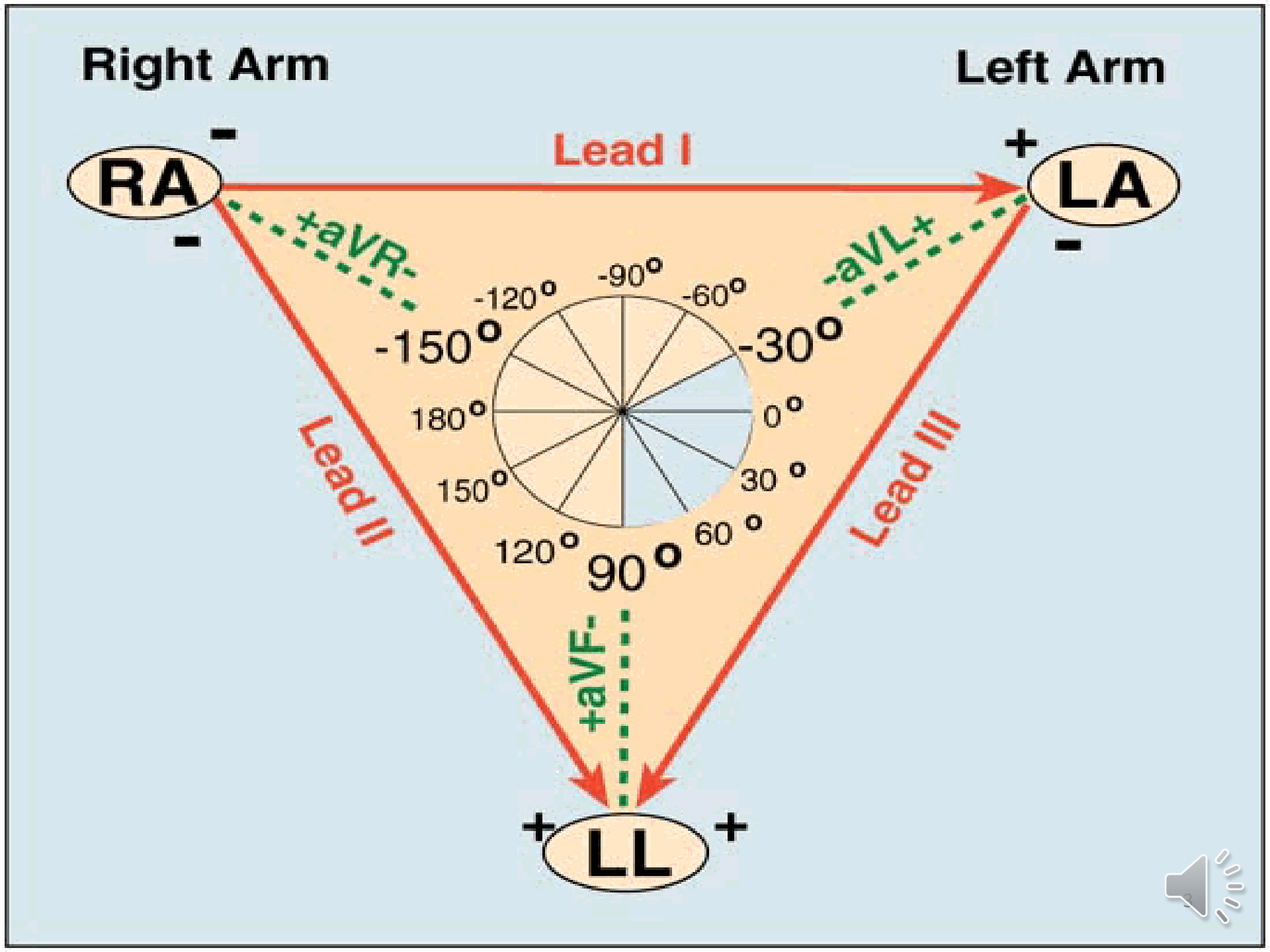
AXIS DEVIATION OR *VECTOR CARDIOGRAM*

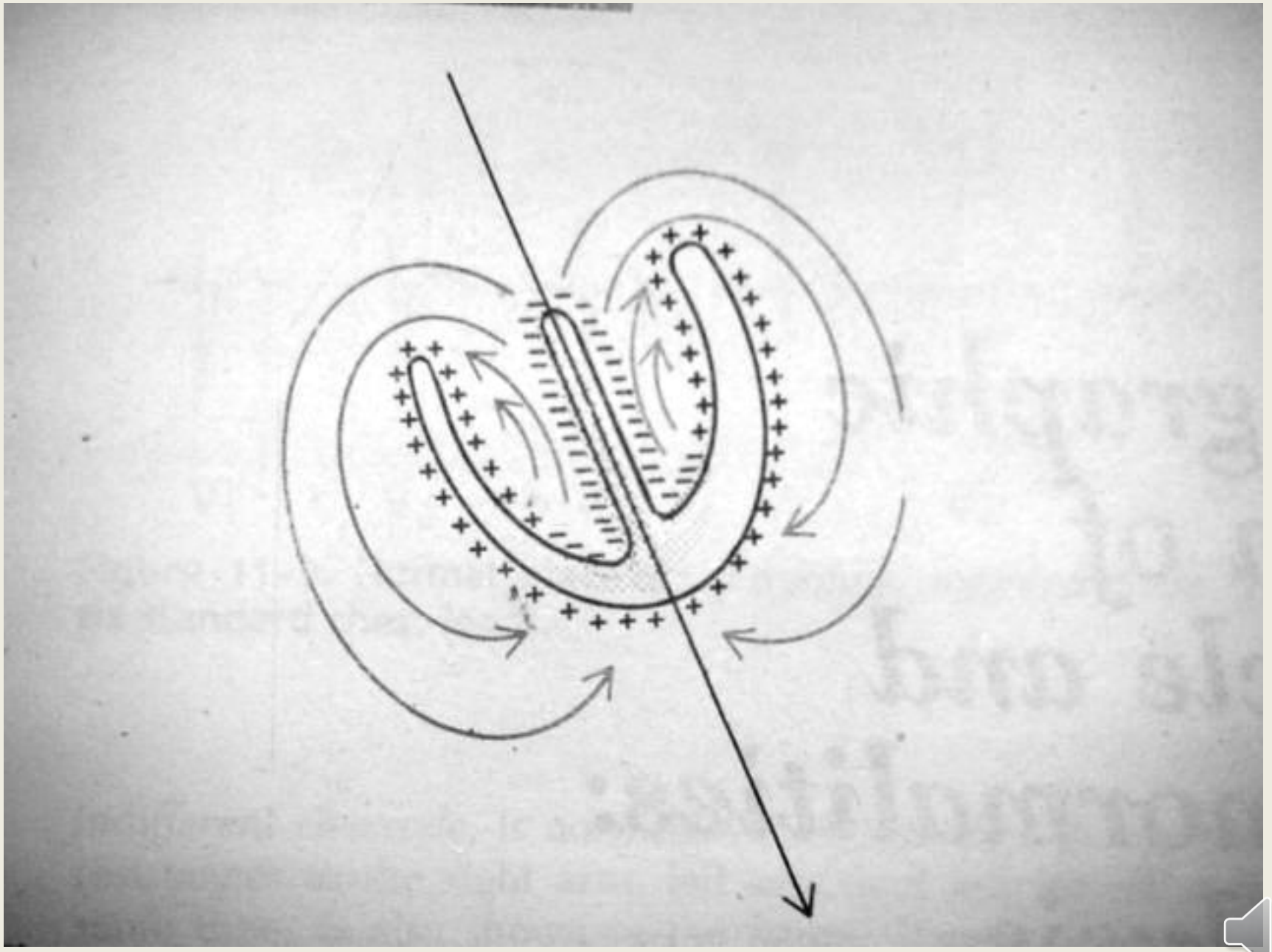
By

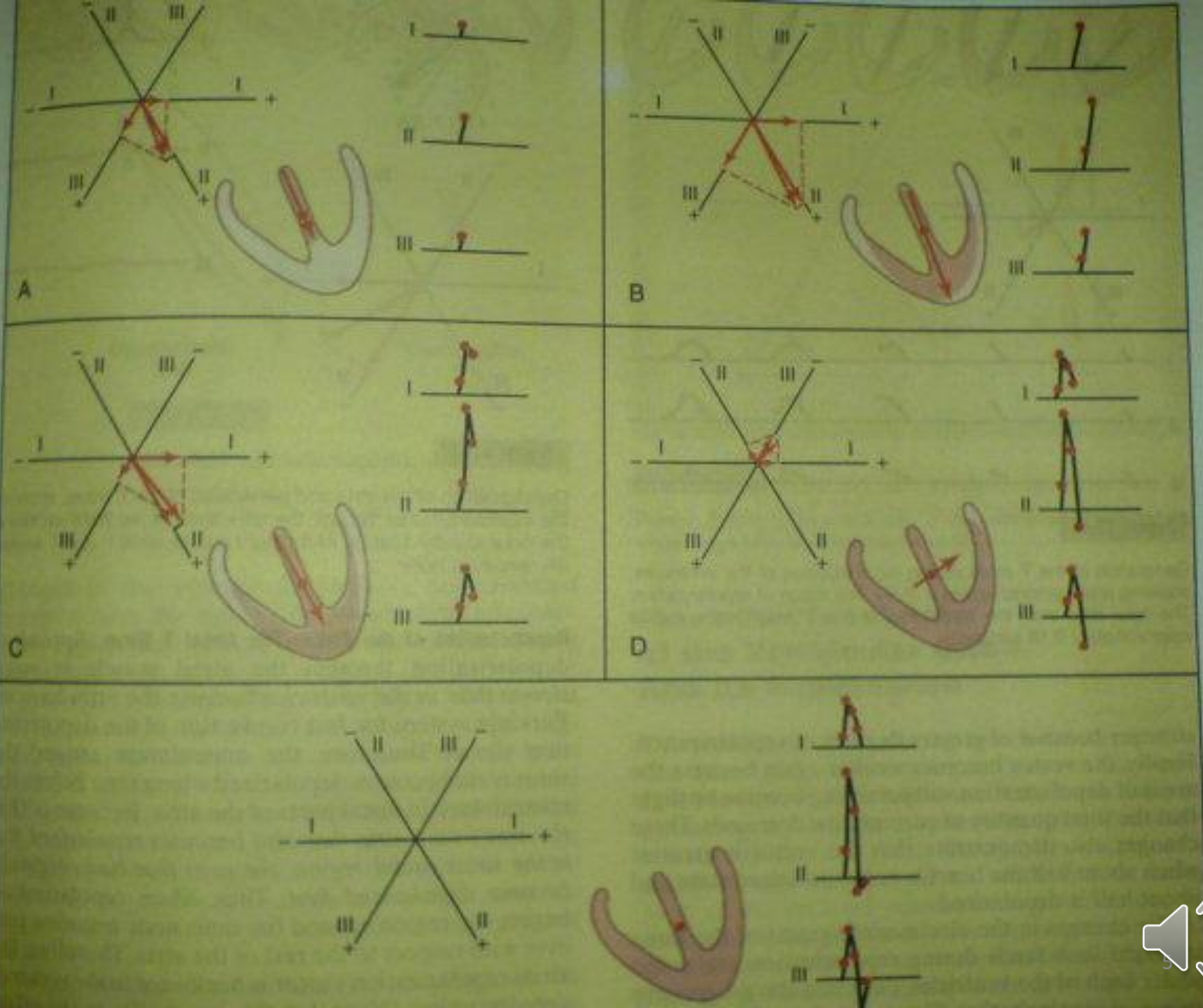
Dr Gul Muhammad

Learning objectives

