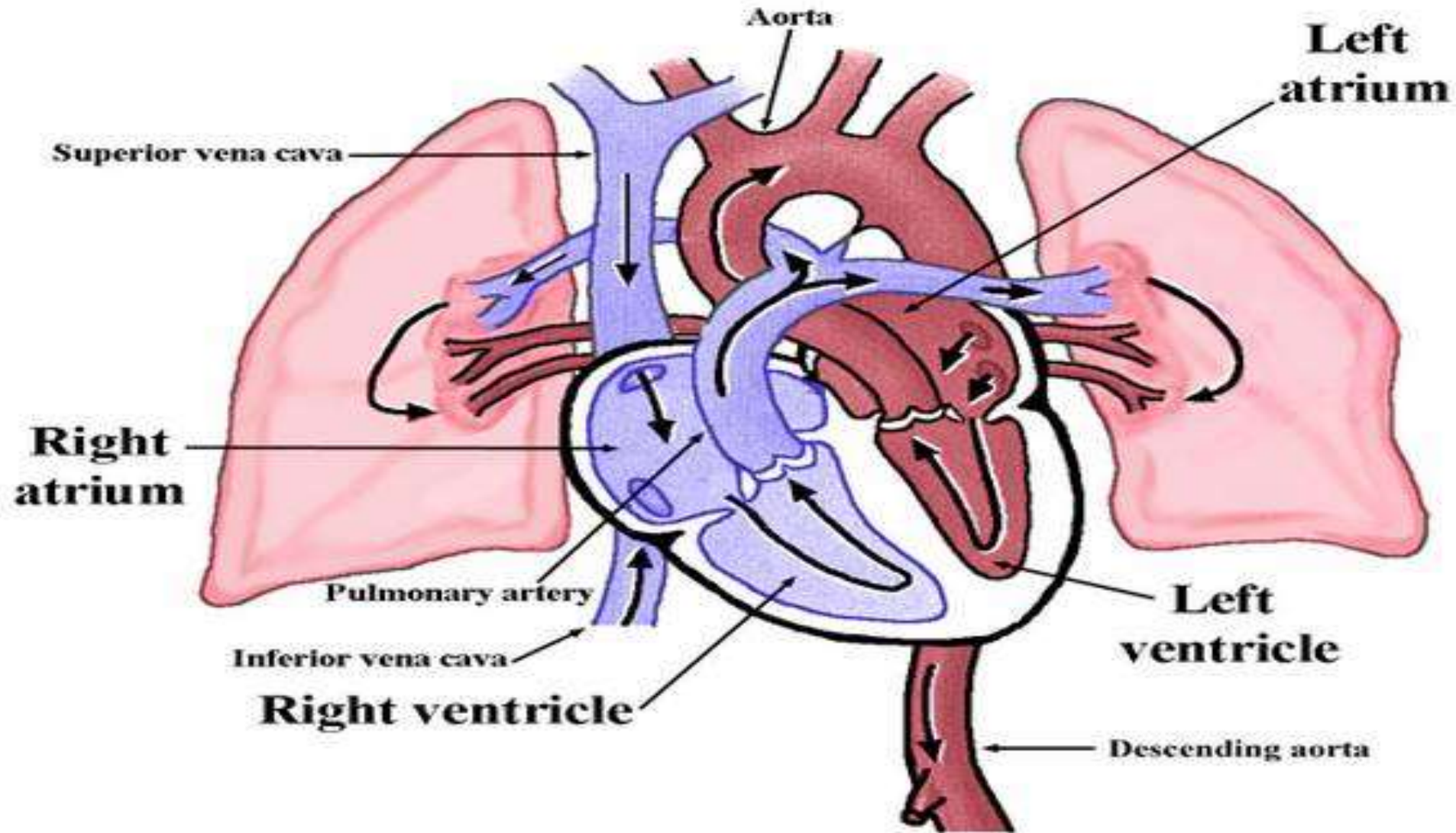


CARDIOVASCULAR EXAMINATION

- The precordium -

Dr. Zaid Alhelo

ANATOMY



Definitions :

- **The precordium** : the area of the anterior chest wall over the heart
- **Apex beat** : the point on the precordium farthest outwards (laterally) and downwards (inferiorly) from the sternum at which the cardiac impulse can be felt, results from the left ventricle moving forward and striking the chest wall during systole . normally in the fifth left intercostal space at the mid-clavicular line . It can be impalpable (overweight or emphysema) or displaced (left ventricular dilatation).
- **Heave** : is a palpable impulse that noticeably lifts your hand.(the upward push on your hand when you palpate the precordium). Parasternal heaves are present in patients with right ventricular hypertrophy
- **Heart murmurs** : sounds during heartbeat cycle — such as whooshing or swishing , produced by turbulent blood flow across an abnormal valve, septal defect or outflow obstruction.
- **Thrill** : is the tactile equivalent of a murmur and is a palpable vibration.(It is a murmur that you can feel)

