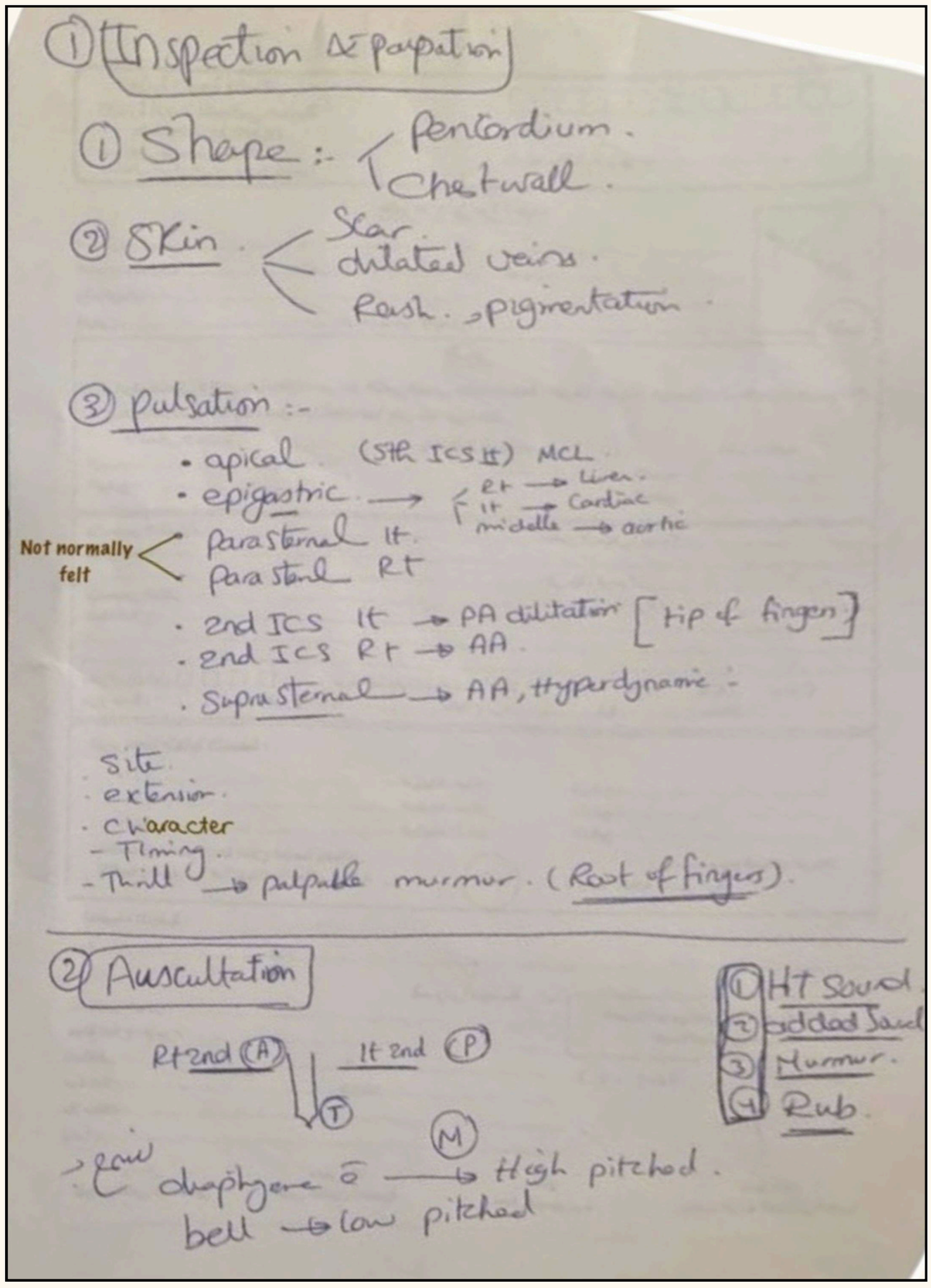
ECE Practical

Cardiac Examination

2. Cardiac Apex (Palpation & Auscultation)

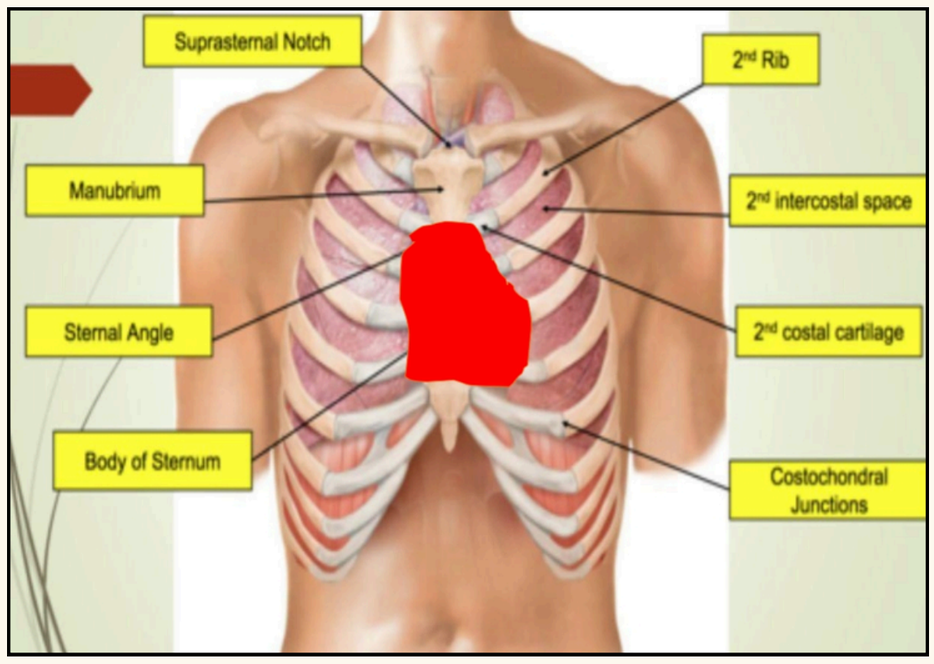
1- Introduce yourself & examine from the right side of the patient.
2- Explain the purpose.
3- Obtain consent.
4- Ask the patient about (name – age – pain).
5- Ensure the patient is comfortable.
6- Position the patient at 45 degrees appropriately and ensure proper exposure for the examination.
7- Look for the sternal angle.
