

AXIS DEVIATION **OR** ***VECTOR CARDIOGRAM***

By

Dr Gul Muhammad



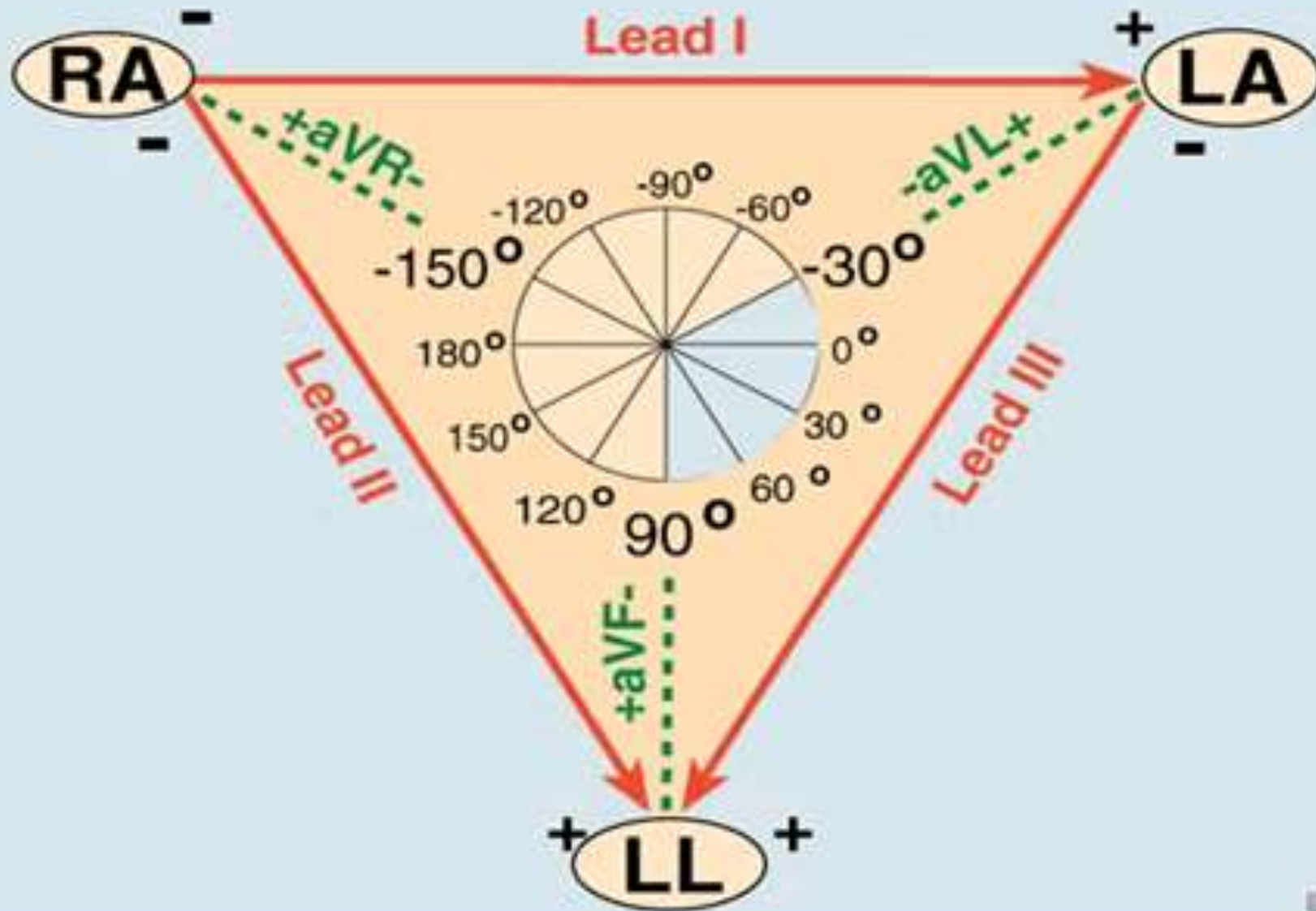
Learning objectives

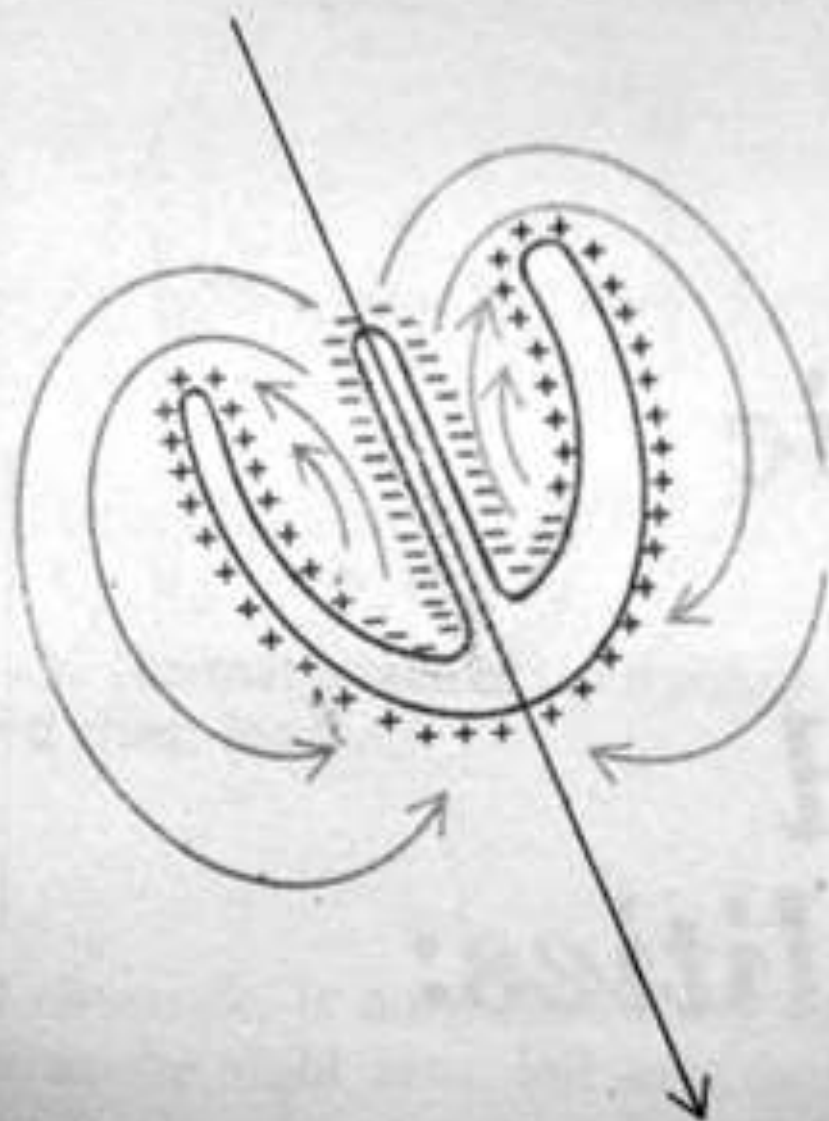
- What is normal axis or vector?
- What is axis deviation?
- How you will differentiate left and right axis deviation?
- What are the significances of axis deviation?
- What are the Causes of axis deviation?

