

CLINICAL ANATOMY: HEART.

Lecture notes

By

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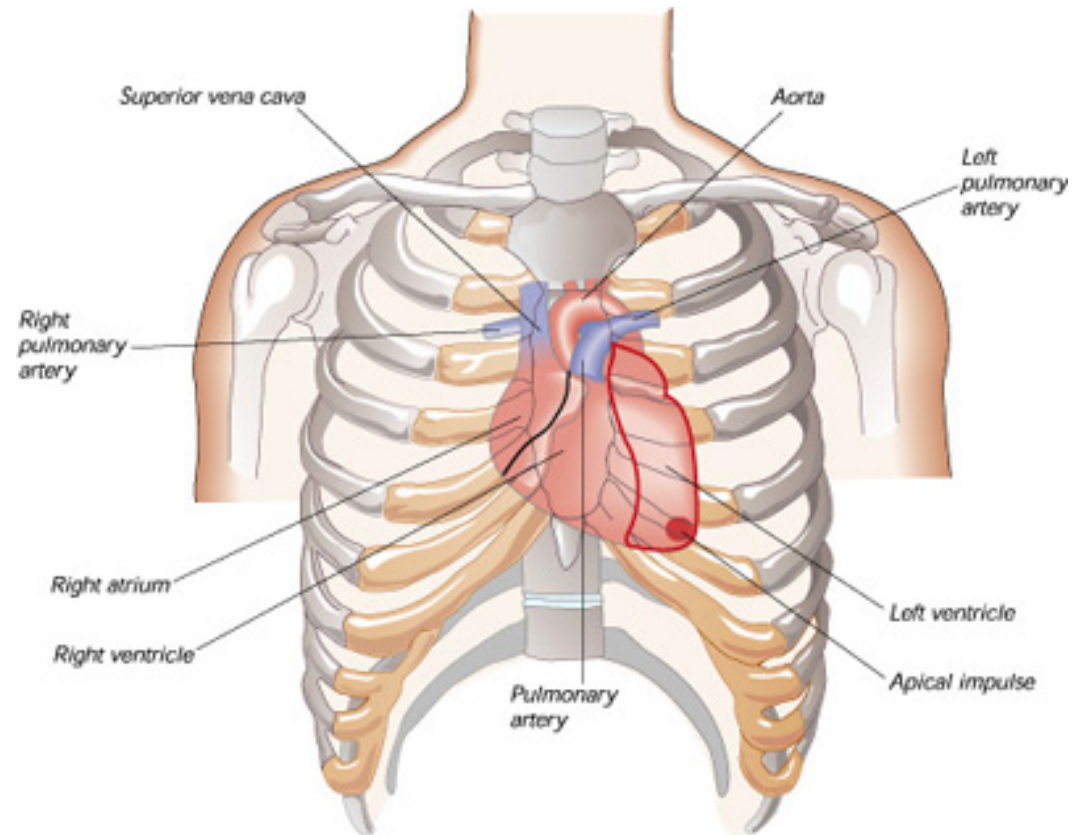
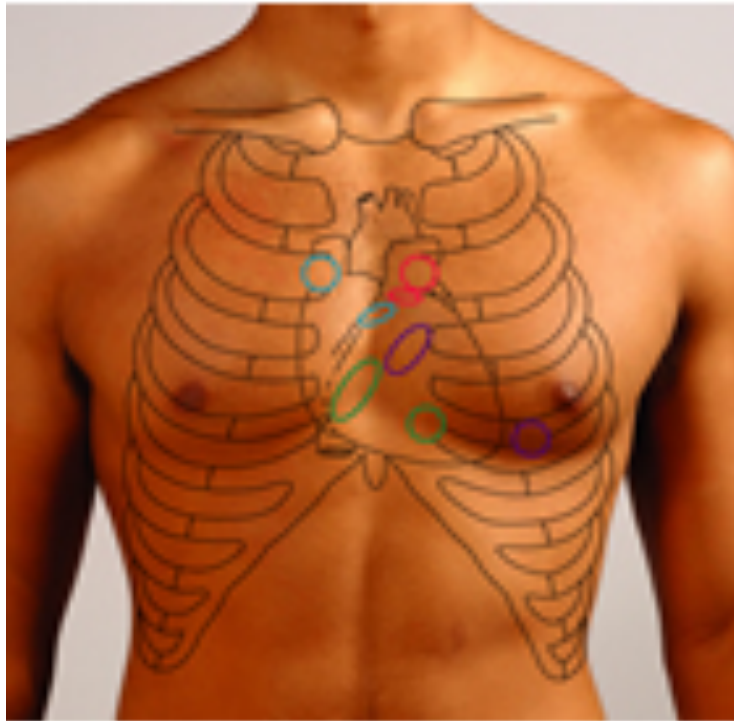
BSc(Anat), MBChB(Uon), MMed(Muk), FCS(ECSA),
Phd.

HEART.

- Muscular organ found in the Middle mediastinum.
- Enclosed in the pericardial sac.

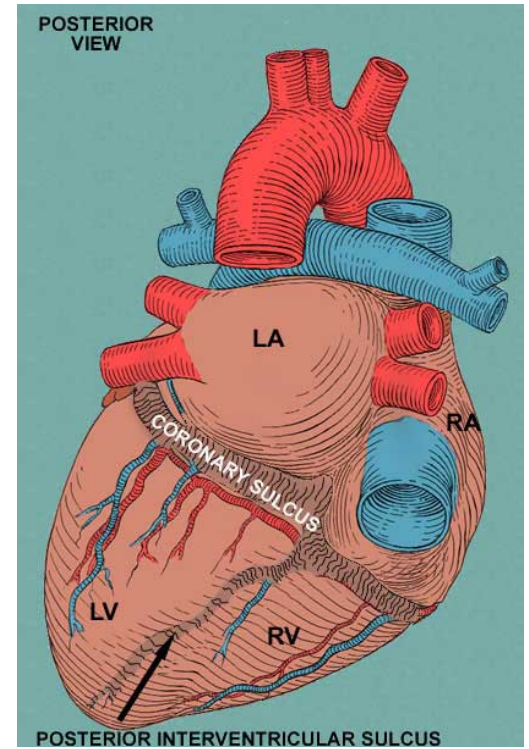
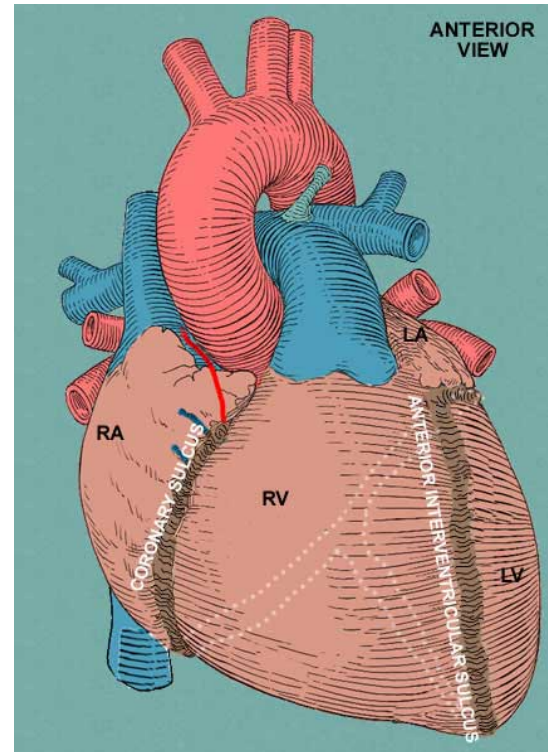


Surface markings



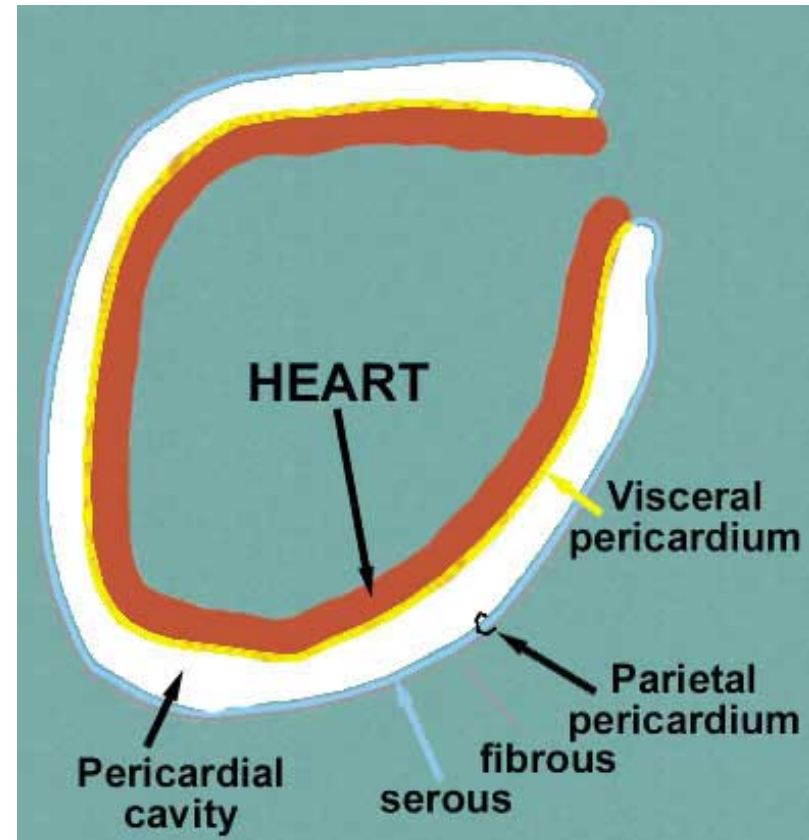
Introduction.

