

ECG basics (basic physiology, ECG lead and axis)



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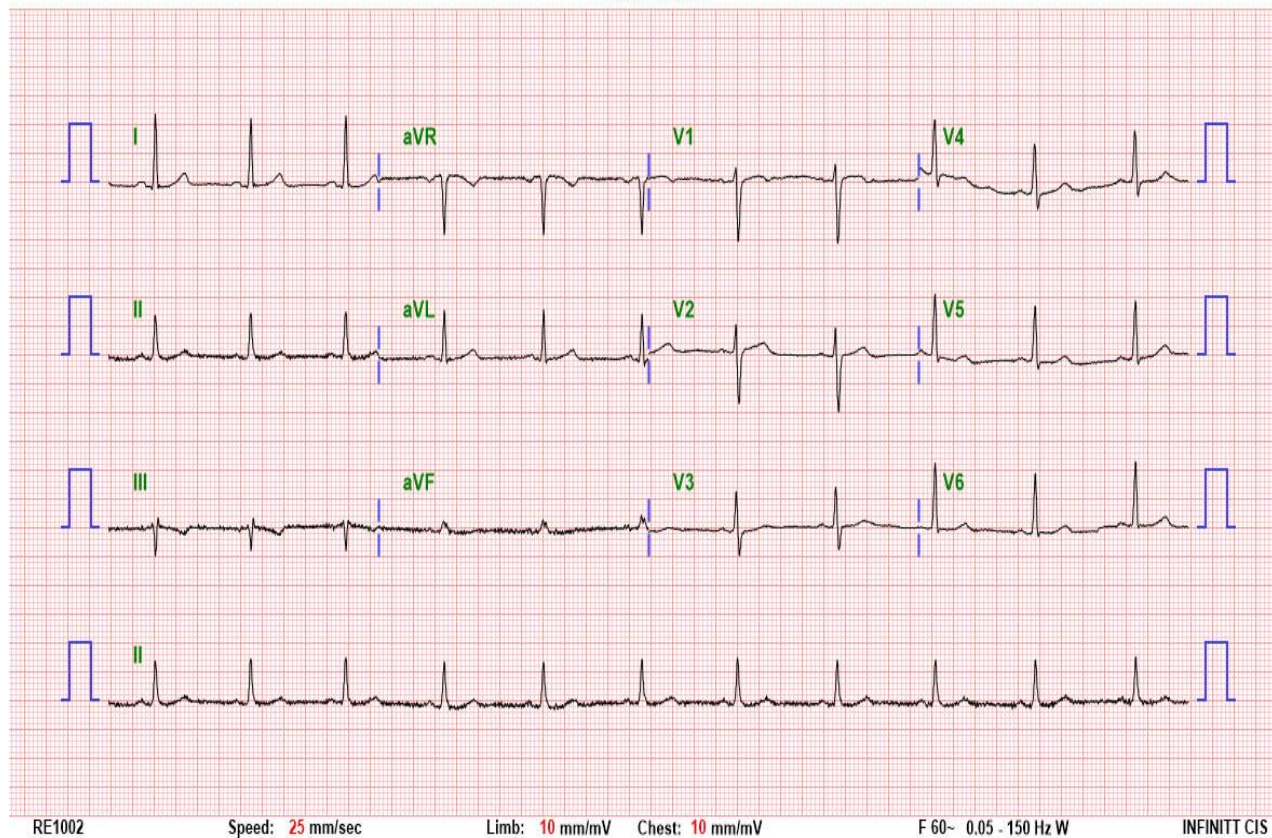
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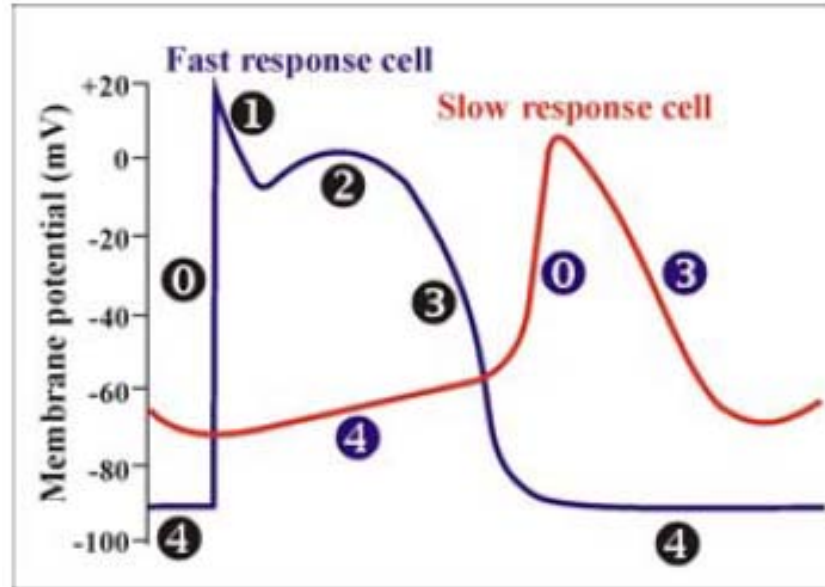
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ECG란?

- Recording of the electrical activity generated by the heart that reaches the body surface.

