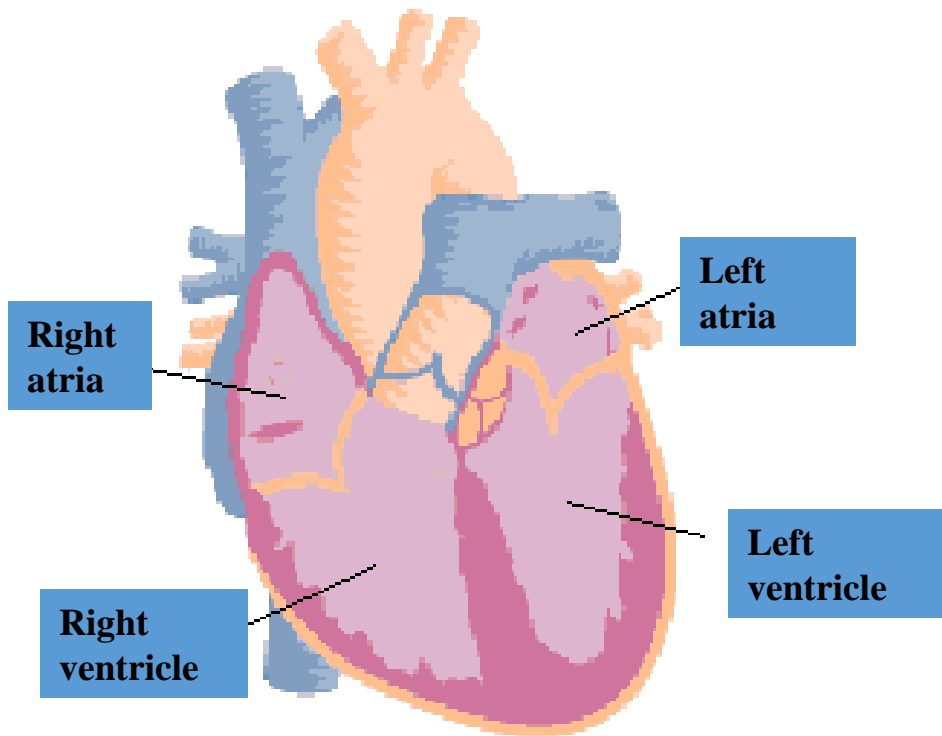


12 Lead EKG

What is the heart?

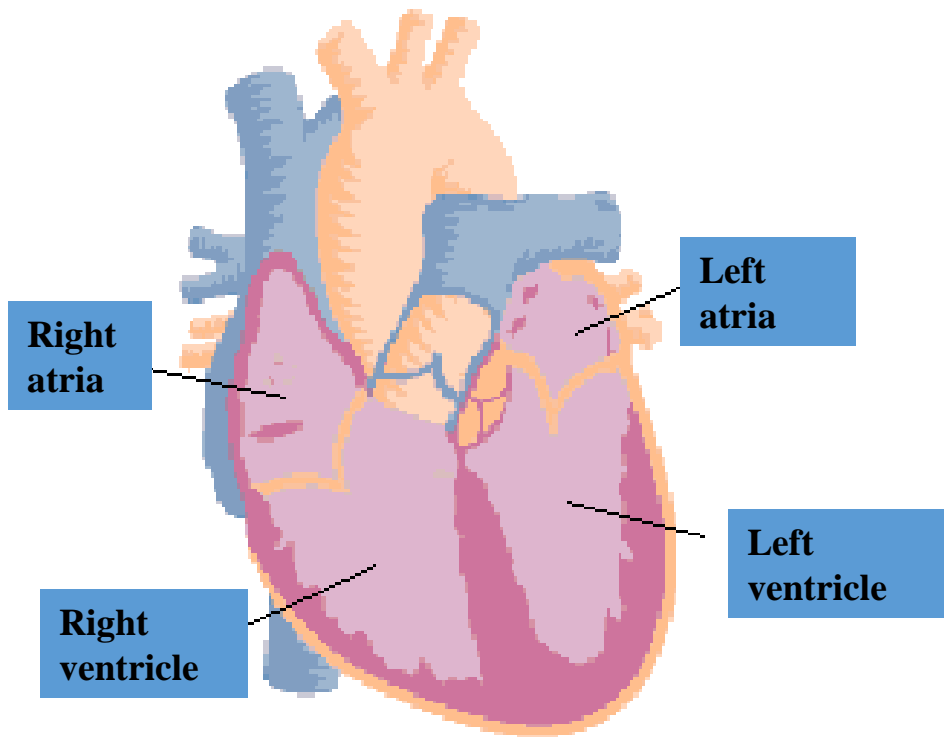
- The heart is the organ that is responsible for pumping blood rich in oxygen to all parts of the body
- It is located in the center of the chest and is approximately the size of a fist

