

LAB

EKG *and* Blood Pressure

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Some illustrations are courtesy of McGraw-Hill.



Review Lecture notes on conduction through the heart. 2

SELF-STIMULATION (SA Node)

**The heart does NOT require nerves to beat.
(Nerves usually change the RATE of the heartbeat)**

Ectopic beats: originate outside of the normal pacemaker.

**Conduction through GAP JUNCTIONS (low resistance)
found in intercalated discs of cardiac muscle.**

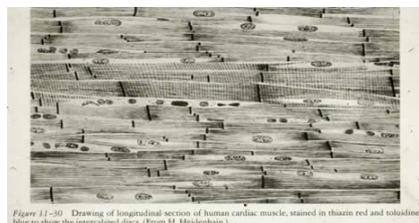


Figure 11-50 Drawing of longitudinal section of human cardiac muscle, stained in thiazin red and toluidine blue to show the intercalated discs. (From H. Hoeselstein.)

**EKG values are small voltages since readings are taken through the skin (some distance from the heart).
Actually, measures average voltage output of millions of cardiac cells.**

Electrode Placement

For a 3 lead setup:

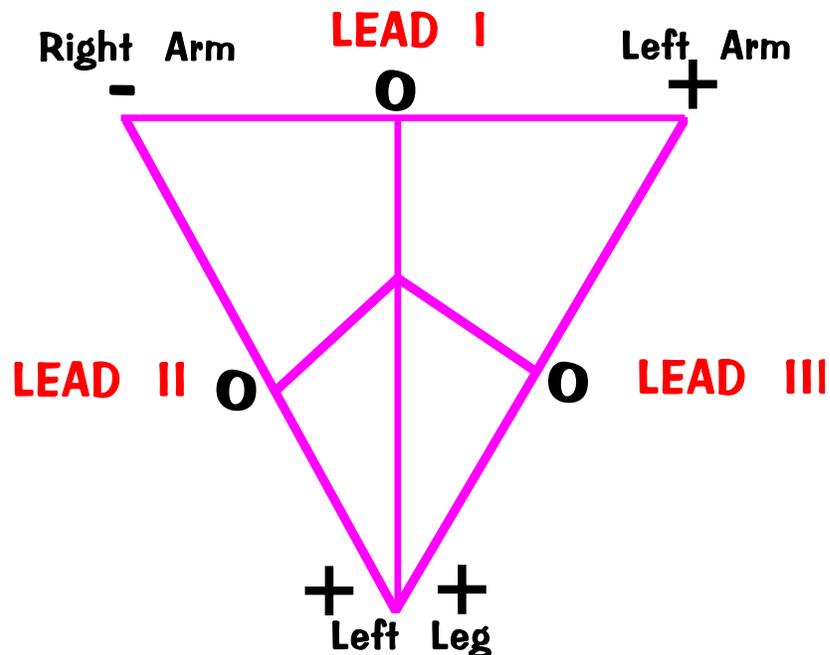
Ground

LEAD 1 Right wrist, left wrist left ankle
(BASE of HEART)

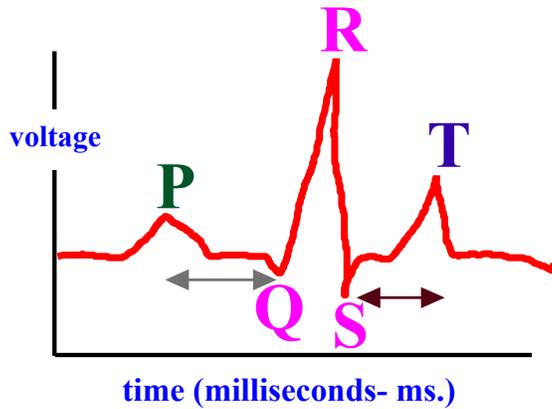
LEAD 2 Right wrist, left ankle left wrist
(RIGHT SIDE OF HEART)

LEAD 3 left wrist, left ankle right wrist
(LEFT SIDE OF HEART)

EINTHOVEN TRIANGLE



EKG/ECG



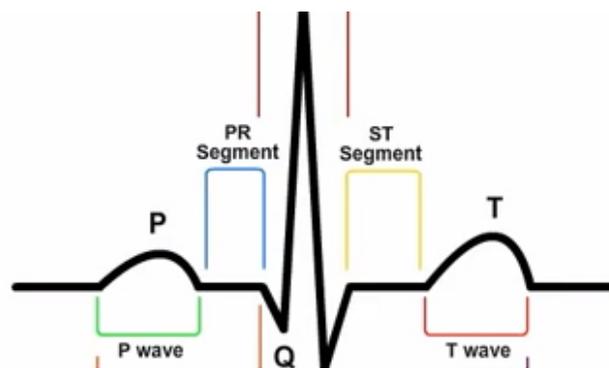
P = atrial depolarization
(conduction through atria)

QRS complex =
ventricular depolarization

T = ventricular repolarization

S-T line = refractory state of
the ventricular myocardium

P-Q line = nonconductive
state of AV during which
atrial systole can be
completed.