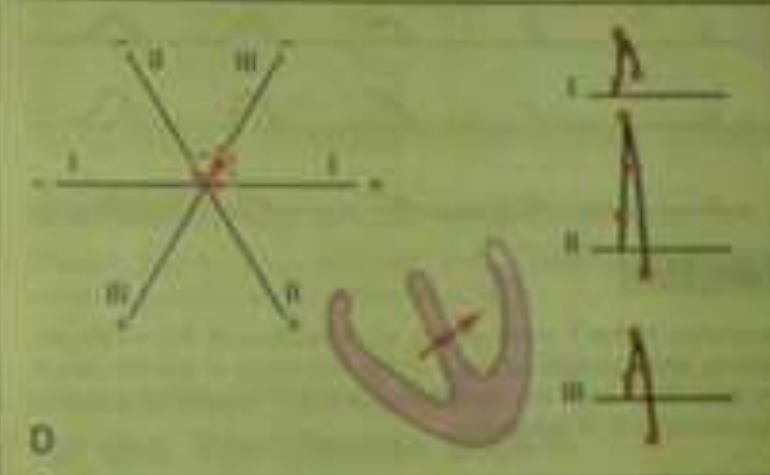
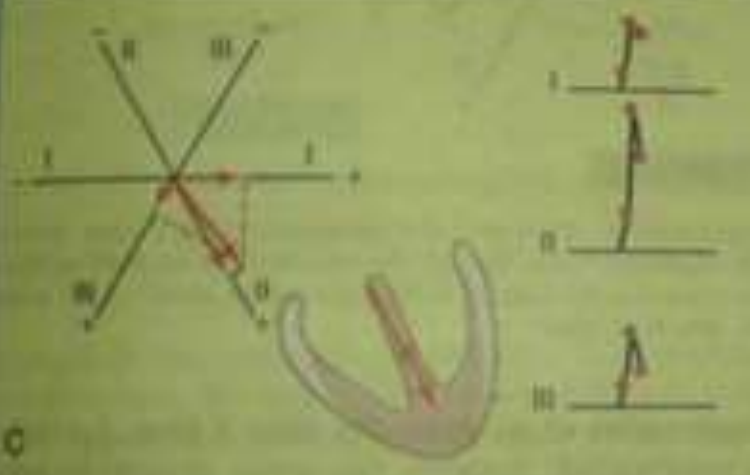
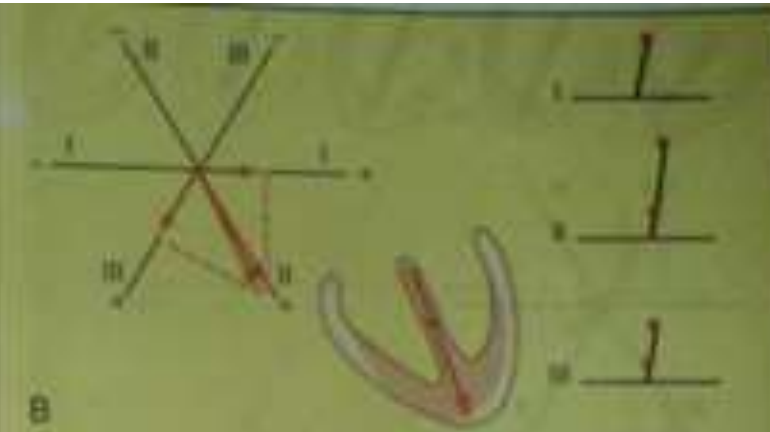