Heart Chambers



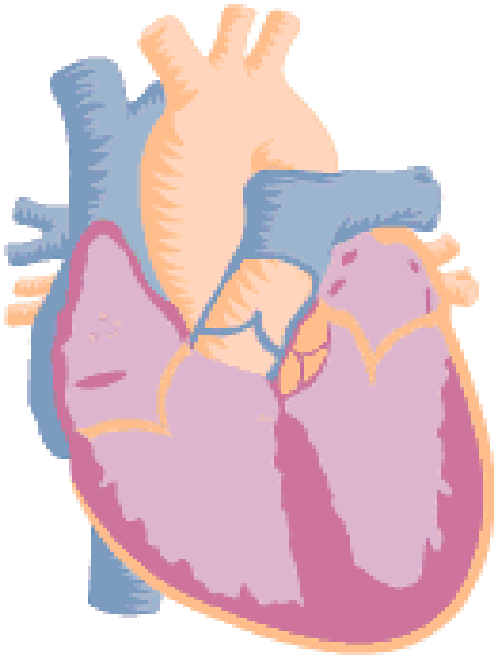
- The heart has:
 - two upper small chambers called the atria
 - two lower large chambers called the ventricles
- In order to pump blood, the heart must have an electrical system that functions

Heart Valves



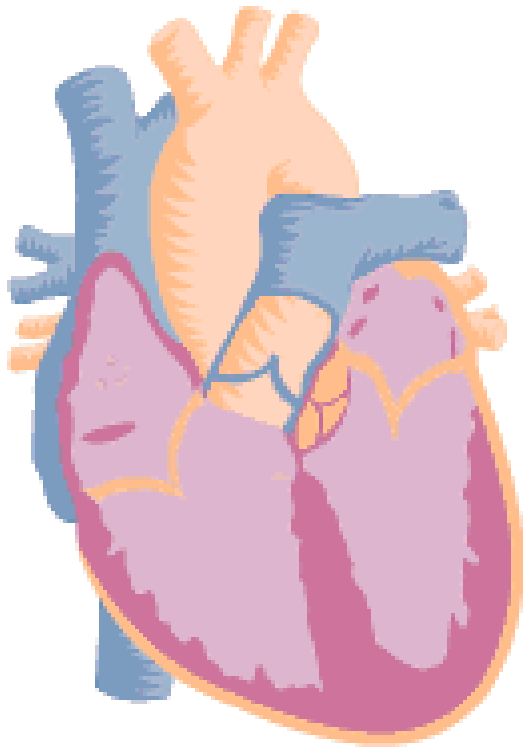
- Blood is pumped through the heart via four valves that are dependent on pressure changes to open and close

Where does the electricity come from?



- Each heartbeat begins with an impulse in the upper right atrium – this is the heart's pacemaker
- This impulse activates both upper chambers of the heart (the atria)
- Then the atria contract and pump blood into the lower chambers

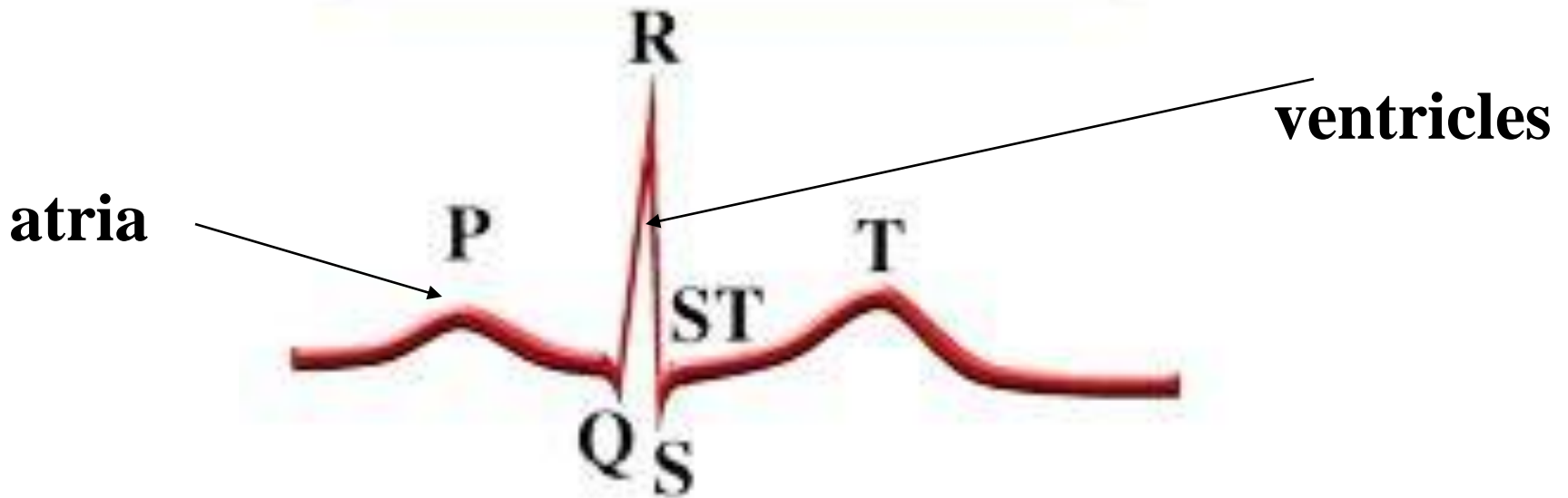
Where does the electricity come from?