- Introduction
- Exterior
 - surfaces
 - borders
- Interior
 - Heart chambers
 - Heart valves
 - Subvalvular apparatus
 - Conducting system



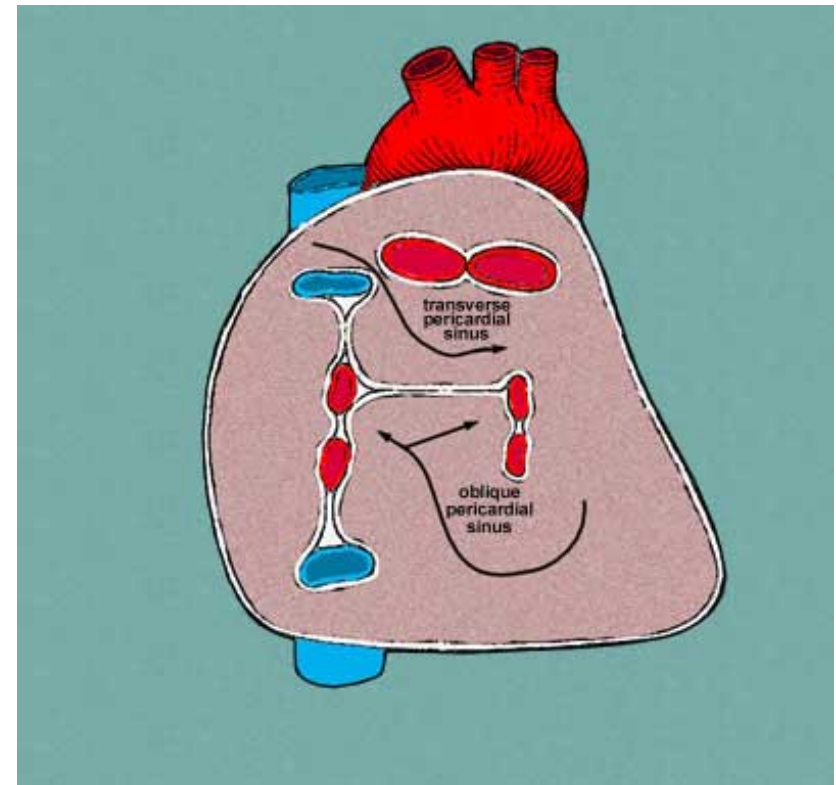
Pericardium.

- The parietal and visceral pericardium are continuous
- This continuity takes place at the points where the major blood vessels enter and leave the heart.



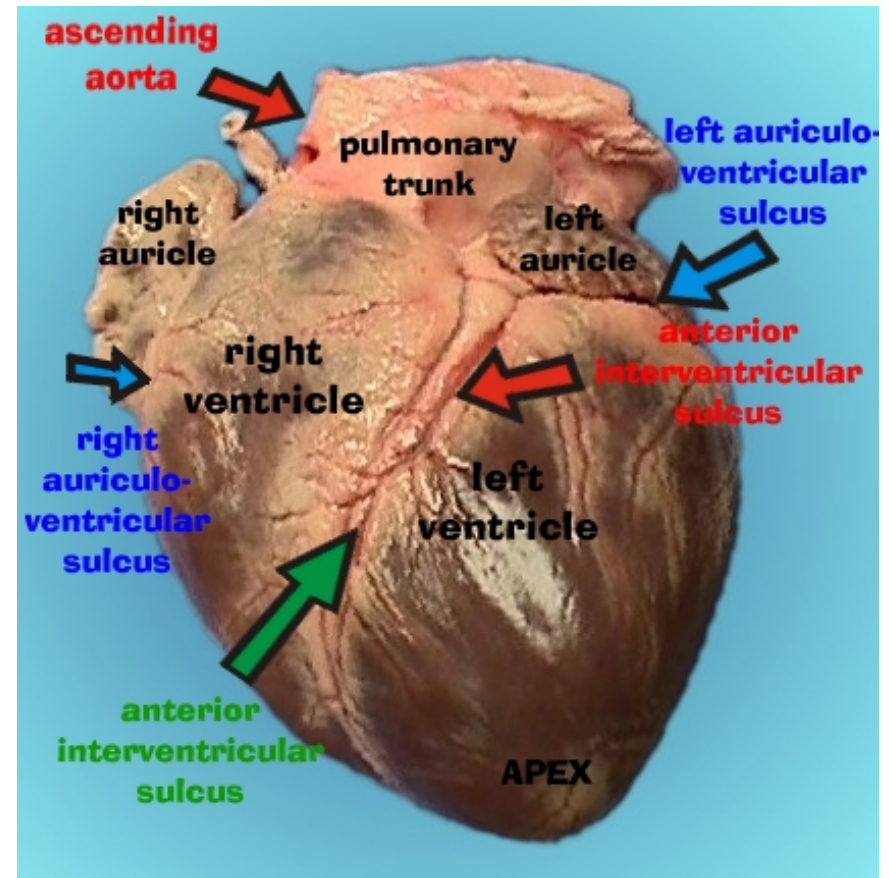
Pericardium innervation.

- Fibrous- phrenic nerve
- Serous-parietal- phrenic nerve
 - visceral-
autonomic innervation
vagus nerve.

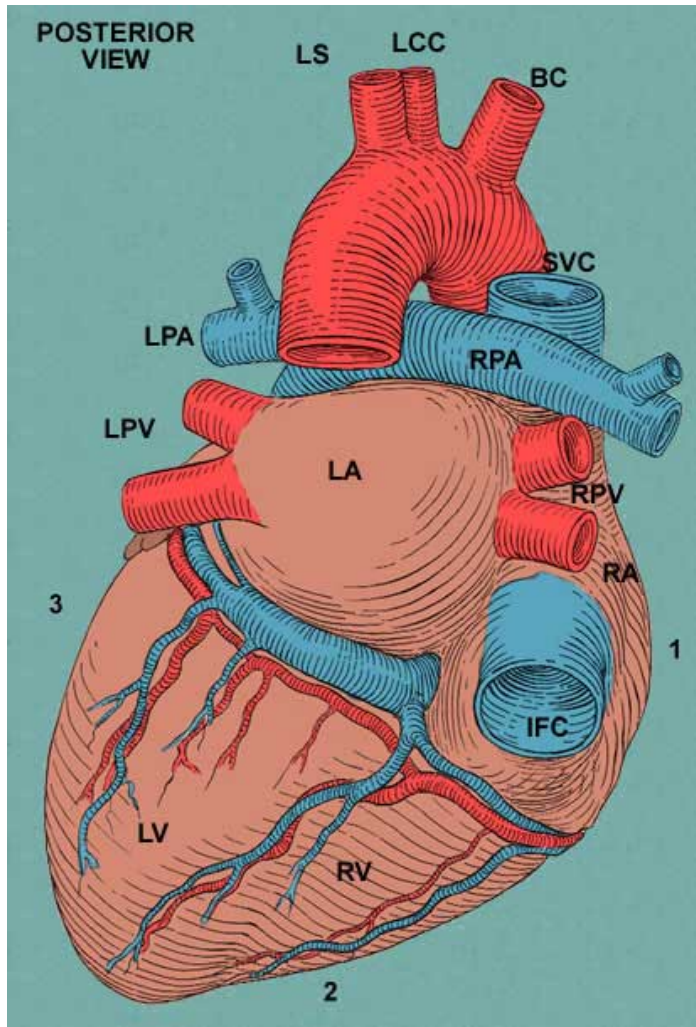


External surface

- Description: number of **surfaces, borders and grooves or sulci.**
- Dimensions:
- base to apex 10-11cm
- transversely 7-10cm
- AP 6cm
- On average, male hearts are heavier than female hearts: **300g** compared to **250g.**

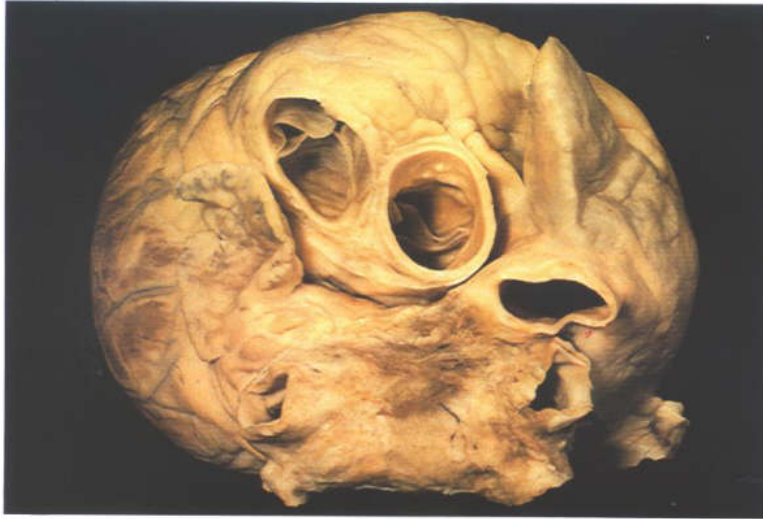


Surfaces.