8- Locate the apex: Left 5th intercostal space in the midclavicular line.
9- If Palpation: Use your fingertips or palm to palpate for the apex beat. It is usually felt in the left chest wall.
If Auscultation: Place the stethoscope at the apex to listen to S1 heart sound.
10- Evaluate its amplitude and duration (e.g., displaced or forceful in left ventricular hypertrophy).
11- Thank the patient.

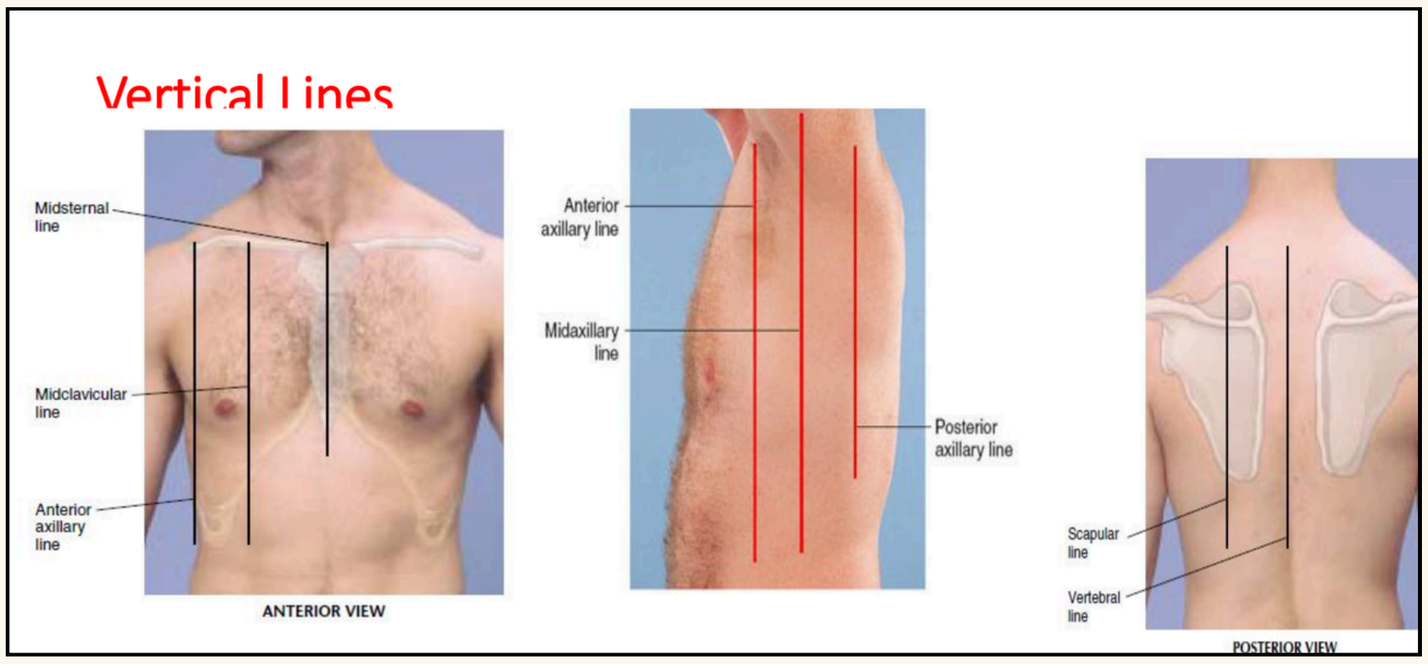
N.B: May ask you about 2nd rt or Lt intercostal space also