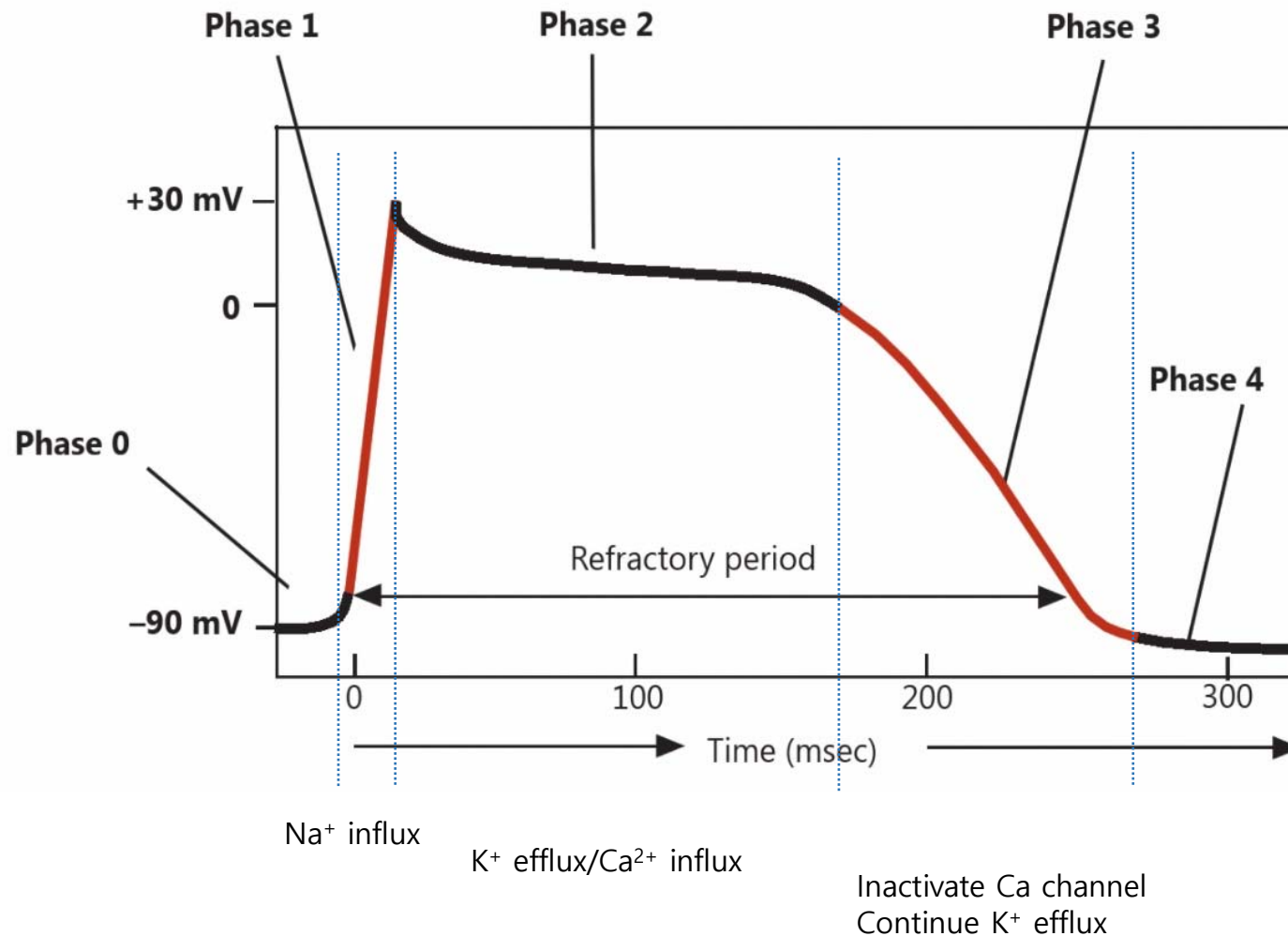


Action potential

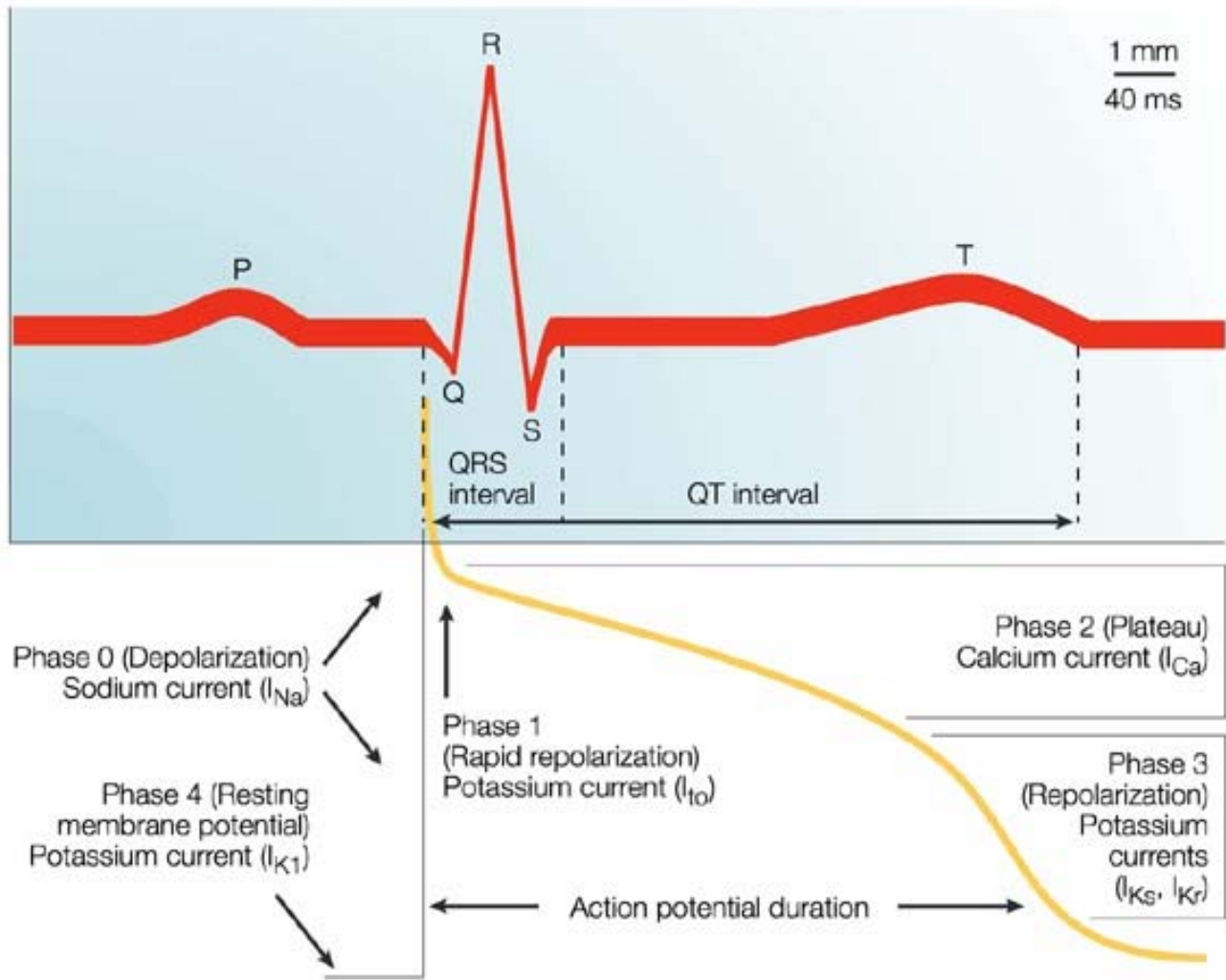


- Slow response cell: SA node/AV node, 주로 calcium channel에 의해 변화, phase 4 depolarization
- Fast response cell: Atrial, ventricular myocardial cells, Purkinje cells, 정상적으로는 phase 4 depolarization이 없다.