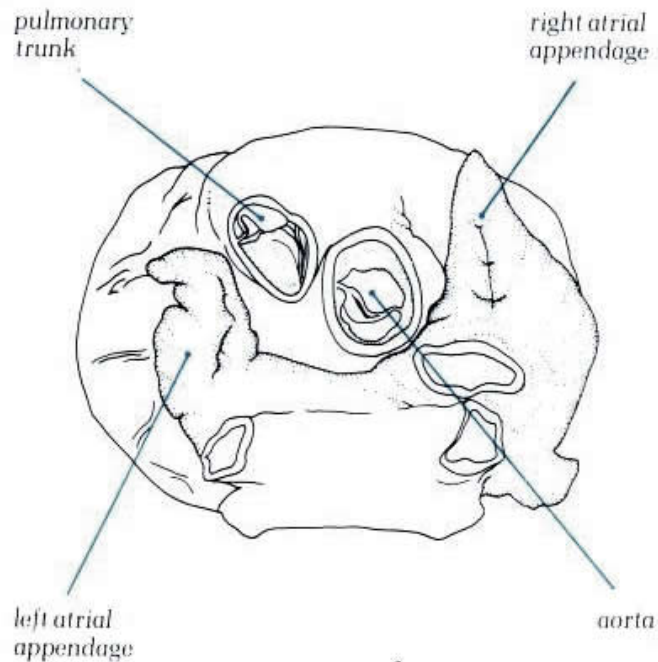
- Diaphragmatic surface-ventricles.
- It rests on the fibrous part of the diaphragm.
- The left atrium -base of the heart.
- In supination, the heart rests on its base and the apex projects up and to the left.

superior

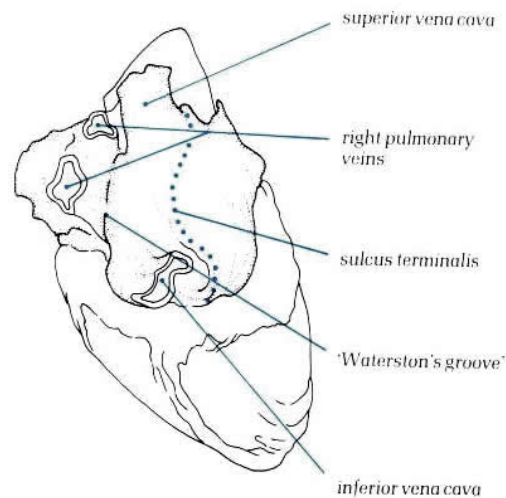
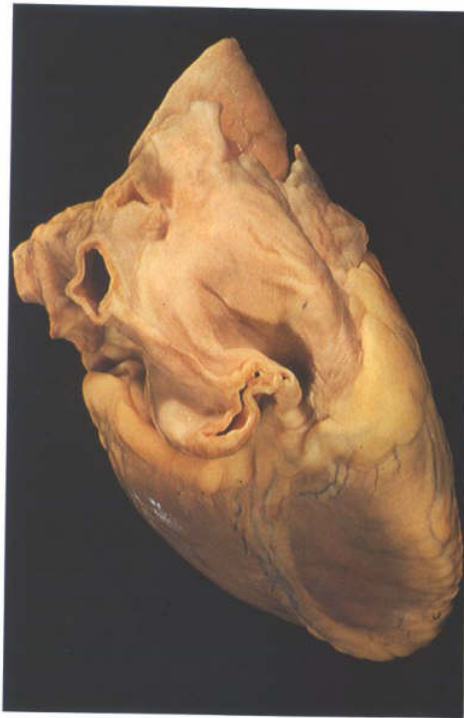


- The heart viewed from above showing how the atrial appendages

encircle the roots of the great arteries (Left atrial appendage; aorta; pulmonary trunk; right atrial appendage)



Right posterior

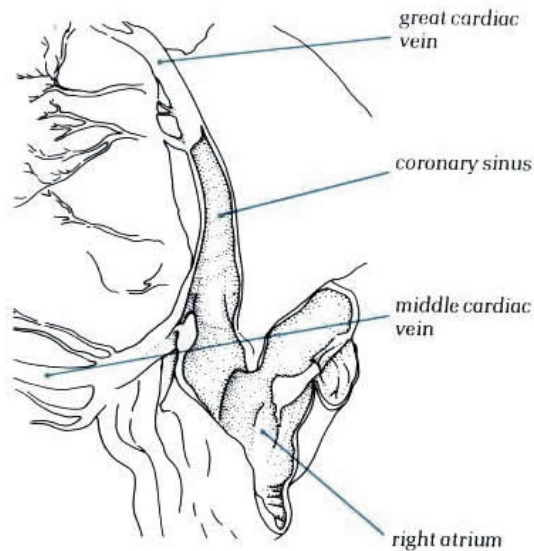


- The heart viewed posteriorly and from the right showing the groove between the pulmonary veins and right atrium: sulcus terminalis, **'Waterston's groove'**,



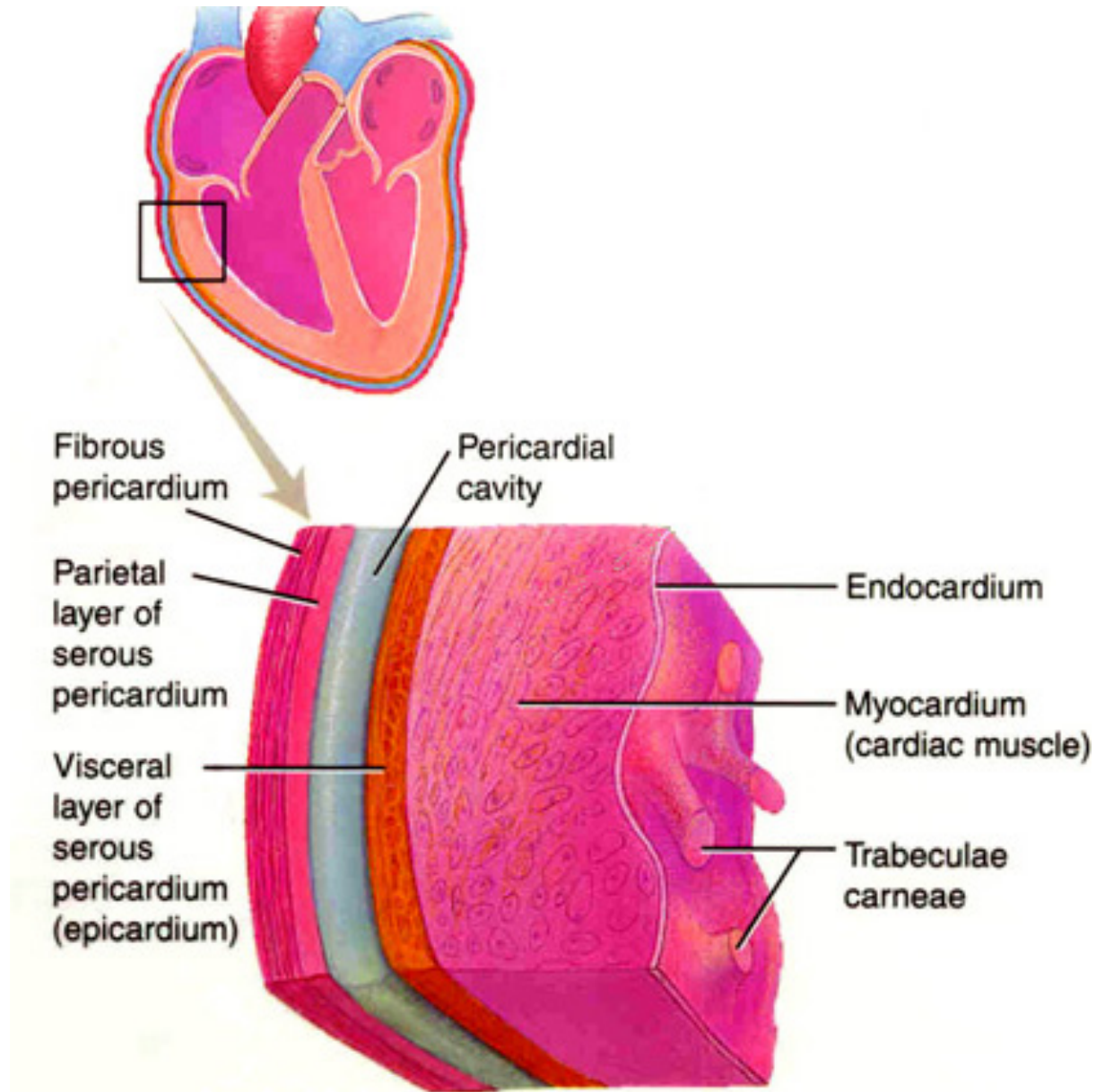
Posterior.

- The heart viewed from behind and oriented in its in situ position.
- The position of the coronary sinus is shown



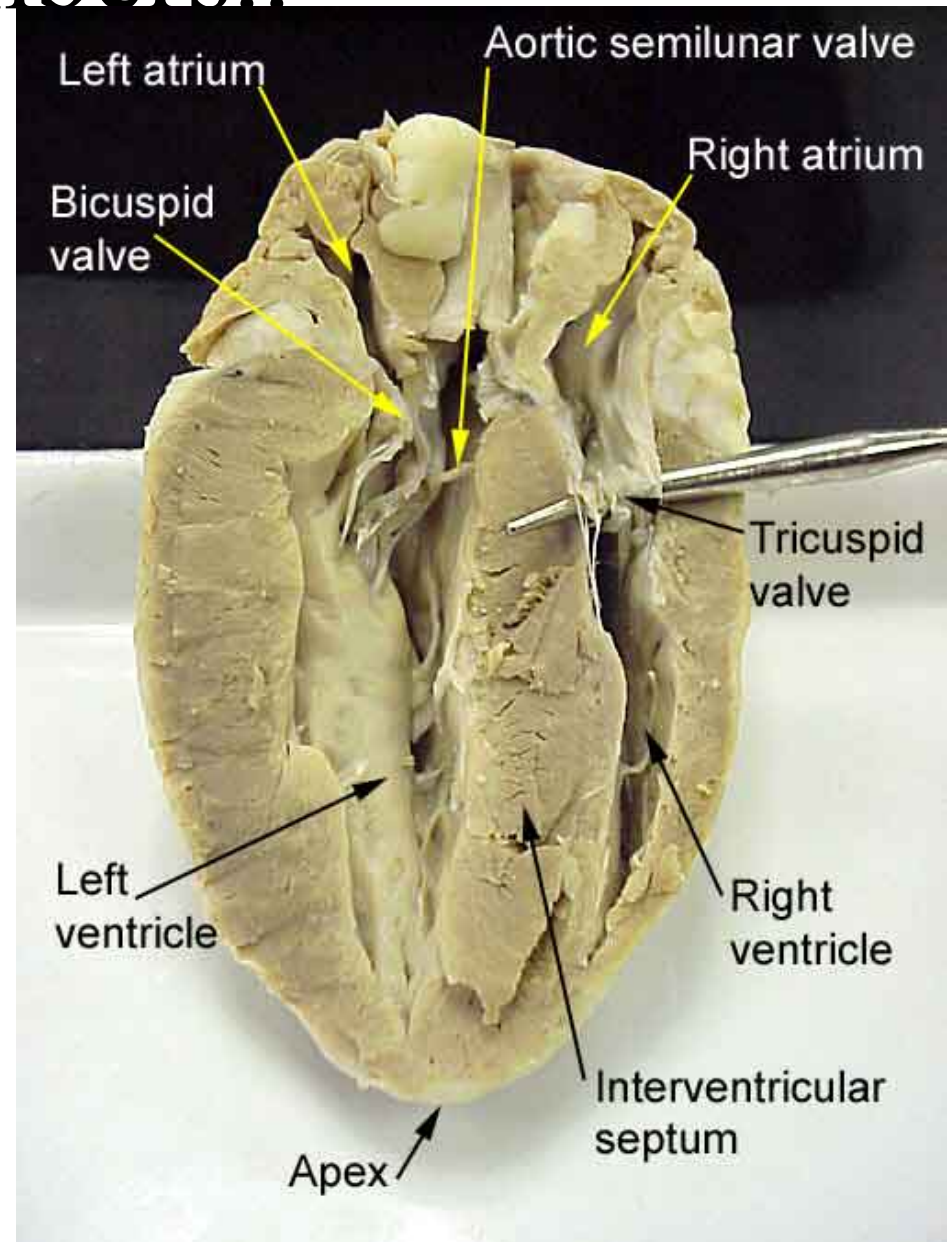
in the left
artioventricular groove
between the left atrium
and the left ventricle.