ECE Practical

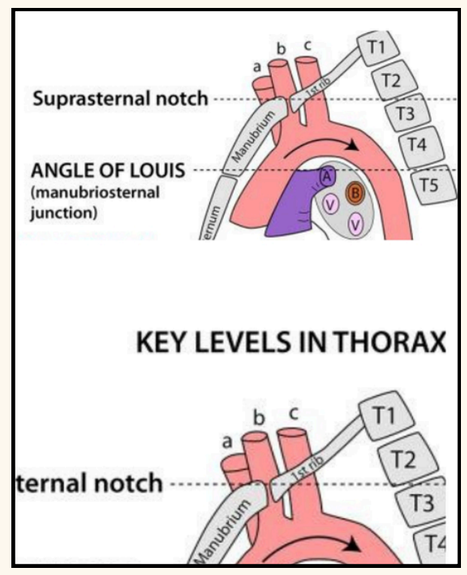
Anatomy of Chest Wall





Sternal Angle= Angle of Louis

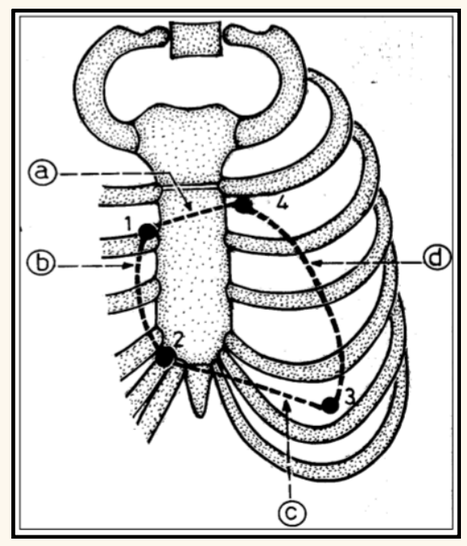
1. Junction of manubrium with body of sternum.
2. Level of tracheal bifurcation.
3. Meeting of lung borders.
4. Upper limit of atria.
5. Aortic arch starts and ends at this level.
6. Level of separation between superior and inferior mediastinum.
7. Pulmonary artery bifurcates just below this level.
8. Center of right atrium is ~5 cm below the sternal angle.
9. Azygos vein opens into SVC at this level.
10. Opposite the disc between T4 and T5 vertebrae.



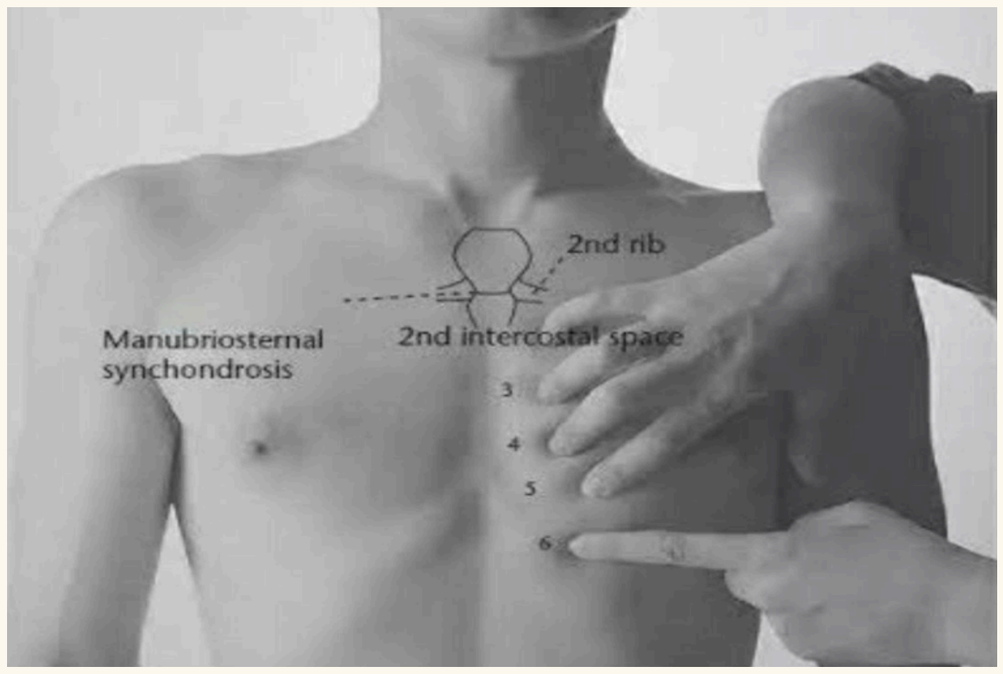
.....

Surface Anatomy of the Heart:

1 → 1 inch from midline (upper border of 3rd right costal cartilage)
2 → 0.5 inch from midline (right 6th costal cartilage)
3 → 3.5 inches from midline (left 5th intercostal space – apex)
4 → 1.5 inches from midline (lower border of 2nd left costal cartilage).



.....



