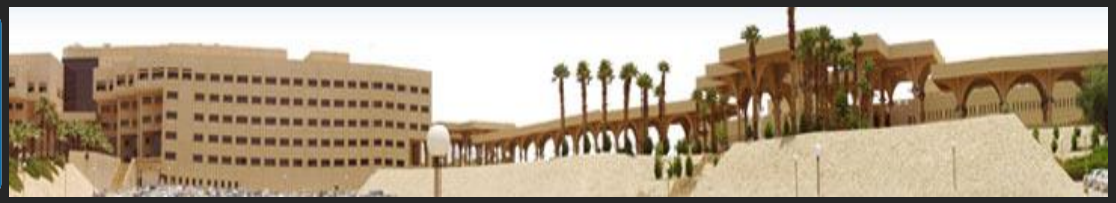
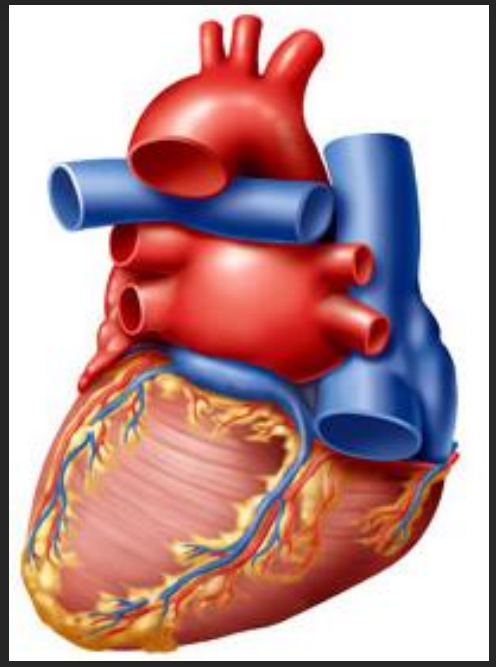


CARDIOVASCULAR BLOCK

HEART SOUNDS



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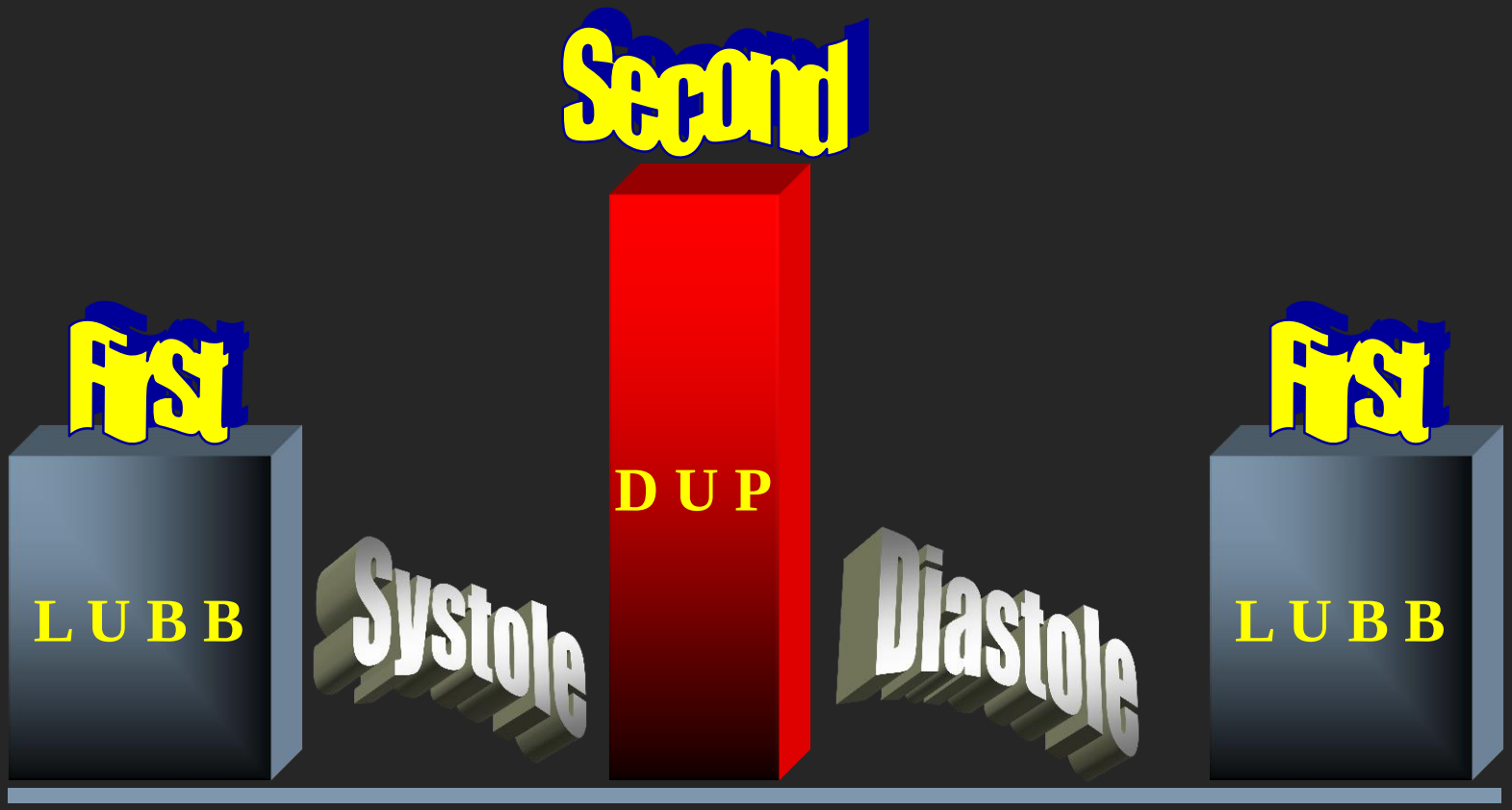
OBJECTIVES