Cardiac wall.

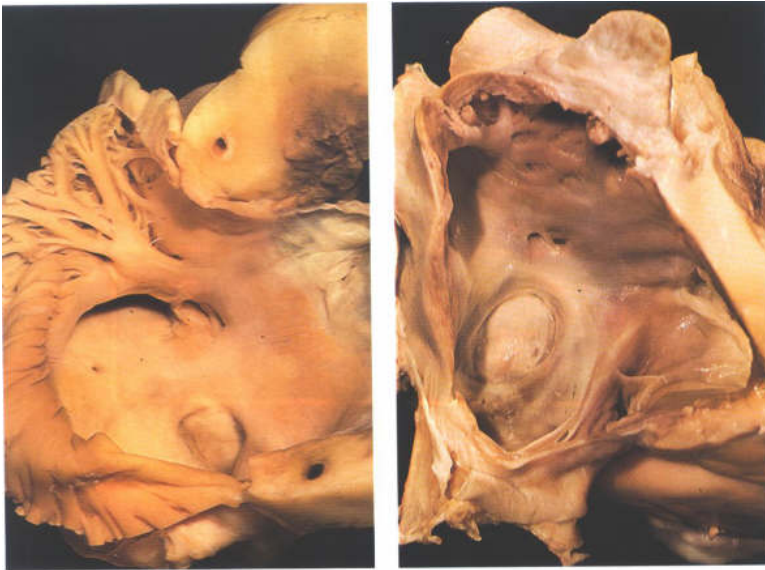


Chambers..

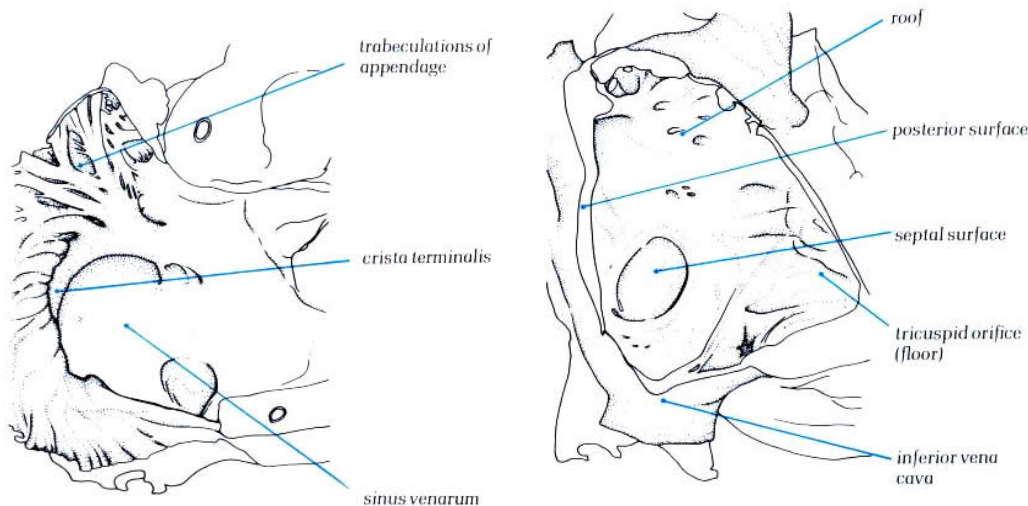
- Right & left atria
- Right & left ventricles.



Right atrium



- Features:
- Sinus venarum
- Sulcus terminalis
- Junction between the two is marked by a well-formed muscle bundle, the **crista terminalis**

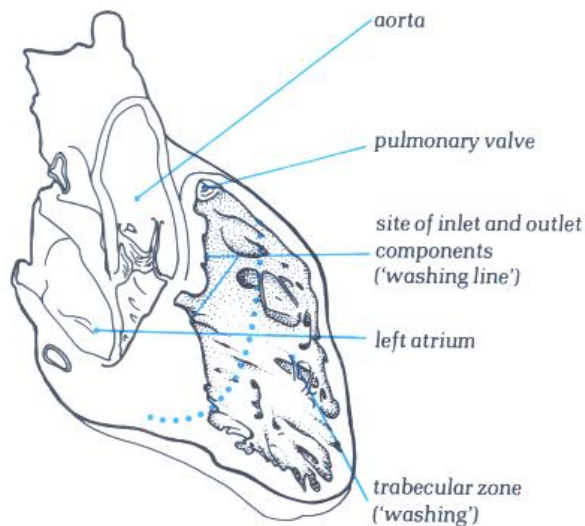


The trabeculae tend to run at right angles to the crista.



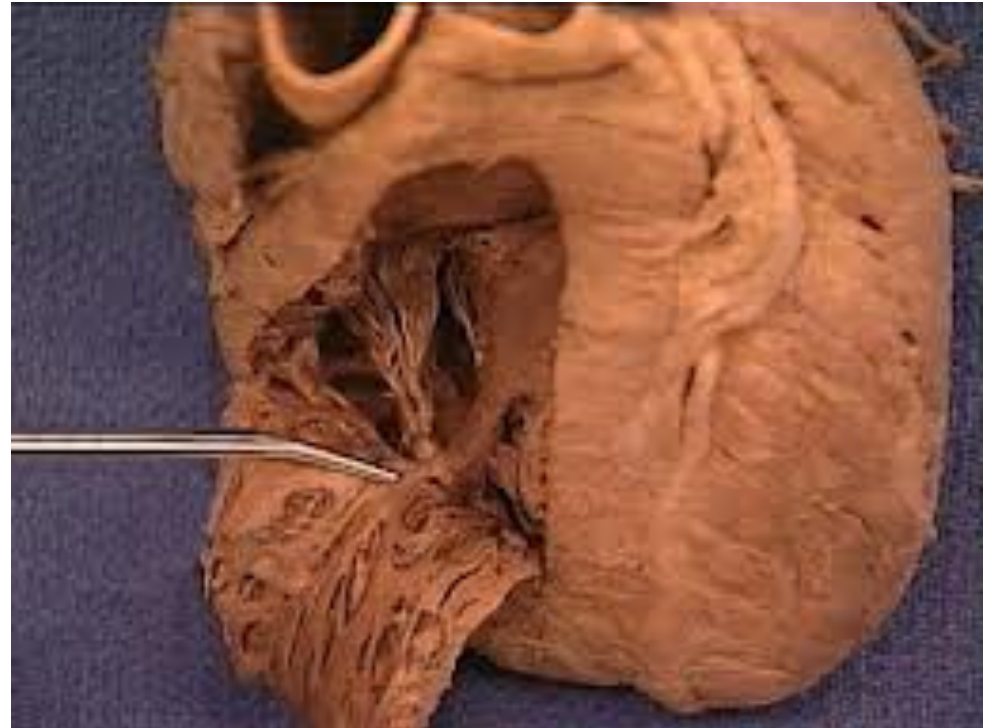
Right ventricle

- **Trabecular zone** is suspended like a piece of washing from the washing line made up of the inlet and outlet components.