Right Arm

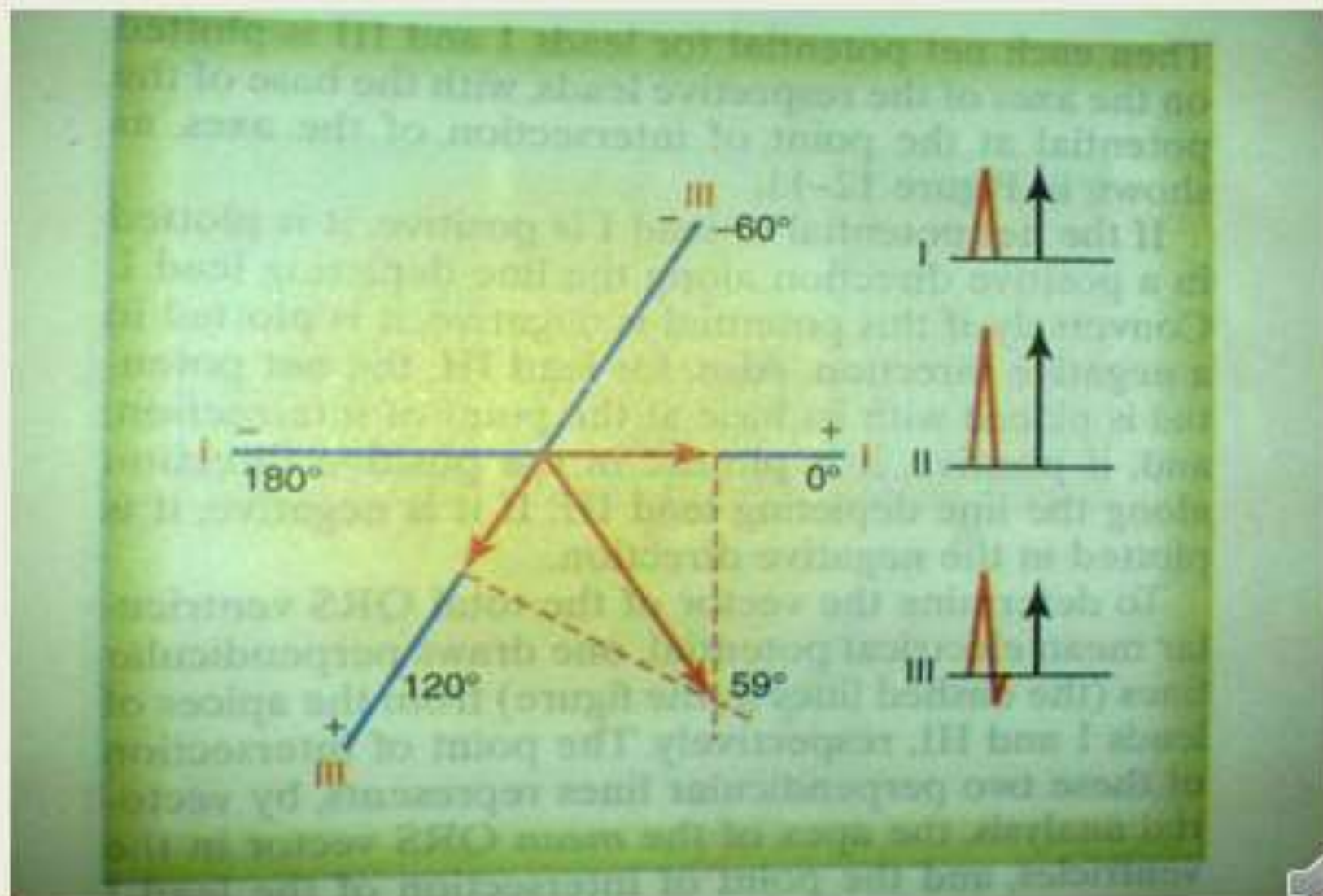
Left Arm



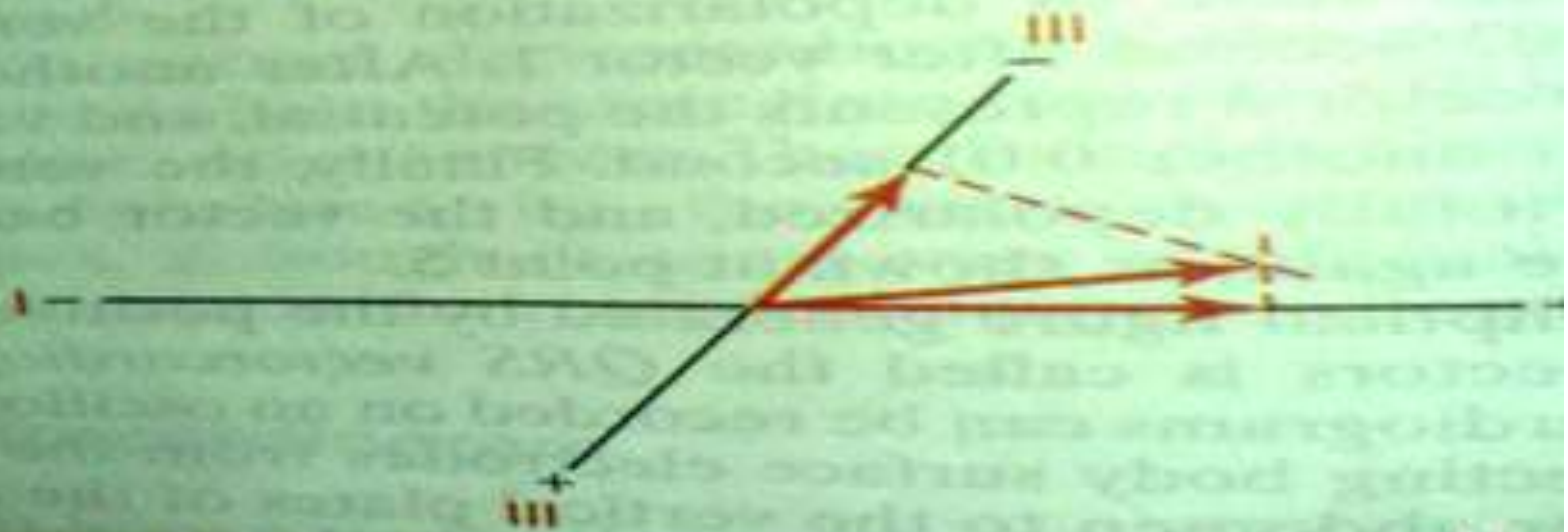