Examination sequence :

Introduction :

- **Introduce yourself**
- **Confirm patient details – *name / age***
- **Wash hands**
- **Explain the examination**
- **Gain consent , maintain privacy , offer the patient a chaperone .**
- **Position the patient at 45° with their chest exposed with shoulders horizontal**
- **Ask if the patient currently has any pain**

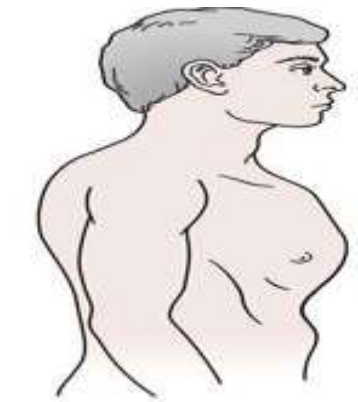
inspection :

1) Scars:

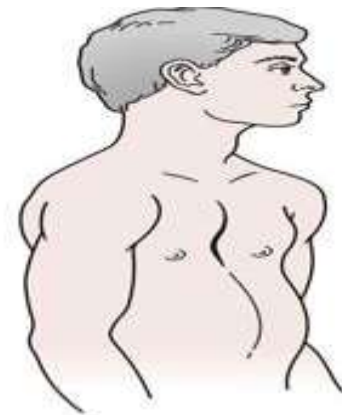
- A midline sternotomy scar : usually indicates previous coronary artery bypass surgery or aortic valve replacement .
- Infraclavicular scars : seen after pacemaker or defibrillator implantation, and the bulge of the device may be obvious.

2) Chest wall deformities – pectus excavatum / pectus carinatum

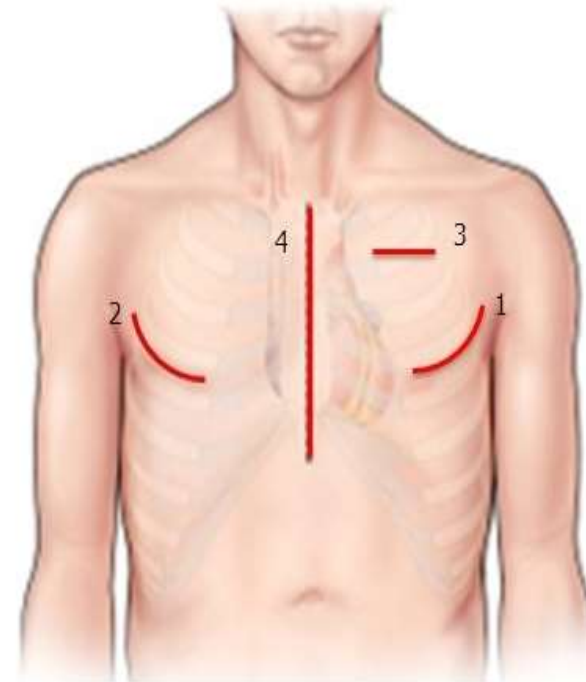
3) Visible pulsations – forceful apex beat may be visible



PECTUS CARINATUM

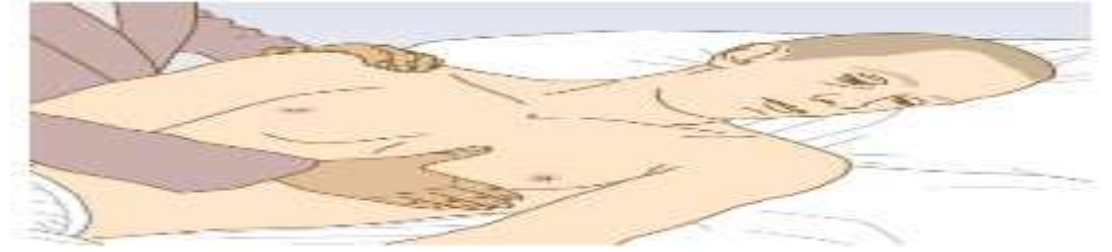


PECTUS EXCAVATUM



Palpation :

- ■ Locate the **apex beat** by lying your fingers on the chest parallel to the rib spaces(your fingers placed horizontally across the chest) .



- ■ Place the **heel** of your hand parallel to the left sternal edge (fingers vertical) to palpate for **heaves** . If heaves are present you should feel the heel of your hand being lifted with each systole



- ■ Palpate for **thrills** , You should assess for a thrill across each of the heart valves in turn using the **flat of your fingers**

Auscultation :

*) Make sure the room is quiet when you auscultate

1) Auscultate through the valve areas using the diaphragm of the stethoscope:

Mitral valve , Tricuspid valve , Pulmonary valve , Aortic valve

- **Mitral valve** – 5th intercostal space – *midclavicular line (apex beat)*
- **Tricuspid valve** – 4th intercostal space – *lower left sternal edge*
- **Pulmonary valve** – 2nd intercostal space – *upper left sternal edge*
- **Aortic valve** – 2nd intercostal space – *upper right sternal edge*

2) Repeat auscultation across the four valves with the bell of the stethoscope.