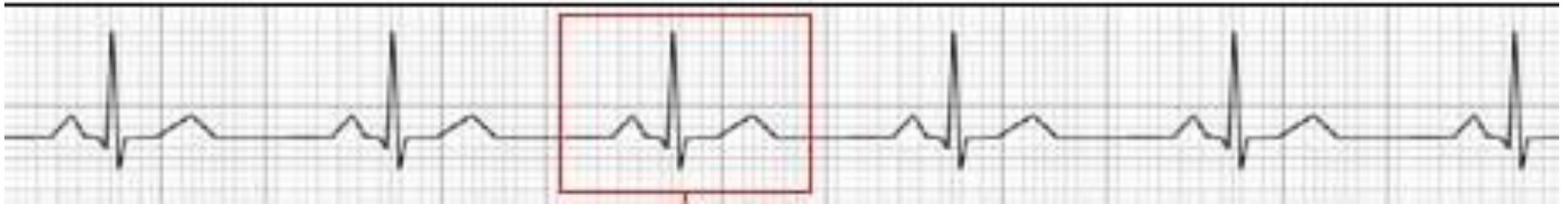
- Next, the electrical current flows down to both lower chambers (the ventricles)
- Both ventricular chambers then contract and pump blood to the body via a large artery

What does the electricity look like?