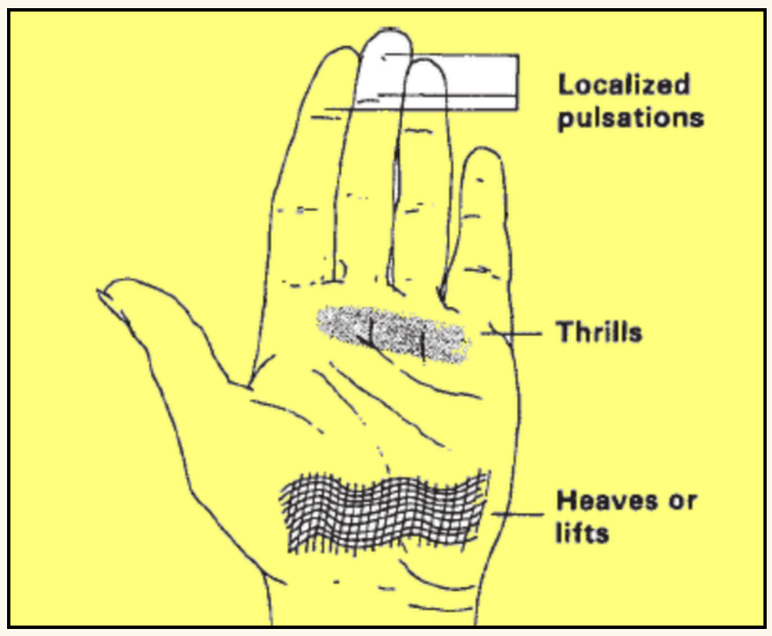
📌 How to locate the 2nd intercostal space:

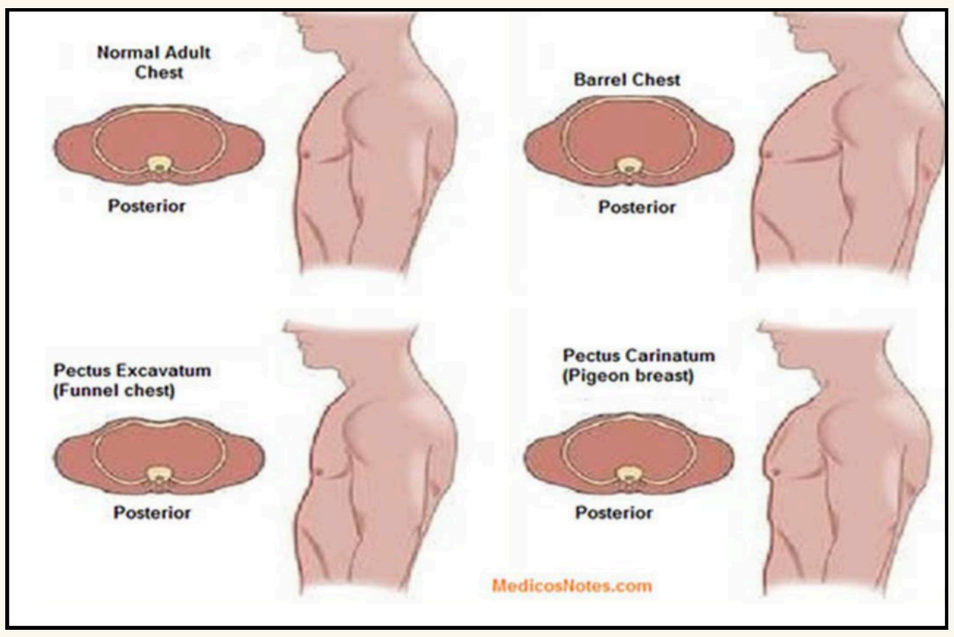
1. Start at the suprasternal notch (jugular notch).
2. Move your fingers downward until you feel a bony ridge — this is the sternal angle (Angle of Louis).
3. Just lateral to this angle on either side lies the 2nd costal cartilage, and below it is the 2nd intercostal space.

