Rhythm is a Dancer: Quick Tips for Rhythm ID

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Conflicts of Interest:

NONE

- Identify Various Rhythms
- Have FUN!

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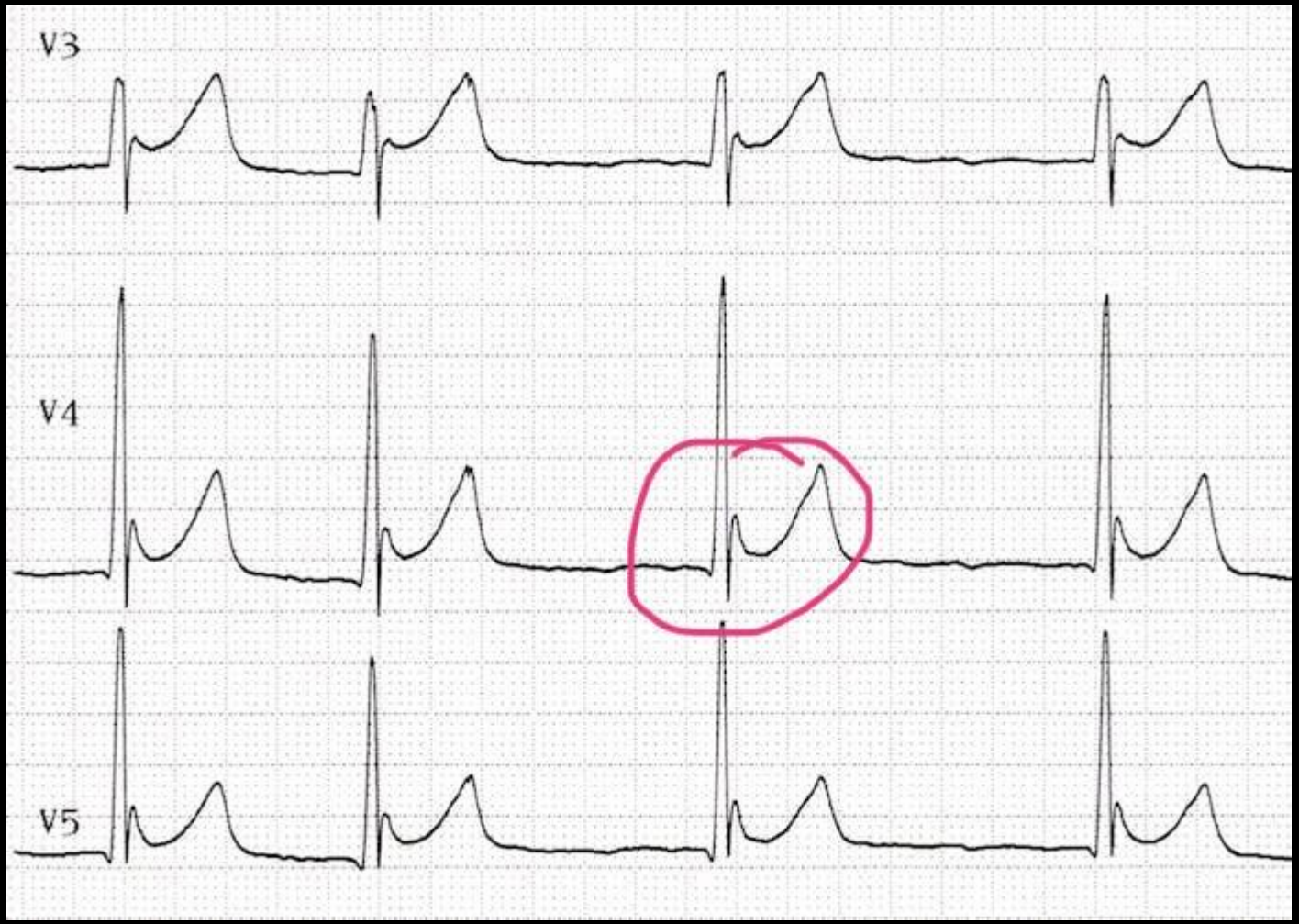
1


V3
V4
V5

Autonomic Nervous System

Parasympathetic:

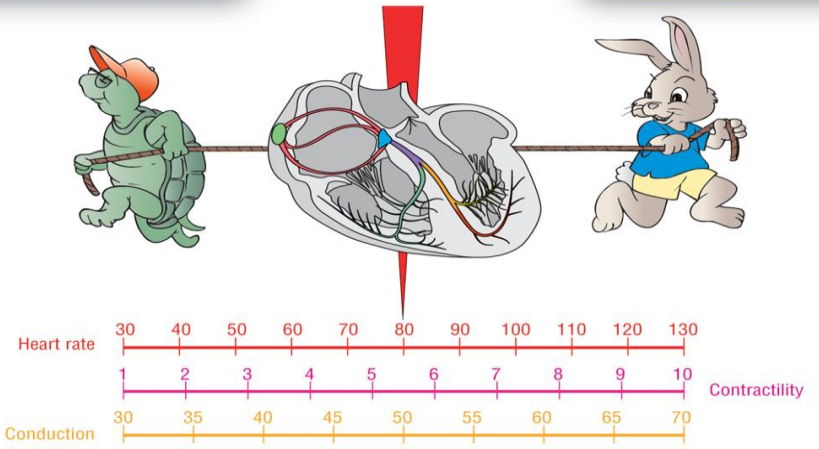
1. Slows rate
2. Decreases contractility
3. Slows conduction through the AV node.