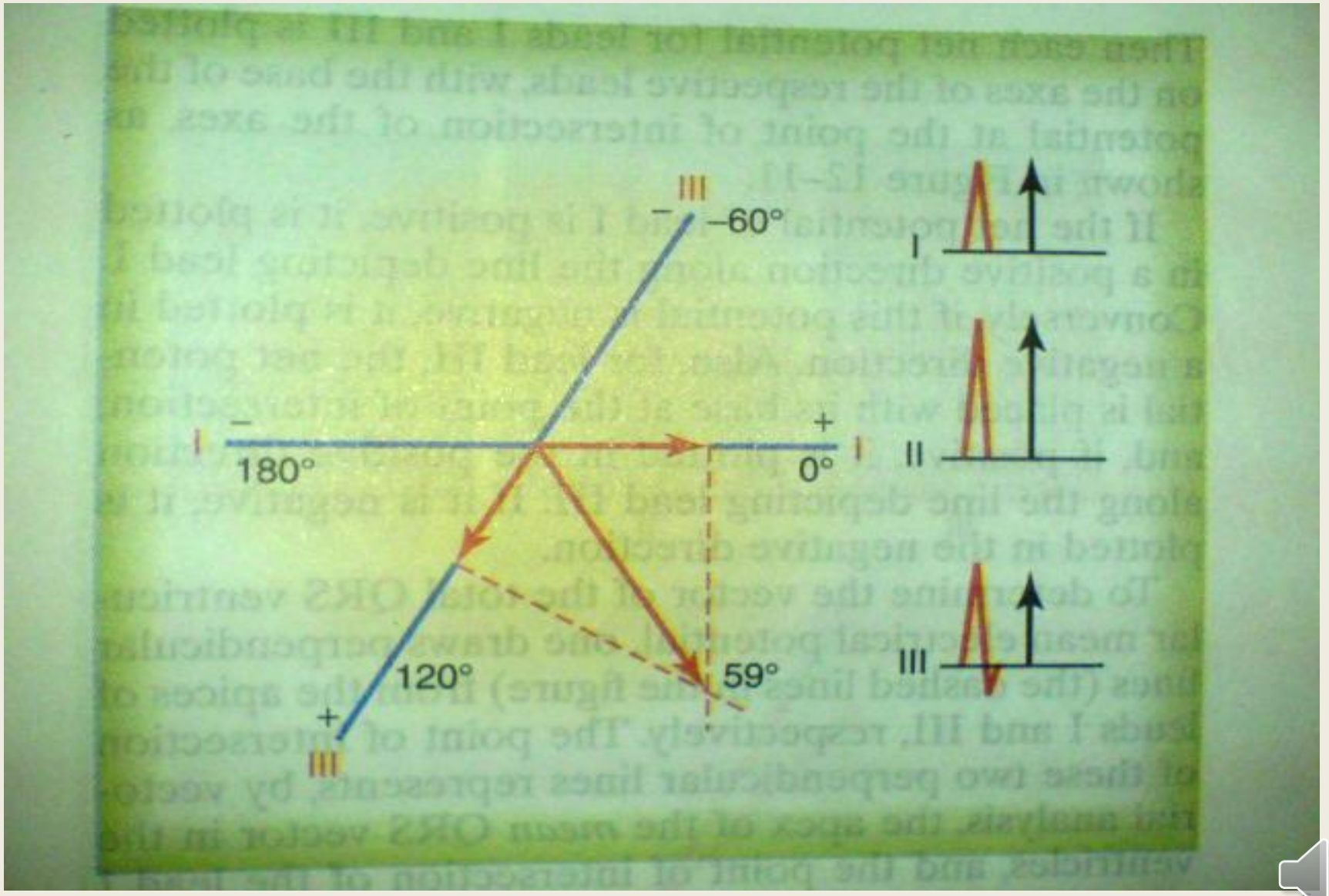
- What is normal axis or vector?
- What is axis deviation?
- How you will differentiate left and right axis deviation?
- What are the significances of axis deviation?
- What are the Causes of axis deviation?


Right Arm
Left Arm
RA
LA
LL
-
+
-
+
-
+
Lead I
Lead II
Lead III
-aVR+
-aVL+
+aVF-
-120°
-90°
-60°
-150°
-30°
180°
0°
150°
30°
120°
90°
60°