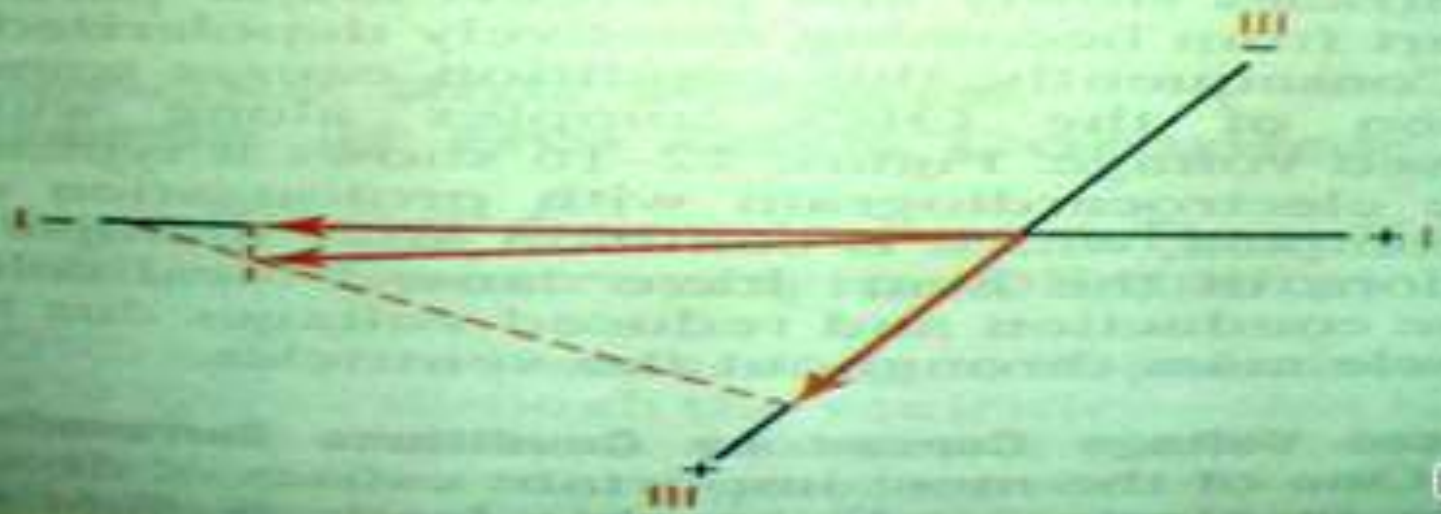
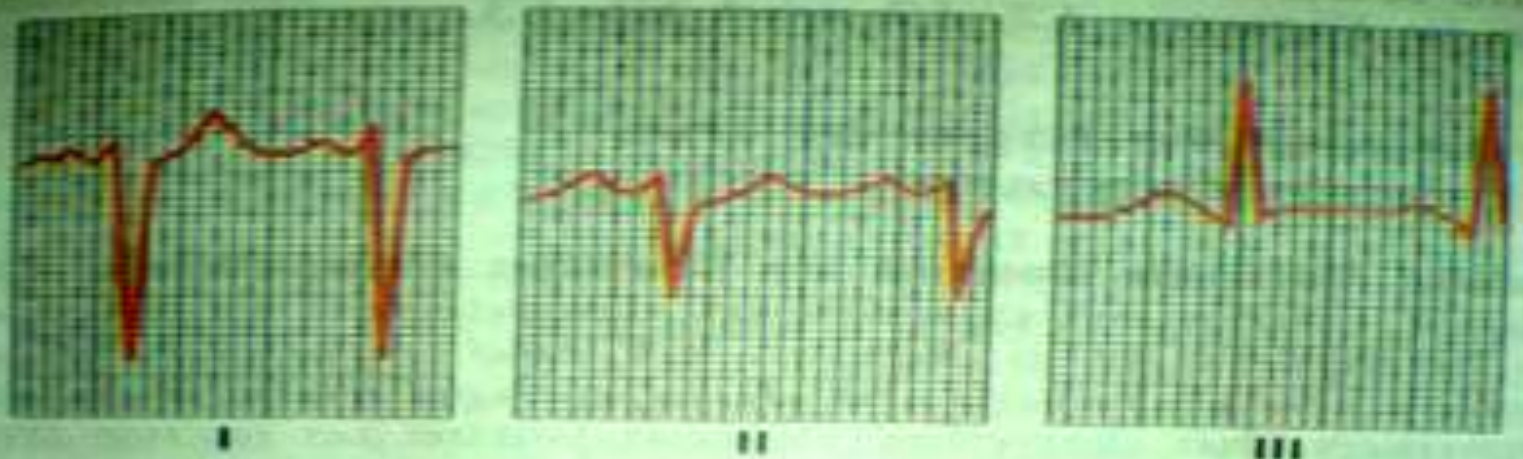
Normal Axis of the heart