Main chemical messenger:
Acetylcholine

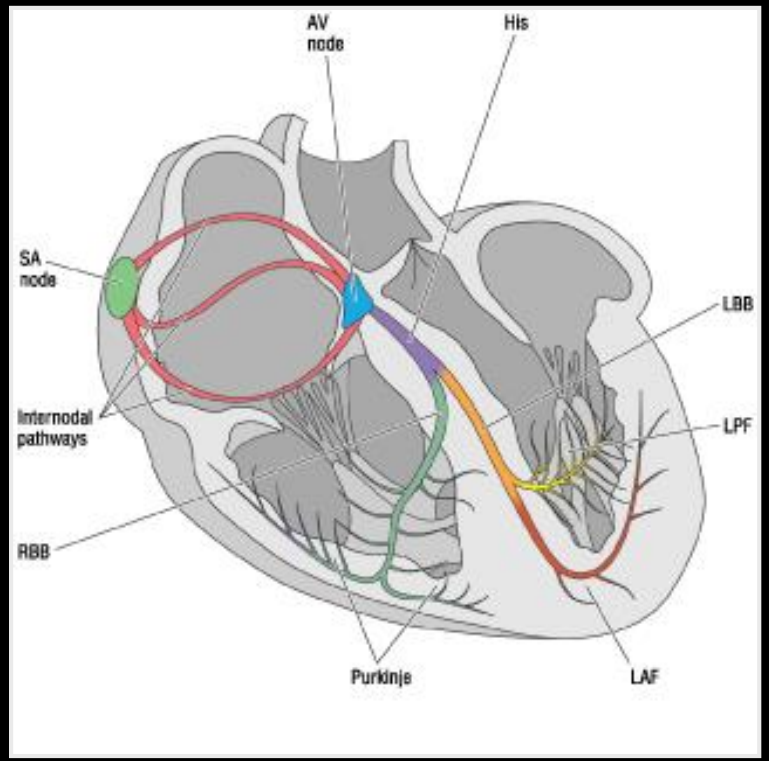
Sympathetic:

1. Speeds up rate
2. Increases contractility
3. Speeds conduction through the AV node.

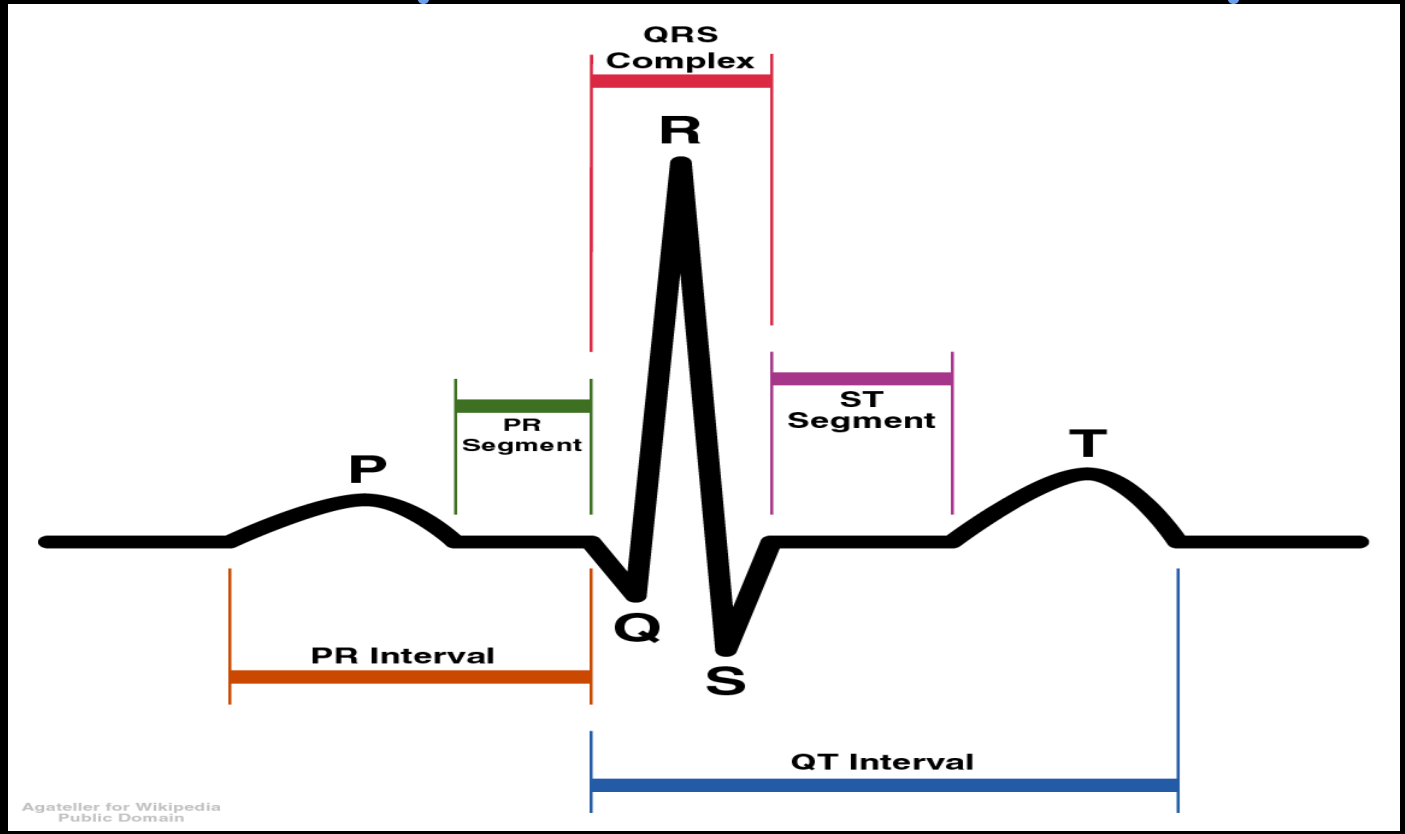
Main chemical messenger:
Epinephrine



Conduction System

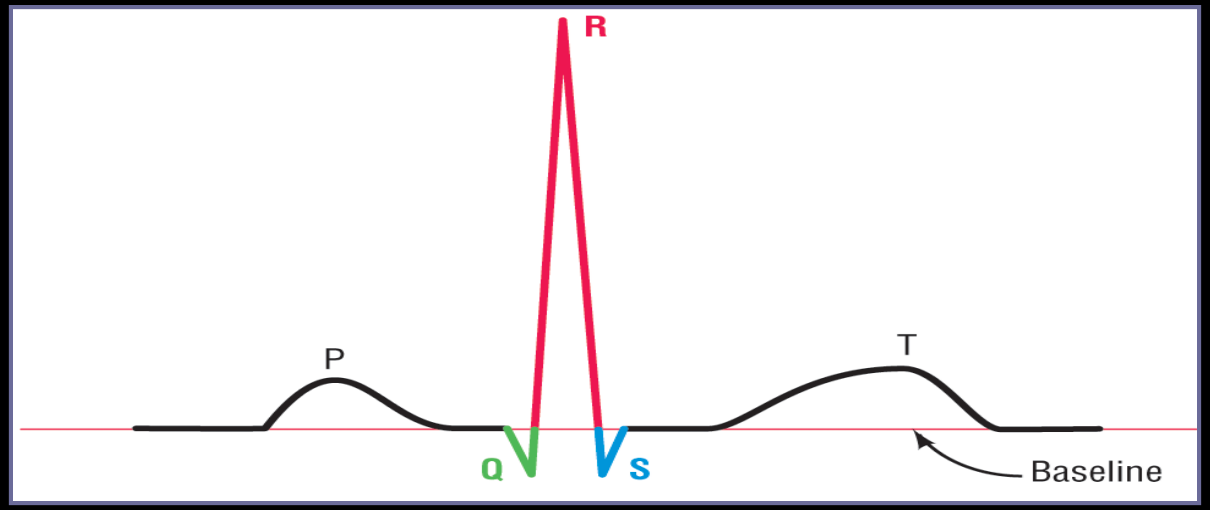


Basic Components of the Complex



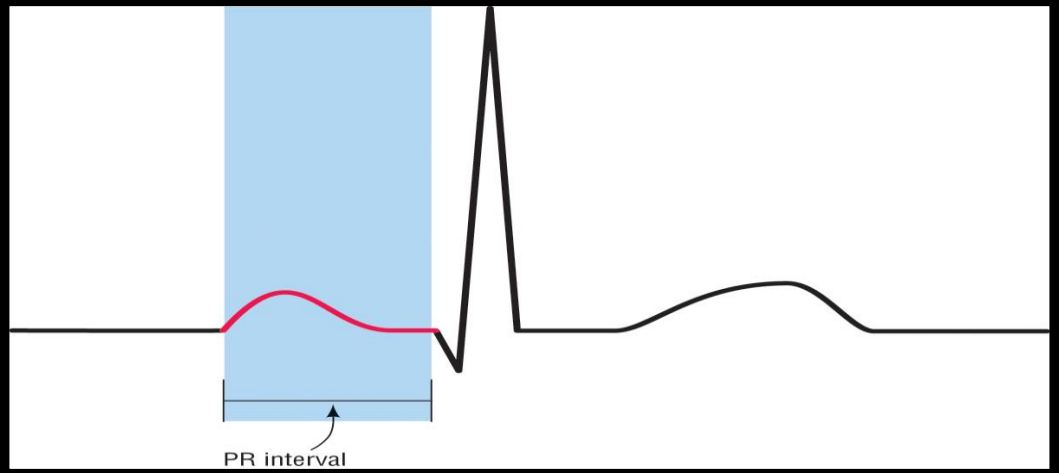
The Baseline of the ECG

The baseline is an imaginary line drawn from TP segment to TP segment.



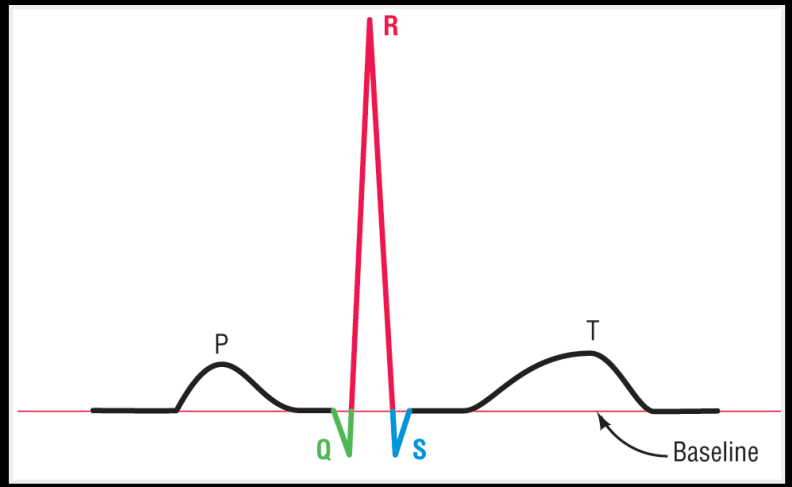
The PR Interval

- From the beginning of the P wave to the beginning of the QRS complex
- Normals: 0.12 to 0.20 seconds