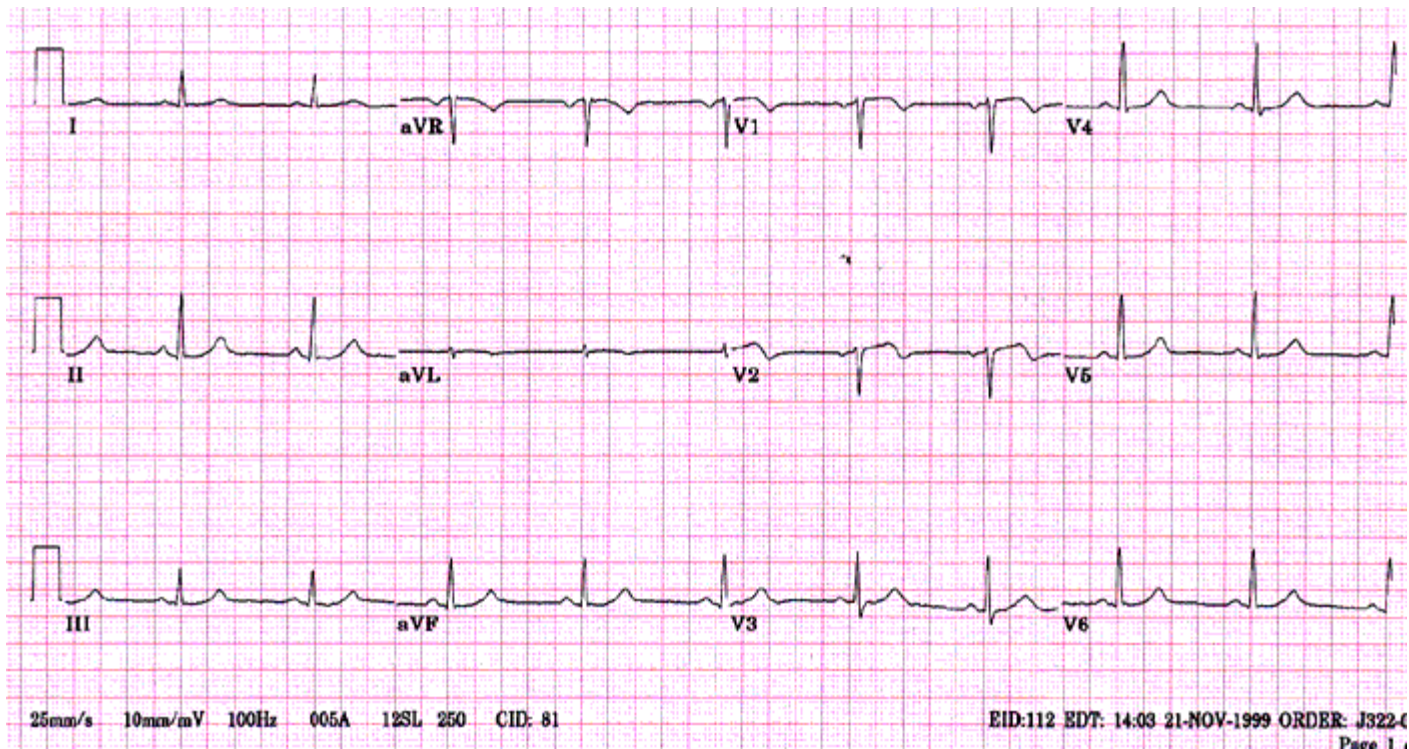
Each heartbeat



Electricity of several heart beats



Electricity is Recorded on an ECG



What is an ECG?

- ECG
 - **Electrocardiogram**
- Also referred to as EKG
 - **Electrokardiogram**

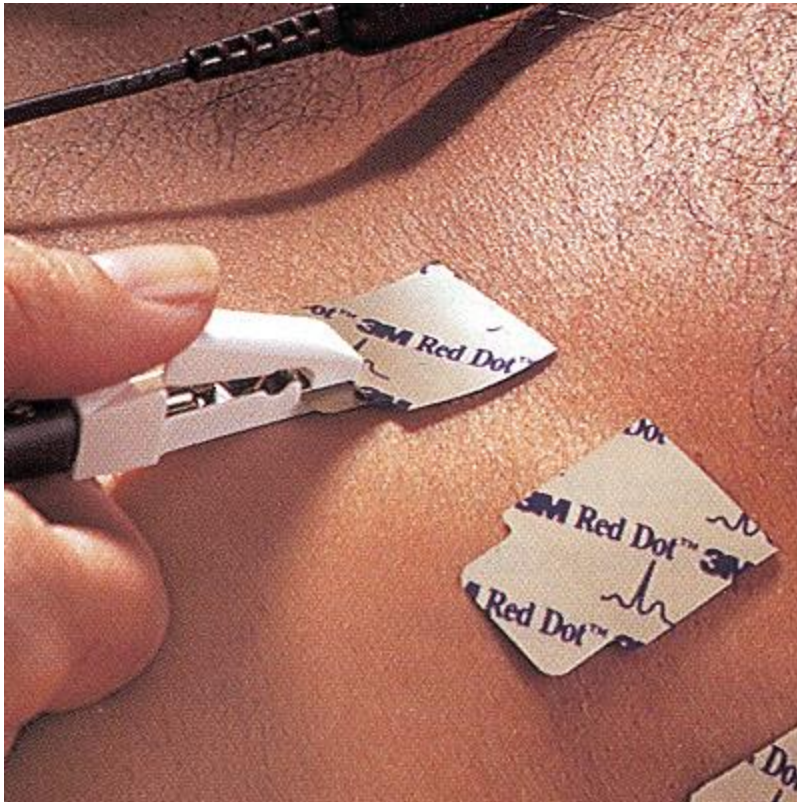
What is an ECG?

- A recording of the electrical activity of the heart
- It does not provide information about the mechanical function of the heart
- It provides information about the heart's:
 - Rate fast, slow, normal
 - Rhythm regular, irregular
 - Conduction pathways normal, abnormal
 - Conditions affecting the heart muscle, chambers or valves e.g. heart attack, angina, enlarged atria or ventricles, infection
 - Response to medications

Why do an ECG?

- Protocol for research trials to detect any changes in the electrical properties of the heart

How is the electricity recorded?



- Via “electrodes” that are placed on the skin
- They sense the electrical activity as it passes through the heart
- Each electrode is attached to a wire, called a “lead wire”
- The lead wires are connected to the ECG machine