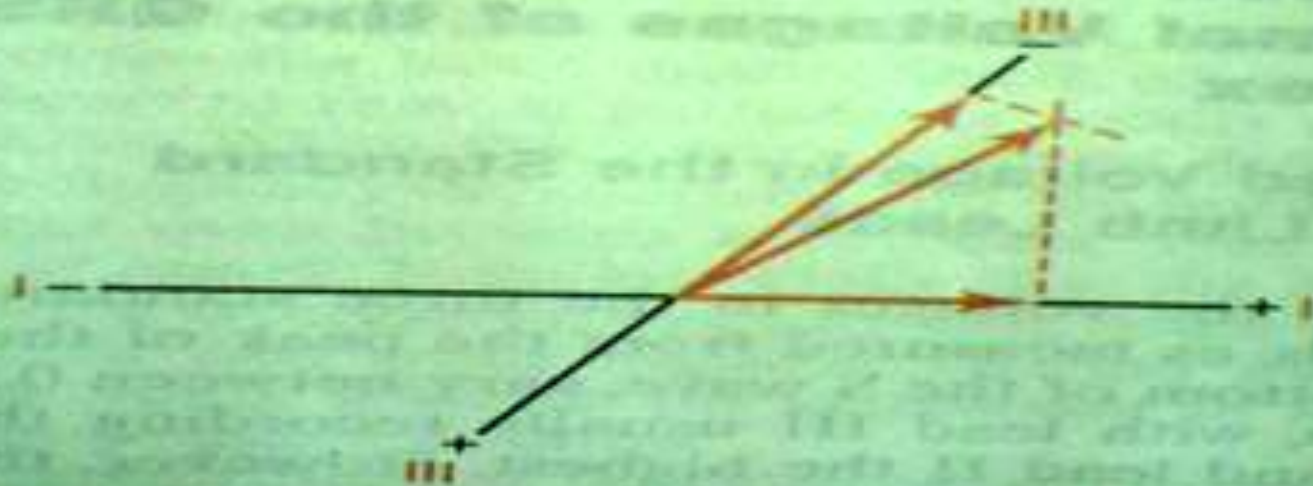
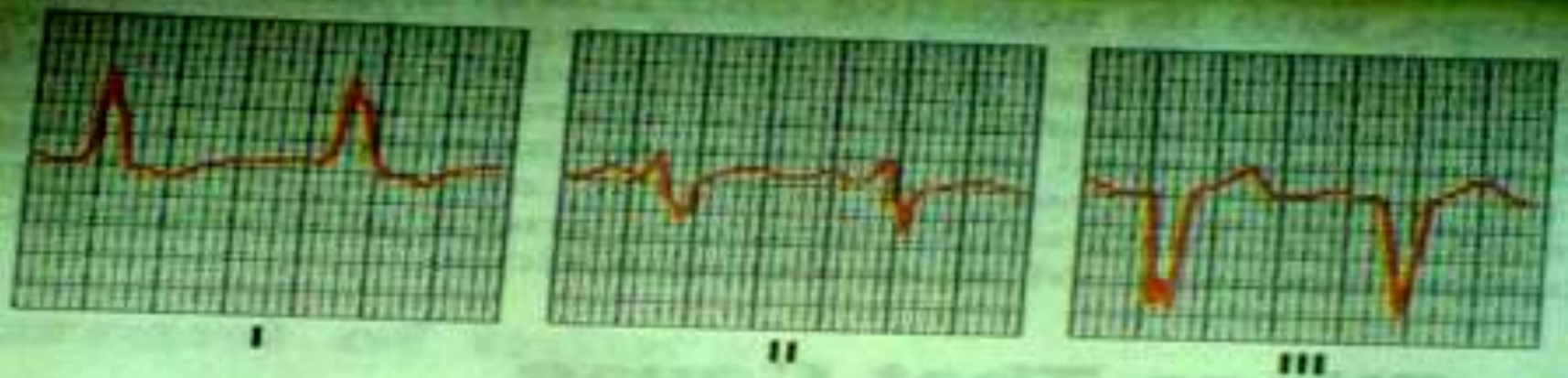
Left axis deviation