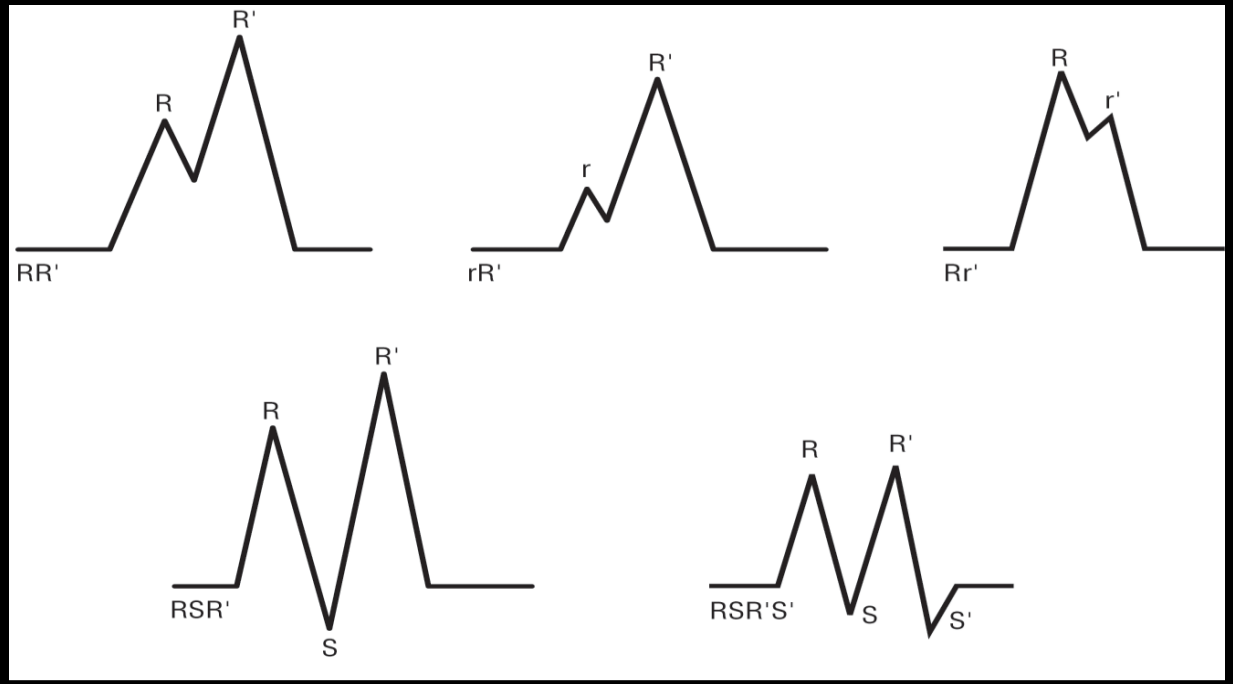


The QRS Complex

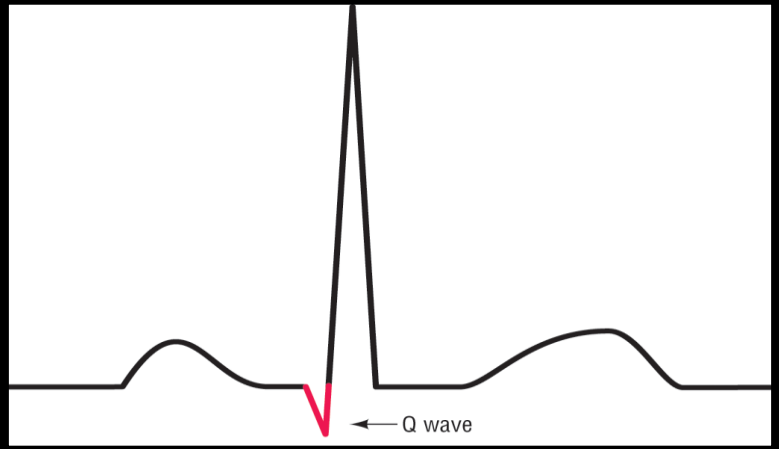
- Represents ventricular depolarization
- Typically composed of 2 or more waves
- Normals: 0.06 to 0.11 seconds