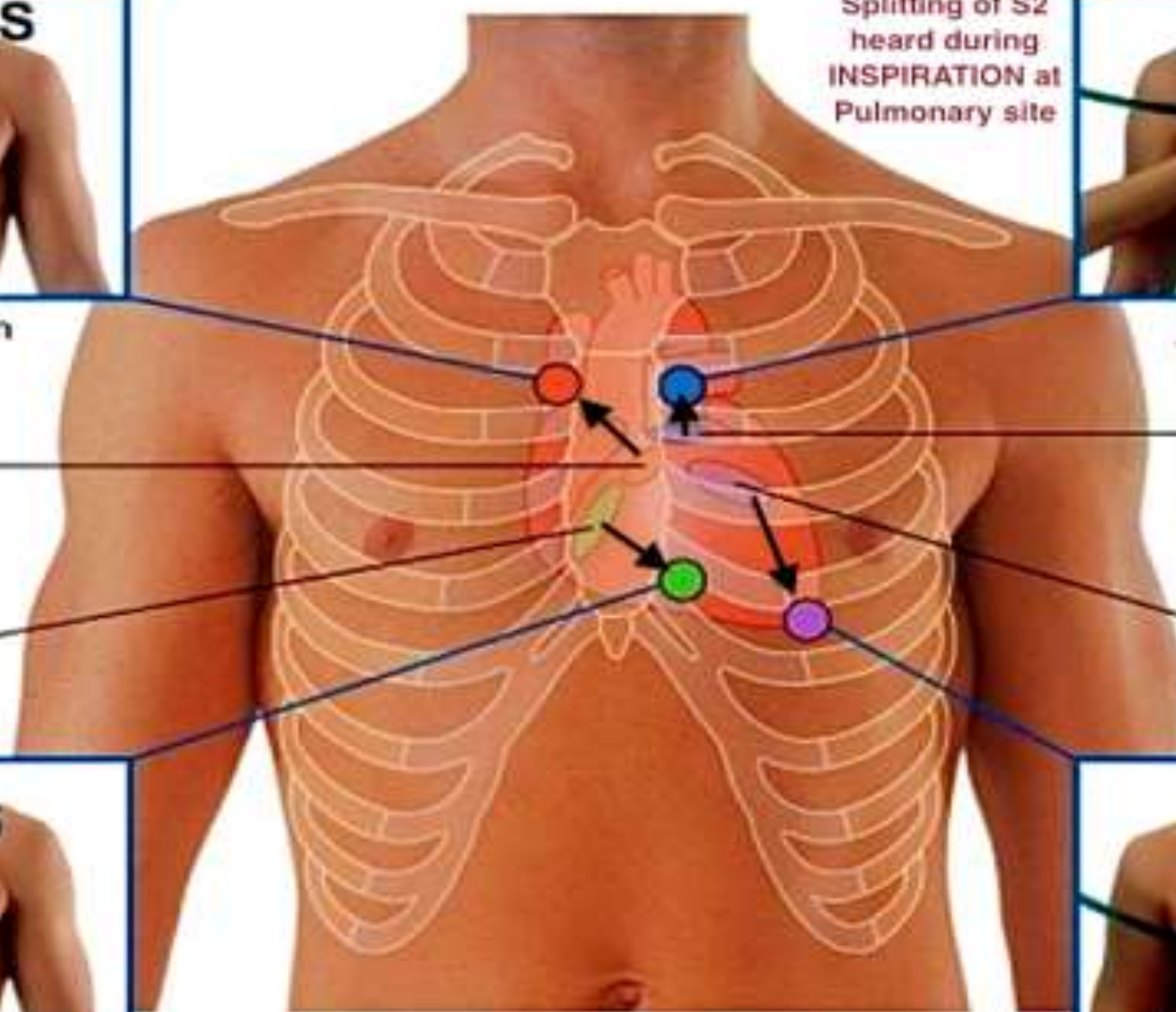
Auscultation position
for aortic valve

Aortic valve

Tricuspid valve



Auscultation position
for tricuspid valve