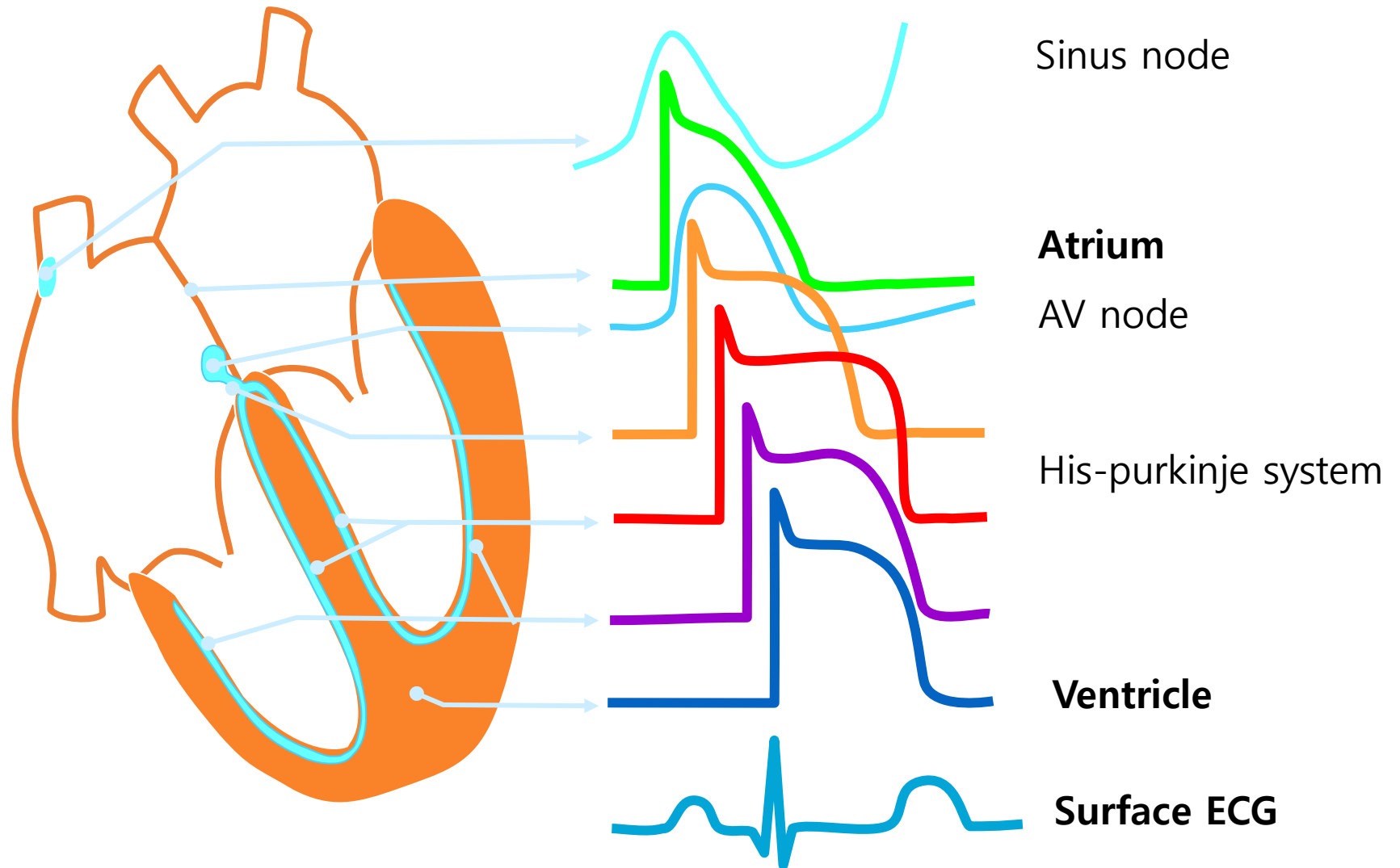
Action potential (fast response cells)



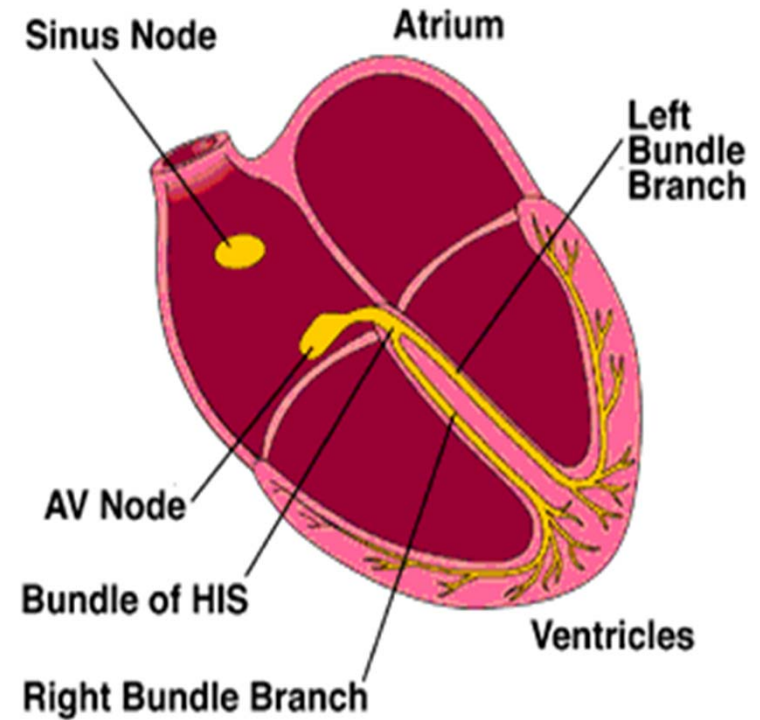
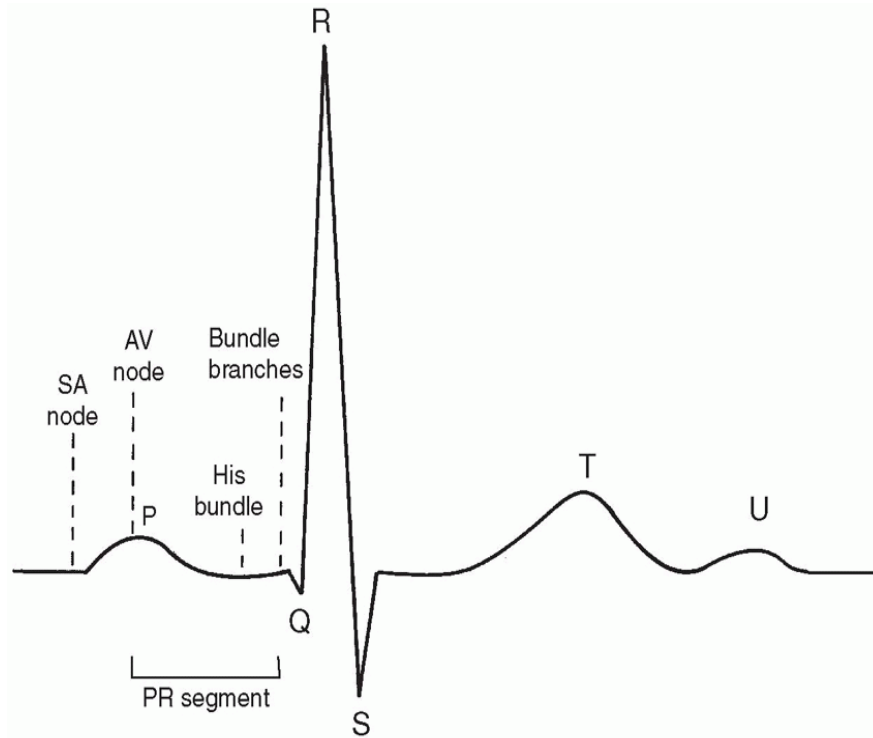
Surface ECG



