

Unipolar and bipolar biosignals

Article to be checked

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'Unipolar and bipolar biosignals'

ECG (electrocardiography) is used to recognise and record any electrical activity within the heart. The device uses electrodes that are placed on the patient's limbs and chest. Those are the leads that detect the electrical activity within the heart. In a conventional 12 lead ECG, the heart's electrical potential is measured from 12 different angles (leads). I'm going to discuss leads called the standard limb leads, also called bipolar leads, and augmented unipolar leads. These leads help us identify electrical biosignals within the heart. 4 peripheral leads are attached to the right and left wrist and right and left ankle, where the left ankle is neutral (no electrical charge). These 9 leads are seeing the heart in some kind of tunnel vision, which makes them unipolar.

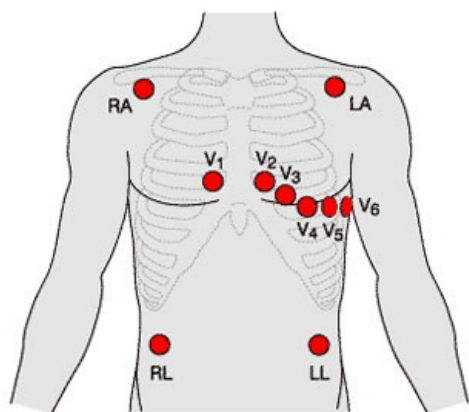


Figure 1. Placement of wires on the chest wall and on the extremities

The three active peripheral leads are named as aVr, aVL and aVf.

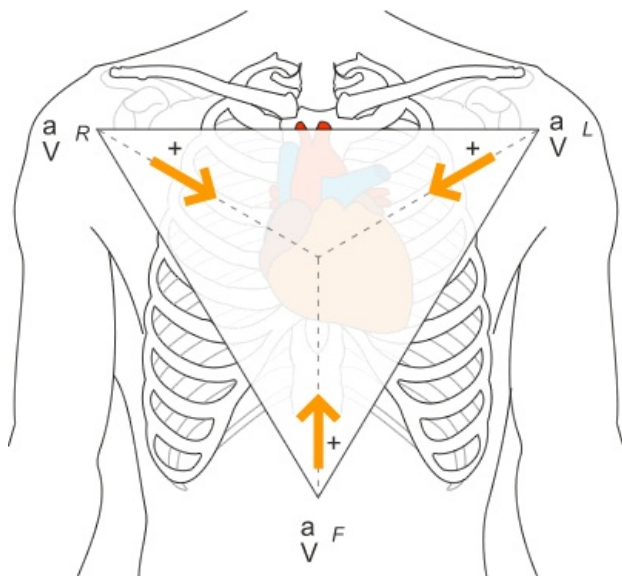


Figure 2. Picture showing the unipolar leads.

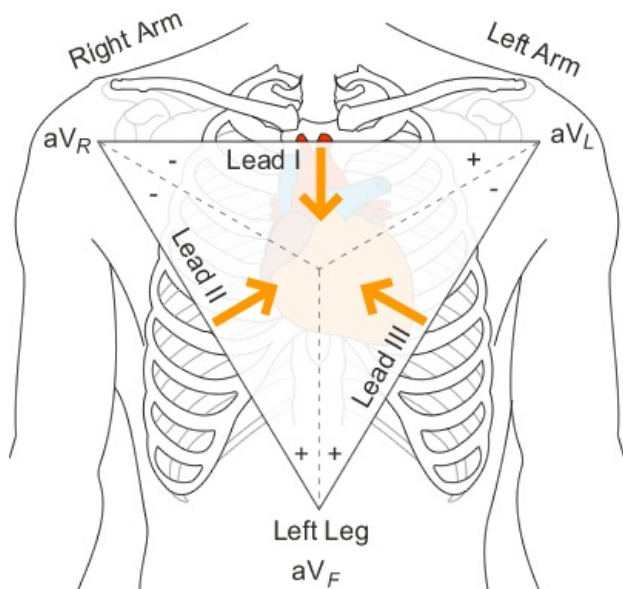


Figure 3. Wires connected to the extremities create an imaginary triangle known as "Einthoven's triangle". Information gathered between these leads is known as bipolar.

The augmented unipolar leads use the same electrodes as for the standard limb leads, but the only thing that is changes is the connection between the electrodes. For each of the augmented unipolar leads, represented by the prefix "aV", two of the three electrodes we had used are tied together and brought to ground. The remaining electrode becomes the active lead. In the case of any unipolar lead, current flow heading towards the active electrode produces a positive deflection, while current going away from the electrode produces a negative deflection. The zero point is in the center of the lead between aVr and aVL. The purpose of ECG is to detect abnormalities and unhealthy conditions within the heart such as brachycardia, tachycardia, systemic diseases, peri- and myocarditis, cardiac dilation, just to mention a couple of abnormalities.

The usage of ECG is a normal procedure within the cardiothoracic occupation but is also used within all specialties where the condition of the heart needs to be examined. The literature dealing with this topic don't differ much in information. ECG procedure is a well-known and accepted equipment in a M.D.'s dealing with patients. Things are never perfect and can always develop to the better. The precursor and development of procedure of the ECG has been going on since the 17th century.

Sometimes results may differ because of something and that is why it is important to detect outcomes and why they are like they are. Methods for obtaining the information are the same the world over. The leads routinely attached to wrists and ankles will be placed on shoulders and lower abdomen so that movement of limbs has minimal effect on the rhythm trace. These positions may also differ if a patient is shaking (maybe due to Parkinson's Disease or hypothermia) or has muscle tremors. In this situation the leads may be moved onto the thighs and forearms.