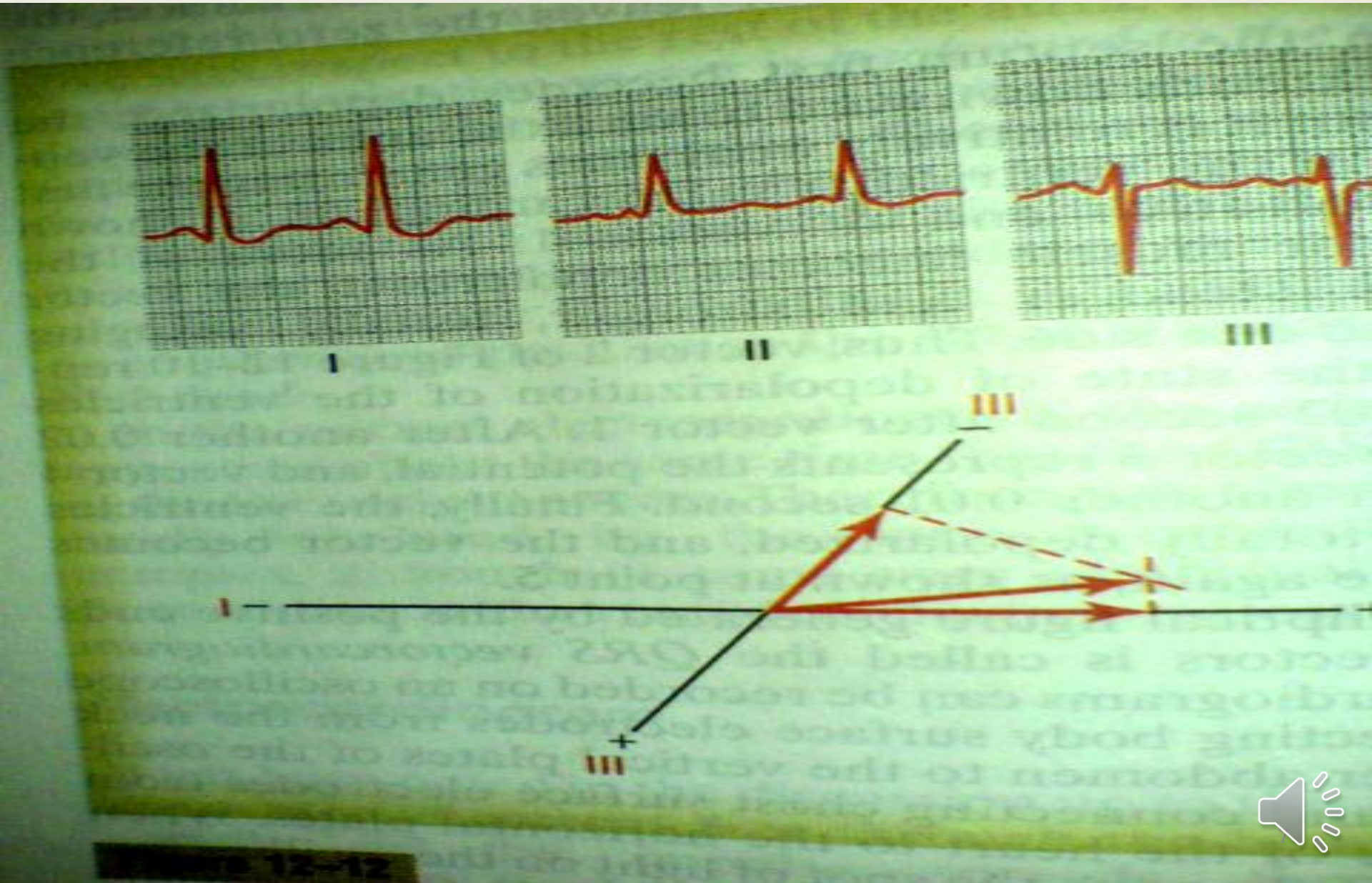



A
B
C
D
I
II
III

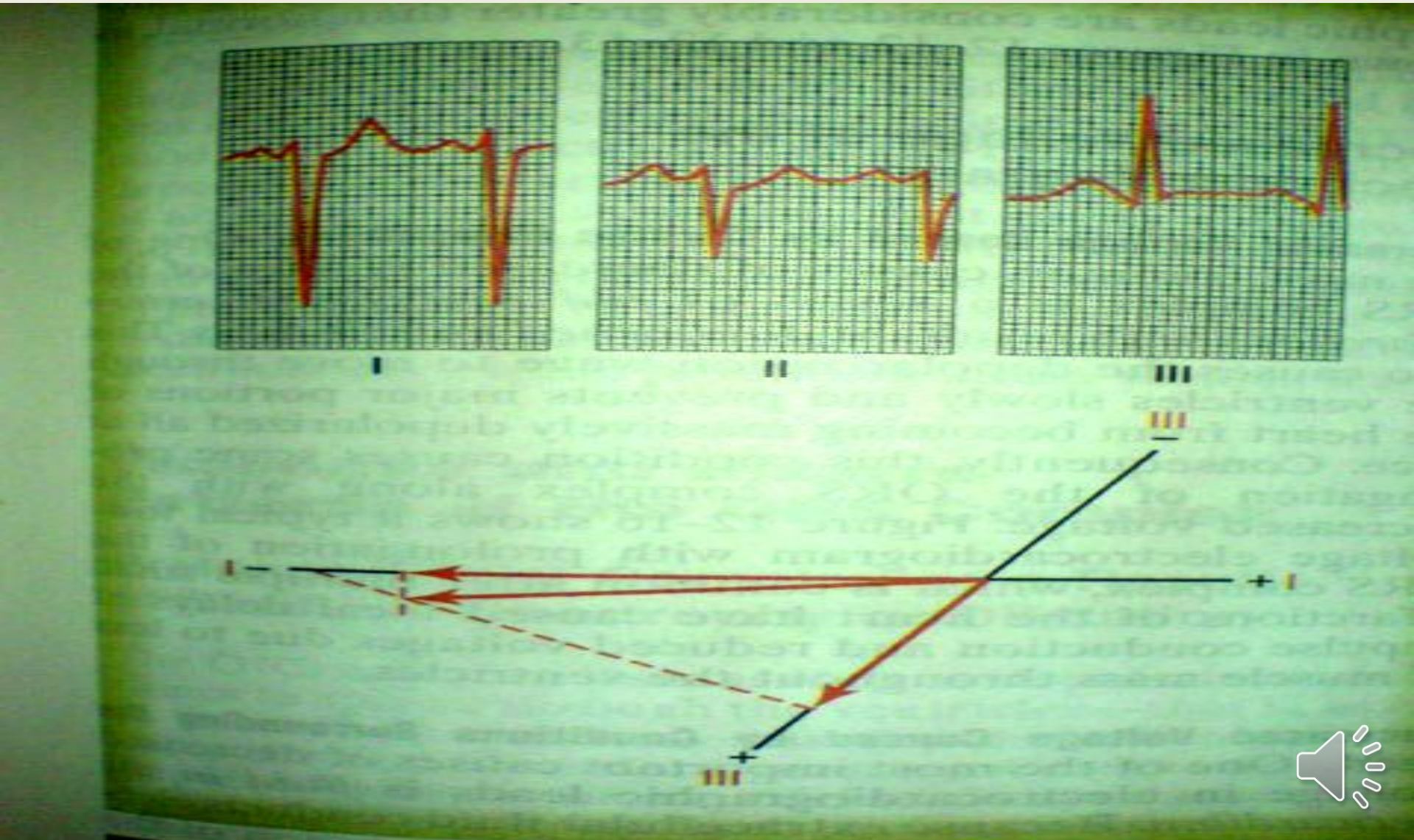
Normal Axis of the heart



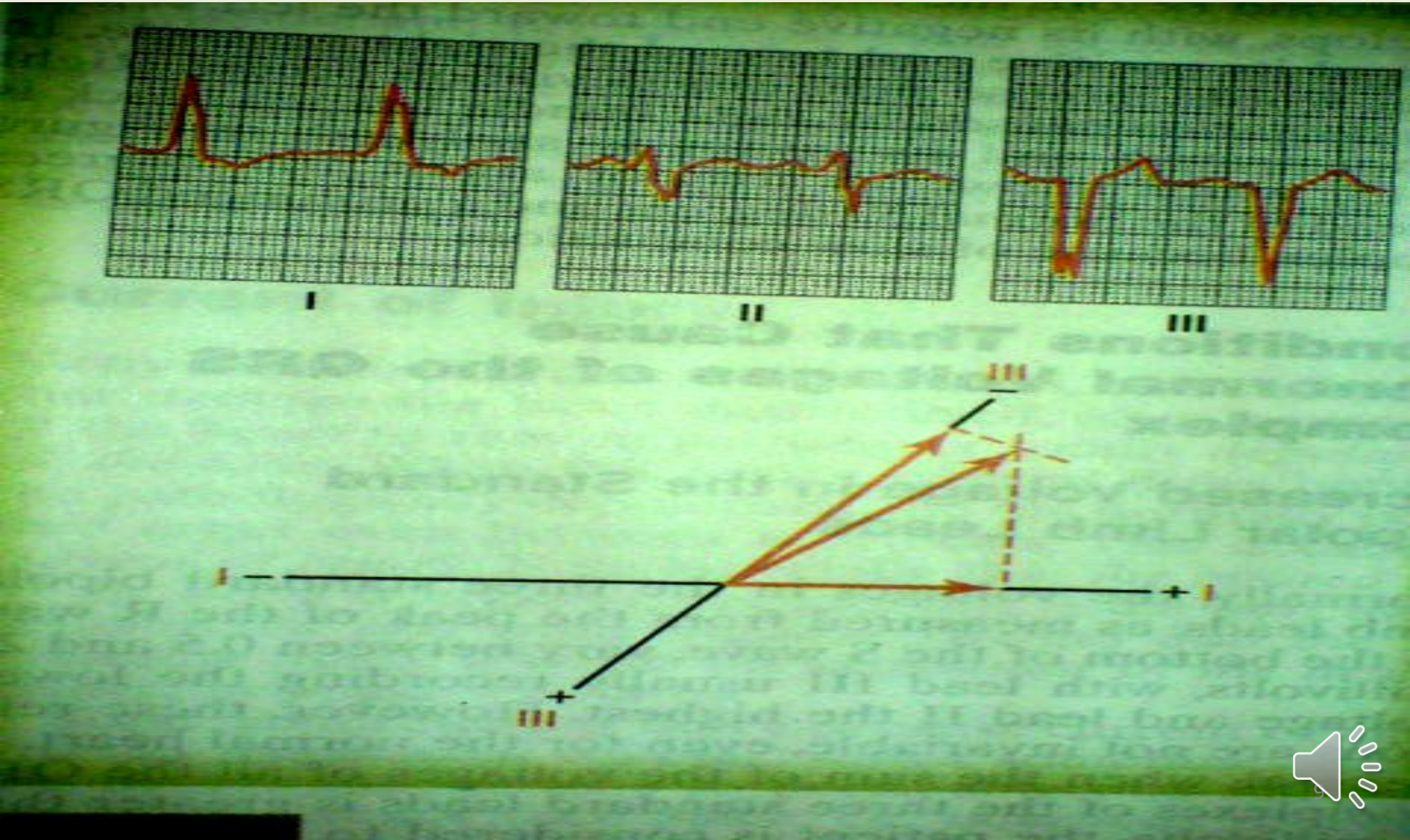
Left axis deviation