Electrical impulse propagation and ECG



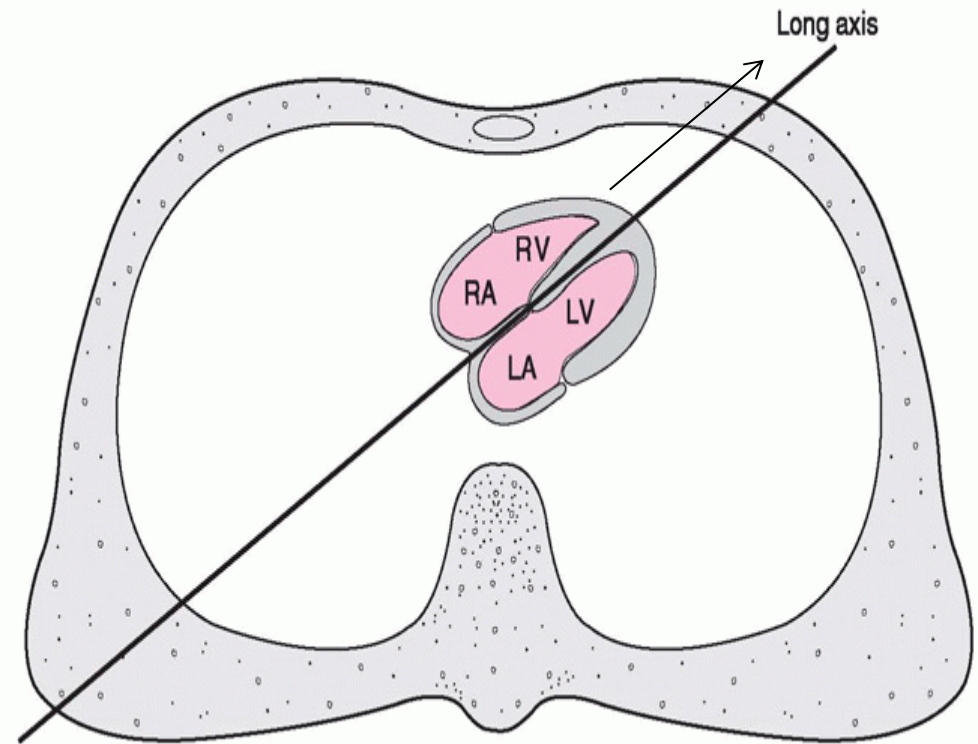
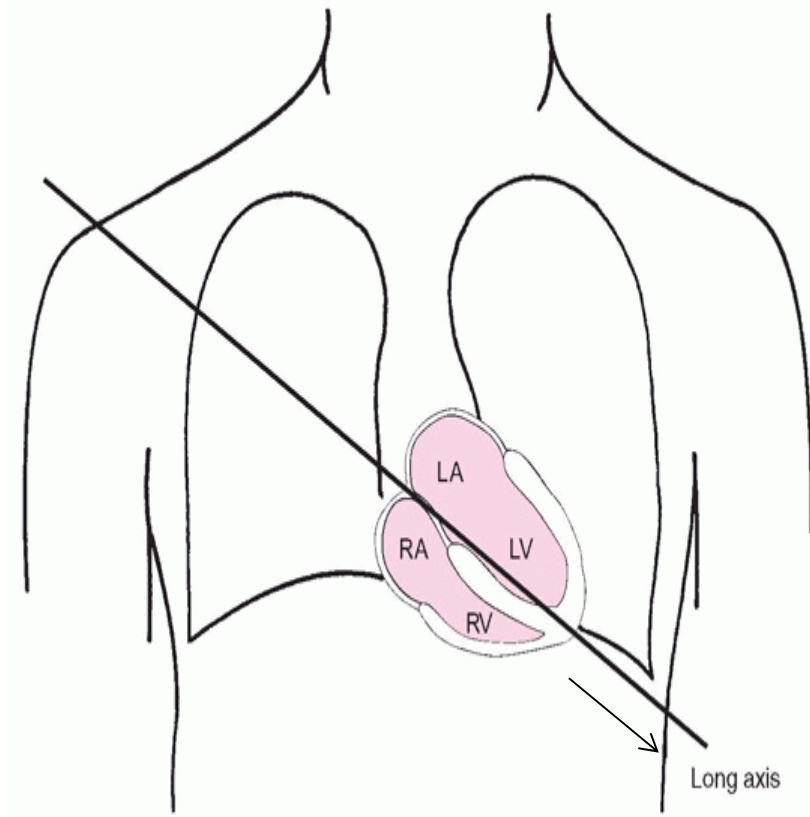
Normal ECG wave



- 1) SA node fire: not seen
- 2) Atrial depolarization: P wave
- 3) Atrial repolarization: usually hidden in QRS
- 4) Ventricular depolarization: QRS wave
- 5) Ventricular repolarization: T wave