- **At the end of the lecture you should be able to …..**

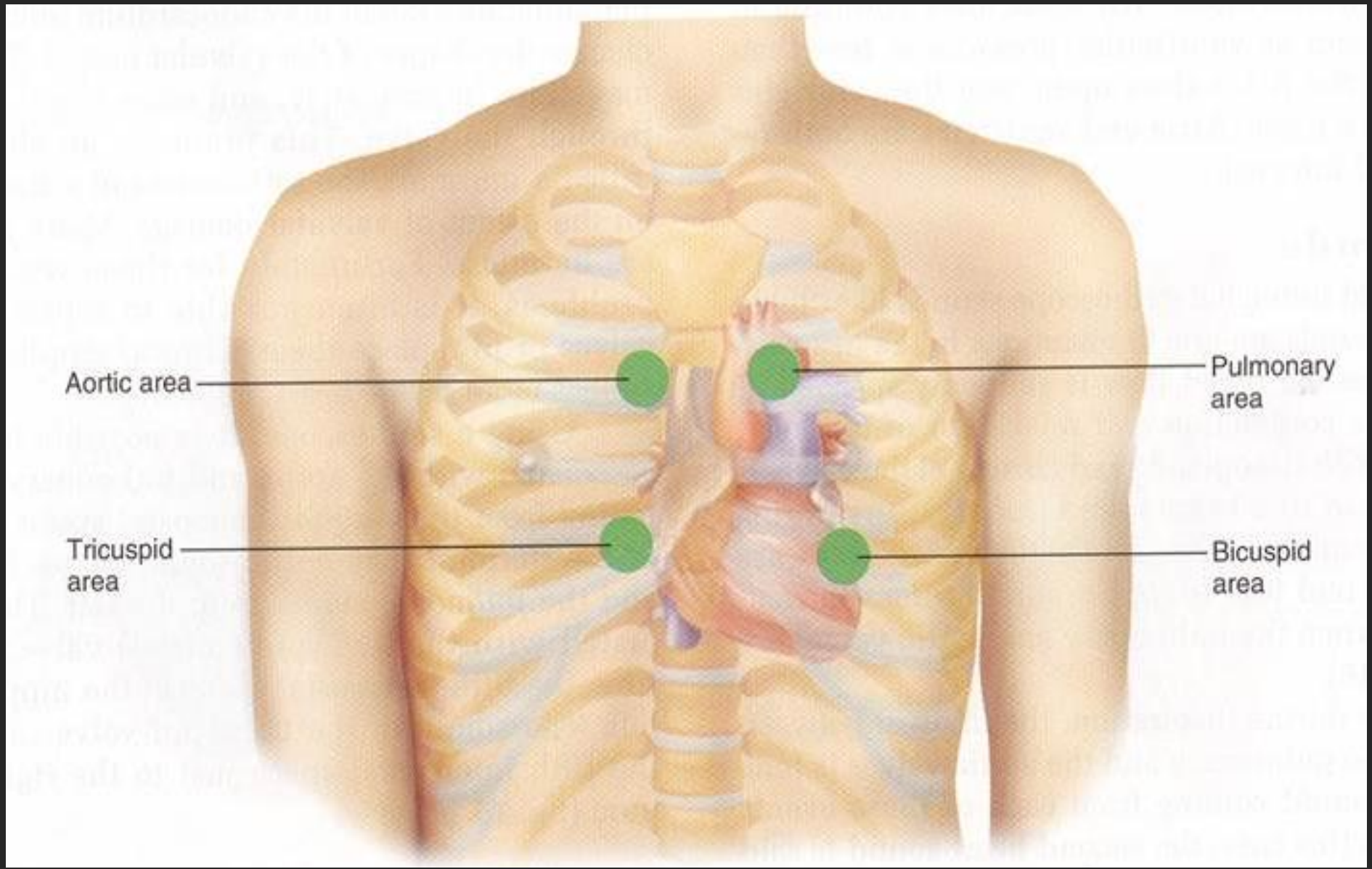
1. **Enumerate the different heart sounds**
2. **Describe the cause and characteristic features of first and second heart sound**
3. **Correlate the heart sounds with different phases of cardiac cycle**
4. **Define murmurs and their clinical importance**