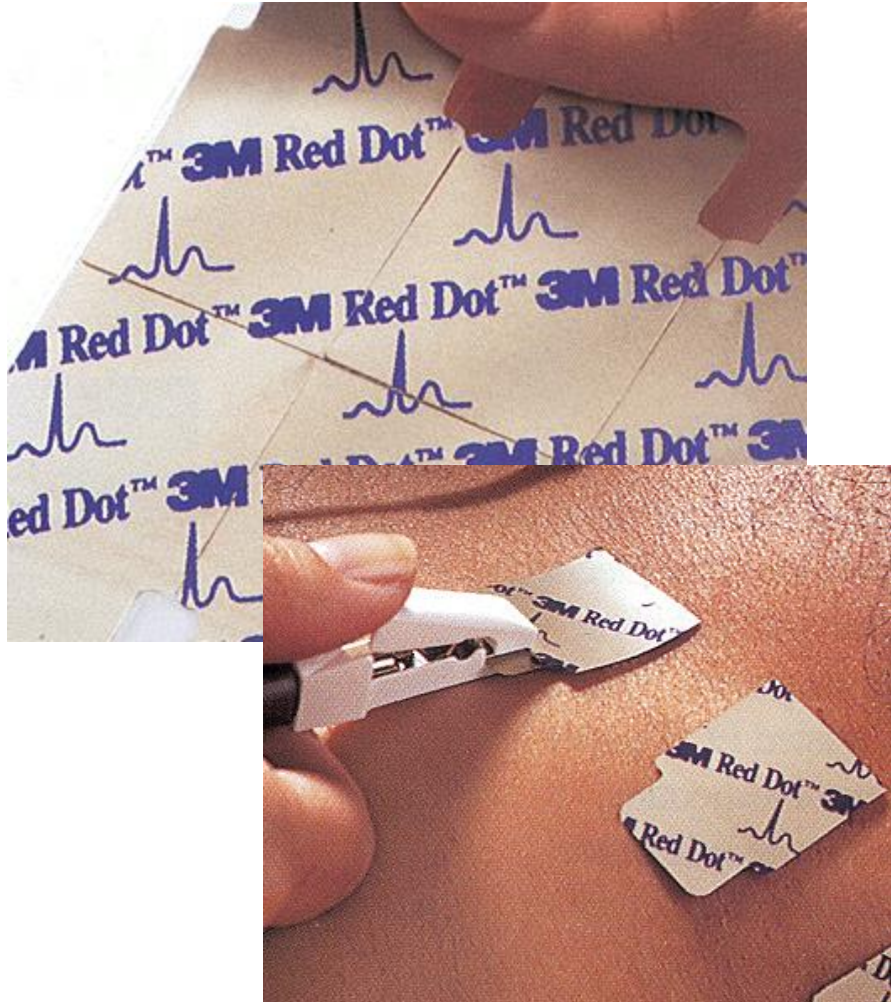
Preparation of Participant

- Introduce yourself to the patient and tell him/her that you are going to take an ECG
- Explain that it:
 - is a recording of the electrical activity of the heart
 - is painless
 - takes about 15 minutes

Preparation of Participant

- Maintain privacy
 - Close curtain or door
 - Explain that an access to their wrists/arms, ankles and chest is needed to apply the electrodes
- Ensure that the participant is comfortable
 - Assist them to lie down or recline
 - Head of bed to a 30° to 45° angle or sit in recliner with legs up
 - Arms resting at sides
 - Legs flat, not touching and parallel to one another
 - Pillow supporting the head
 - Blanket to keep warm

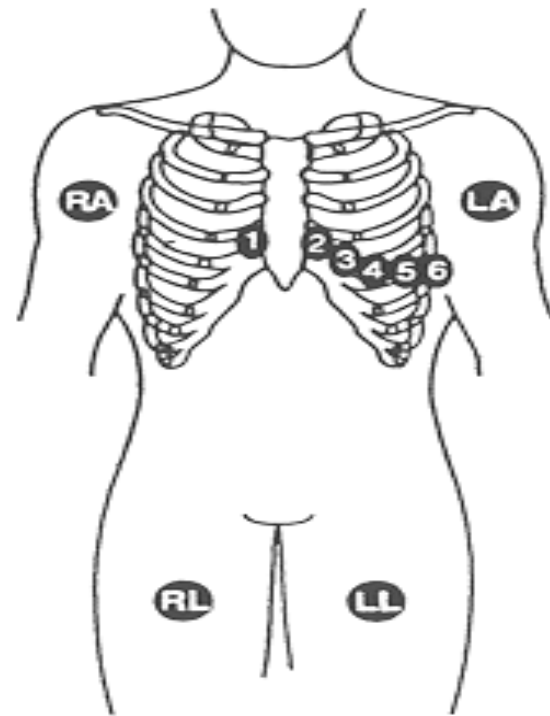
Prepare Skin for Electrode Placement



- Wash with soap and water and/or alcohol
- Cut or clip excess hair if necessary
- Do not shave skin
- Do not place over bony prominences (e.g. wrists, ankles, sternum)