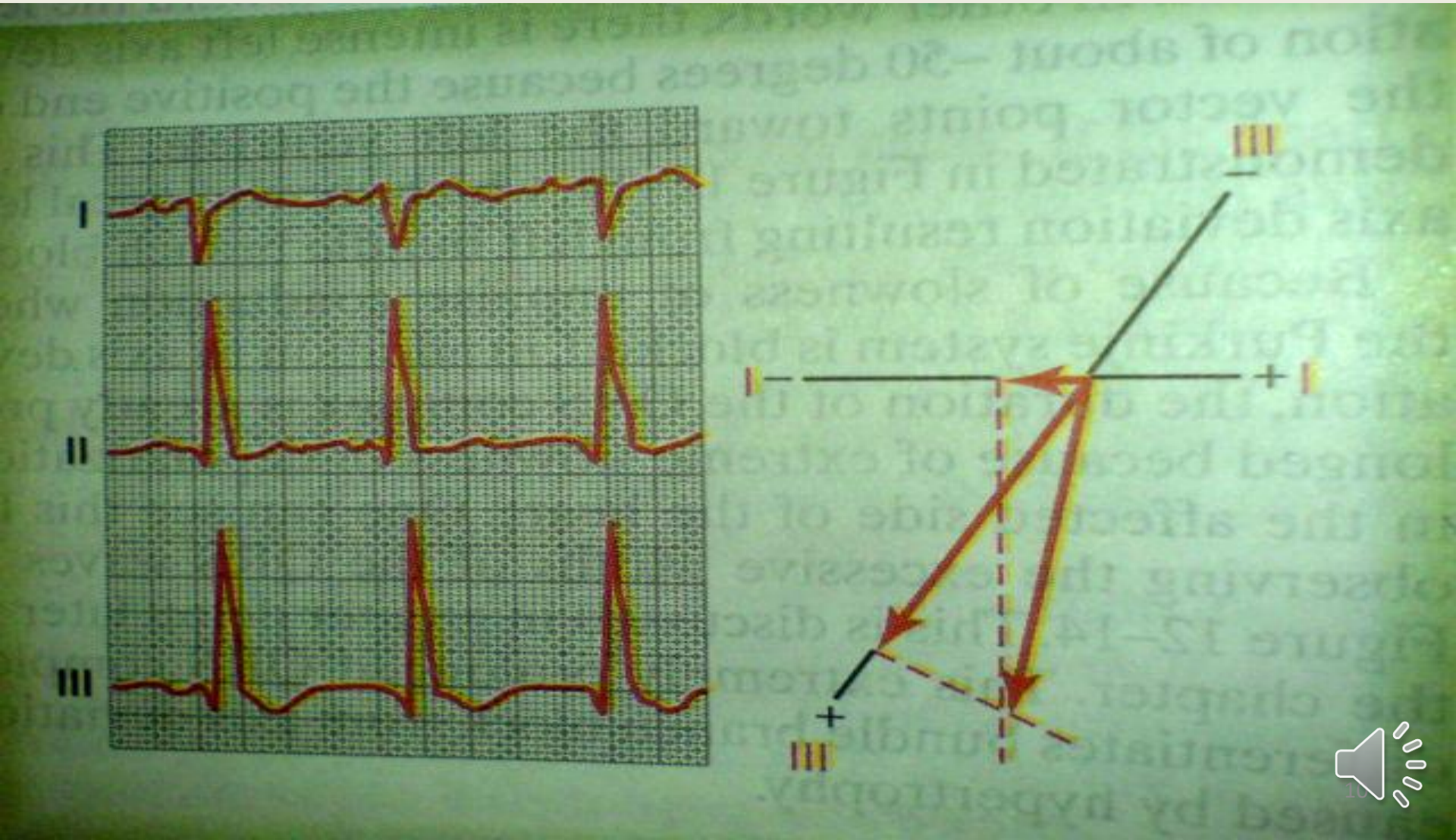
Right axis deviation



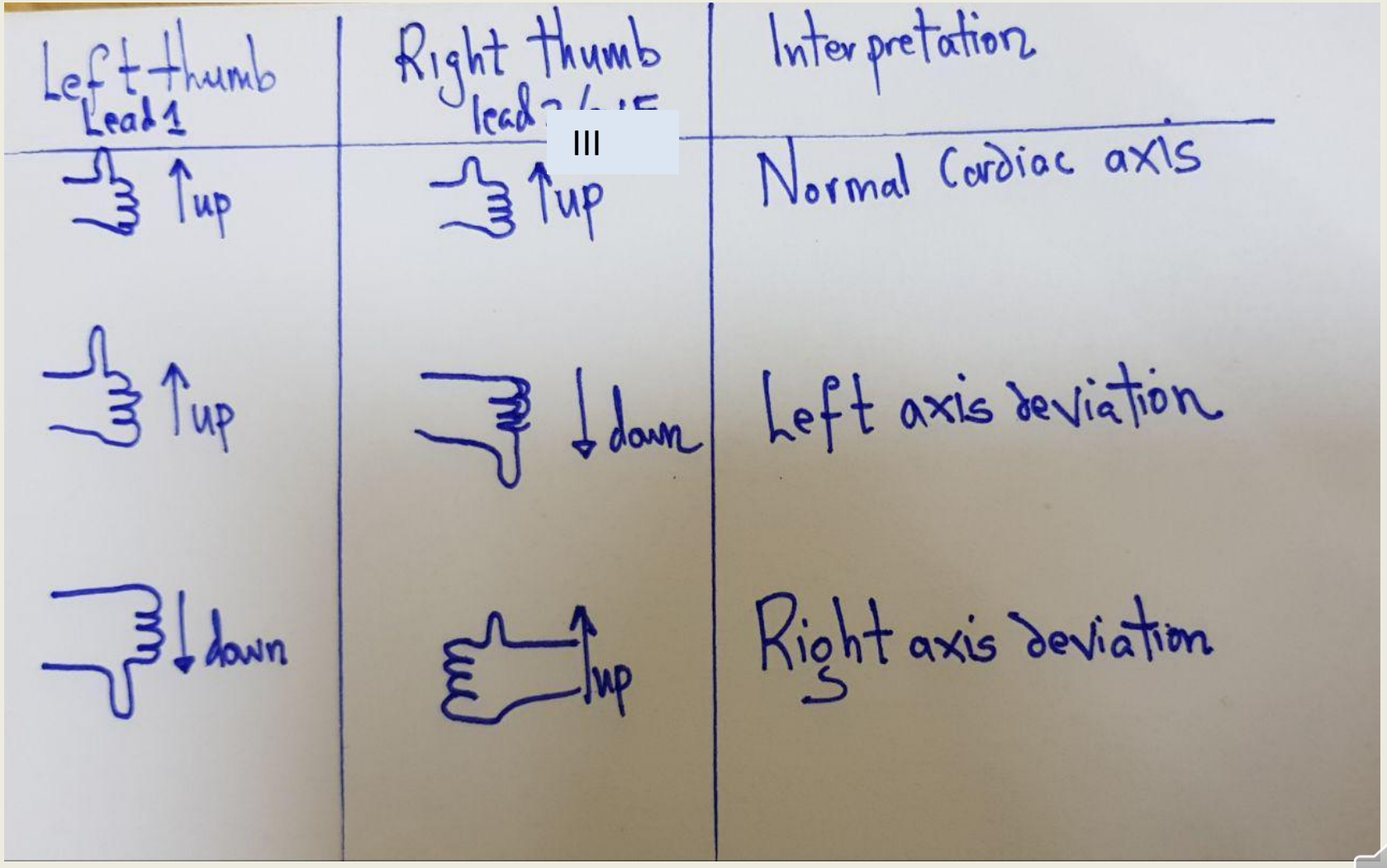
Left Axis Deviation



Right axis deviation



Rule of thumb



RULE OF THUMB LINK

- https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3Dgy0gkh1foR4&psig=AOvVaw23nk9sQGeDZyPwpa9Pxf3i&ust=1589654528560000&source=images&cd=vfe&ved=0CAIQjRxqFwoTCICtz_nCtukCFQAAAAAdAAAAABAo