HEART SOUNDS

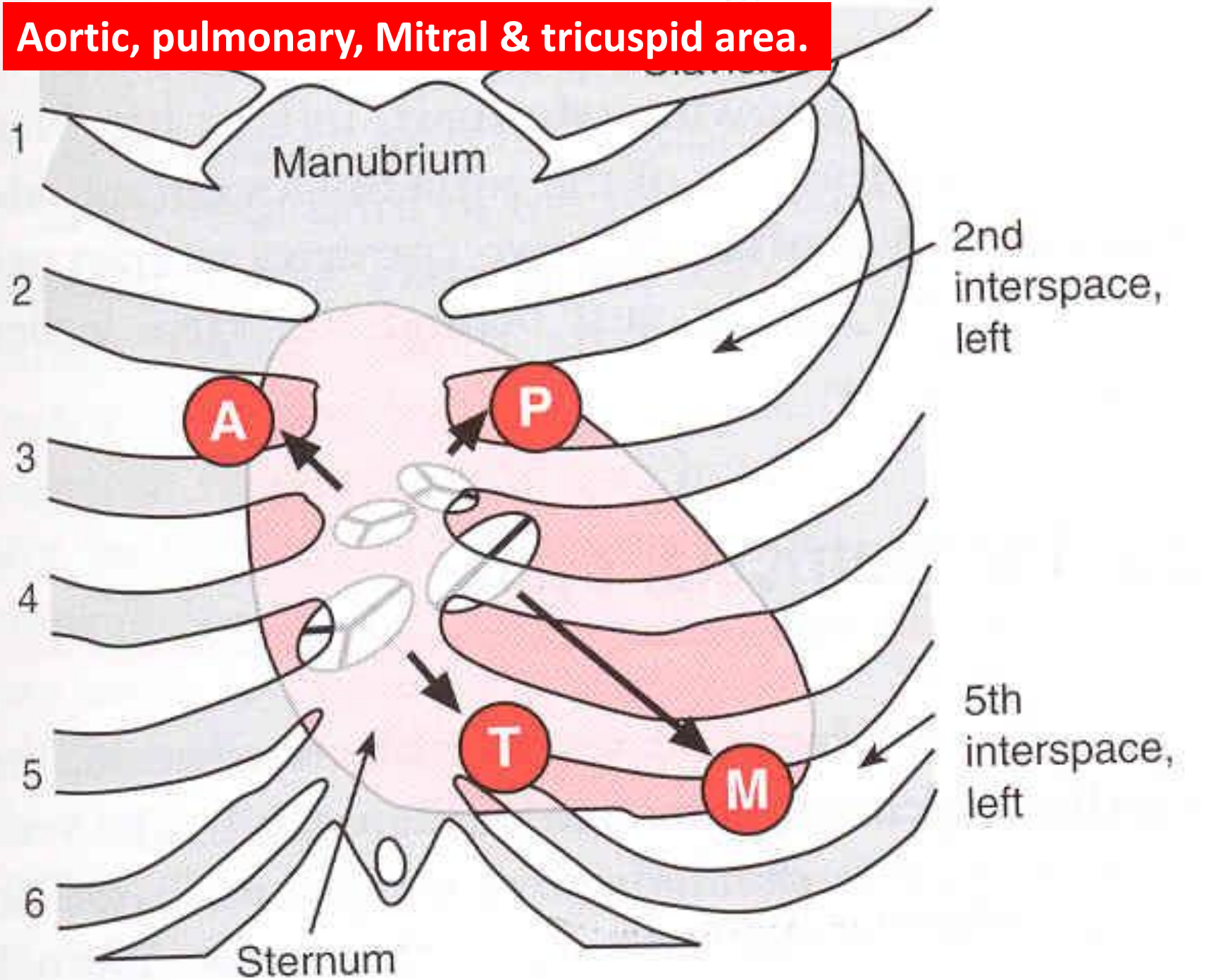


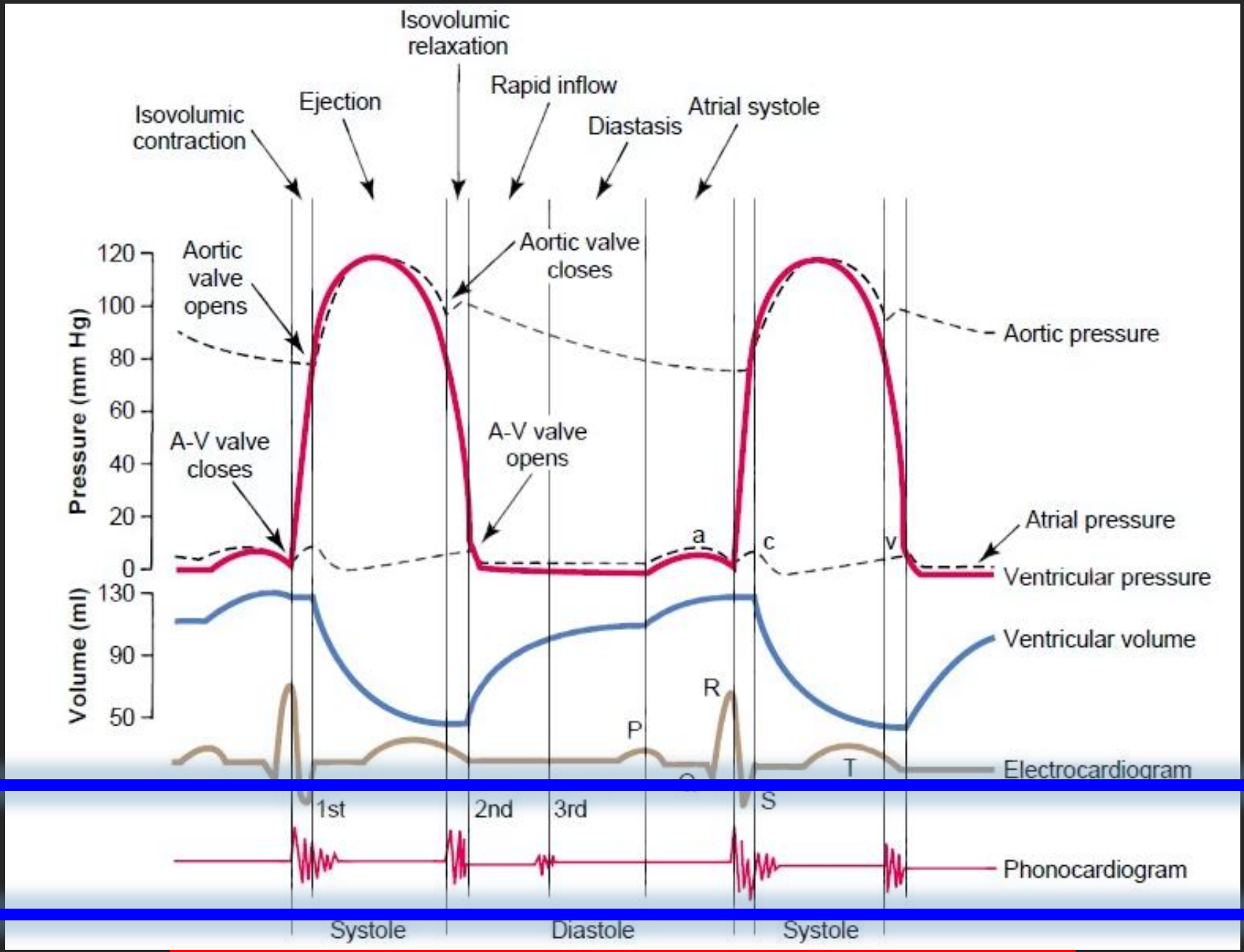
Heart sounds

AREAS OF AUSCULTATION



Aortic, pulmonary, Mitral & tricuspid area.