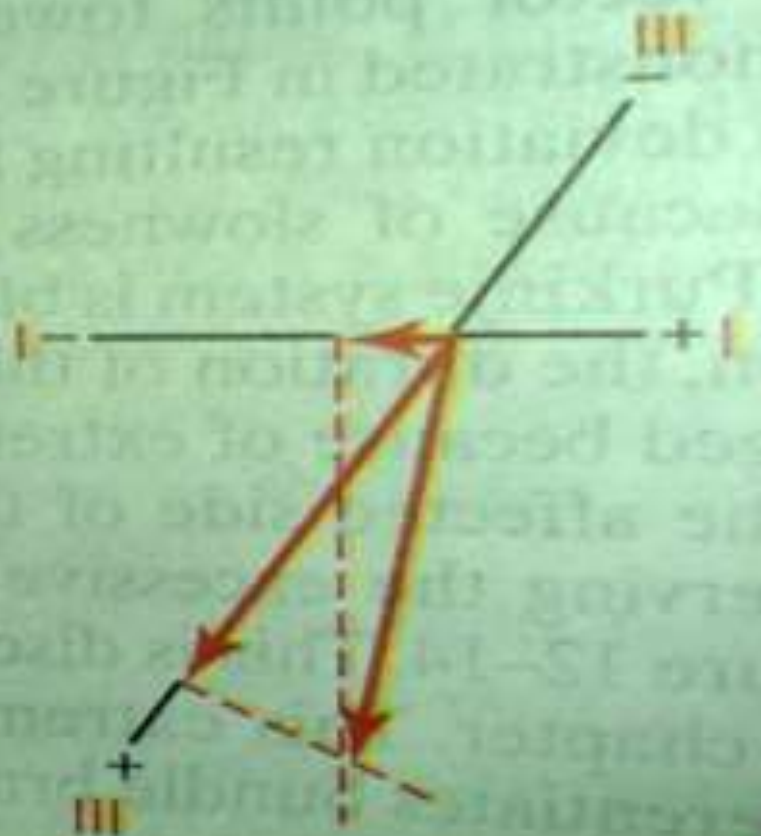
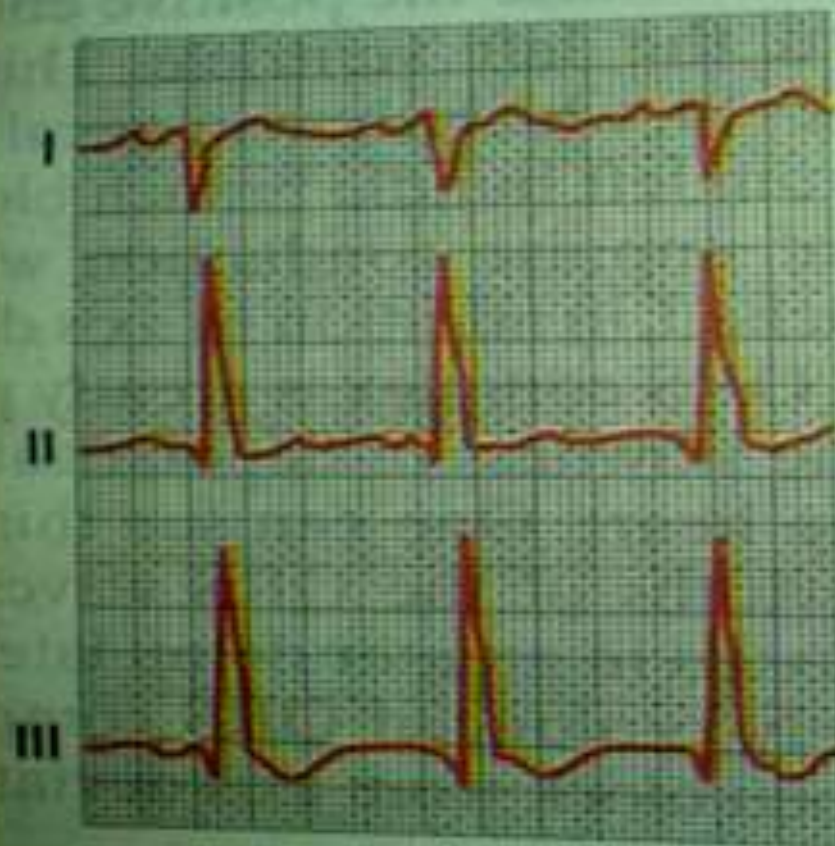
Right axis deviation



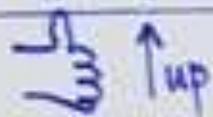
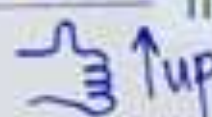

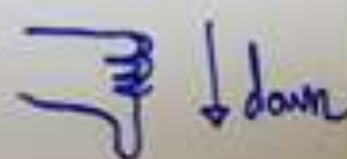

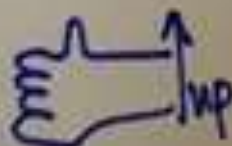
Left Axis Deviation



Right axis deviation



Rule of thumb

Left thumb Lead I	Right thumb lead - I, II, III	Interpretation
 ↑ up	 ↑ up	Normal Cardiac axis
 ↑ up	 ↓ down	Left axis deviation
 ↓ down	 ↑ up	Right axis deviation