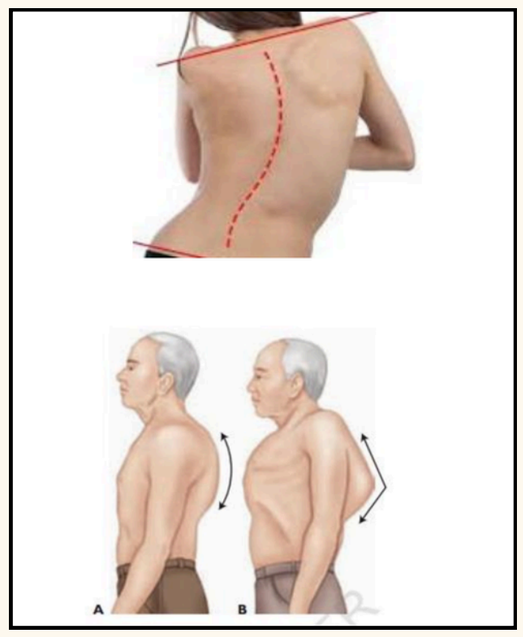
سؤال مهم

ECE Practical

Local Cardiac Examination



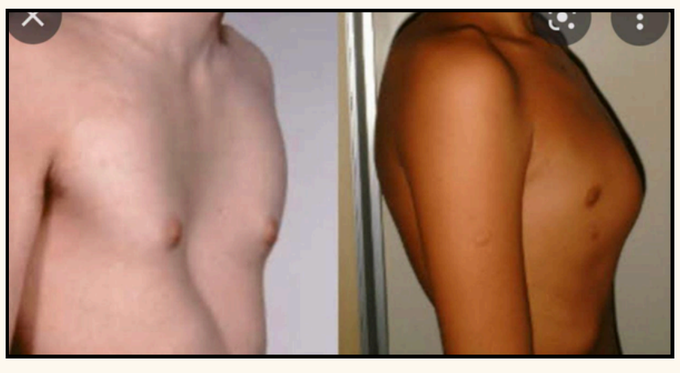




Inspection & Palpation

The following should be noticed:

- Shape of the precordium
- Shape of the chest wall
- Scars of previous cardiac surgery
- Rate and pattern of respiration
- Dilated veins
- Pulsations



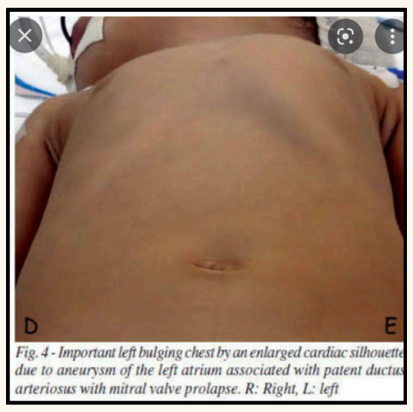
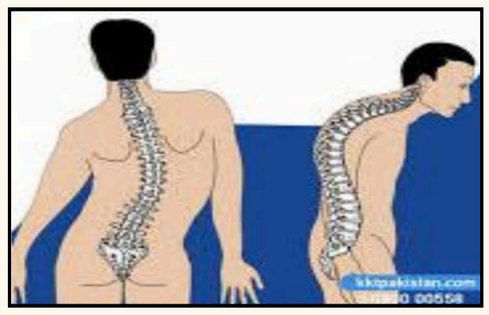
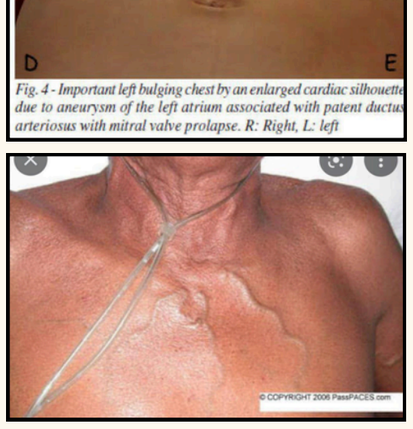


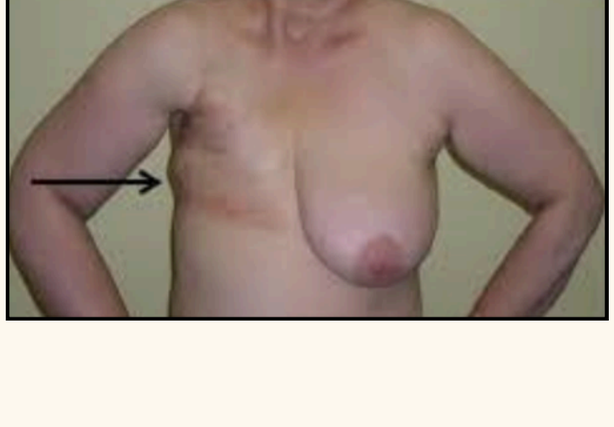
Fig. 4 - Important left bulging chest by an enlarged cardiac silhouette due to aneurysm of the left atrium associated with patent ductus arteriosus with mitral valve prolapse. R: Right, L: left