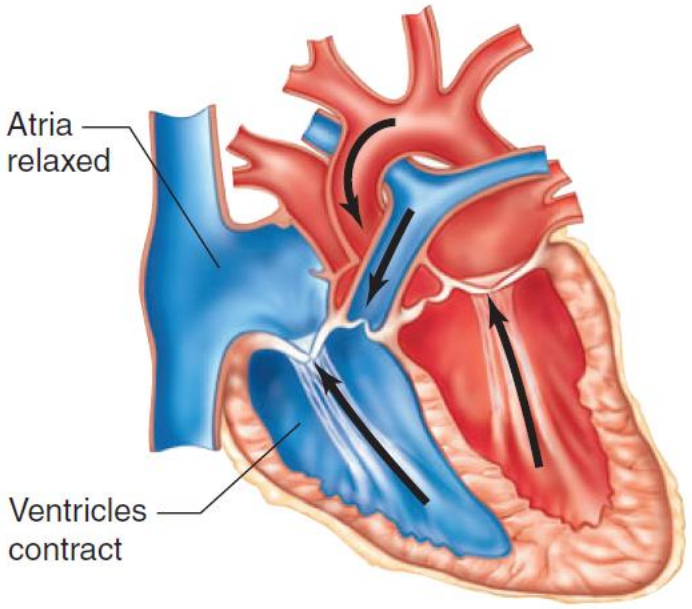




The Events of the Cardiac Cycle

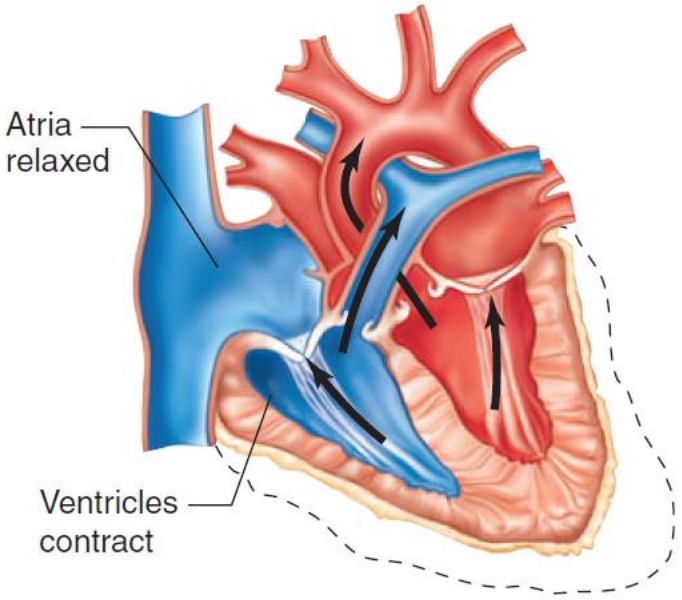
A Systole

Isovolumetric ventricular contraction



Ventricular ejection

Blood flows out of ventricle



AV valves:	Closed	Closed
Aortic and pulmonary valves:	Closed	Open

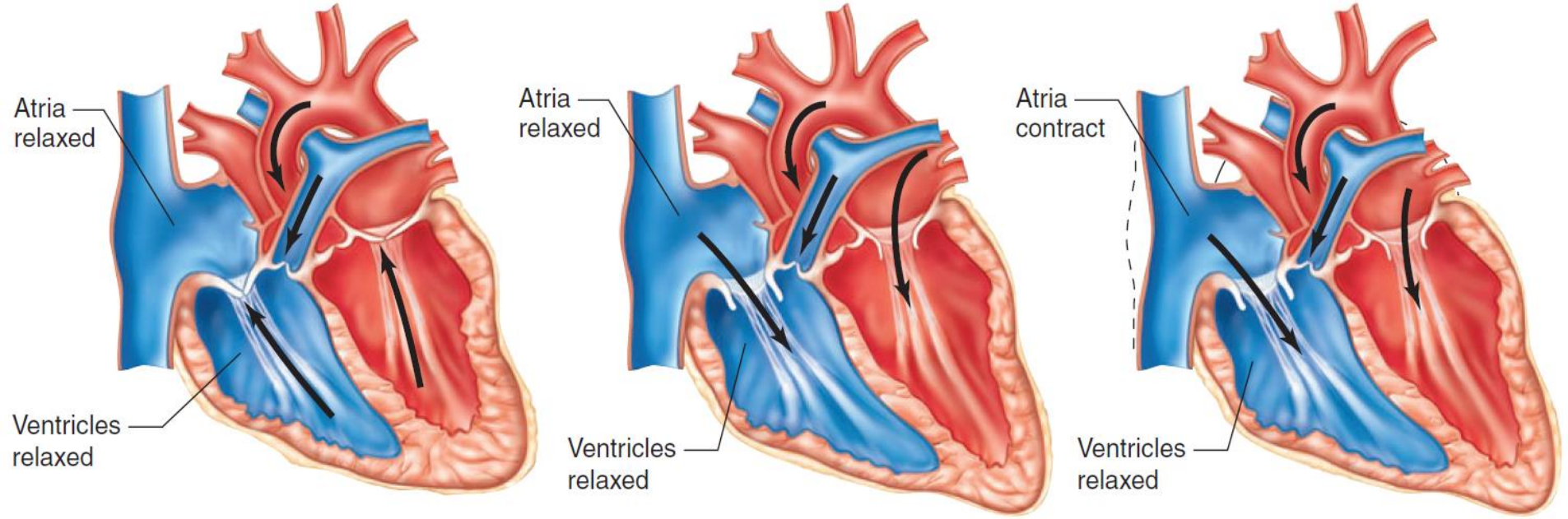
B Diastole

Isovolumetric ventricular relaxation

Ventricular filling

Blood flows into ventricles

Atrial contraction



AV valves:	Closed	Open	Open
Aortic and pulmonary valves:	Closed	Closed	Closed

HEART SOUNDS

- There are four heart sounds SI, S2, S3 & S4.
- Two heart sound are audible with stethoscope S1 & S2 (Lub - Dub).
- S3 & S4 are not audible with stethoscope Under normal conditions because they are low frequency sounds.
- Ventricular Systole is between First and second Heart sound.
- Ventricular diastole is between Second and First heart sounds.

FIRST HEART SOUND (S1)

- It is produced due to the closure of Atrioventricular valves (Mitral & Tricuspid)
- It occurs at the beginning of the systole and sounds like LUB
- Frequency:50-60 Htz
- Time: 0.15 sec
- Its is heavier when compared to the 2nd heart sound.

SECOND HEART SOUND (**S2**)

- **It is produced due to the closure of Semilunar valves (Aortic & Pulmonary)**