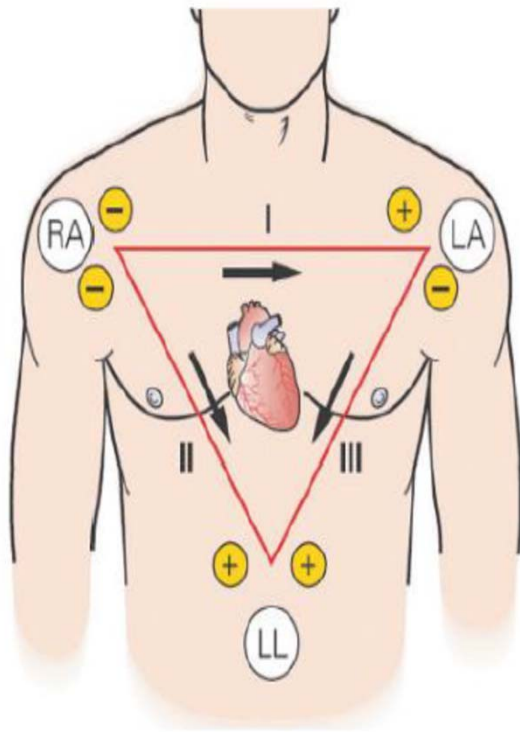
Axis

- Normal axis

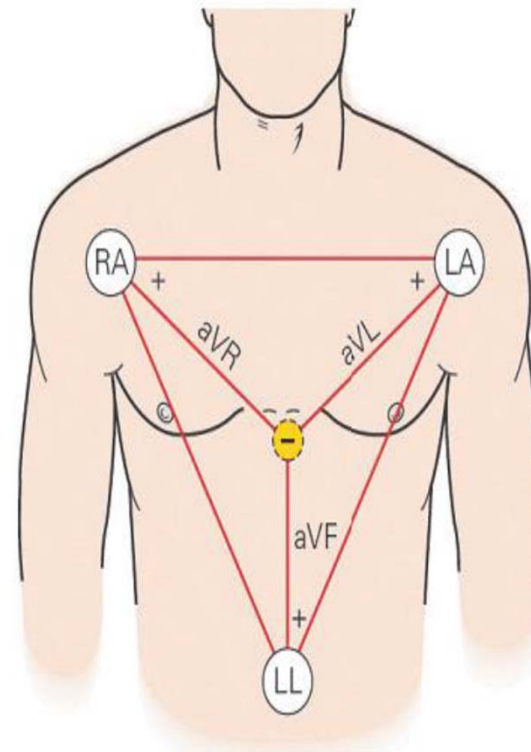


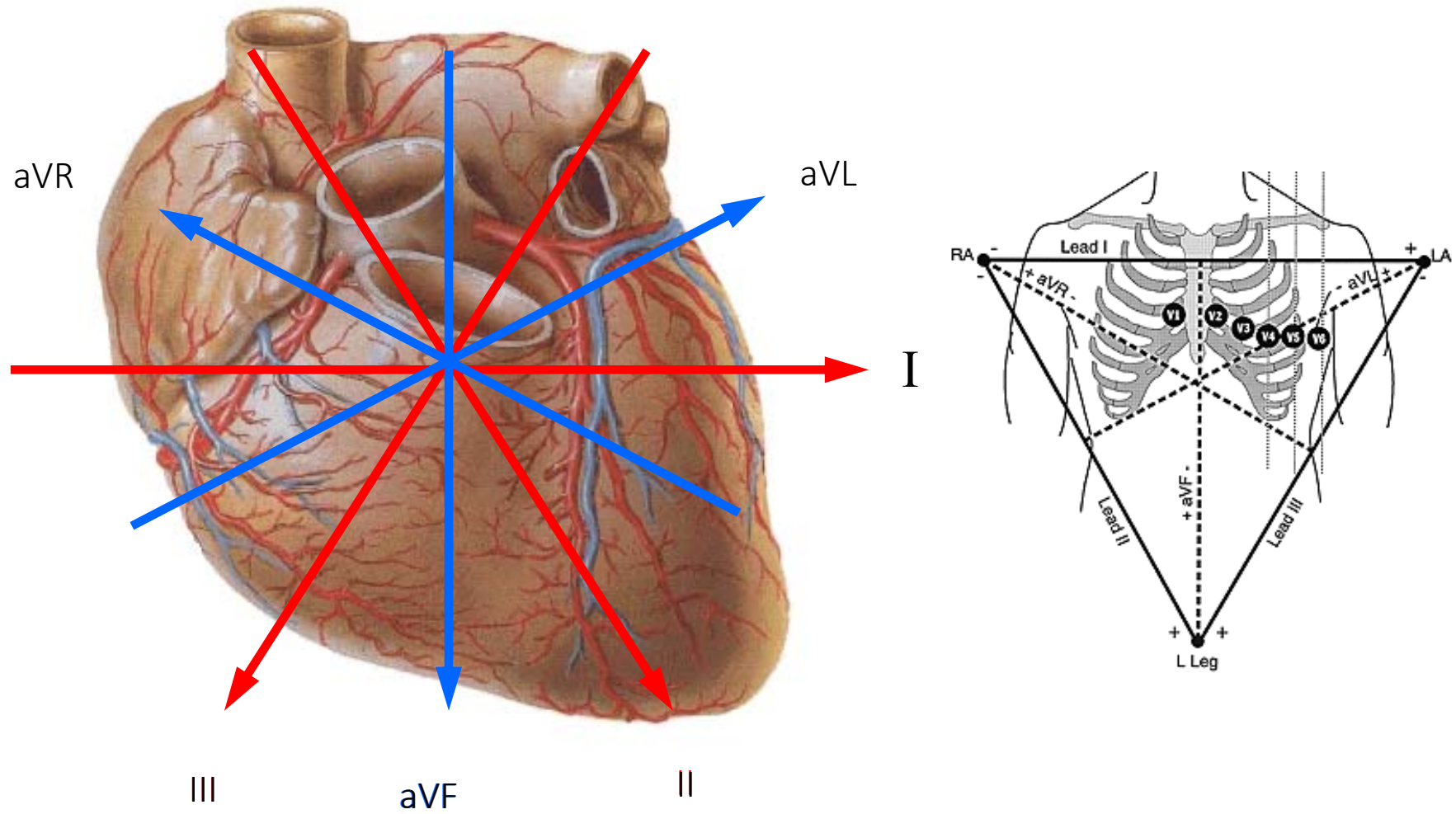
Limb lead axis

Standard bipolar limb lead



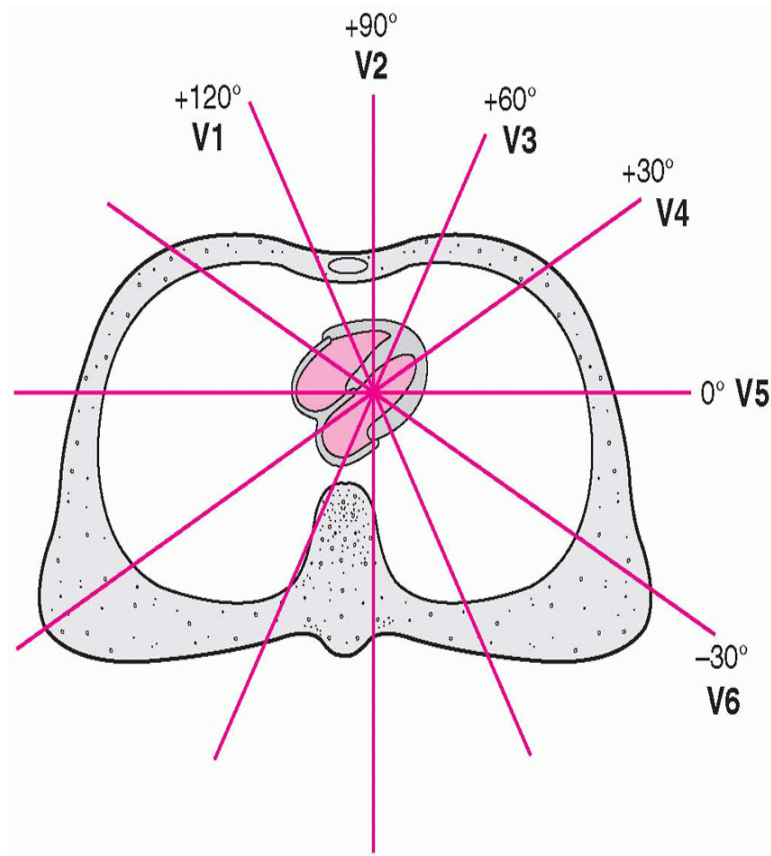
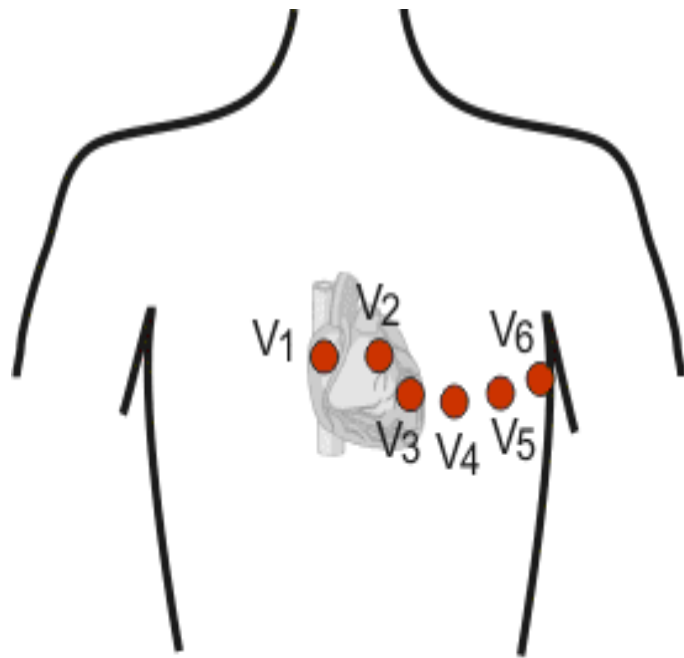
Augmented bipolar limb lead



