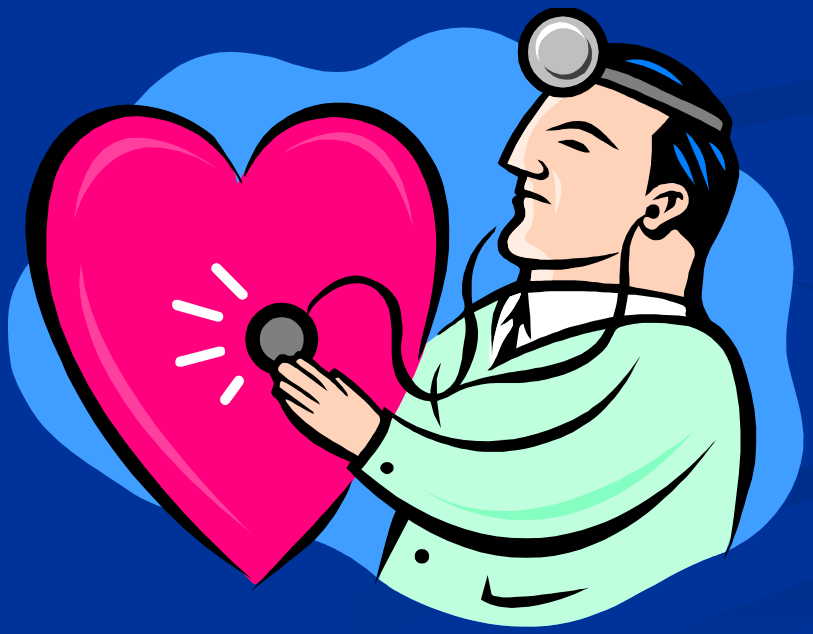
HEART SOUNDS



Dr Thouraya

Objectives

- Causes of HS
- Sites at which HS are best recorded
- Value of phonocardiography

Causes of H S

- Vibration of : the taut valves immediately after closure.

- Vibration of : the adjacent blood, the walls of the heart , the major vessels around the heart.

The 1st HS "Lub"

- Low, slightly prolonged "lub"
- Cause: closure of the AV valves
- Time: start of ventricular systole
- Duration: 0.15 sec
- Frequency: 25 – 45 Hz

The 2nd HS "Dub"

- A shorter high-pitched "dub"
- Cause: closure of the semilunar valves
- Time: end of ventricular systole
- Duration: 0.12sec
- Frequency: 50 Hz

The 3rd HS

- A weak rumbling sound at the beginning of the middle third of diastole.
- Cause: inrush of blood during rapid ventricular filling.
- Can be physiological in children, young adults, third trimester of pregnancy.
- Is pathological if in : > 40 years, volume overload of a ventricle, myocardial failure
- The frequency is so low that it can't be heard, yet it can often be recorded in the phonocardiogram.

4th HS

- Cause: End of ventricular filling(when the atria contract).
- Time: immediately before 1st HS when atrial pressure is high or the ventricle is stif in conditions such : ventricular hypertrohy, hypertensive disease, aortic stenosis.
- Rarely heard in normal adults (trained athletic).

AUSCULTATION

Listening to HS using a stethoscope

Stethoscope:

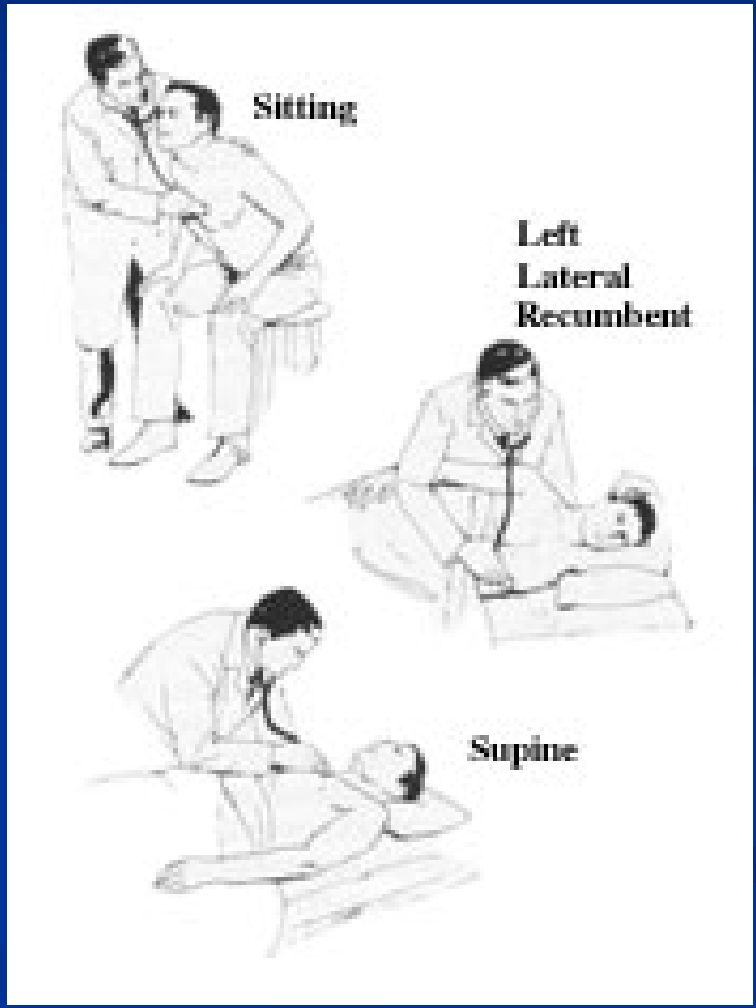
- Earpieces
- Rubber tubing
- Chest pieces:

  Diaphragm: high frequency sounds S1, S2

  Bell: low frequency sounds S3 , S4

Position of the patient

- Supine
- Left lateral
- Sitting



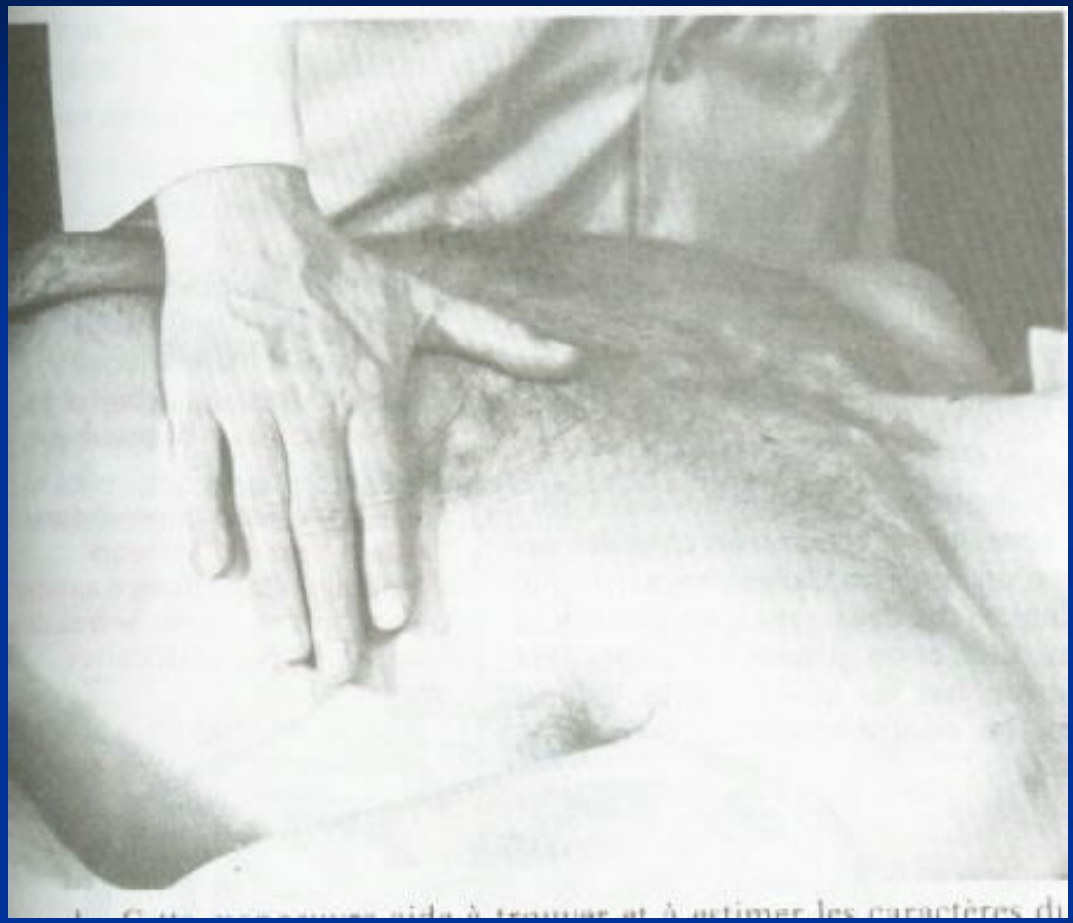
Clinical methods

- **Inspection**:

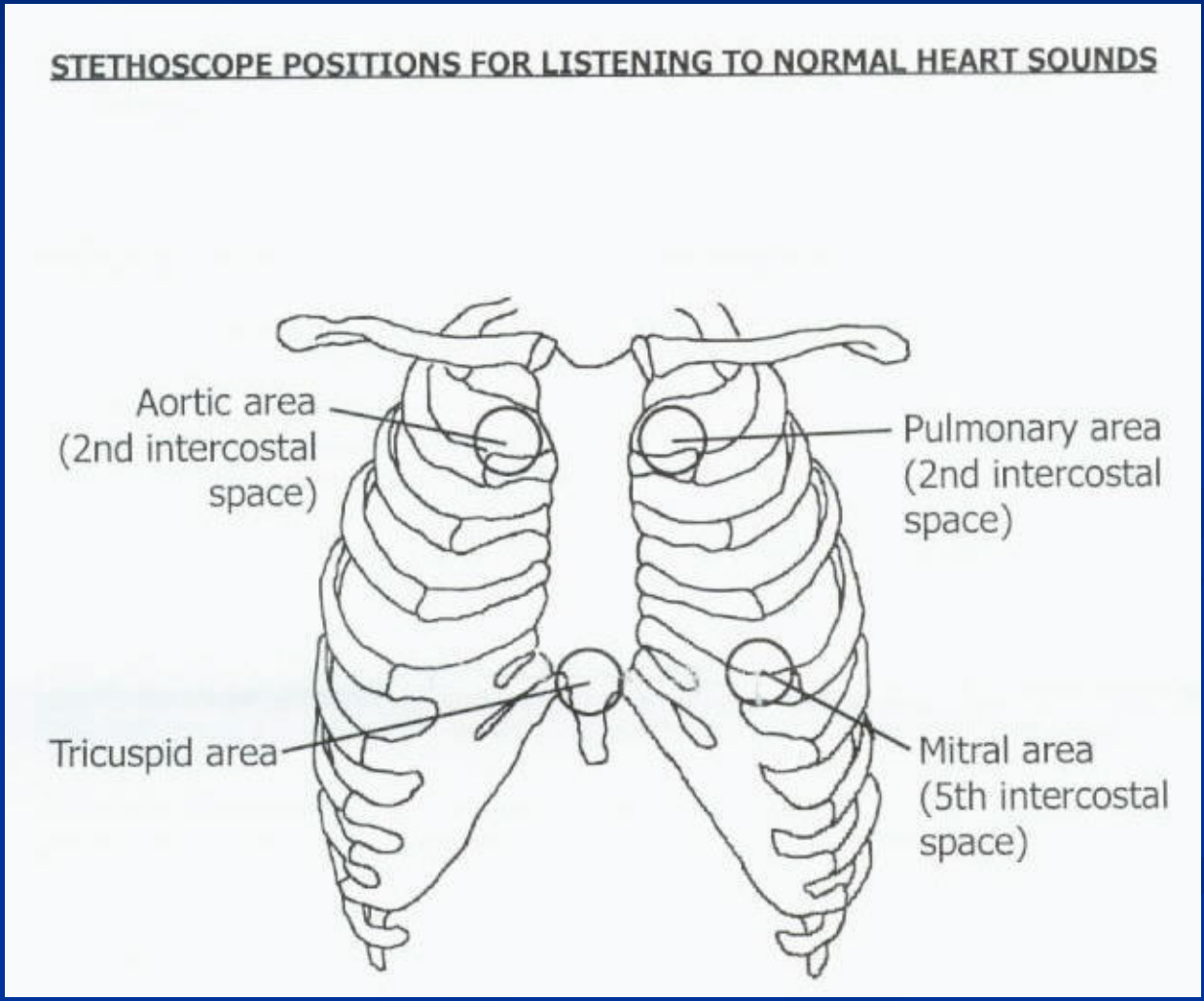
Examine the chest wall for any visible pulsation.