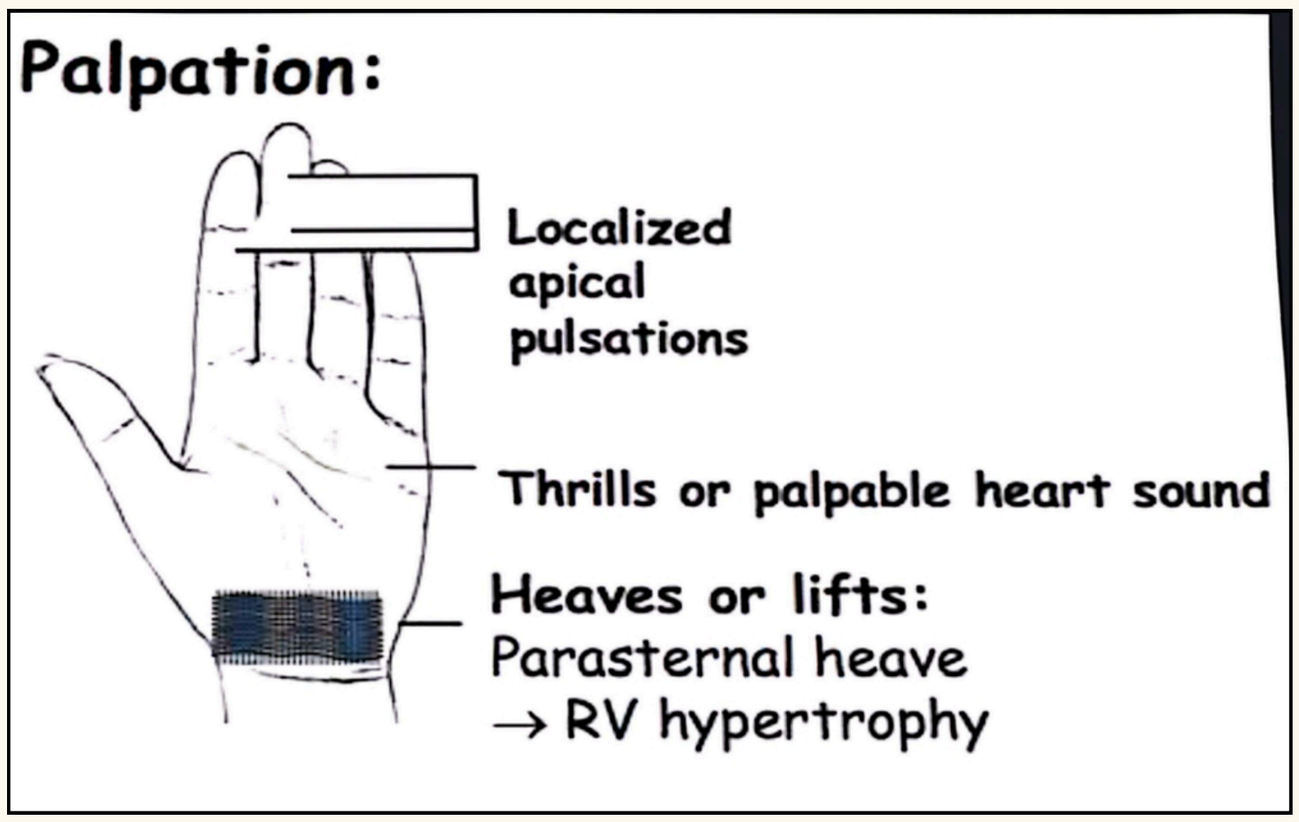




- **Scars to Inspect**
  - Scar of wounds
  - Scar of burns
  - Scar of irradiations
  - Scars of operations:

1. Midline sternal incision (Sternotomy)
2. Axillary scar (for intercostal tube insertion & thoracoscopy)
3. Minithoracotomy scar



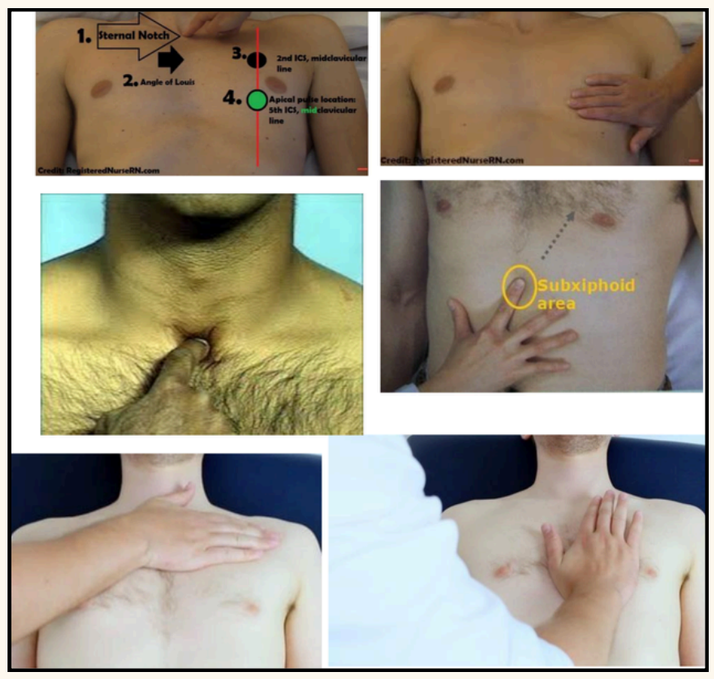


ECE Practical

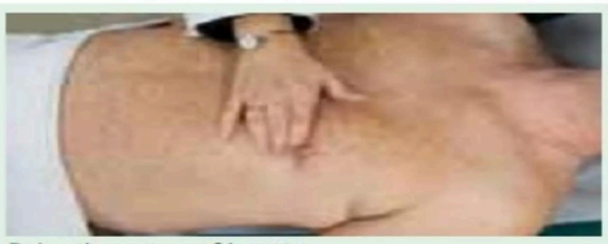
Local Cardiac Examination

Pulsations (Clockwise Distribution)

- Apical pulsation
- Epigastric pulsation
- Right parasternal pulsation
- Suprasternal pulsation
- 2nd left intercostal space pulsation
- Left parasternal pulsation



- **Palpating the Precordium**
- - Identify and palpate each cardiac site for pulsations, and thrills:
- - Apex (left ventricular area), or mitral area fifth intercostals space, midclavicular line.