- **It occurs at the end of the systole and sounds like DUB**
- **Frequency:80-90 Htz**
- **Time: 0.12 sec**
- **It is short and sharp compared to the 1st hear sound**

THIRD HEART SOUND (**S3**)

- **It occurs at the beginning of middle third of Diastole**
- **Cause of 3rd sound – Rush of blood from Atria to Ventricle during rapid filling phase of Cardiac Cycle. It causes vibration in the blood**
- **Frequency:20-30 Htz**
- **Time: 0.1 sec**
- **S3 may be heard in children and young slim adults but usually pathological in old age.**

FOURTH HEART SOUND (S4) OR ATRIAL SOUND

- It occurs at the last one third of Diastole

  (just before S1)
- Cause of Fourth heart sound – Due to Atrial systole which causes rapid flow of blood from Atria to Ventricle and vibration in the blood.
- Frequency: < 20 Htz

Note:

- Third and Fourth heart sound are low pitched sounds therefore not audible normally with stethoscope
- S4 may be heard in elderly but is usually pathologic in the young.

HEART MURMURS

- Murmurs are abnormal sounds produced due to abnormal flow of blood.

OR

- Murmurs are pathologic and added heart sounds that are produced as a result of turbulent blood flow

TABLE 30–2 Heart murmurs.