Auscultation position
for pulmonary valve

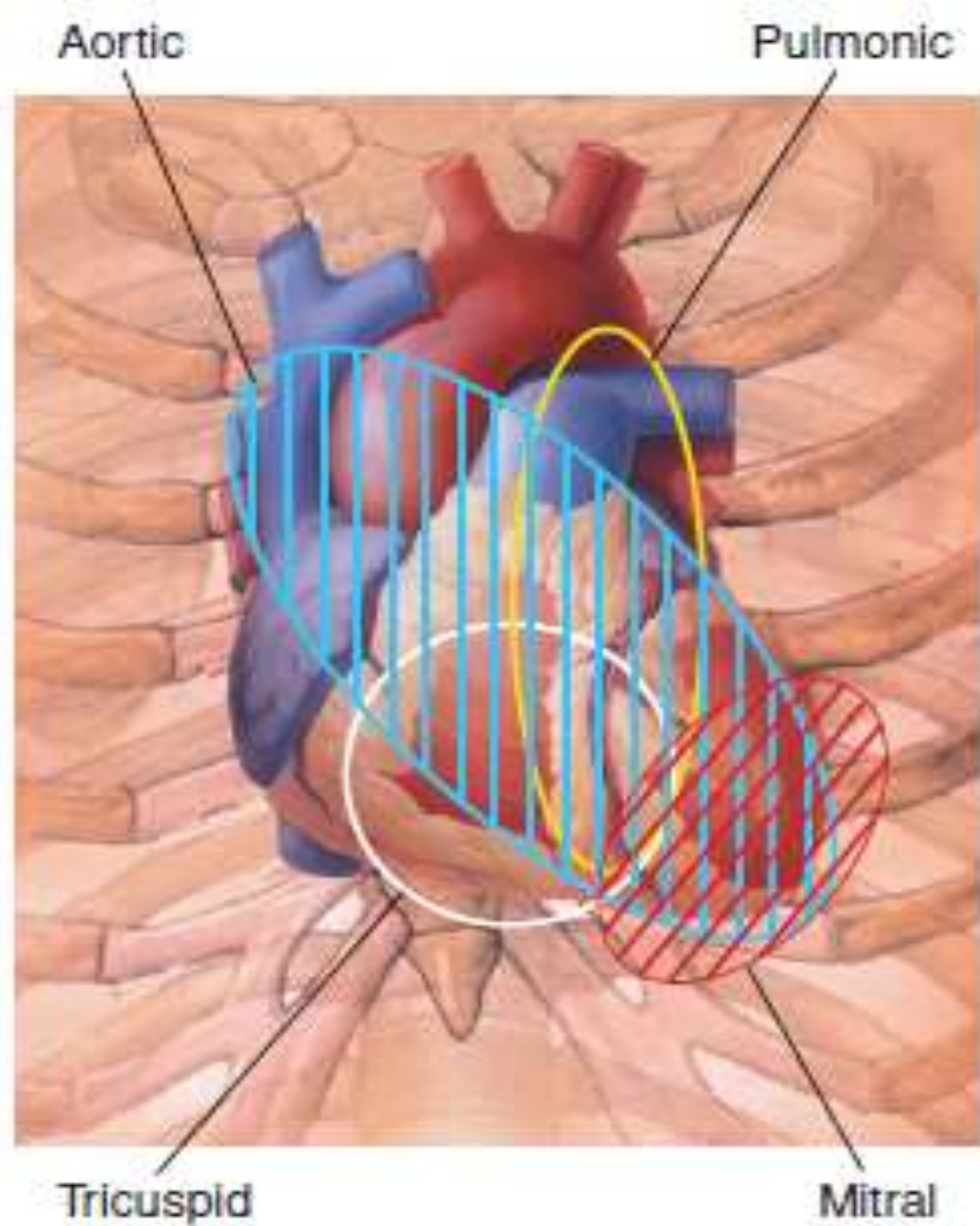
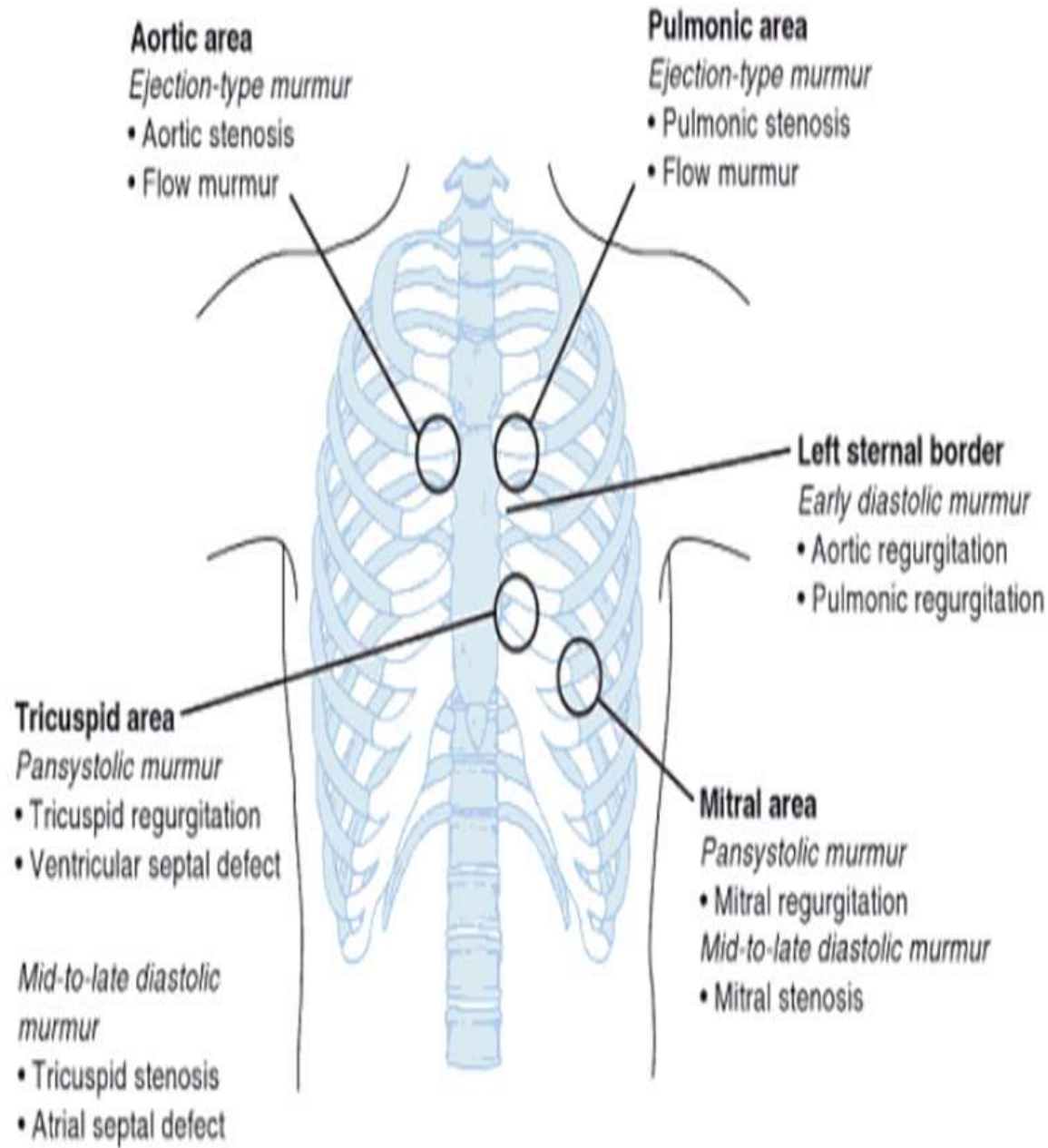
Pulmonary valve

