

Where the blockage occurs in the artery

Where the heart is affected
Plaque with fibrous cap

Cap ruptures

Blood clot forms around the rupture, blocking the artery
Location of chest pain during angina or heart attack

- Upper chest
- Subternal radiating to neck and jaw
- Subternal radiating down left arm
- Sternal radiating down left arm
- Epigastric radiating to neck, jaw, and arms
- Neck and jaw
- Left shoulder and down both arms
- Intrascapular

Typical distribution of referred pain
Electrocardiogram (ECG)
**Nuclear Thallium Scan**
Thallium Scan
Blood test
Echocardiogram
Computerized tomography (CT) angiogram
cardiac catheterization
The arrow points the narrowing of an occluded anterior descendental coronary artery (on the heart) with a great ischemic territory.

The arrow shows the restored flow inside the same artery on the heart, delivering blood again and eliminating ischemia.
Occluded carotid artery with an atheroma plaque, the most common cause of stroke

Same artery after angioplasty, filter and stenting, the function has been restored
Balloon angioplasty (percutaneous transluminal coronary angioplasty or PTCA)
Angioplasty (PTCA) Stent Implantation & Placement
Stent Implantation & Placement

- Stent insertion
- Stent expansion
- Stent remains in coronary artery
Coronary artery located on the surface of the heart

A
Coronary artery Plaque

Catheters Closed stent Expanded stent Balloon

B
Closed stent around balloon catheter

Artery cross-section

Narrowed artery Plaque

C
Stent widened artery Compressed plaque Increased blood flow

Compressed plaque

Widened artery

Stent
Stent Inside a Coronary Artery

Coronary Artery

Plaque

Stent
Coronary Artery Bypass Grafting (CABG)

A. Simplified view of diseased heart before surgery

- Stenosis
- Occlusion
- Right coronary artery
- Left anterior descending artery
- Obtuse marginal artery

B. View of heart after bypass surgery

- Left subclavian artery
- Left internal mammary artery
- Vein grafts

Plaque blockage
Coronary artery