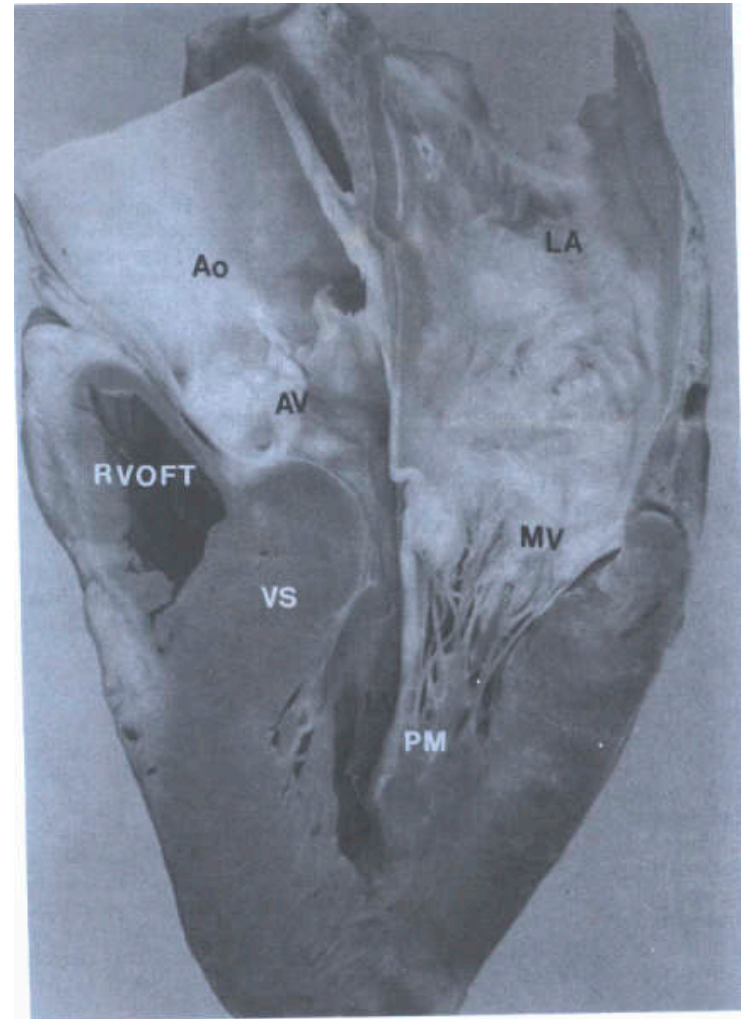
Ventricular wall

- the rough lining of the ventricular wall is called **trabeculae carneae**, because of their meaty appearance
- the anterior papillary that has an attachment to the interventricular wall known as the **septomarginal trabecula** or the **moderator band**



Interventricular Septum.

- Thick wall separating the ventricles of the heart from one another.
- The ventricular septum is directed backward and to the right, and is curved toward the right ventricle



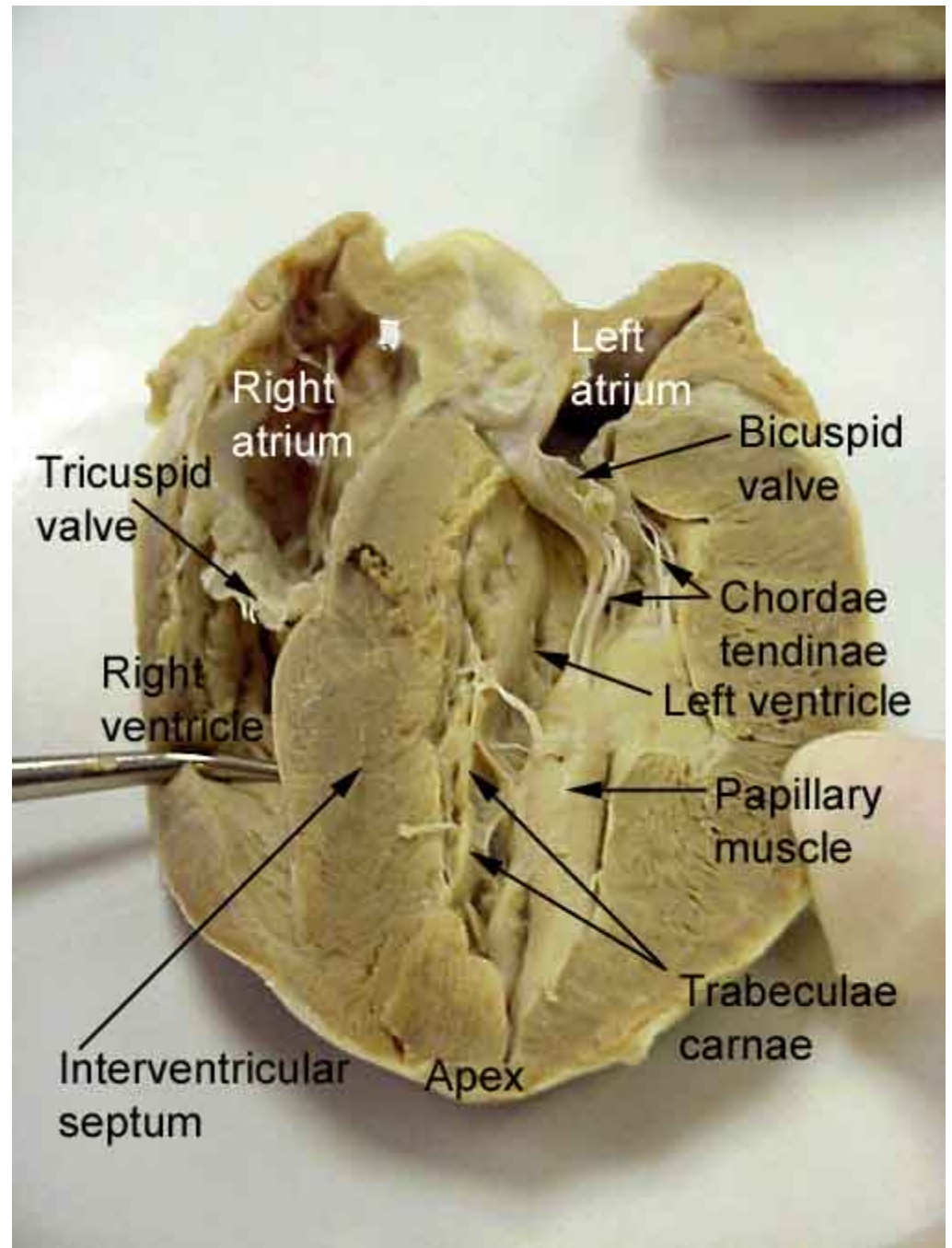
- **Atrioventricular membranous septum-** between the aorta and the right atrium.




Valves.

Atrio-ventricular-
tricuspid & mitral
valves

Semilunar-aortic &
pulmonary trunk
valves



Mitral valve.

- Resembles a mitre's hat. 
- Also bicuspid/ left atrioventricular valve.
- Has anteromedial & posterolateral cusps.
- Mitral valve **prolapse** – mitral valve syndrome.
- Mitral valve **regurgitation**- incompetence.
- Mitral valve **stenosis**.

Tricuspid valve.

- Right atrioventricular valve
- Has 3 cusps
- The cusps held by chorda tendinae to its 3 papillary muscles.
- Number of cusps could change during one's lifetime.
- Not commonly affected by regurgitation.



Semilunar valves

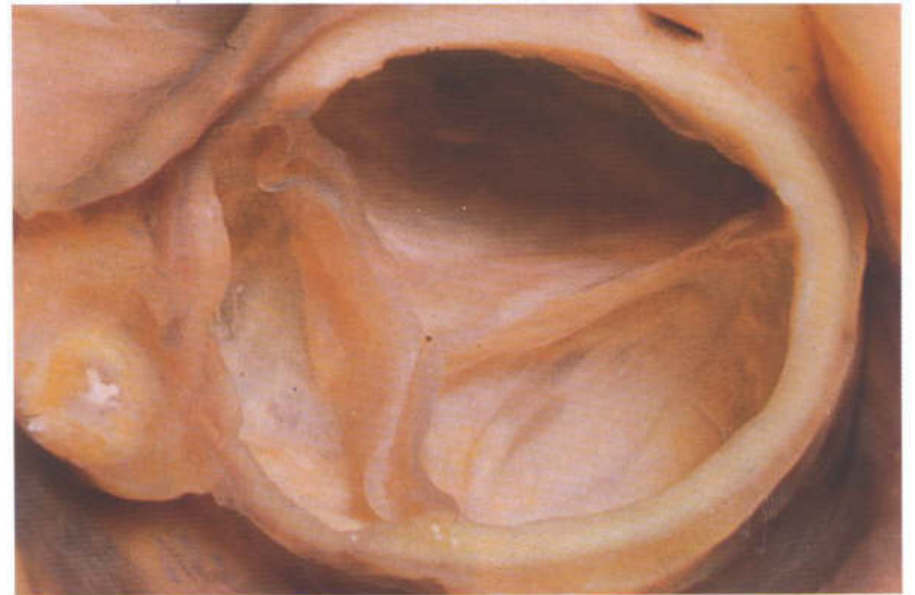
- Aortic & pulmonary semilunar valves.



Aortic valve.

- Left ventricle to aorta.
- Has 3 cusps- posterior, right & left valves.
other.

Other valves:, eustachian
thebesian

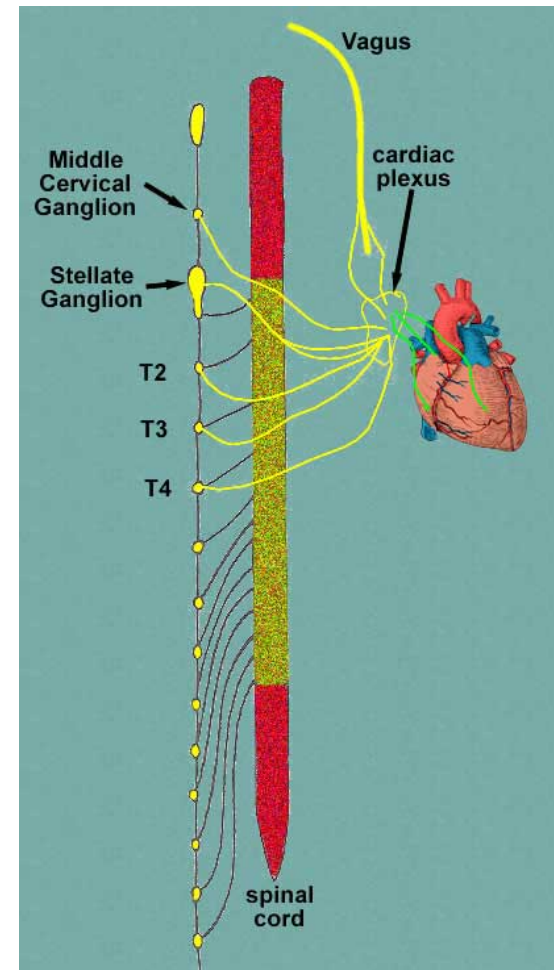


Surface markings for valves.