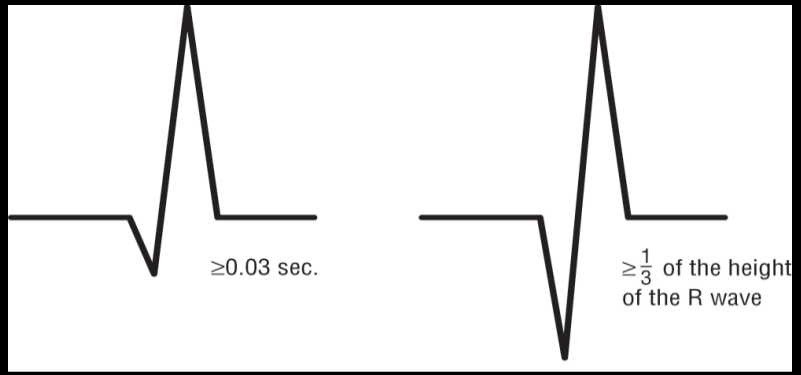


Additional Waves in the QRS Complex



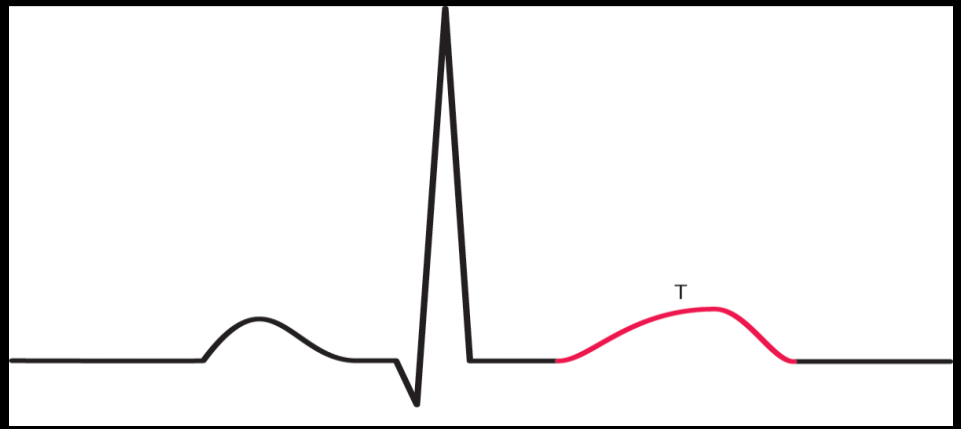
Queen Q Waves





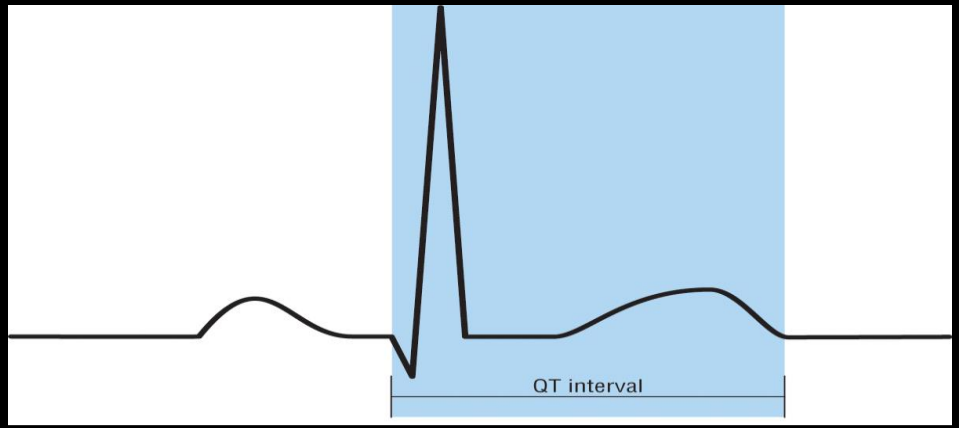
The T Wave

- Represents ventricular repolarization
- Should be asymmetrical
- Typically has a slow upstroke and fast downstroke if upright

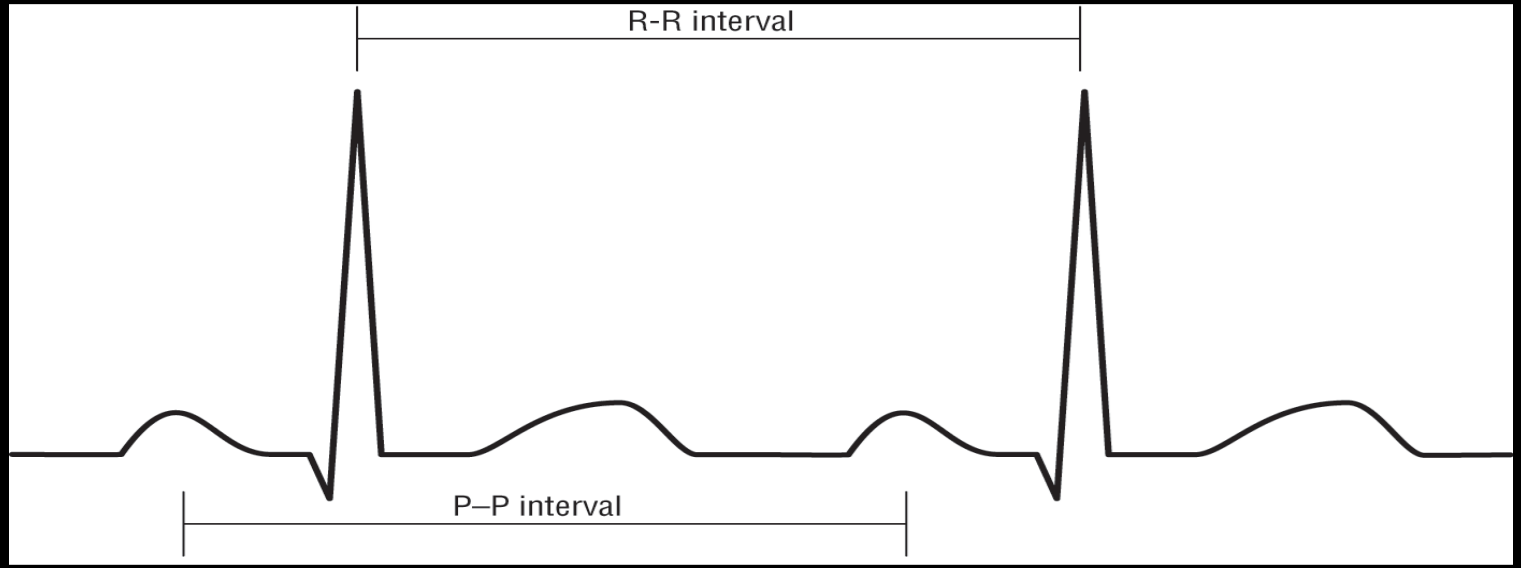


The QT Interval

- From the beginning of the QRS complex to the end of the T wave
- Normals are rate-related - QTc