- **Palpation**:

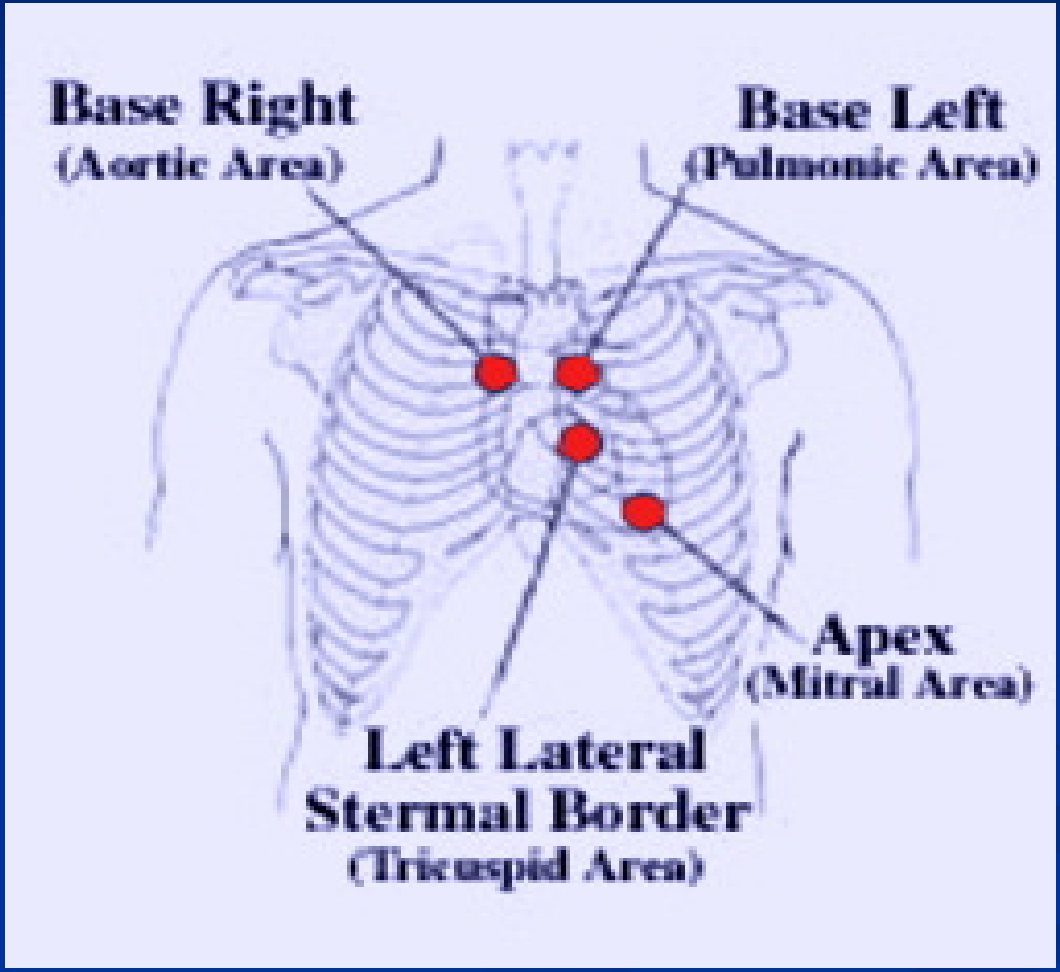
Locate the **apex beat** (the outermost and lowermost distinct cardiac pulsation)