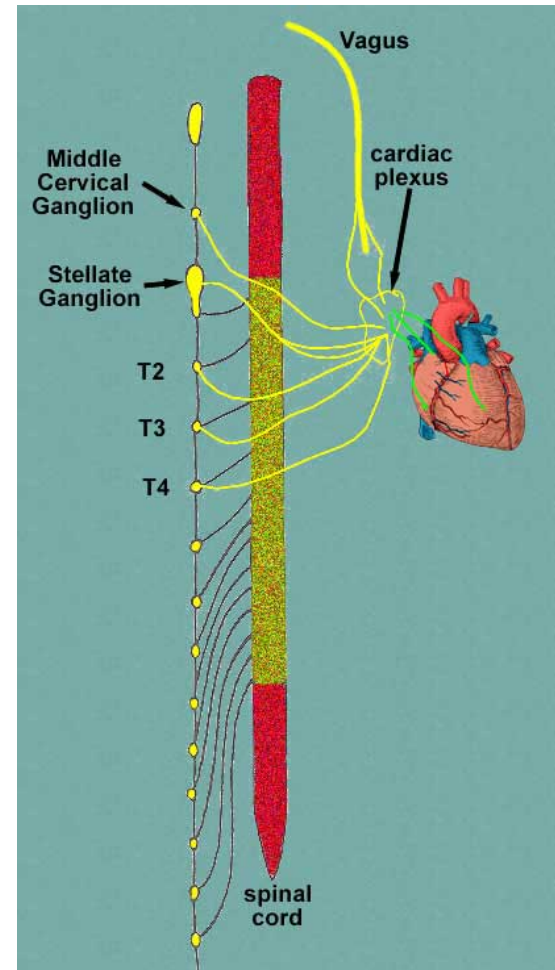
| <u>Valve</u> | <u>Sternocostal projection</u> | <u>Point of auscultation</u> |
|--------------|-----------------------------------|---|
| Pulmonic | left sternal border, 3rd rib | 2nd, left IC space, just lateral to sternal angle |
| Aortic | left sternal border, 3rd IC space | 2nd right IC space, just lateral to sternal angle |
| Mitral | left sternal border, 4th rib | 5th, left IC space, 8cm lateral to midline |
| Tricuspid | midsternal, 4th IC space | 4th, left IC space, just lateral to sternum |

Innervation :heart

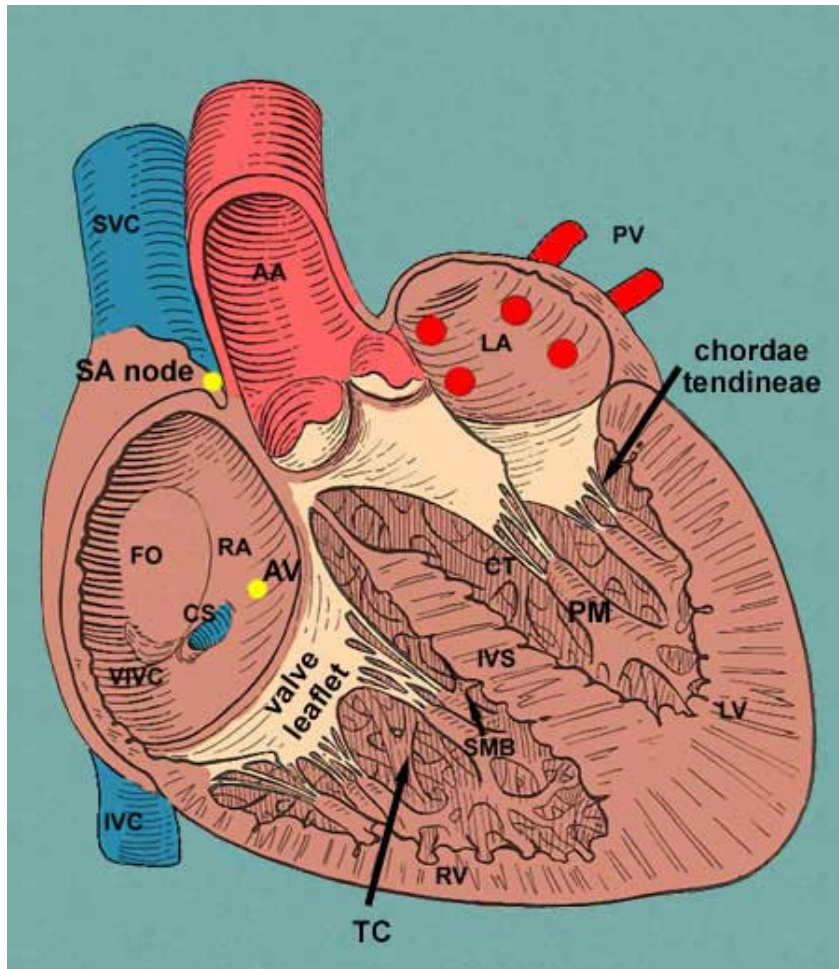
- Innervation –
through the cardiac
plexus.
- Formed by vagus nerve
& sympathetic fibres from
the middle cervical
ganglion and stellate
ganglion.



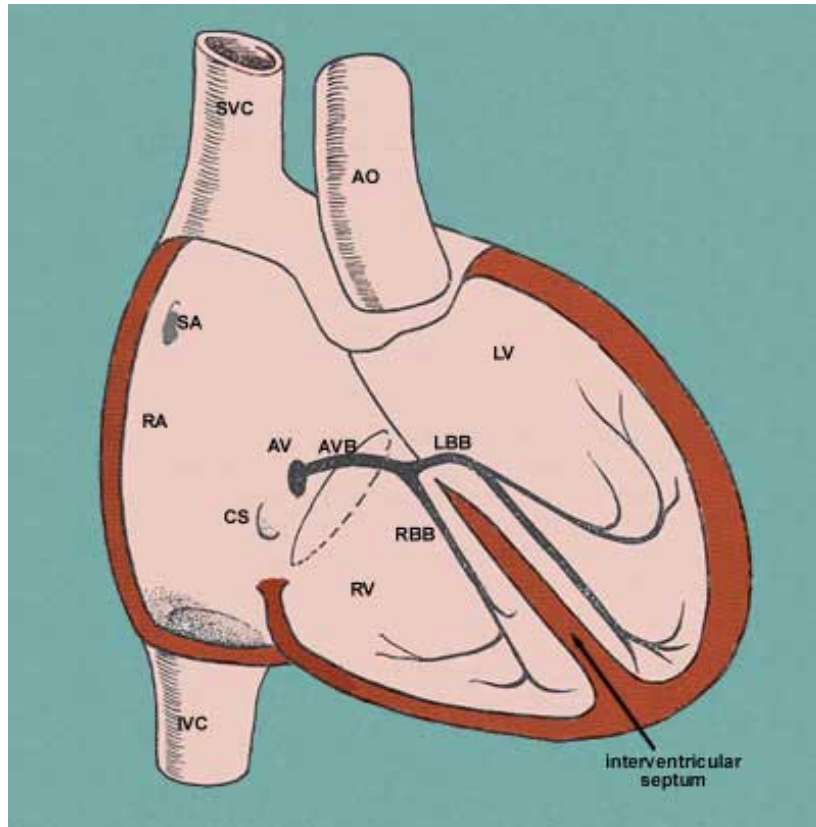
- Vagus- slows down the heart & reduces the stroke volume.
- Sympathetic stimulation- increases the heart rate and the stroke volume as well.



Conducting system.



- Heart's internal nervous system. Made up of 3 parts:
- The **sinoatrial (SA) node** at the junction of the superior vena cava with the right atrium.
- The **atrioventricular (AV) node** located on the lower part of the interatrial septum near the opening of the coronary sinus close to



- The AV bundle (His) splits over the upper part of the interventricular septum into a left bundle branch (LBB) and a right bundle branch (RBB).

Blood supply.

- Arterial - right coronary
 - left coronary
 - 3rd coronary of Beda
- Venous- great cardiac
 - middle cardiac
 - small cardiac
 - oblique vein of Marshall

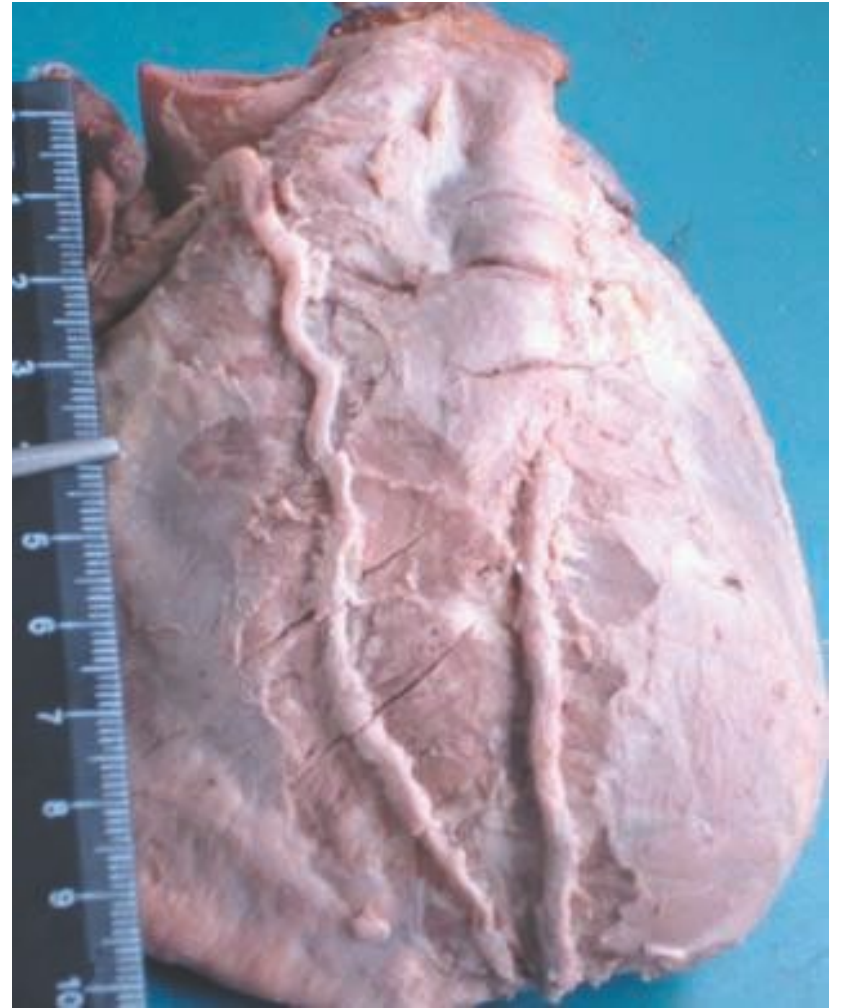


Coronary sinus.