Valve	Abnormality	Timing of Murmur
Aortic or pulmonary	Stenosis	Systolic
	Insufficiency	Diastolic
Mitral or tricuspid	Stenosis	Diastolic
	Insufficiency	Systolic

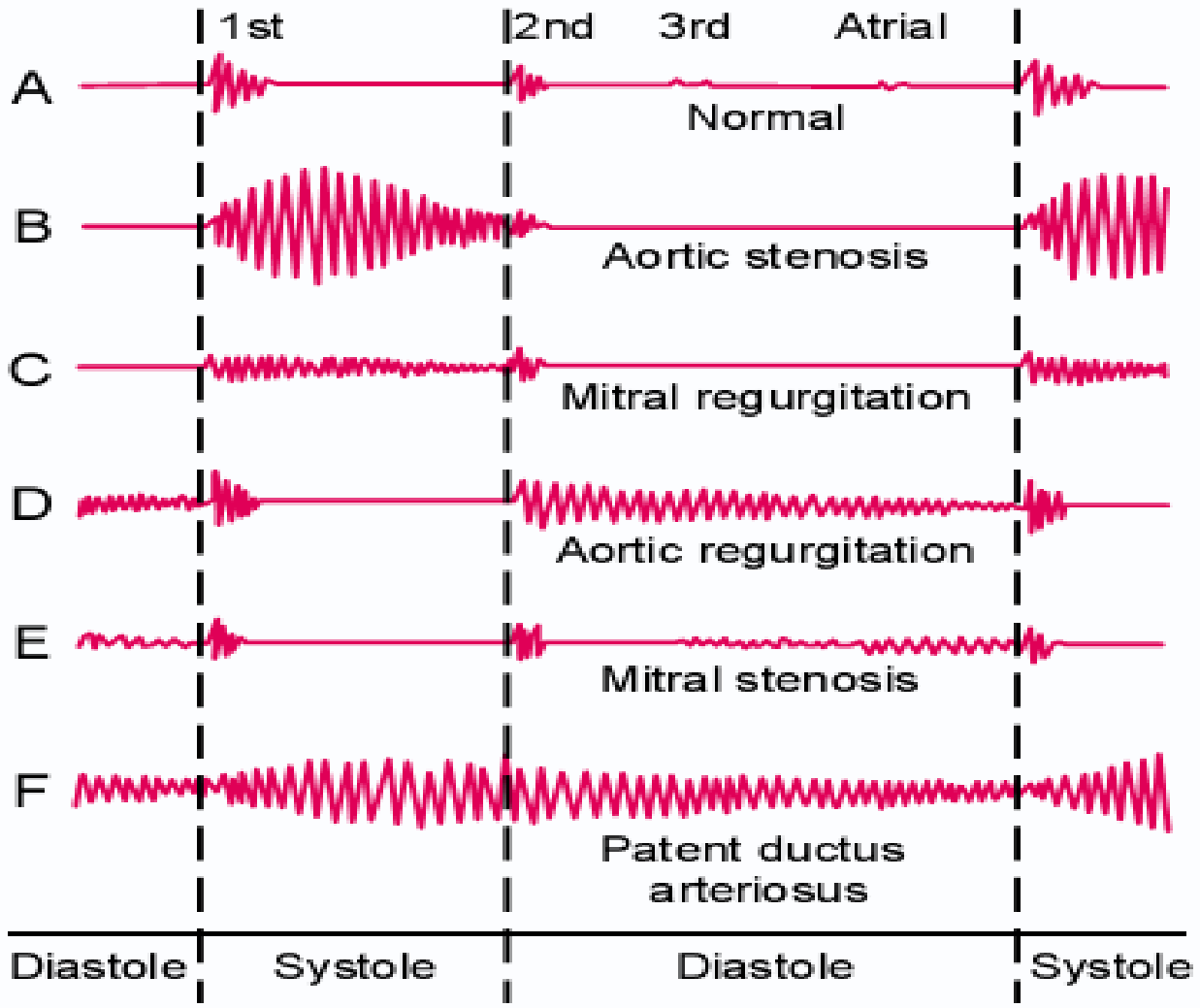


Figure 23–3

Phonocardiograms from normal and abnormal hearts.

FOR FURTHER READINGS AND DIAGRAMS:

Textbook of Medical Physiology by Guyton & Hall

Chapter 19 (Heart Sounds)