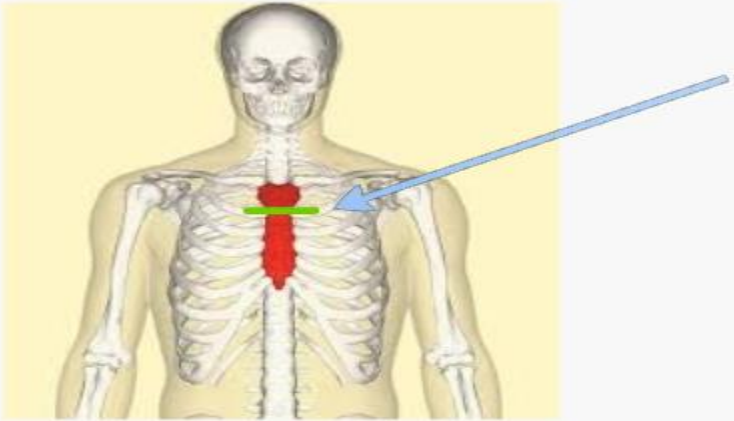
Additional Intervals



Anatomical Landmarks

- ribs
- intercostal space
- mid clavicular line
- midaxillary line
- angle of louis

Angle of louis



palpable landmark, formed by the junction of sternum and the manubruim

LEAD Placement

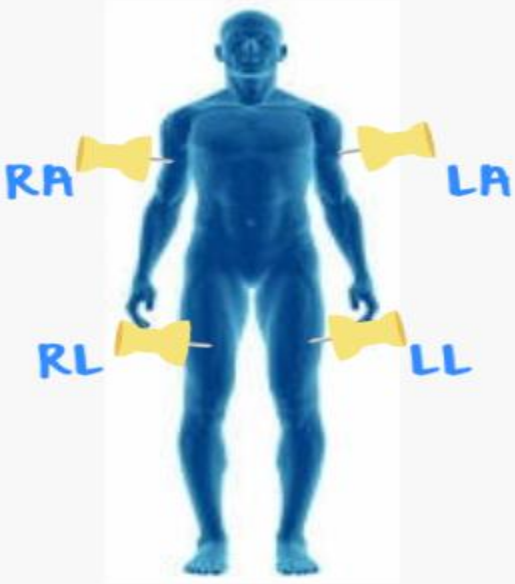
Limb leads

- in order of historical development
- leads I, II, III, aVR, aVL, aVF

Chest leads or precordial leads

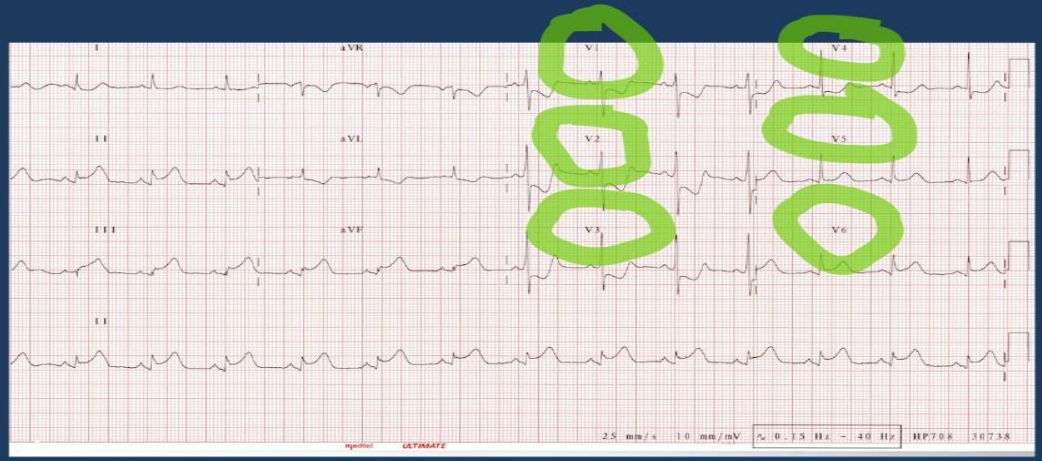
- in order of their sequence
- V1, V2, V3 V4, V5, V6