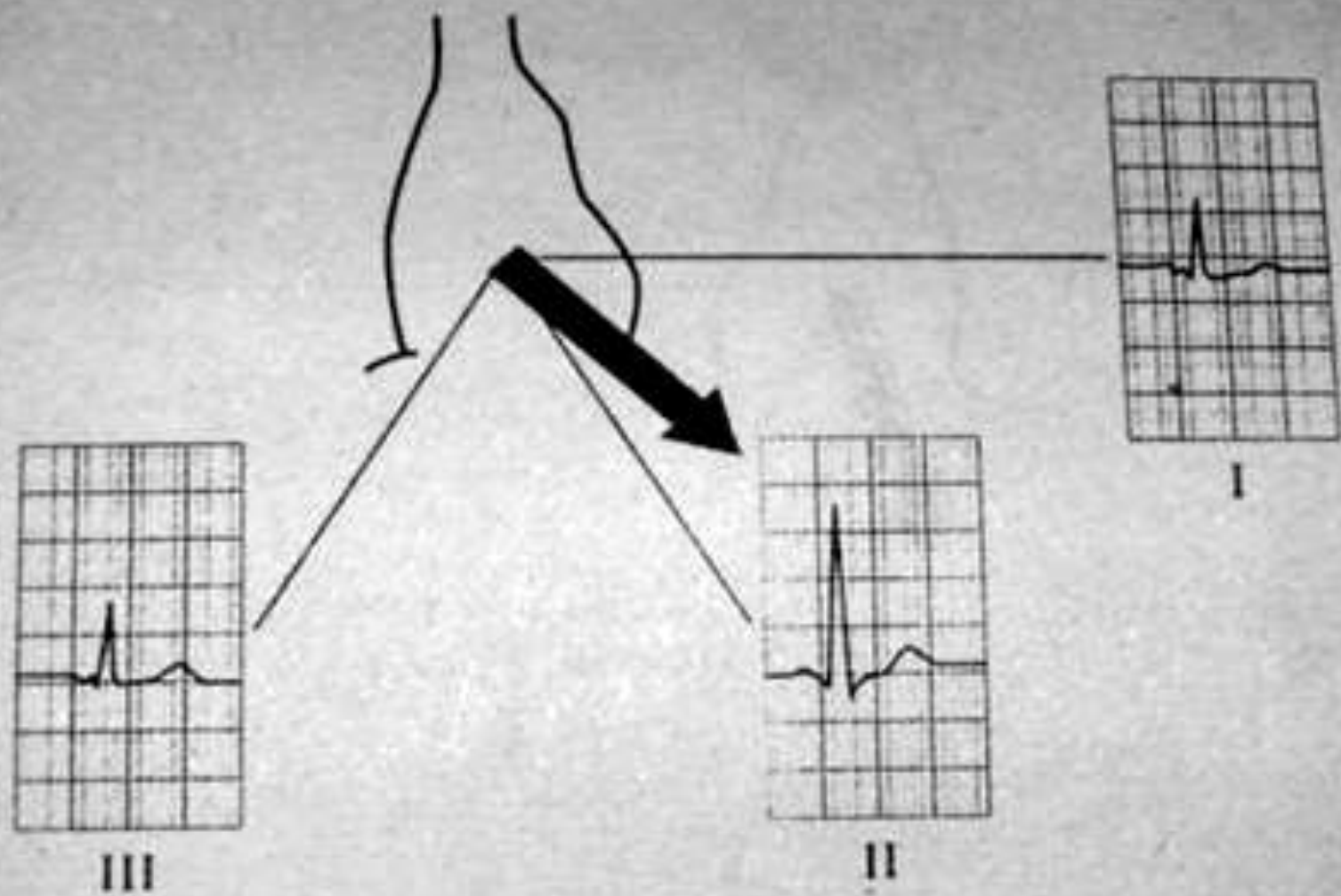


Fig. 1.14 The normal axis



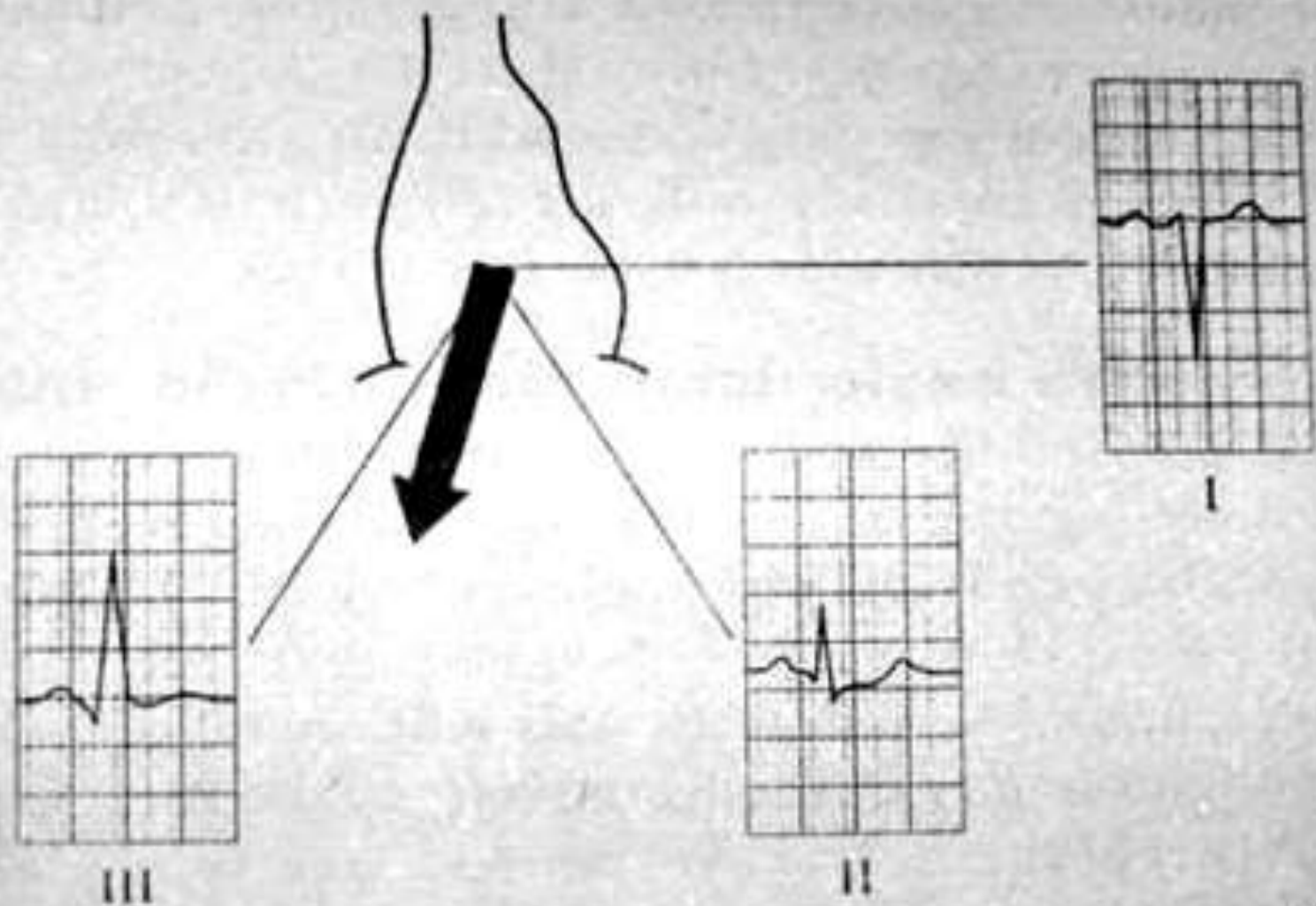


Fig. 1.15 Right axis deviation



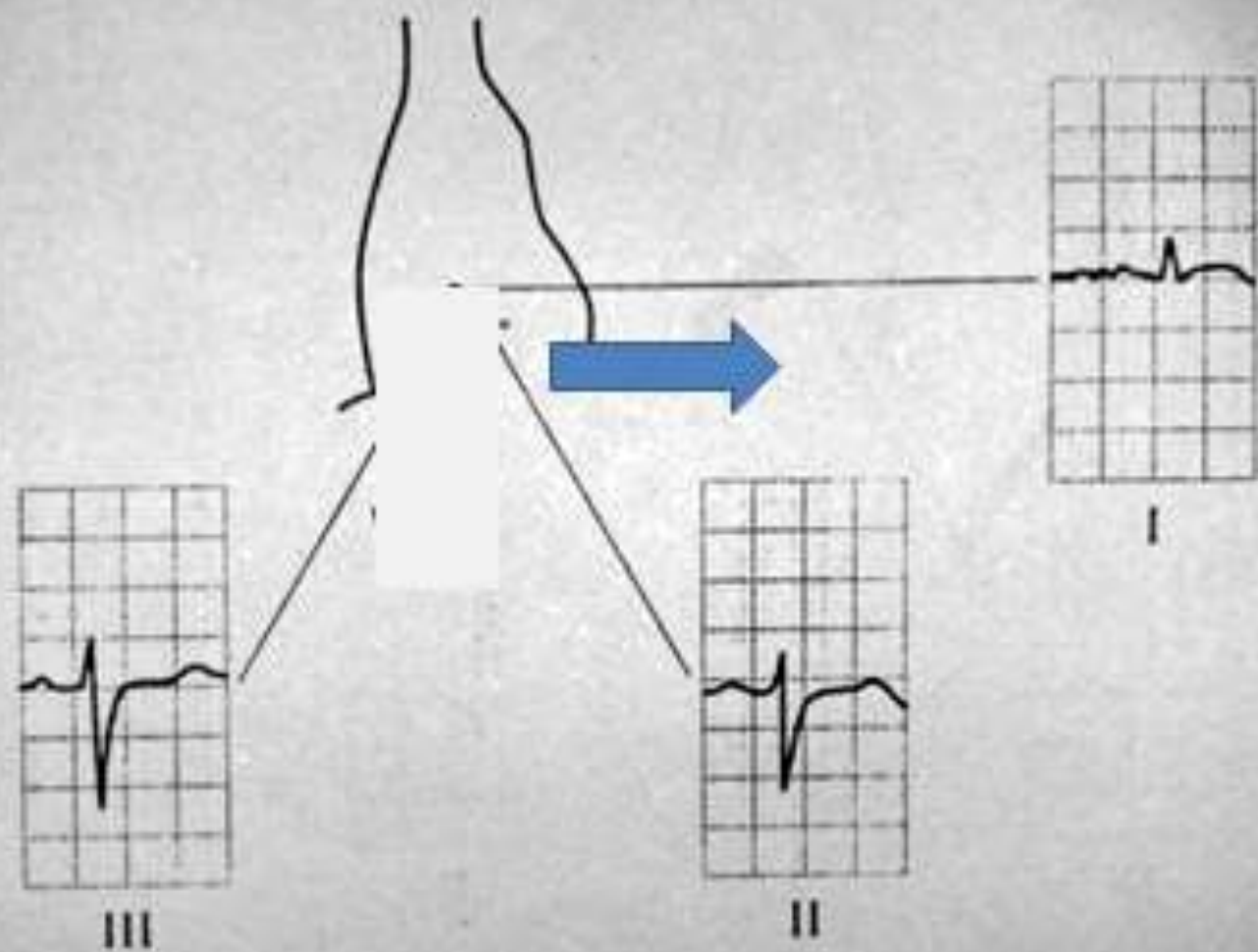


Fig. 1.16 Left axis deviation



Causes of LAD include

➤ Normal variation (physiologic,

Short stature, pregnancy, obese, lying position, often age-related change) expiration,

➤ Causes in Heart

Left ventricular hypertrophy, Conduction defects: left bundle branch block, left anterior fascicular block, Inferior wall myocardial infarction, Preexcitation syndromes

(e.g., Wolff-Parkinson-White syndrome), Ventricular ectopic rhythms

(e.g., ventricular tachycardia) Congenital heart disease

(e.g., primum atrial septal defect, endocardial cushion defect)



Causes of LAD include

- Causes outside the heart
Hyperkalemia,, Mechanical shift, such as with expiration or raised diaphragm (e.g.,
- Pacemaker-generated rhythm or paced rhythm,
- Push and pull theory in the chest
- Push- (Rt pleural effusion, Rt chest tumor, Rt chest Pneumothorax, Emphysema
- Pull- (Lt lung fibrosis, Lt lung collapse)



Causes of RAD include:

➤ Physiological causes;

variation (e.g., children, young adults, tall slim stature, standing Limb-lead reversal (left- and right-arm electrodes), inspiration

➤ Causes with in the heart

Right ventricular overload syndromes (acute or chronic), Right ventricular hypertrophy , Conduction defects: left posterior fascicular block, right bundle branch block, Lateral wall myocardial infarction , Preexcitation syndromes (e.g., Wolff-Parkinson-White syndrome) , Ventricular ectopic rhythms (e.g., ventricular tachycardia) Congenital heart disease (e.g., secundum atrial septal defect), Dextrocardia



RAD

- Conditions that cause right ventricular strain (e.g., pulmonary embolism, pulmonary stenosis, pulmonary hypertension, chronic lung disease, and resultant cor pulmonale)
- Causes outside the heart
 - Push and pull theory
 - Push- Left pneumothorax, or emphysema, left pleural effusion
 - Pull - Rt Lung collapse, Rt lung fibrosis



X-ray proof of heart shifting to affect axis



THANK YOU