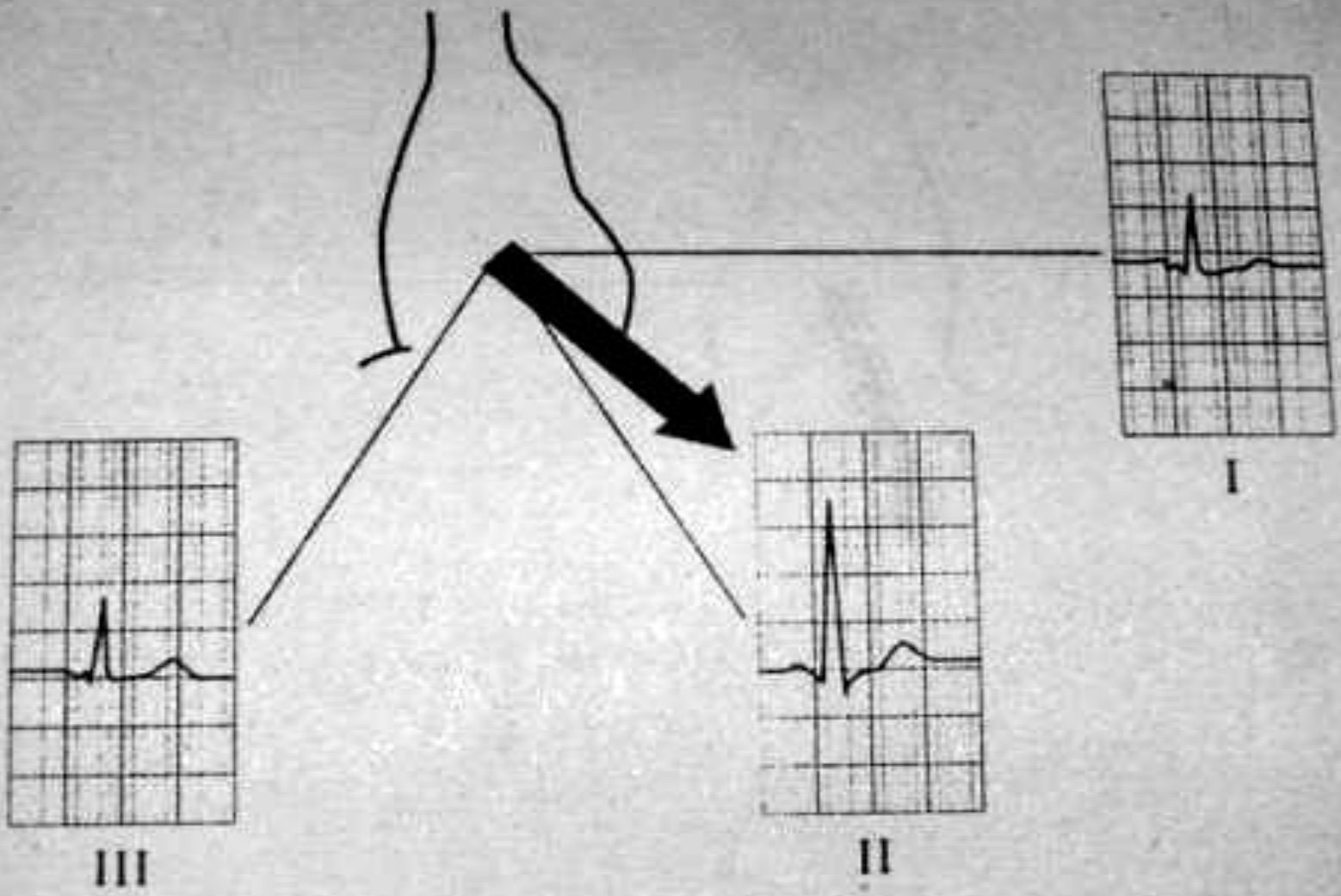


Fig. 1.14 The normal axis

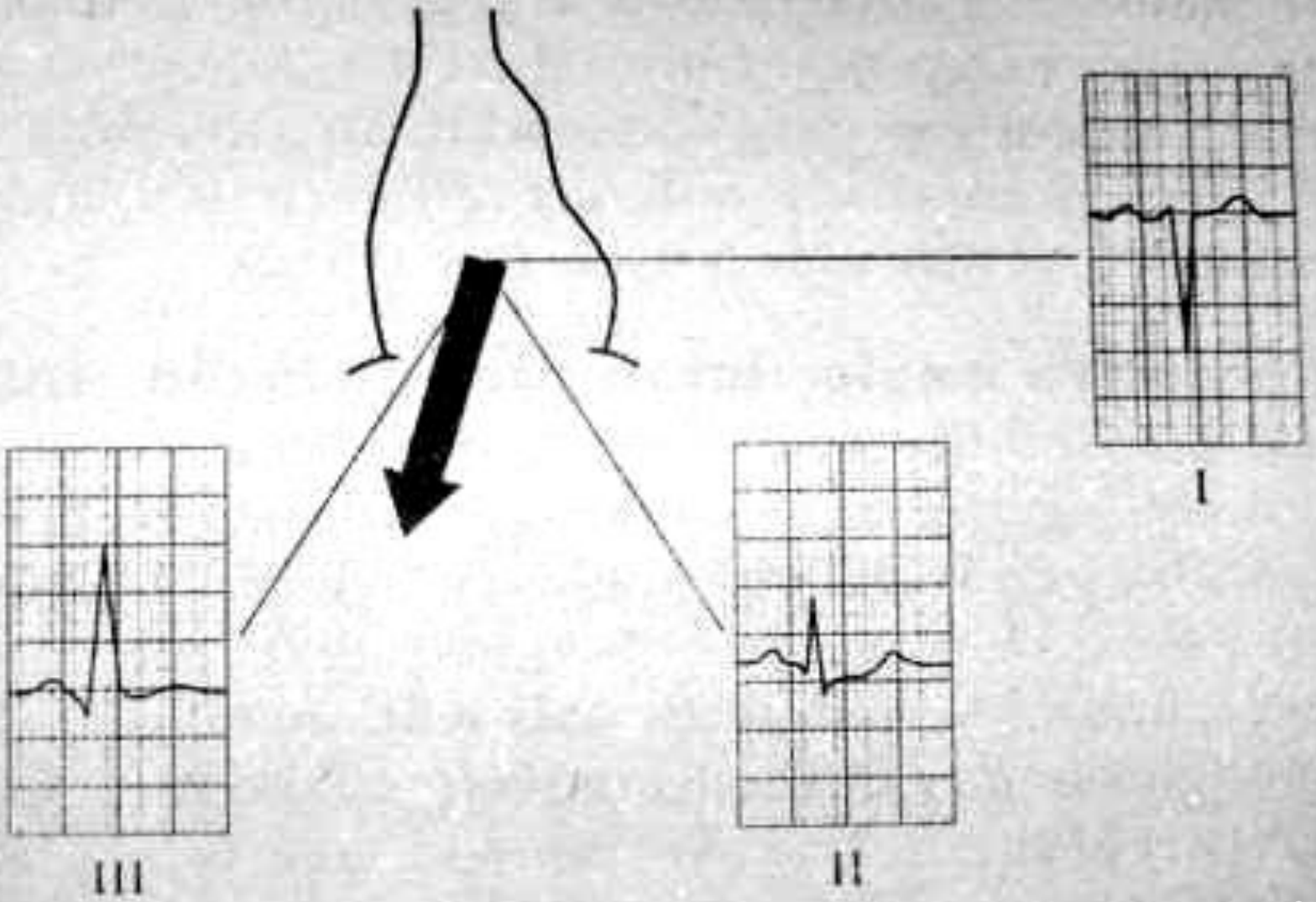


Fig. 1.15 Right axis deviation

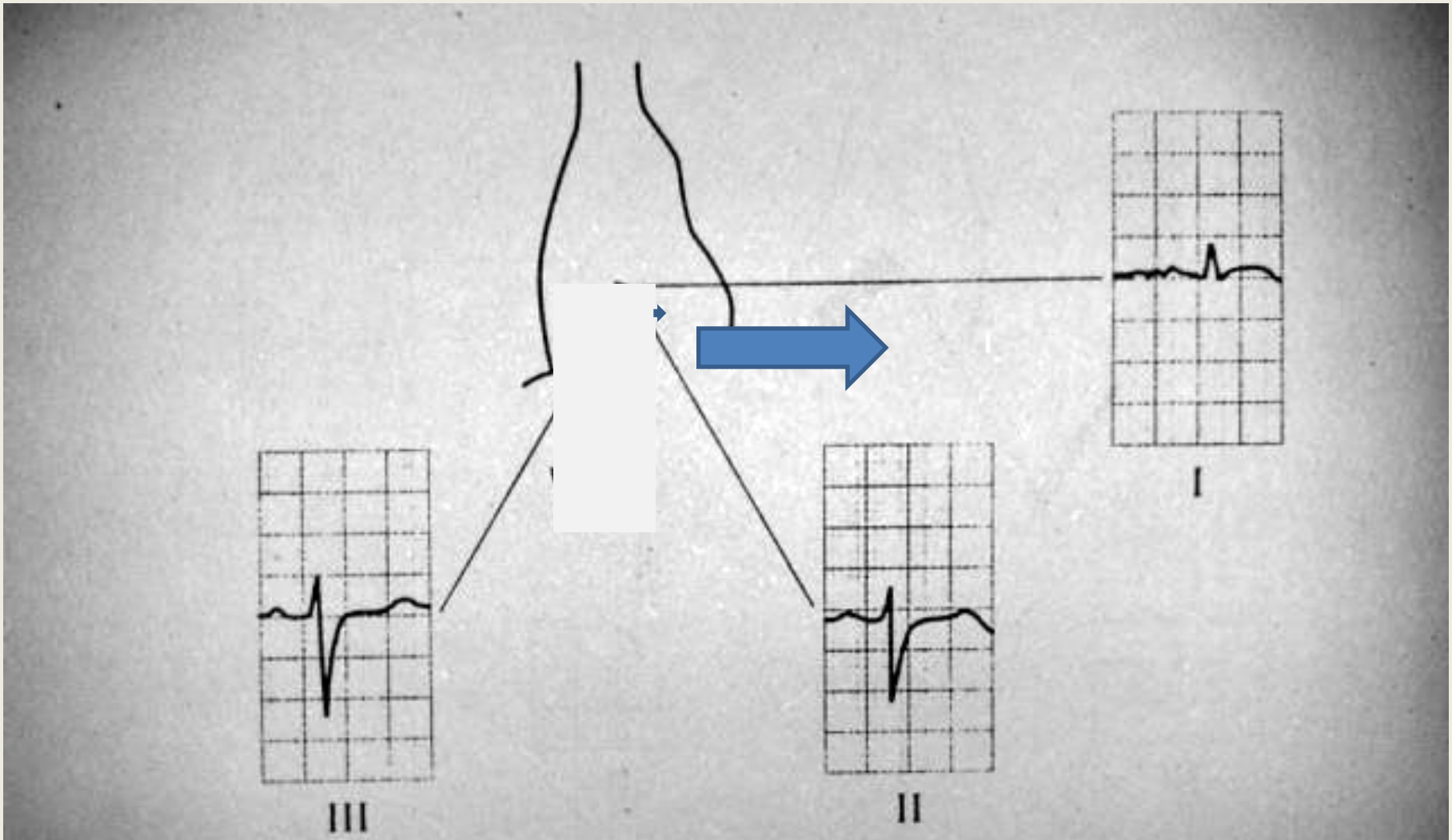