4 Limb leads

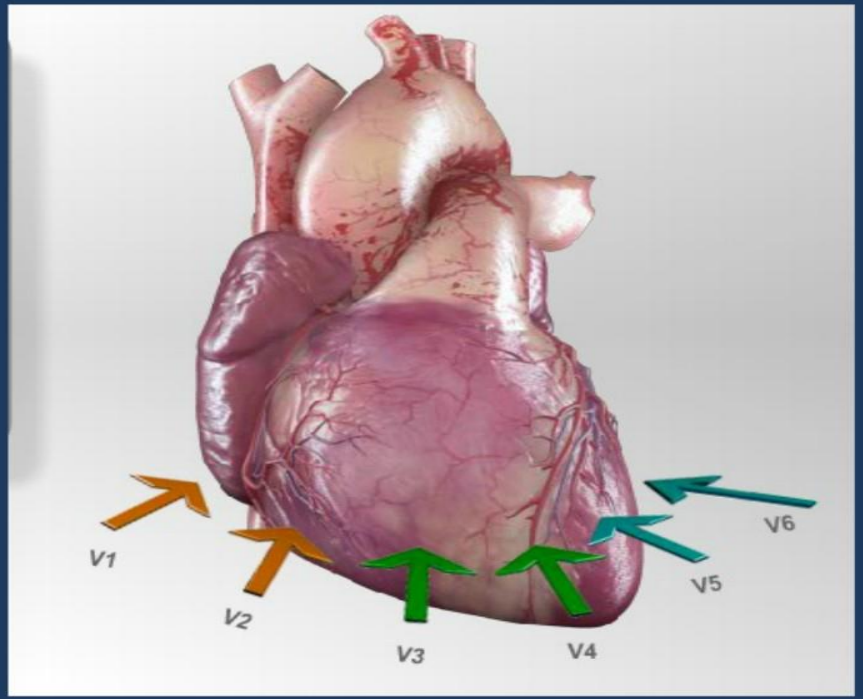


= 6 angles

Chest leads (precordial leads)

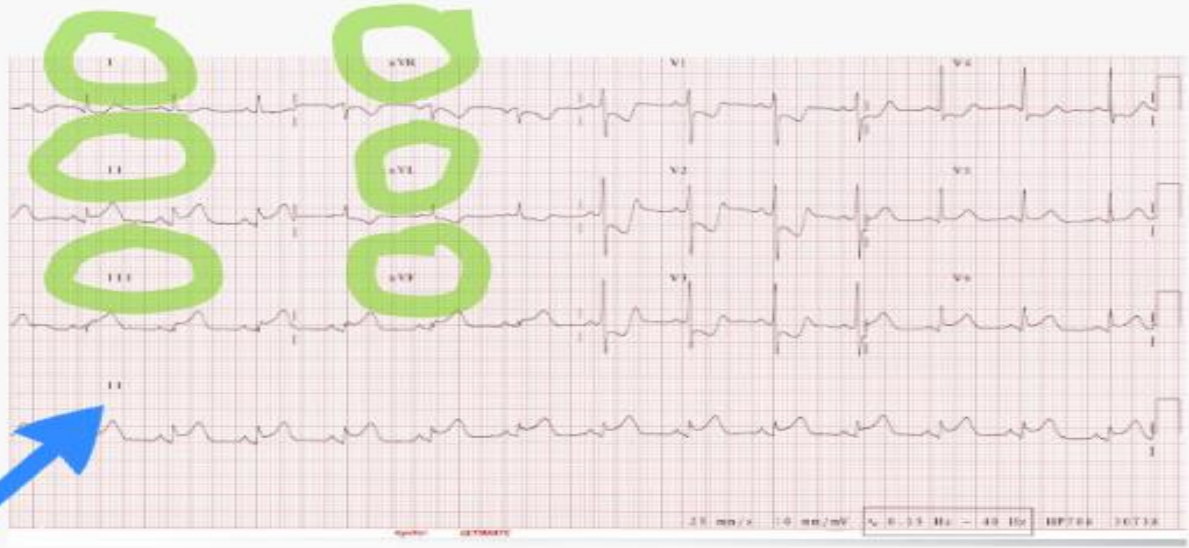


Precordial leads V1-V6



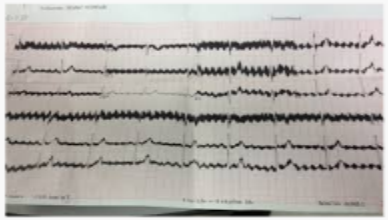
Looks at ❤ from right to left

Limb Leads



lead II or VI is typically displayed accross bottom

Trouble shooting



artifact

- minimize patient movement
- untangle cords so they are not touching
- tighten up connections
- put patient supine and arms at side (document if obtained in position other than supine)

Trouble shooting

large breasts

- support breast over chest leads while obtaining
- lift them up; you need the leads on chest wall not breast tissue

Trouble shooting

low voltage

- remove electrodes off bone or muscle
- abrade skin
- check calibration; Normal = 10mm/mV (amplitude) and 25mm/sec (speed)