Mitral valve



Mitral site best
for auscultation
of S3 if present

Auscultation position
for mitral valve



- 3) Listen over the **carotid arteries** with the patient holding their breath to check for radiation of an aortic stenosis murmur and in the **left axilla** (pansystolic murmur of mitral regurgitation).
- ■ At each site identify the first and second heart sounds (**S1 and S2**). Assess their character and intensity . Palpate the carotid pulse to time any murmur. The S1 barely precedes the upstroke of the carotid pulsation, while the S2 is clearly out of phase with it.
- ■ Concentrate in turn on **systole** (the interval between S1 and S2) and **diastole** (the interval between S2 and S1). Listen for **extra heart sounds** (S3 and S4) , **additional sound** e.g. clicks and snaps , and then for **murmurs**. (murmurs in systole and/or diastole.)

****Two Important Maneuvers :**

- **4) Roll the patient on to his left side.** Listen at the **apex** using light pressure with the **bell**, to detect the the mid-diastolic and presystolic murmur of **mitral stenosis**
- **5) Ask the patient to sit up and lean forwards,** then to **exhale** completely and **hold his breath** . Listen over the right second intercostal space and **over the left sternal edge** with the diaphragm for the murmur of **aortic regurgitation.**

Heart sounds :

- Normal heart valves make a sound only when they close. The '**lub-dub**' sounds are caused by closure of the atrioventricular (mitral and tricuspid) valves followed by the outlet (aortic and pulmonary) valves
- First heart sound (**S1**), '**lub**' : is caused by closure of the mitral and tricuspid valves at the onset of ventricular systole.
- Second heart sound (**S2**), '**dub**' : is caused by closure of the pulmonary and aortic valves at the end of ventricular systole and the beginning of ventricular diastole . Physiological (normal) splitting of S2 occurs because left ventricular contraction slightly precedes that of the right ventricle so that
the aortic valve closes before
the pulmonary valve.