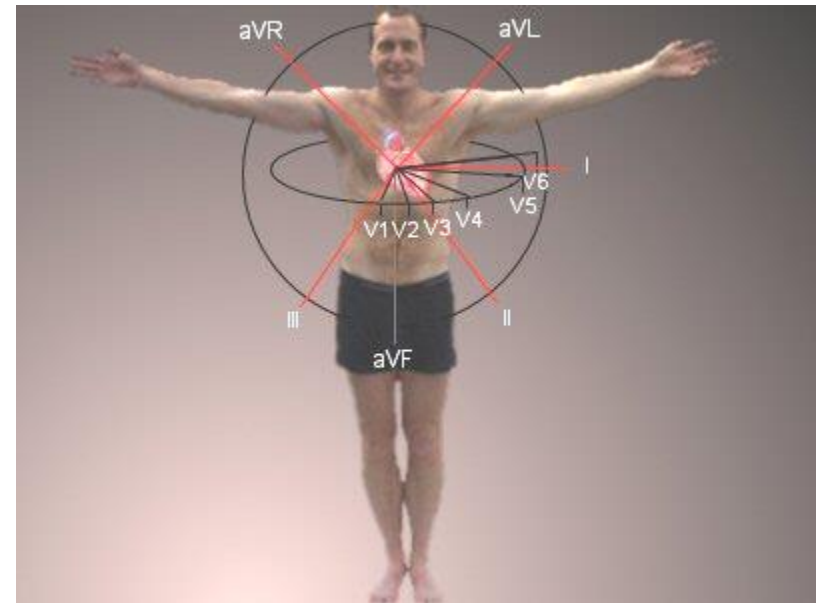
Standard Placement of Electrodes

- Ten electrodes are placed on designated areas of the body
 - Four on the limbs (one on each arm and one on each leg)
 - Six on the chest
- These electrodes will record different views of the heart's electrical activity



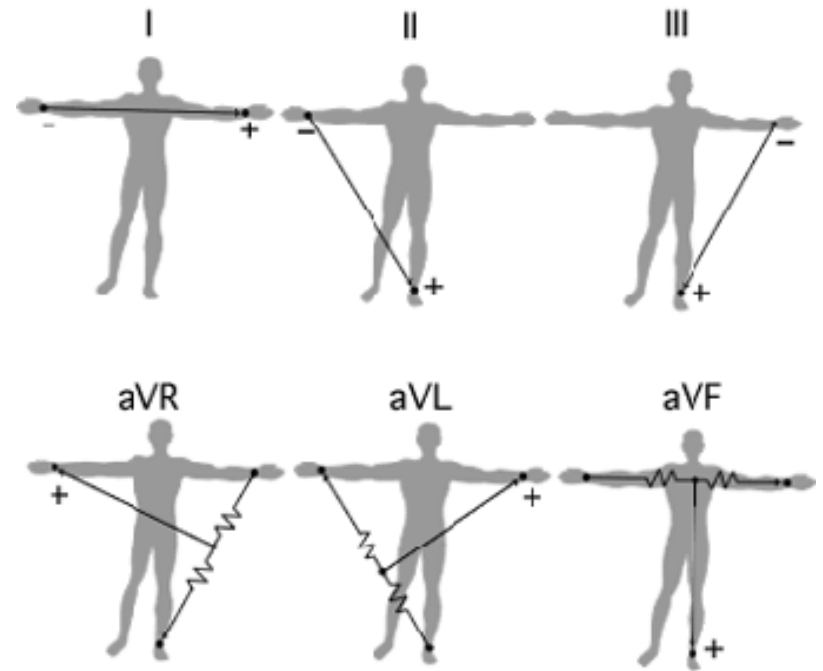
12 Lead ECG

- 12 views, referred to as “leads”, are derived from the signals obtained from the 10 electrodes
- 12 lead ECG: results in 12 different views of the heart



