Limb Leads Directions
Direction of Propagation

Lead aVF will be negative if the mean QRS vector is in this hemisphere.

Lead aVF will be positive if the mean QRS vector is situated in this hemisphere.

Lead I will be positive if the mean QRS vector is situated in this hemisphere.

Lead I will be negative if the mean QRS vector is in this hemisphere.
Determination of QRS Axis

STEP 1: LOOK AT LEADS I & aVF TO DETERMINE IN WHICH QUADRANT THE FRONTAL PLANE AXIS IS SITUATED

- Lead I negative
- Lead aVF negative
- Lead I positive
- Lead aVF negative
- Lead I positive
- Lead aVF positive

Axes:
- I
- aVF
Normal QRS Axis

Right superior quadrant axis

(-150°) aVR

(180°)

(150°)

III (120°)

aVF (90°)

II (60°)

(-90°)

(-60°)

(-30°) aVL

I (0°)

Normal axis

Left (superior) axis

Right axis
Left Axis Deviation
Right Axis Deviation
Myocardial Infarction
Views of the Heart

Some leads get a good view of the:

- Anterior portion of the heart
- Lateral portion of the heart
- Inferior portion of the heart
Ways the ECG can change include:

- Appearance of pathologic Q-waves
- ST elevation & depression
- T-waves: peaked, flattened, inverted
ST Elevation

A great way to diagnose an acute MI is to look for elevation of the ST segment.
Elevation of the ST segment (greater than 1 small box) in 2 leads is consistent with a myocardial infarction.
Effects of Myocardial Ischemia, Injury, and Infarction on the ECG

- **Zone of ischemia**
  - Myocardial ischemia causes ST segment depression with or without T wave inversion as a result of altered repolarization.

- **Zone of injury**
  - Myocardial injury causes ST segment elevation with or without loss of R wave.

- **Zone of infarction**
  - Myocardial infarction causes deep Q waves as a result of absence of depolarization current from dead tissue and receding currents from the opposite side of the heart.

**Normal ECG**
Differential Diagnosis of Q Waves

Nonsignificant Q wave

Q wave is normally produced in lead I by initial depolarization of interventricular septum, with electrical vector directed to right and downward. Septum is relatively thin and depolarization occurs quickly, generating only small, short-lived potential.

Resultant septal Q wave in lead I is of small amplitude (<25% of succeeding R wave) and short duration (<0.04 second, i.e., <1 small box on ECG tracing)
ST Elevation Infarction

Evolving infarction:

A. Normal ECG prior to MI

B. Ischemia from coronary artery occlusion results in ST depression (not shown) and peaked T-waves

C. Infarction from ongoing ischemia results in marked ST elevation

D/E. Ongoing infarction with appearance of pathologic Q-waves and T-wave inversion

F. Fibrosis (months later) with persistent Q-waves, but normal ST segment and T-waves
Anterior MI

Remember the anterior portion of the heart is best viewed using leads $V_1$- $V_4$. 

Precordial Leads
Anterior MI
The lateral portion of the heart is best viewed by:

**Leads I, aVL, and V₅- V₆**
Anterolateral MI

This person’s MI involves both the anterior wall (V$_2$-V$_4$) and the lateral wall (V$_5$-V$_6$, I, and aVL)!
Inferior MI

The inferior portion of the heart by:

**Leads II, III and aVF**

Limb Leads  Augmented Leads  Precordial Leads
Inferior Wall MI

Note the ST elevation in leads II, III and aVF.
Inferior MI
Posterior/Lateral MI
Metabolic Abnormalities

Hypokalemia

Hypothermia

Quinidine excess

Tricyclic overdose

Subarachnoid hemorrhage
RBBB and Inferior MI

Tehran Arrhythmia Center
Anterior MI

Tehran Arrhythmia Center
LBBB
Heart can have Bad Habits which are Laziness and Unhealthy Eating. Unhealthy Eating combined with Laziness may lead to Heart Disease, which may lead to Hospitalization and Death.

Good Habits are Eating healthy, which are some good ways to be Healthy through Exercise.
زندگی گل به توان ابیدت
زندگی ضرب زمین در ضربان دل ما