- The splitting **increases**:

- Normally at the end-inspiration (increased venous filling of the right ventricle further delays pulmonary valve closure).
- Pathologically in :delay right ventricular emptying (Right bundle branch block)

- This separation **disappears**:

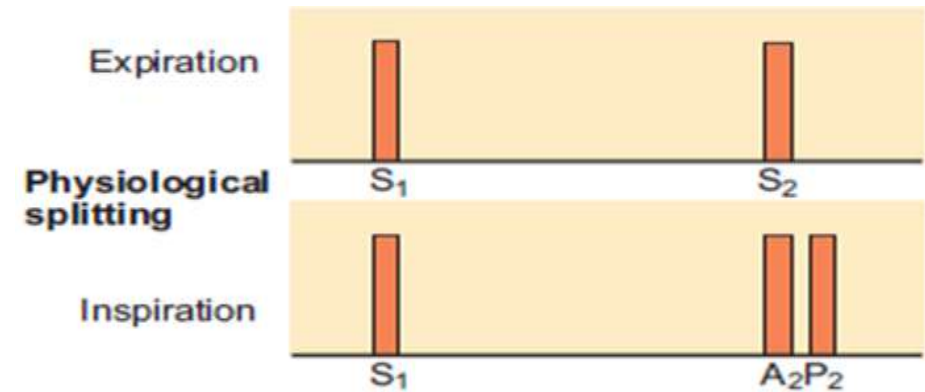
- Normally during expiration.

- **Fixed** splitting (always pathological):

- In atrial septal defect (ASD)

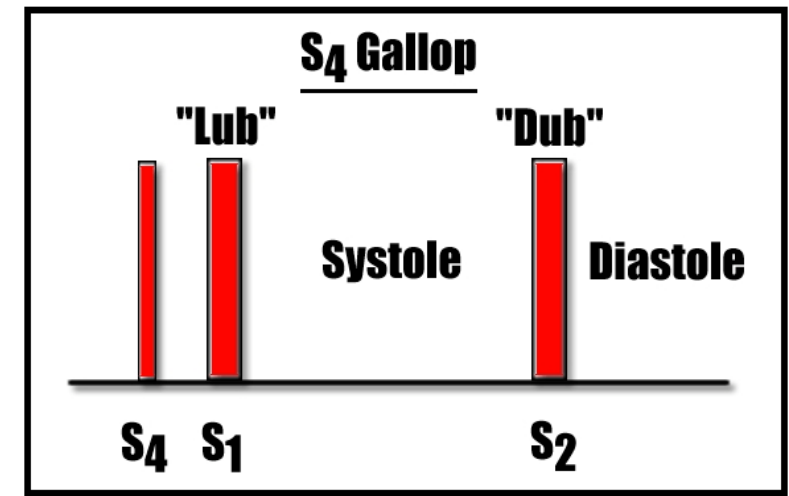
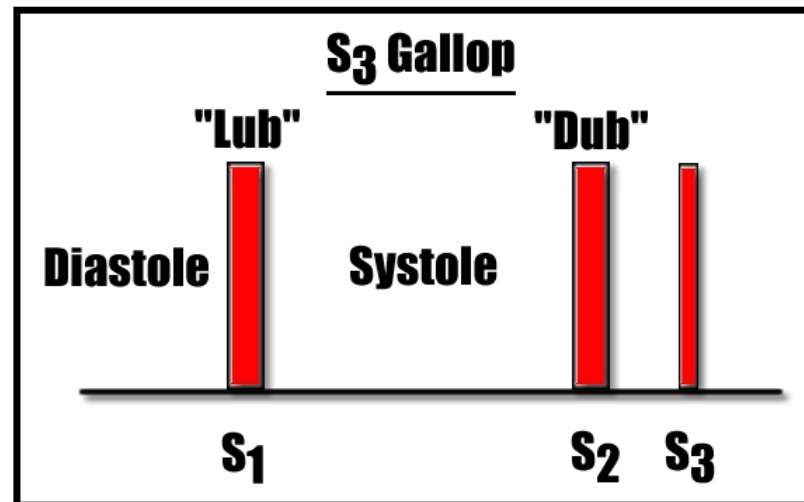
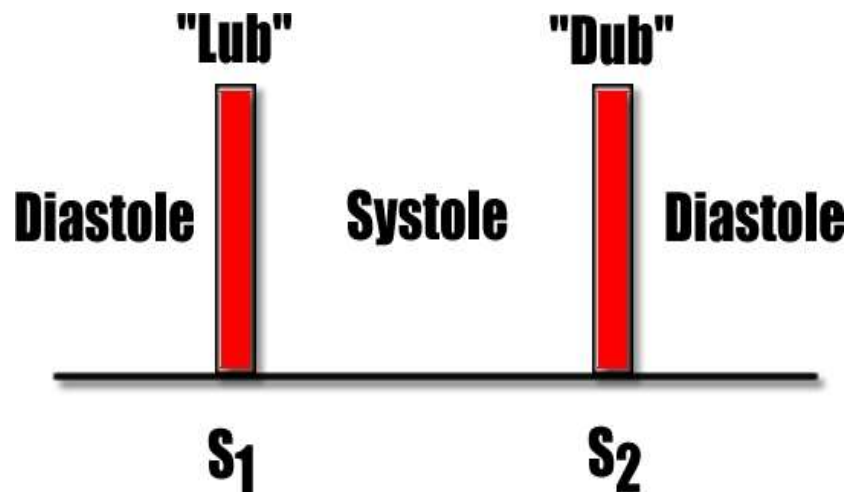
- **Reverse** splitting (when left ventricular emptying is delayed so that the aortic valve closes after the pulmonary valve):

- Left bundle branch block.