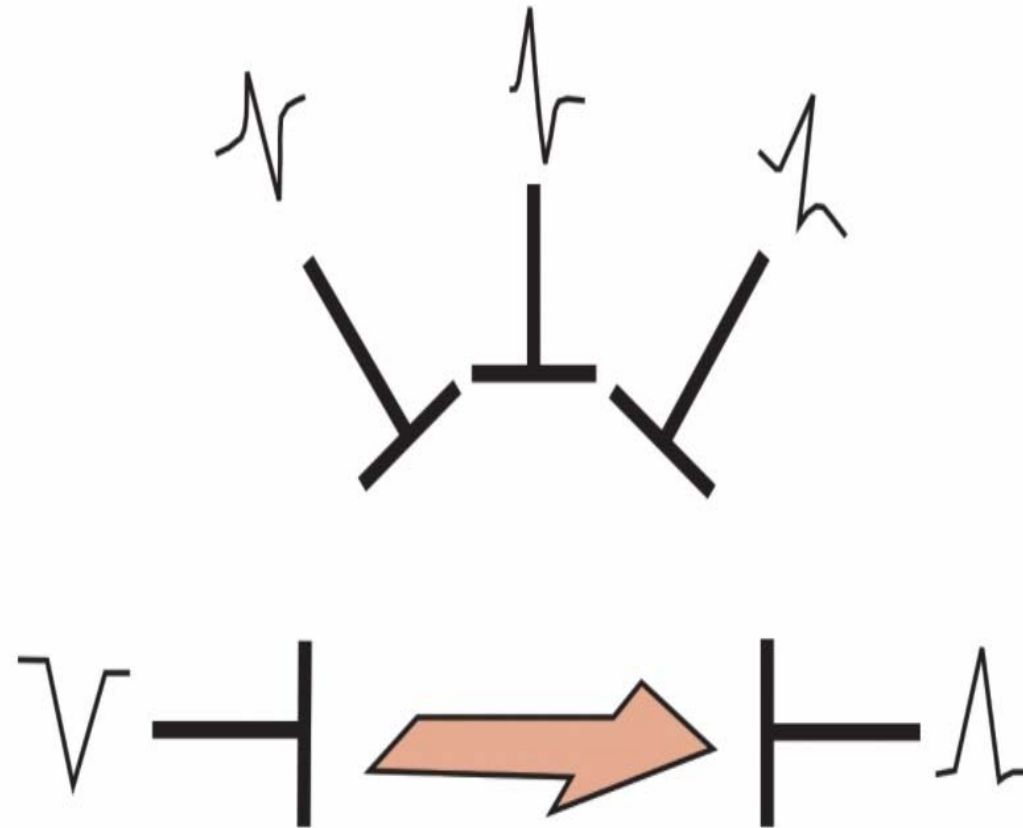


- I, aVR, aVL : 좌우의 전기적 변화
- II, III, aVF : 상하의 전기적 변화

Precordial leads



ECG polarity



WAVE OF DEPOLARISATION

Axis – limb lead

Lead I

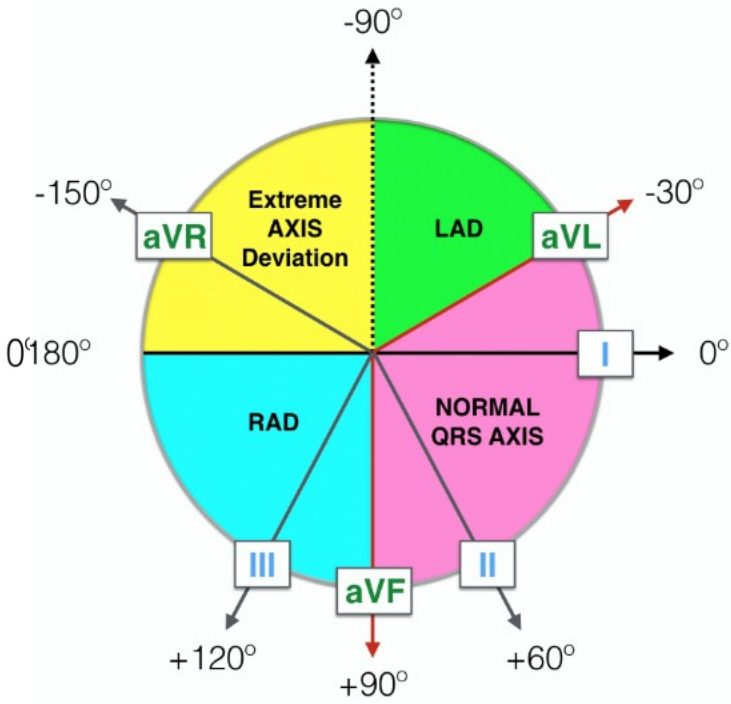
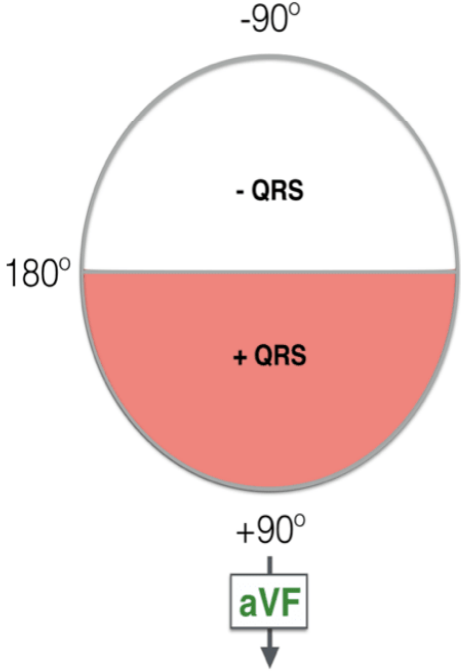
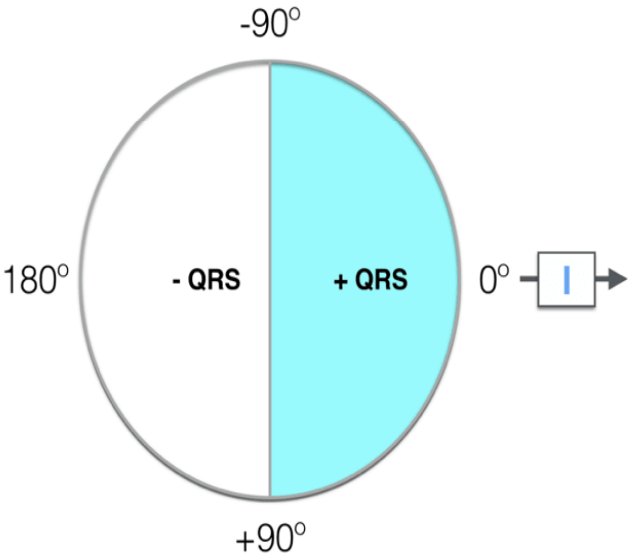


aVF

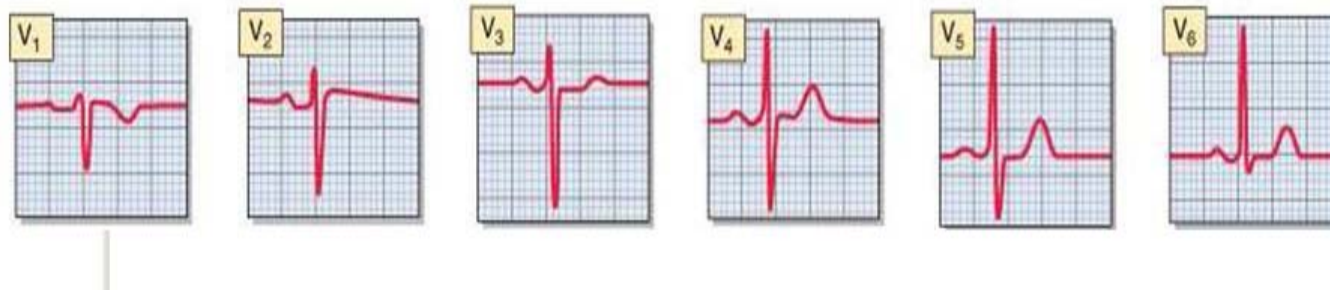
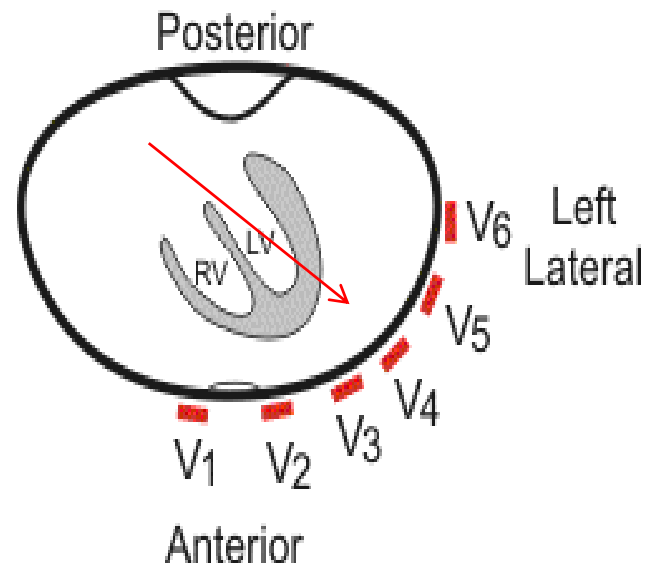