Fig. 1.16 Left axis deviation

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)

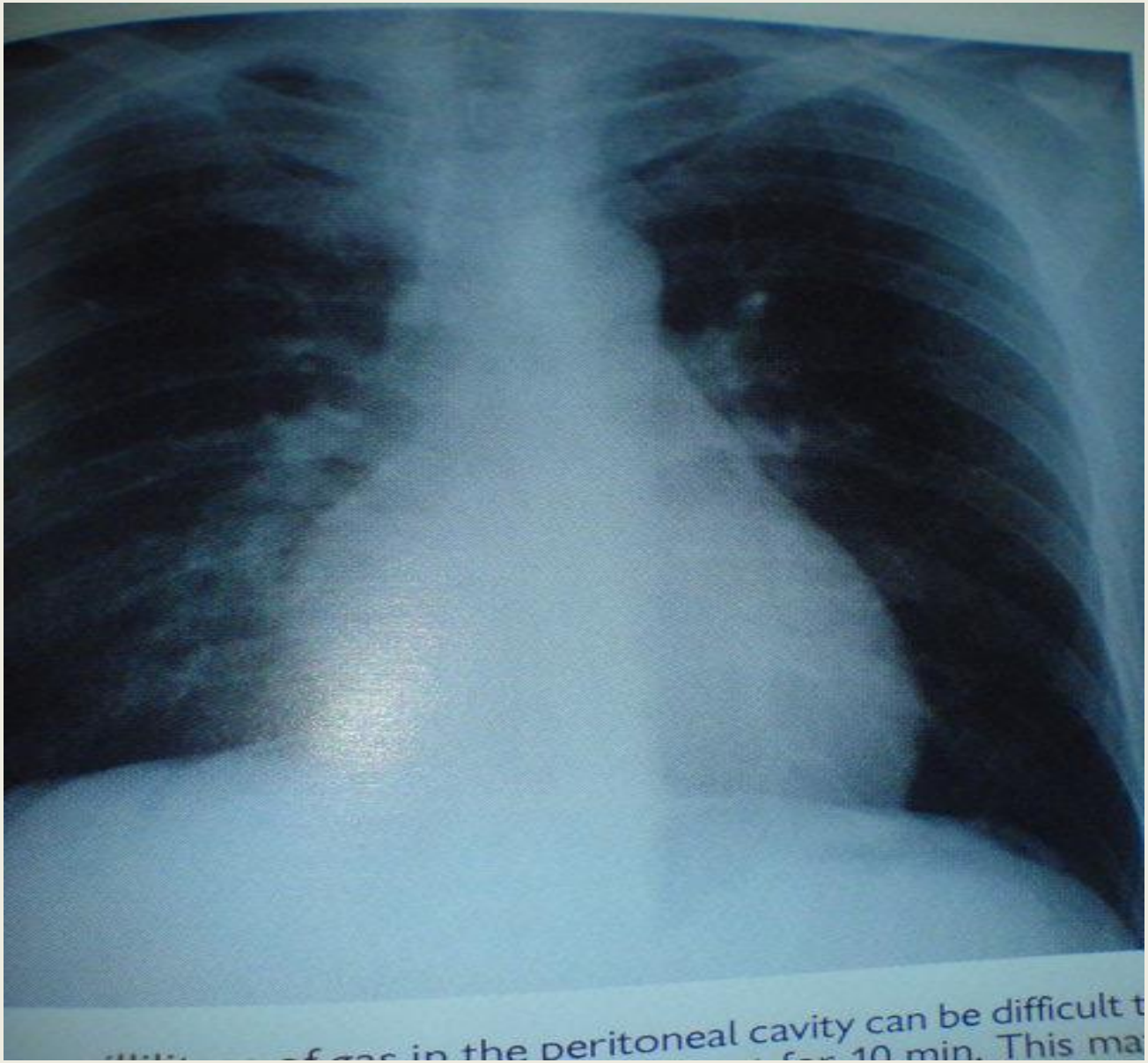
- Causes outside the heart

  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