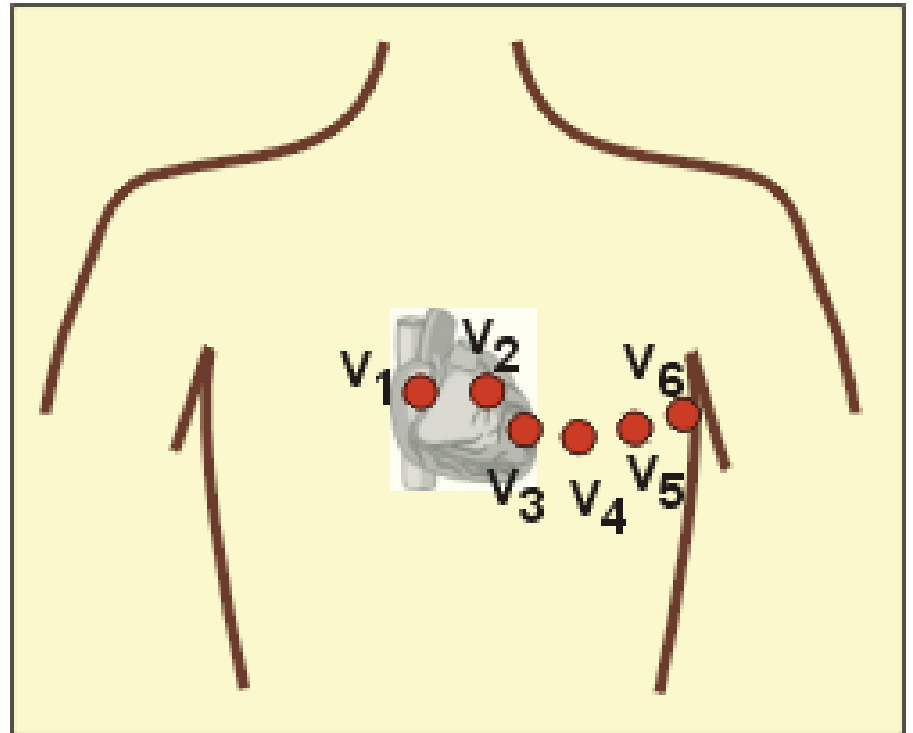
Limb Electrodes

- Four limb electrodes produce six views of the heart
- Leads:
 - I, II, III
 - AVR, AVL, AVF



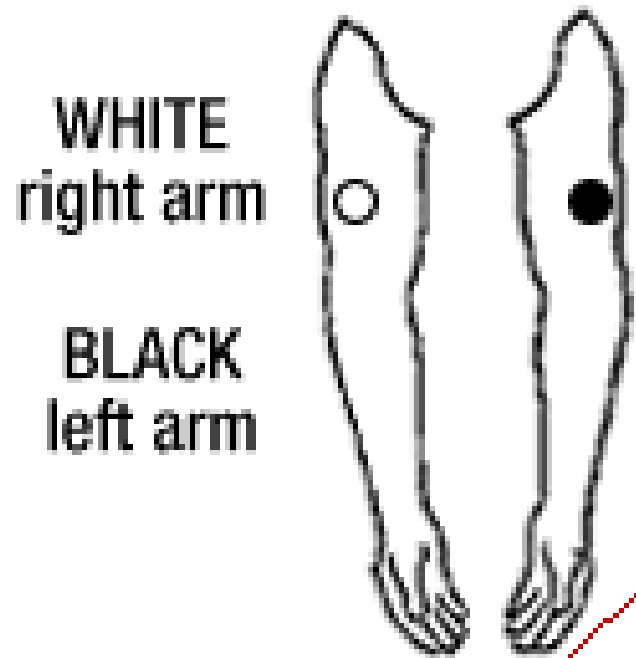
Chest Electrodes

- Six chest electrodes produce an additional six views. Leads:
 - V1
 - V2
 - V3
 - V4
 - V5
 - V6



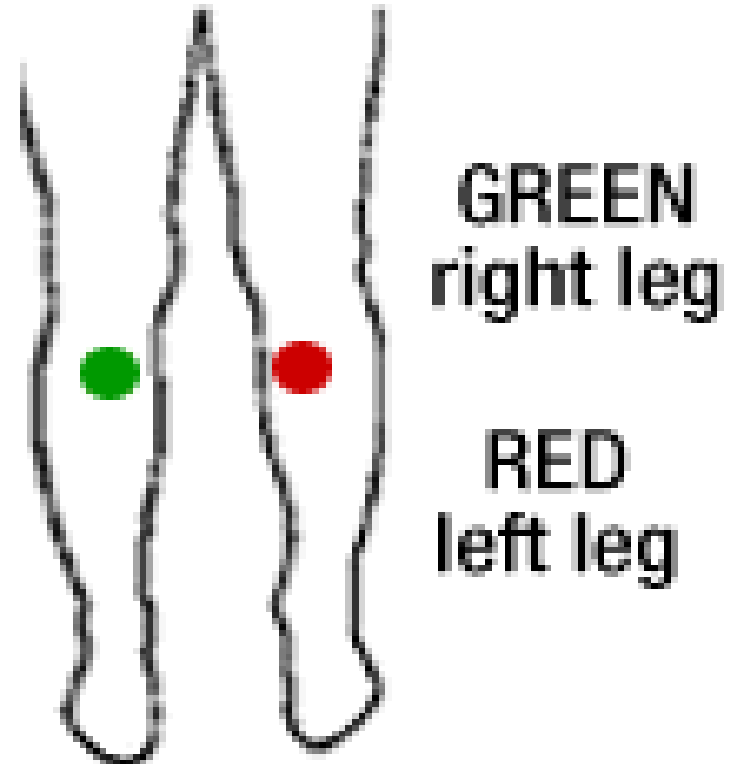
Limb Electrode Placement- Arms

- Place one electrode on the right arm and one electrode on the left arm
- Position electrode above the wrist and below the shoulder
- Avoid placing electrodes on the boney prominences
- Do not place on the torso



Limb Electrode Placement- Legs

- Place one electrode on the right leg and one electrode on the left leg
- Use the inner aspect of the leg
- Above the ankles, below the hip
- Avoid placing electrode on the boney prominences