CLINICAL ASPECTS.

- **3rd coronary** (Olabu et al 2006):
- present in 45% of the population.
- From right aortic sinus
- Source of collateral supply- anastomose with the anterior interventricular.

3rd coronary.



- **Mitral valve& subvalvular apparatus**
(Gatonga et al 2008)
- The valve architecture and the support system
- Mitral valve prolapse.

Mitral valve prolapse.



Normal Closure

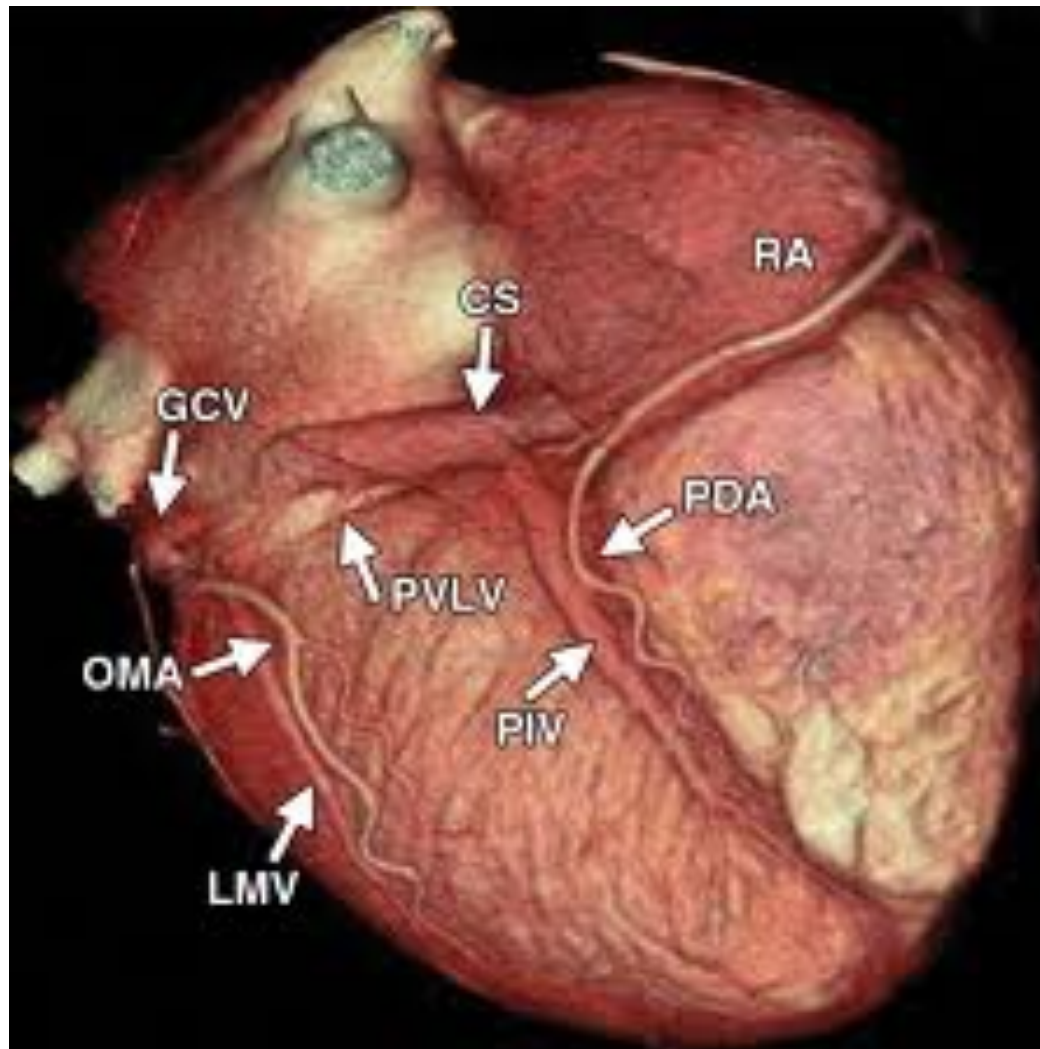


Prolapse Closure



- **Coronary sinus** (Ominde et al 2011)
- Important in catheterization.
- Thus knowledge in variant anatomy is key.
- Thebesian valve.

Coronary sinus.

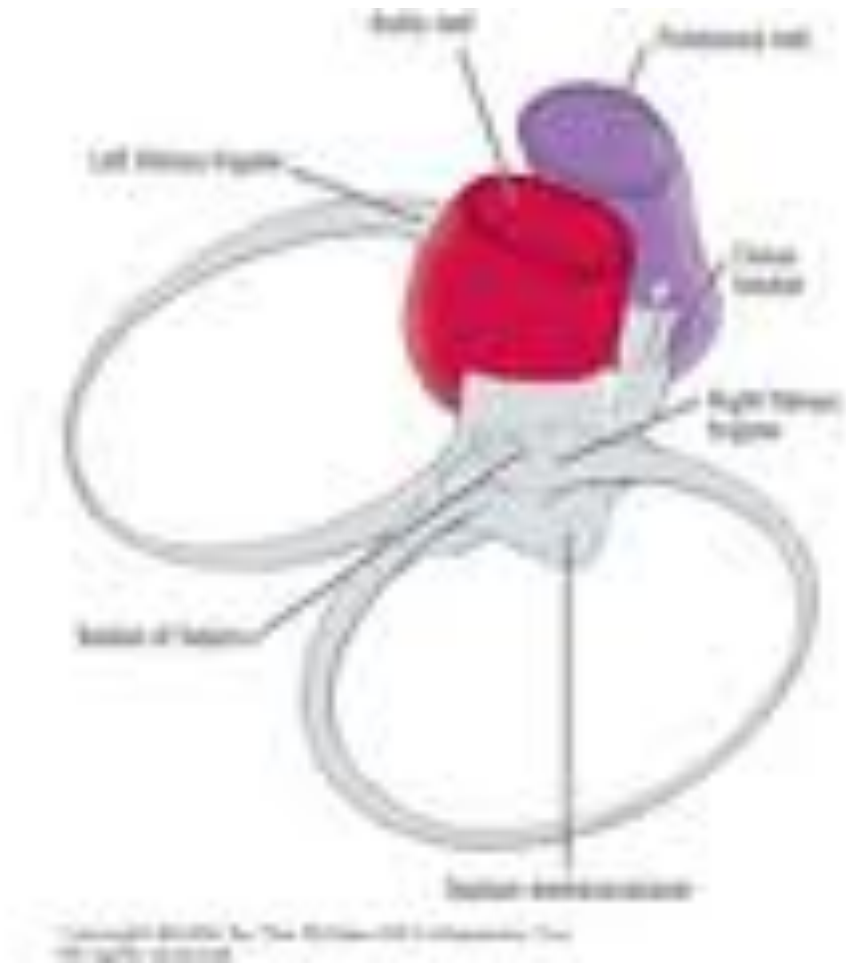


- **Left anterior descending- LAD** (Kilonzi et al 2008)
- Anterior interventricular artery.
- Most common site of coronary artery disease (CAD).

- **Atriopulmonary junction** (Poonamjeet et al 2012).
- Entry of the pulmonary veins into the left atrium.
- Basis for the occurrence of cardiac arrhythmias.