Quadrant

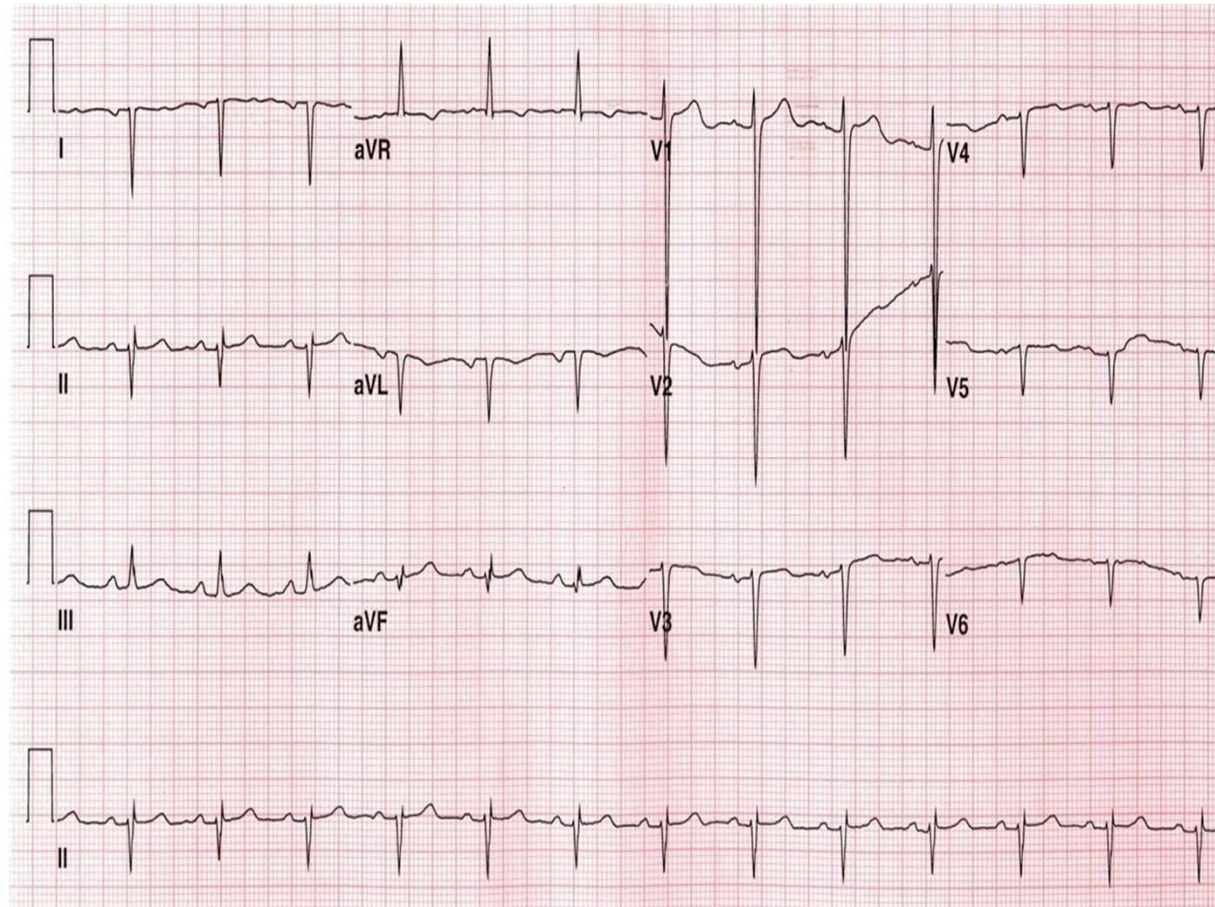
Normal Axis
(0 to +90°)