Performing the Procedure

- Place the ECG machine on the participant's left side so that you can place the chest electrodes accurately and there is less tension on the lead wires
- Plug the machine into an electrical outlet (the machine also runs on battery)
- If ECG is to be transmitted to ECG lab, connect the telephone cable to the jack on the ECG machine and to the jack in the wall
- Turn on the power

Enter Participant Data

- Differs with each ECG machine model
- Check in your area the participant information to be entered and ECG machine functionality

EKG Acquisition

- Place electrodes in the standard 10 positions
- Attach electrodes to designated lead wires
- Instruct the participant to:
 - relax and breath normally
 - remain still, avoid moving
- Tell participant that the recording will only take 12 seconds

EKG Acquisition

- Record EKG (review your machine in your care area for specifics)

Veel. rate
PR interval
QRS duration
QT/QTc
P-R-T axes

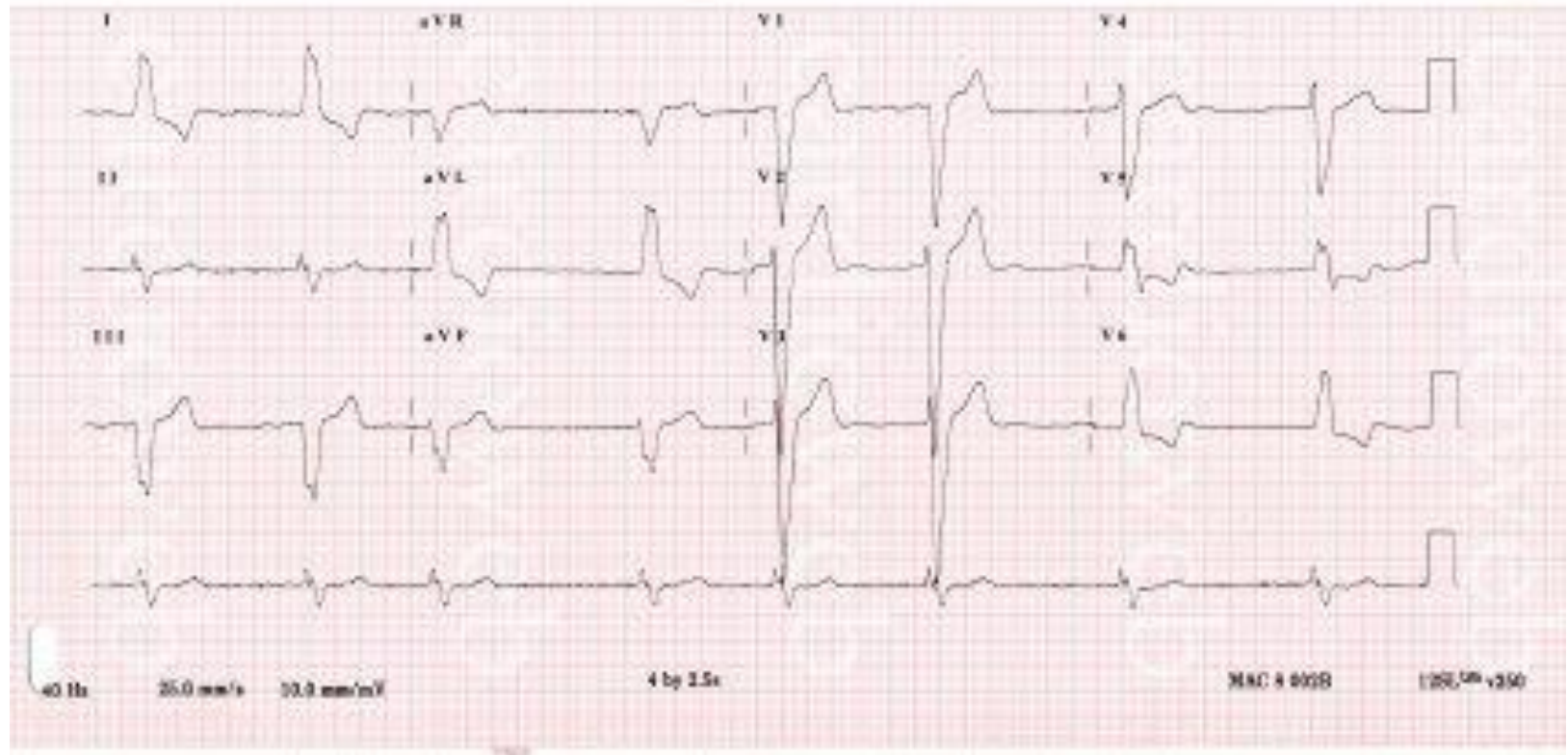
ID:

ECG FROM WWW.CARDHOWEL.CO.UK

Technician:

Referred by:

Unconfirmed



Conclusion

- EKGs provide important information about how well the heart is working
- Accurate lead placement is very important
- Any questions?