Palpating apex of heart

Apical Pulsation

- **Definition** → Lowermost, outermost visible/palpable cardiac impulse.
- **Examination:**

>Site
>Extent: localized or diffuse
>Character: hyperdynamic, heaving, weak, or absent
>Form: systolic bulge or retraction
>Palpable sound or thrill
→ Helps differentiate LV apex vs. RV apex

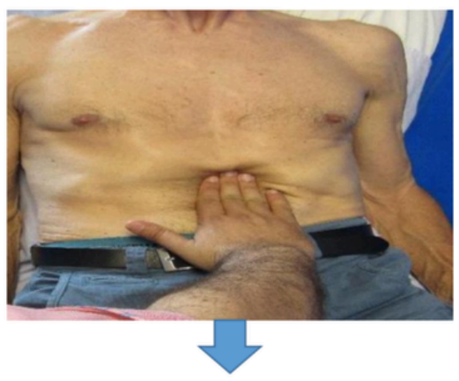
- **Technique:**

1. If not palpable in supine, shift patient to left lateral decubitus.
2. Use palmar surface of fingers.
3. Ask patient to exhale and hold breath to enhance palpation

Other Pulsations

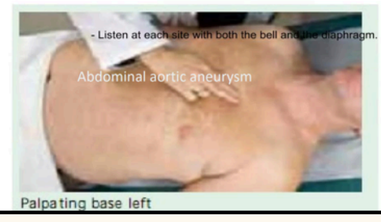
1. Epigastric pulsations
2. LPS pulsation = RVE
3. 2nd Lt ICS = PA dilatation
4. 2nd Rt ICS = Aortic aneurysm
5. Suprasternal = Aortic aneurysm / Hyperdynamic circulation

Epigastric Pulsations



Hepatic	Aortic	Cardiac
To the right	At midline	To the left
■Systolic in TR (prominent V wave) ■Presystolic in TS (prominent a wave)	■Thin persons ■Abdominal aortic aneurysm ■Transmission by a tumour	RV dilatation

- - Base left (pulmonic area), second intercostal space left sternal border.



Palpating base left

- - Base right (aortic area), second intercostals space right sternal border


Palpating base right

Thrills

- Sensation like a vibrating mobile phone
- Best felt by finger roots
- Represent palpable murmurs
- occur with loud murmurs ≥ grade 4/6
- Suggest an organic murmur

ECE Practical

Local Cardiac Examination

Auscultation

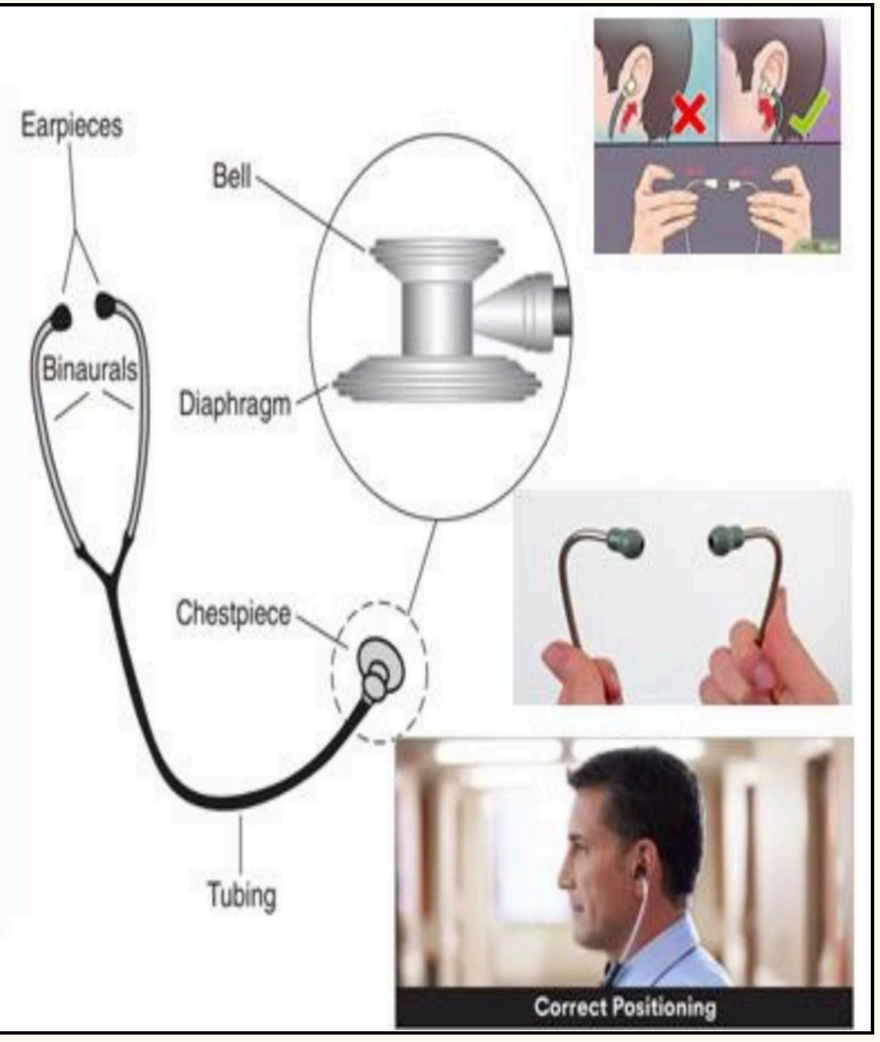
A stethoscope has the following four basic parts