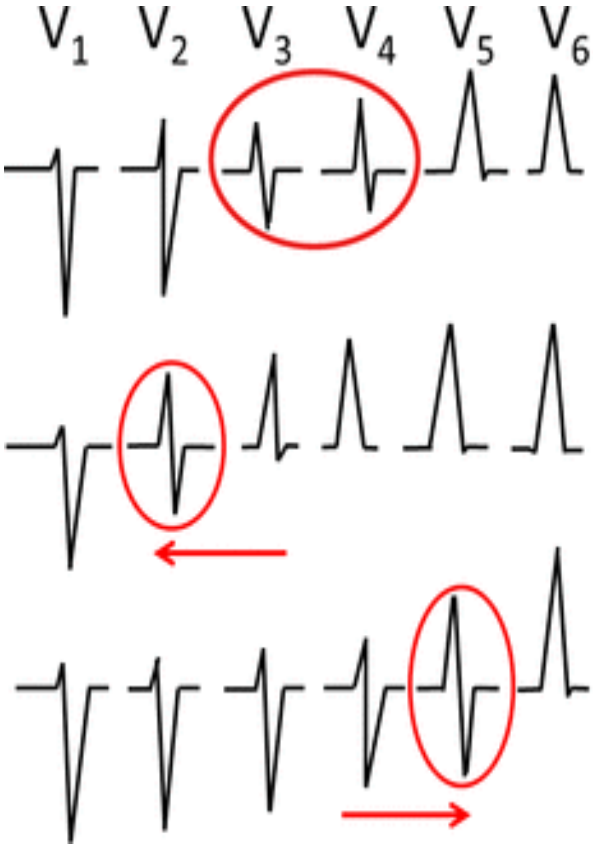
Axis- precordial leads



Dextrocardia



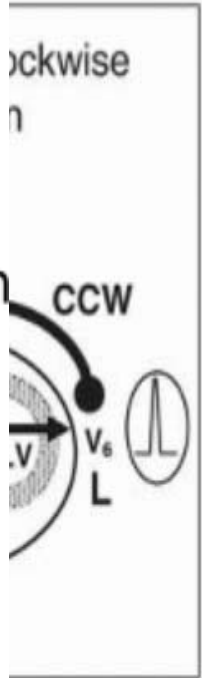
Transverse rotation



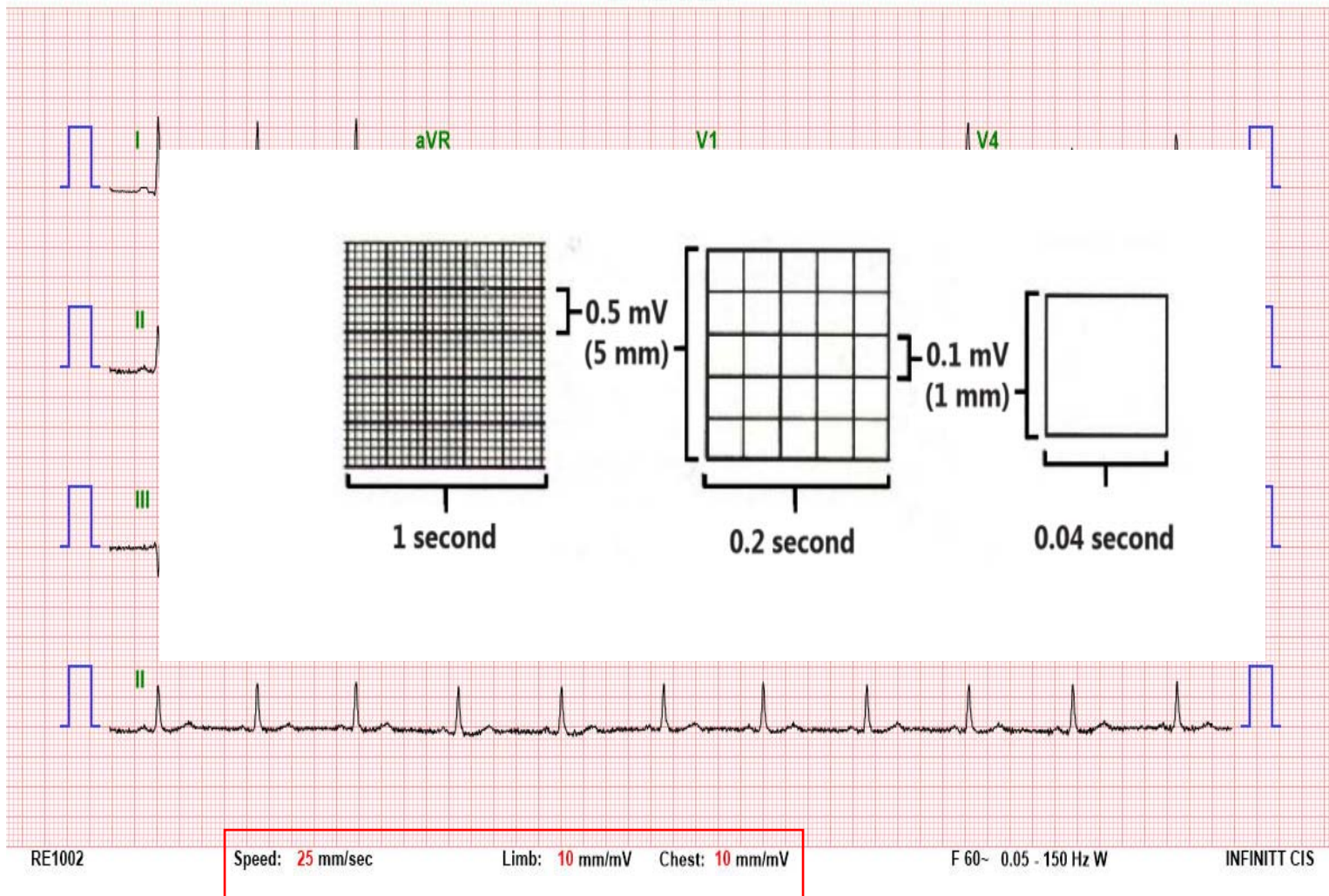
No rotation

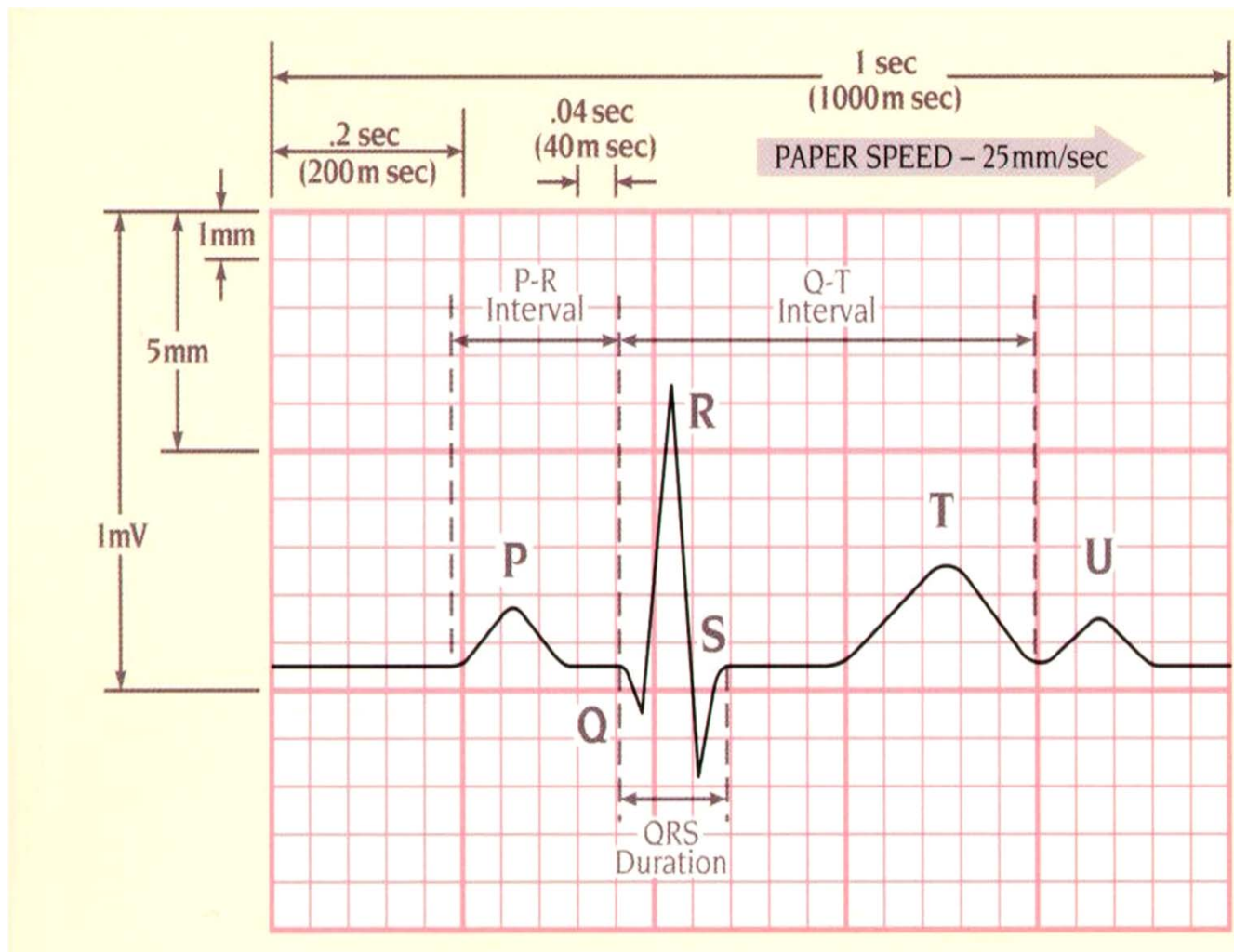
Counterclockwise rotation

Clockwise rotation



ECG paper





Normal values

- PR: 120~200 ms
- QRS: <120 ms
sec
- QTc (corrected
QT)
= $QT \text{ interval} / \sqrt{RR}$
: <440 ms



경청해주셔서 감사합니다.