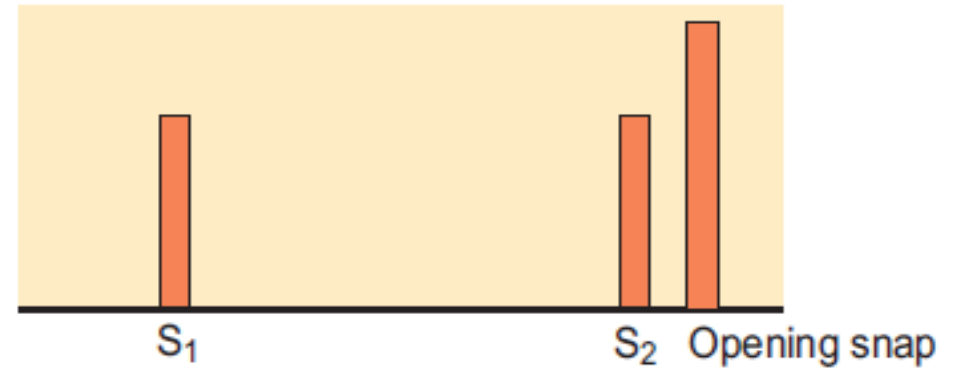
Extra heart sounds:

- Third heart sound (**S3**) is a low-pitched early diastolic sound . It coincides with rapid ventricular filling immediately after opening of the atrioventricular valves and is therefore heard after the second as 'lub-dub-**dum**'. Although It is a **normal finding** when detected in children , young adults and during pregnancy , it is usually **pathological** after the age of 40 years . The most common causes are left ventricular failure and mitral regurgitation.
- Fourth heart sound (**S4**) : This is less common. It is low-pitched, It occurs just before S1 (**da-lub-dub**) . It is **always pathological** and is caused by forceful atrial contraction against a non-compliant or stiff ventricle e.g left ventricular hypertrophy

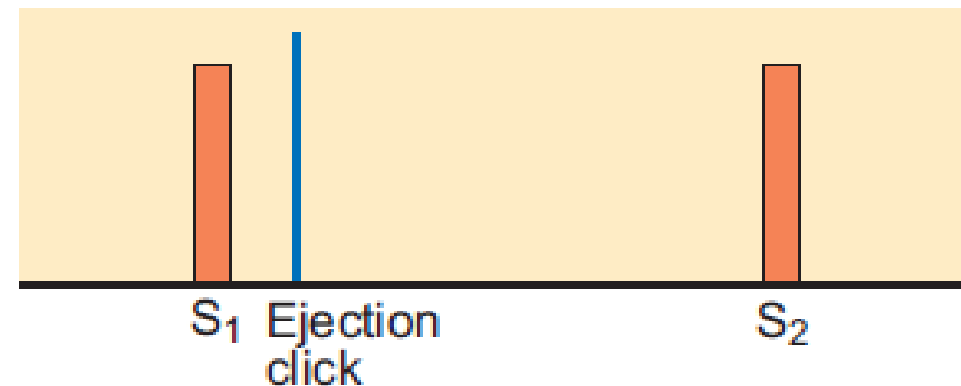


Added sounds

1) **Opening snap** : mitral stenosis.
early in diastole, just after the S2



• 2) **Ejection clicks** : congenital pulmonary or aortic stenosis .
early in systole just after the S1



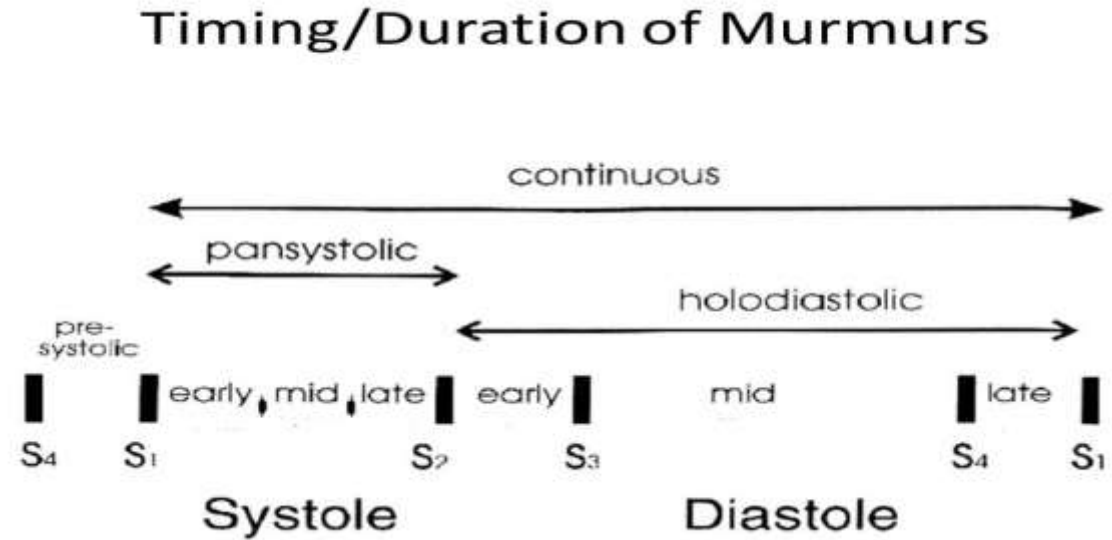
Murmurs : Examination sequence :