1. cone(bell)
to detect low-pitched sounds (e.g., heart S) , press lightly against the skin

2. diaphragm:
detect high-pitched sounds (e.g., Lung S). press firmly against the skin

3.Tubing

4.earpieces: should point in a forward direction as you insert them into your ears. The stethoscope headset is angled to complement the anatomy of the typical ear canal.



Auscultation

1. Position the patient supine with the head of the table slightly elevated.
2. Always examine from the patient's right side. A quiet room is essential.
3. Listen with the diaphragm at the right 2nd intercostal near the sternum (aortic area).
4. Listen with the diaphragm at the left 2nd intercostal near the sternum (pulmonic area).
5. Listen with the diaphragm at the left 3rd, 4th, and 5th interspaces near the sternum (tricuspid area).

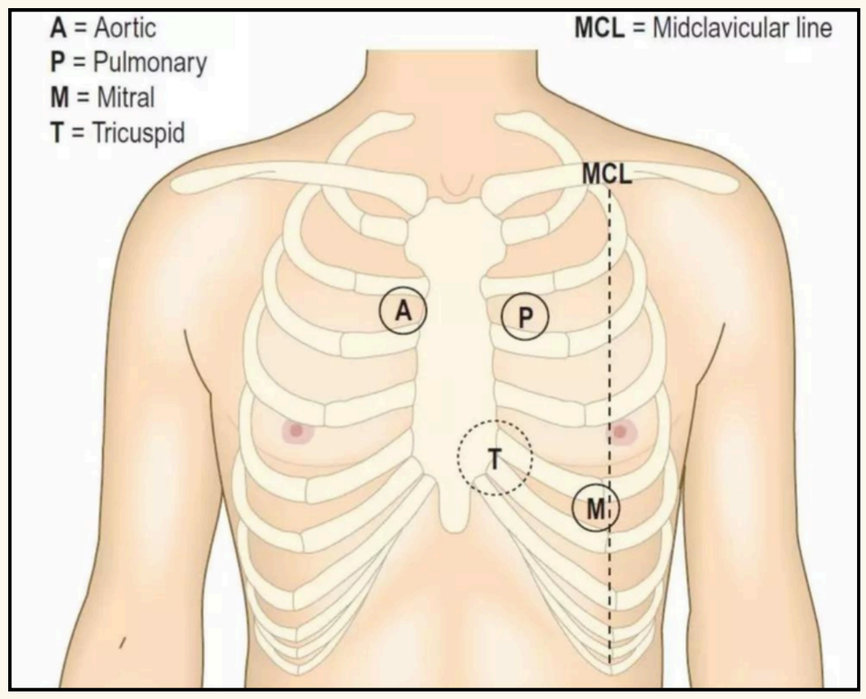
6. Listen with the diaphragm at the apex (mitral area).
7. Listen with the bell at the apex.
8. Listen with the bell at the left 4th and 5th intercostal near the sternum.
9. Have the patient roll on their left side.
   - Listen with the **bell** at the apex.
   - This position brings out S3 and mitral murmurs.
10. Have the patient sit up, lean forward, and hold their breath in exhalation.
    - Listen with the diaphragm at the left 3rd and 4th intercostal near the sternum.
    - This position brings out aortic murmurs.
11. Record S1, S2.
12. Auscultate the carotid arteries.

Cardiac Auscultation Areas

1. Right 2nd ICS → **Aortic area**
2. Left 2nd ICS → **Pulmonic area**
3. Left lower sternal border → **Tricuspid area**
4. Apex (over apical impulse) → **Mitral area**

Heart Sounds

- **S1** ("lub") → Closure of mitral & tricuspid valves
- **S2** ("dub") → Closure of aortic & pulmonic valves
- Low-pitched sounds → **S3, S4**, mitral stenosis



Heart Murmurs – Timing in Cardiac Cycle

- A. **Systolic Murmurs** (during contraction)

- Mitral regurgitation
- Aortic stenosis
- Ventricular septal defect (VSD)

- B. **Diastolic Murmurs** (during relaxation)

- Mitral stenosis
- Aortic regurgitation

- C. **Continuous Murmurs** (systole + diastole)

- Patent ductus arteriosus (PDA)