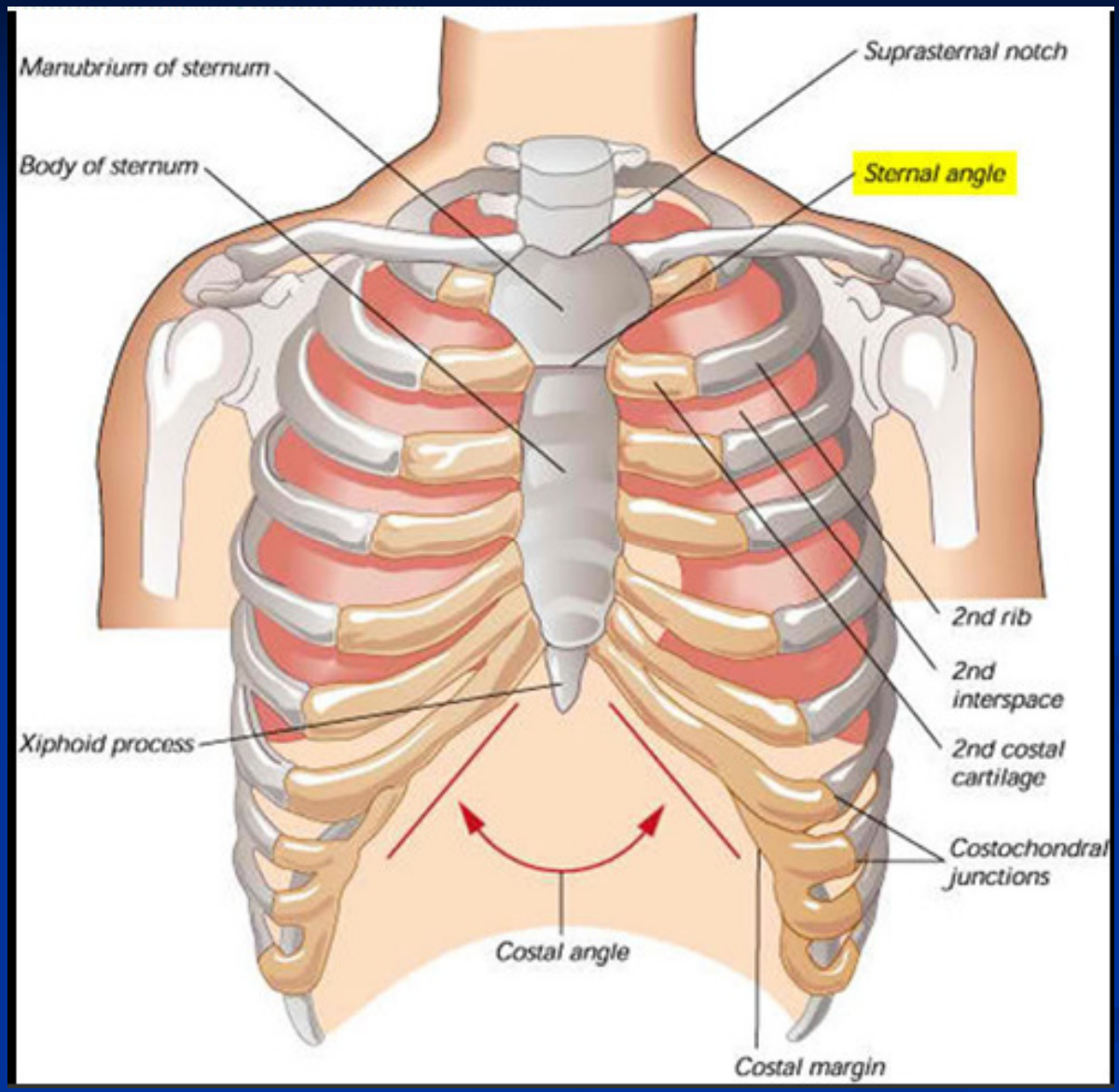
Sites of auscultation



Sites of auscultation



- **Mitral area:** The site of the apex beat. In the 5th left intercostal space, approximately 1 cm inside the mid-clavicular line and 9 cm from the mid-line.
- **Pulmonary area**: In the 2nd left intercostal space at the sternal border
- **Aortic area**: In the 2nd right intercostal space at the sternal border
- **Tricuspid area**: lies just to the left of the lower sternum


Manubrium of sternum
Suprasternal notch
Body of sternum
Sternal angle
2nd rib
2nd interspace
Xiphoid process
2nd costal cartilage
Costochondral junctions