SCRIPT : Site (location) , Configuration (duration), Radiation, Intensity, Pitch and quality, and Timing in the cardiac cycle.

- **1) Timing** : Determine whether the murmur is systolic or diastolic .


Systole begins with the S1 , **Diastole** is the interval between S2 and S1 .

- **2) Duration** : pansystolic , mid-systolic ,
- early diastolic , mid-diastolic



- **3) Character and pitch** : harsh, blowing, musical, rumbling, high- or low-pitched

- **4) Intensity :**

 6.30 Grades of intensity of murmur	
Grade 1	Heard by an expert in optimum conditions
Grade 2	Heard by a non-expert in optimum conditions
Grade 3	Easily heard; no thrill
Grade 4	A loud murmur, with a thrill
Grade 5	Very loud, often heard over wide area, with thrill
Grade 6	Extremely loud, heard without stethoscope

- **5) Location :** Record the site(s) where you hear the murmur best.

- **6) Radiation :** Murmurs radiate in the direction of the blood flow to specific sites outside the precordium.

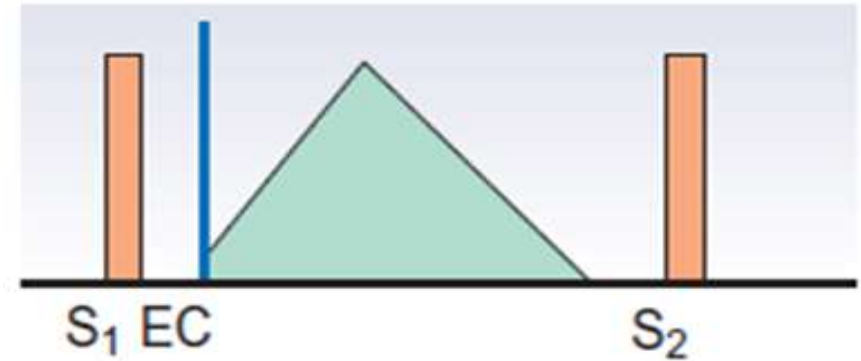
• **Systolic murmurs** : **PASS** : Pulmonary and aortic stenosis are systolic
(Mitral and tricuspid defects are opposite)

1) Aortic stenosis : best heard in the aortic area.
radiates to the carotid arteries.

It is harsh, high-pitched and musical .

It is usually loud and there may be a thrill.

begins after S1 reaches maximal intensity in mid-systole, then fades, stopping before S2

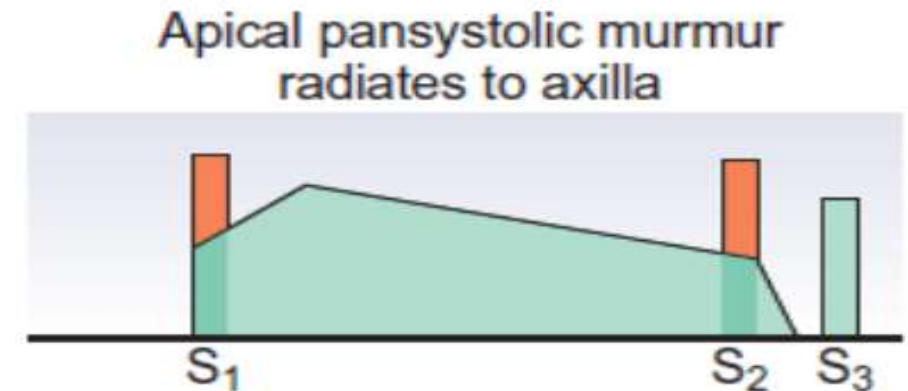


2) Mitral regurgitation : best heard at the apex .
continue throughout systole (pansystolic)

radiating to the axilla.

The murmur is often loud

blowing in character .



- **Diastolic murmurs : PAID** : *pulmonary and aortic insufficiency (regurgitation)* are diastolic. (Mitral and tricuspid defects are opposite)

1) Aortic regurgitation : early diastolic murmur

best heard at the left sternal edge

with the patient leaning forward holding the breath in expiration.



2) Mitral stenosis. : mid-diastolic murmur

a low-pitched, rumbling sound which may follow an opening snap

best heard with the stethoscope bell at the apex with the patient rolled to the left side



**THANK
YOU**