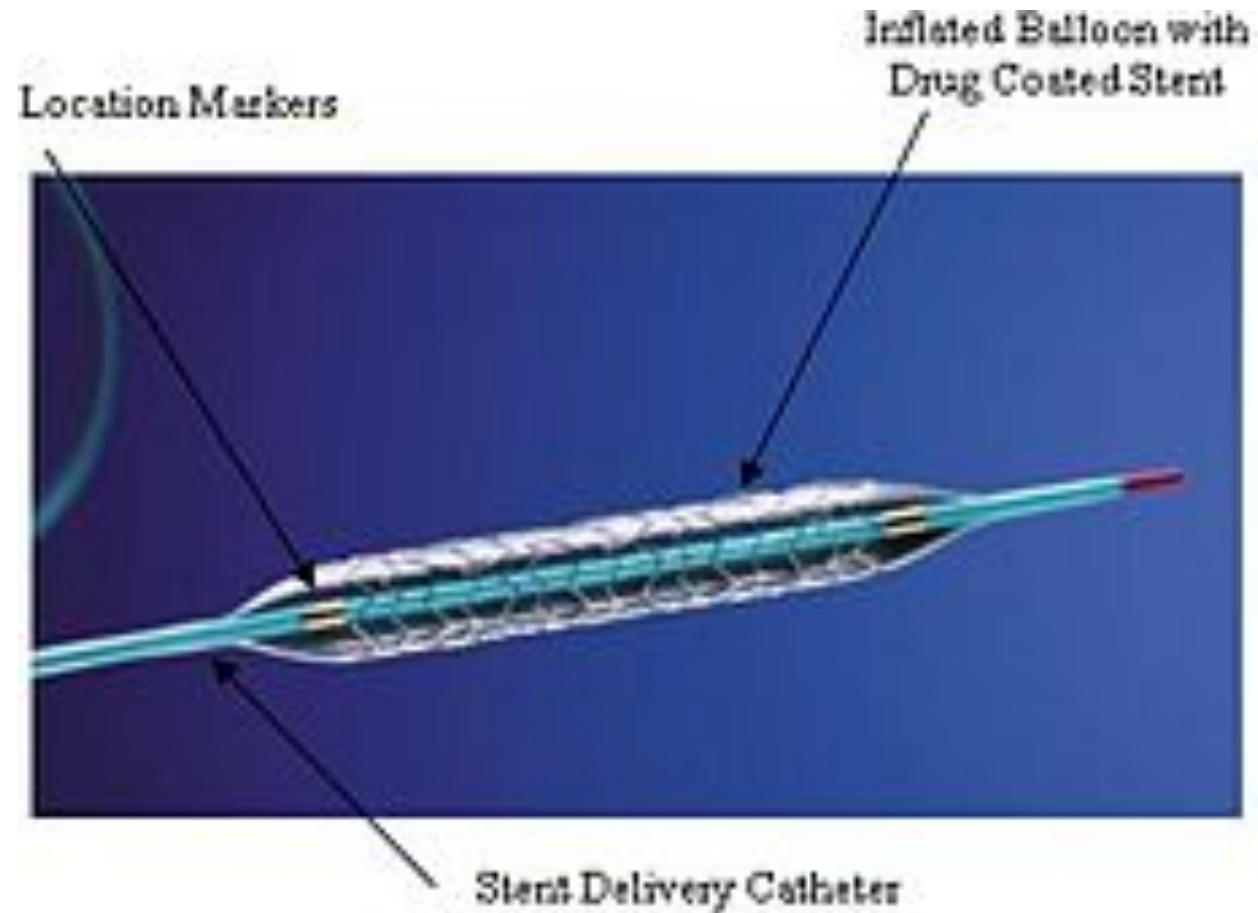
- **Atrioventricular annuli** (Hemed et al 2010)
- Annuli support the valves
- Atrioventricular valve failures.
- Valve failures more common in females.

AV annuli.

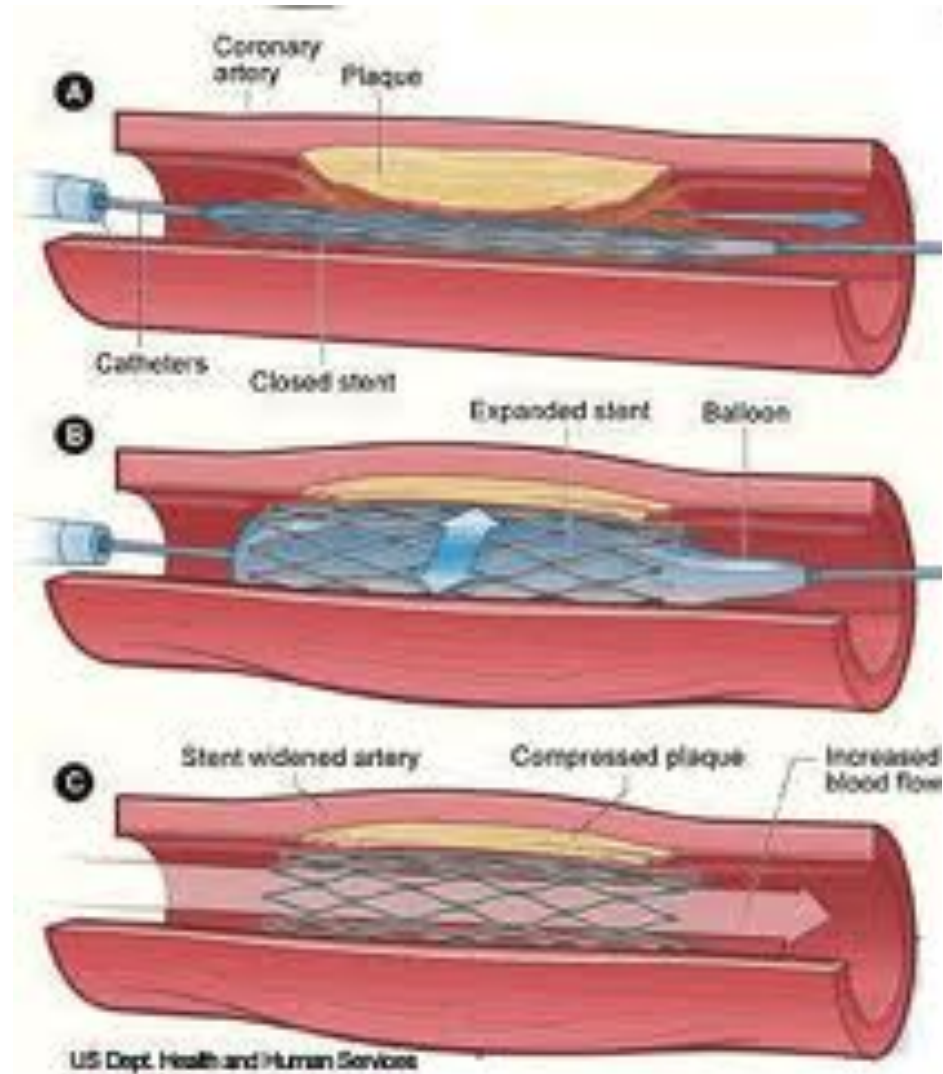


- **Stents surgery.**
- Tube insertion into the coronary arteries.
- Keeps the open
- In CAD
- Reduces the angina.

Coronary stent.



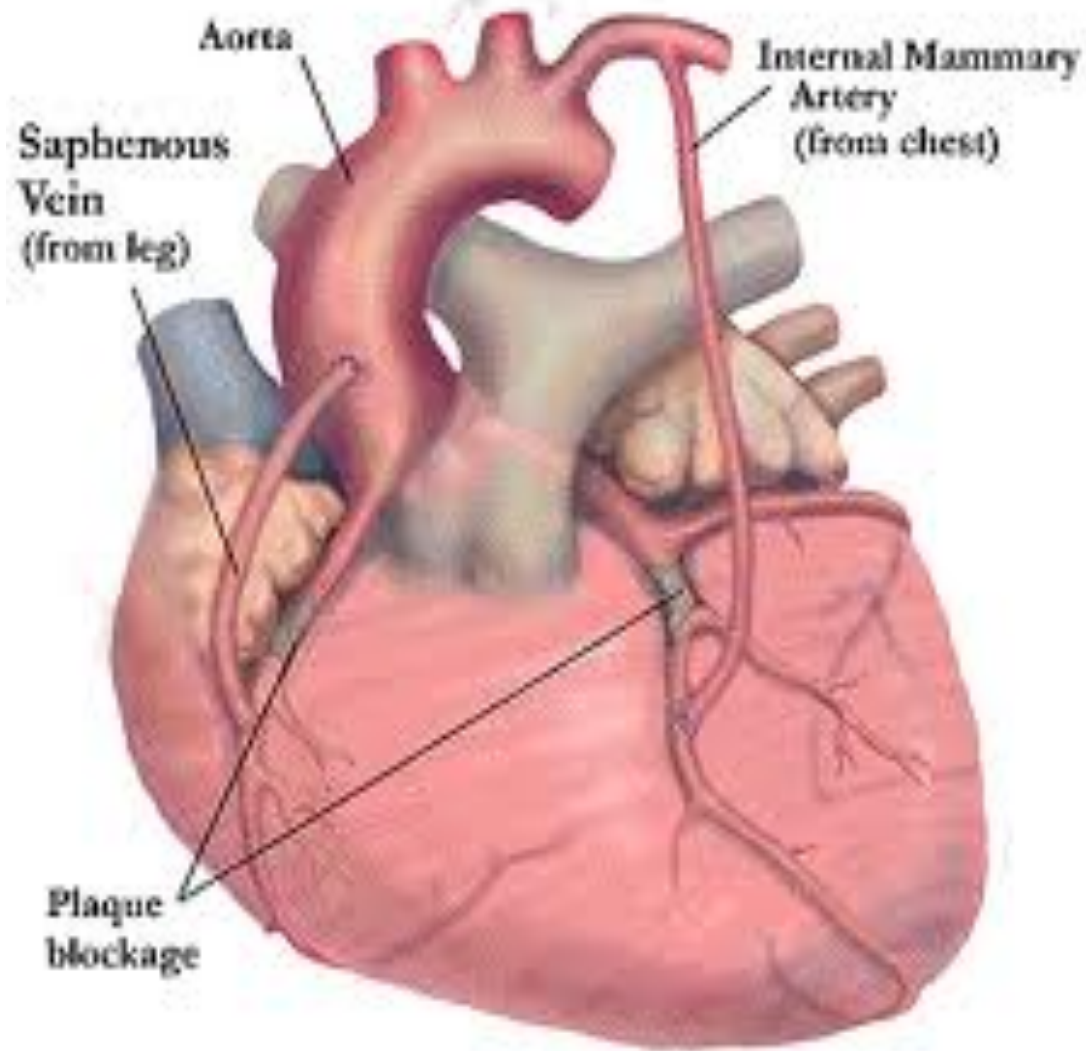
Stent surgery.



- **Pericardial stripping**
- Pericardiectomy
- Done following pericarditis.
- Entire pericardium peeled of the heart surface to allow expansion.

- **Coronary artery bypass**
- surgical procedure involving grafting of vessels.
- Enables bypassing of the stenosed/ blocked section.
- Grafts taken from other vessels: GSV
- Treatment of CAD.

Coronary bypass.



- **Angina pectoris**

- Chest pain

- Due to spasm/ obstruction of coronary vessels-
inadequate blood supply to myocardium.

- Referred to the arm. Basis?

- **Cardiac tamponade.**
- increased fluid in pericardial space
- Compresses the atria- esp right
- Reduced venous return.
- Pericardial percutaneous aspiration done.

- **THANK YOU!**