See the You Tube Video on Lab Page

EKG/ECG

Summary⁷

P atrial depolarization; time for the impulse to travel from the sinoatrial node (SA) throughout the atria.

PR interval time for the impulse to travel from the atria ----> bundle of His ----> bundle branches of Purkinje's fibers

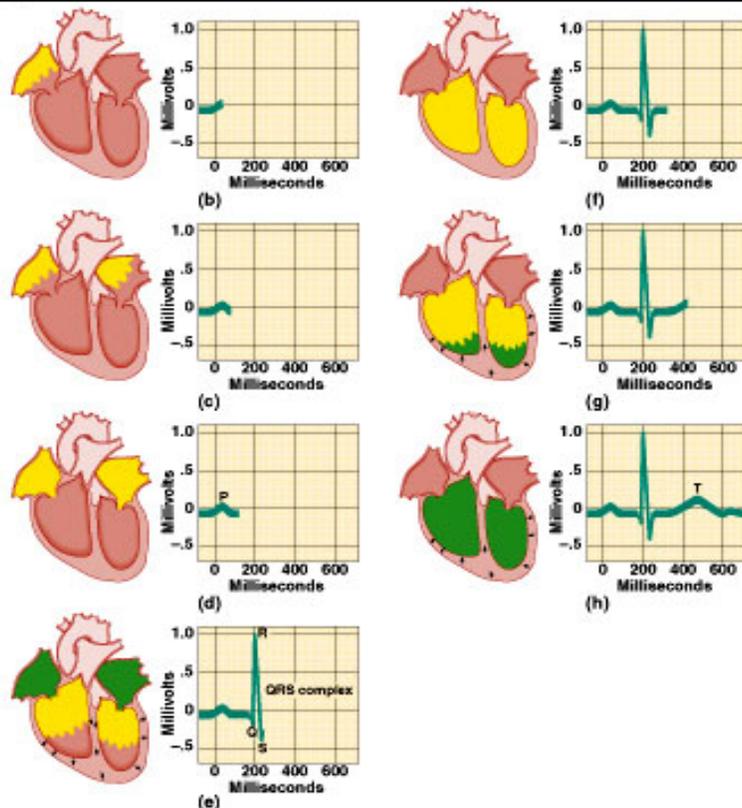
QRS complex ventricular depolarization; time varies with sex/age

QT interval time necessary for ventricular depolarization AND repolarization. time varies with sex/age/heartbeat

T wave repolarization of the ventricles. sometimes followed by a U wave (His/Purkinje's fibers repolarization)...not shown.

ST line indicates: end of ventricular depolarization AND beginning of ventricular repolarization

EKG

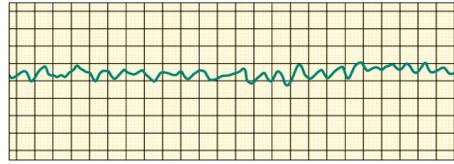


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Arrhythmias

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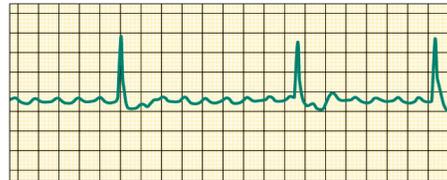
Ventricular fibrillation
rapid, uncoordinated
depolarization of ventricles



Tachycardia
rapid heartbeat



Atrial flutter
rapid rate of atrial
depolarization



Arrhythmias

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Bradycardia



Excellent EKG Exercise: Link at our Lab website!

Sample EKG (ECG) Interpretations

Normal Heart:

P wave always followed by a QRS wave.

Damage to Coronary Circulation:

Waves may widen (contractions are slower).

Also, wave shape changes:

Example- ST segment depression

Distance between two successive QRS waves:

Too close together- Heart beating too fast.

Too far apart- Heart beating too slowly.

BLOOD PRESSURE

measured with sphygmomanometer

1st Korotkoff Sound: systolic pressure
artery has opened enough for blood to squirt through.

Last Korotkoff Sound: diastolic pressure
artery completely opened; no more turbulence in blood.

Systolic BP - Diastolic BP = PULSE PRESSURE
(actual working or driving pressure of the blood)

END