Costal angle
Costal margin

Cardiac Murmurs

Murmurs are caused by:

a) Diseases that cause structural damage to the heart valves and/or

b) Haemodynamic changes e.g. increased blood flow velocity, altered resistance or decreased blood viscosity

Examples:

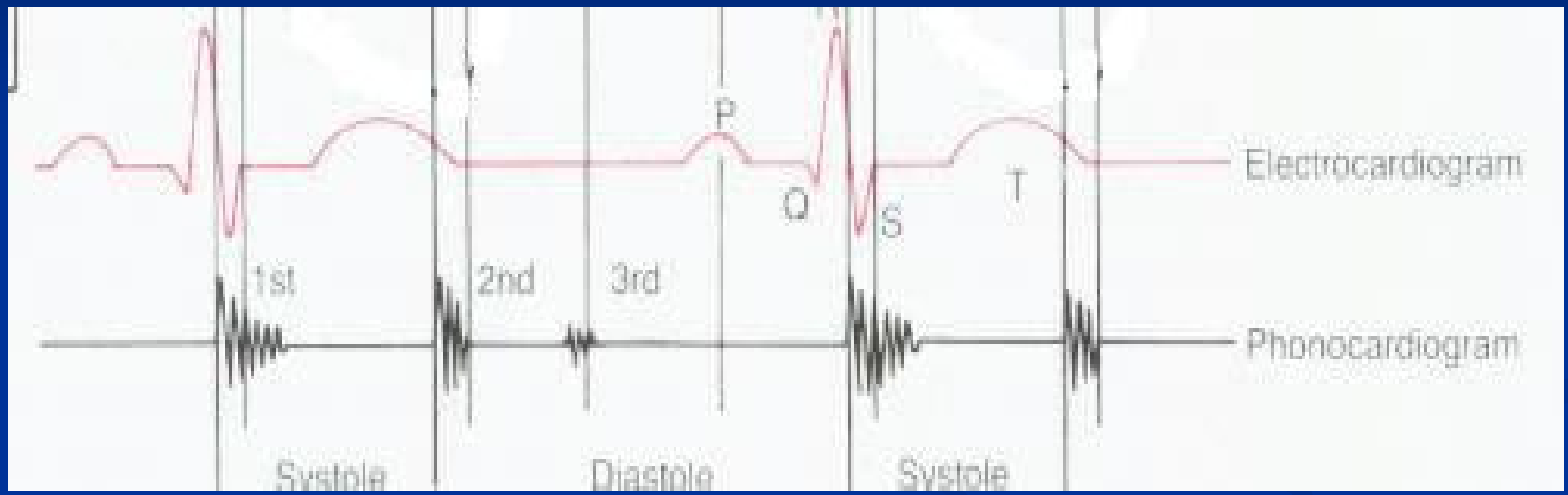
Systolic murmurs: Aortic / pulmonary stenosis
Tricuspid / mitral regurgitation

Diastolic murmurs: Aortic regurgitation
Mitral stenosis

Phonocardiography

Recording of HS

- Transducer :placed on auscultation areas
- ECG: standard limb leads


P
Q
S
T
Electrocardiogram
1st
2nd
3rd
Phonocardiogram
Systole
Diastole
Systole

THANK YOU