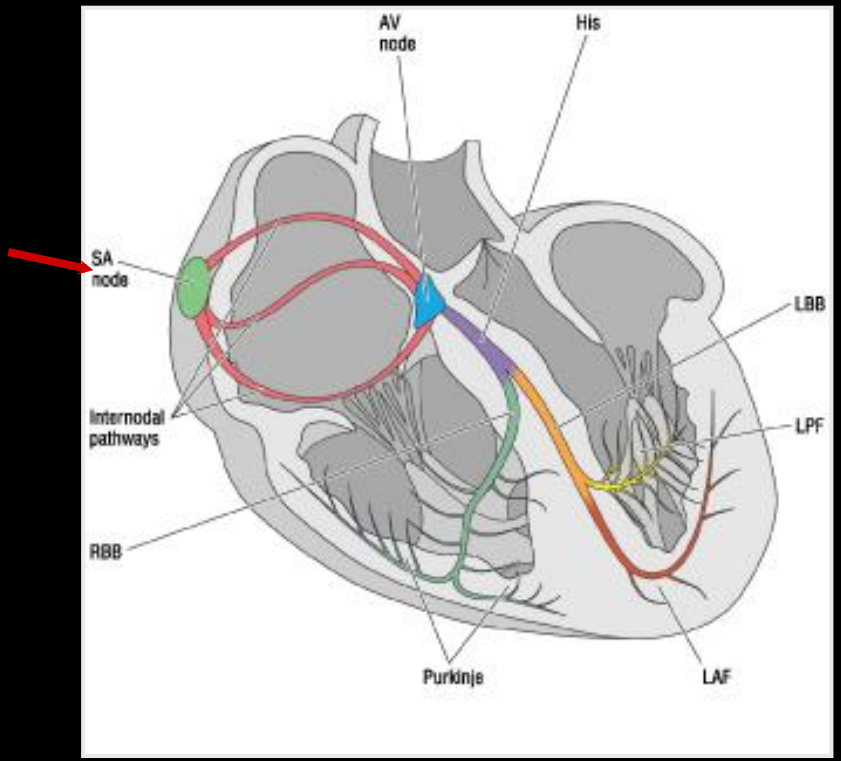
TROUBLESHOOTING:

electrodes won' stick?

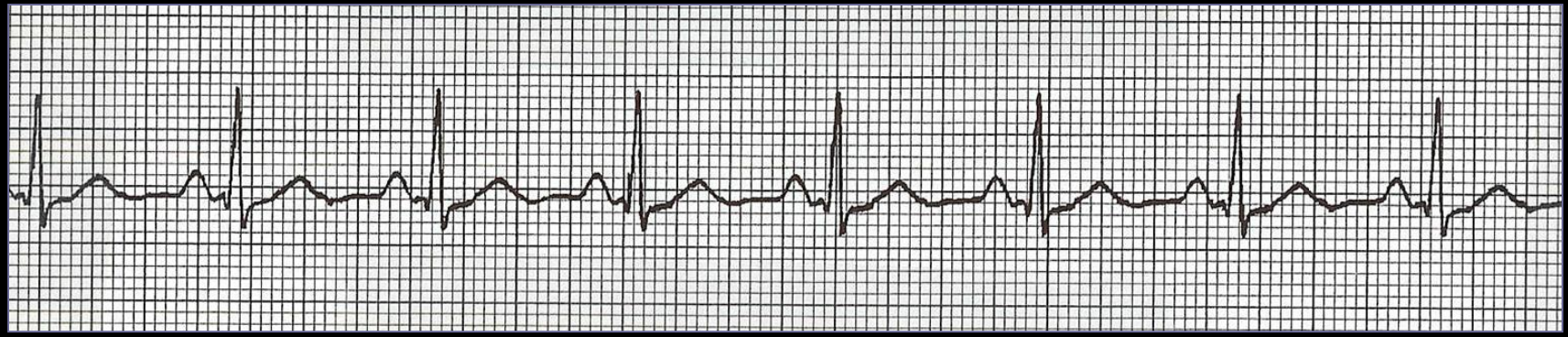
- wipe off skin
- use tincture of benzion
- tape those puppies down
- clip hair (no shaving)

SECRET TIP: all EDs have this laying around, keep some in your pocket

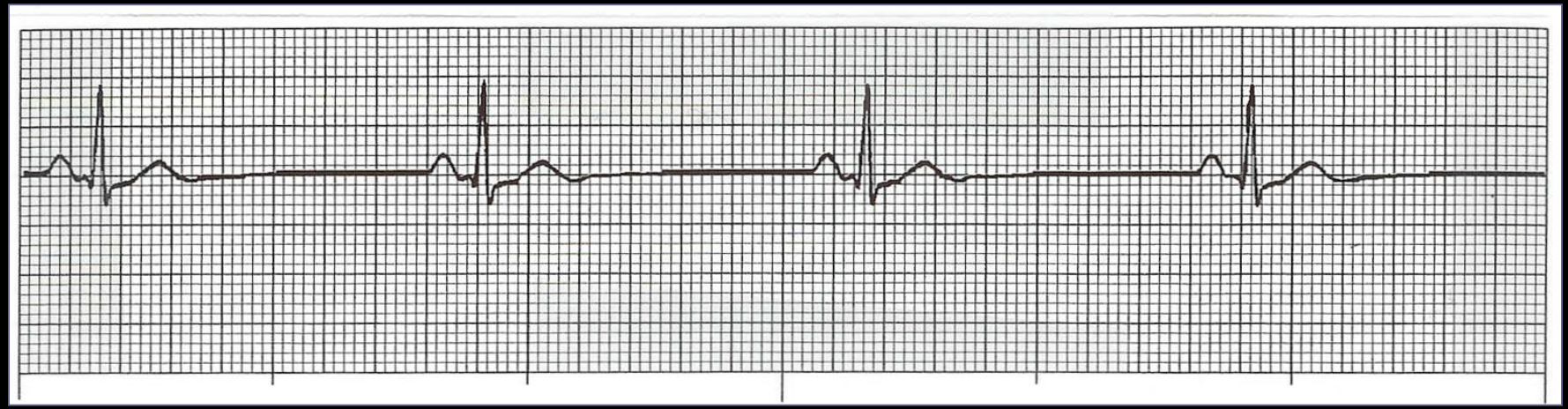
SINUS RHYTHMS



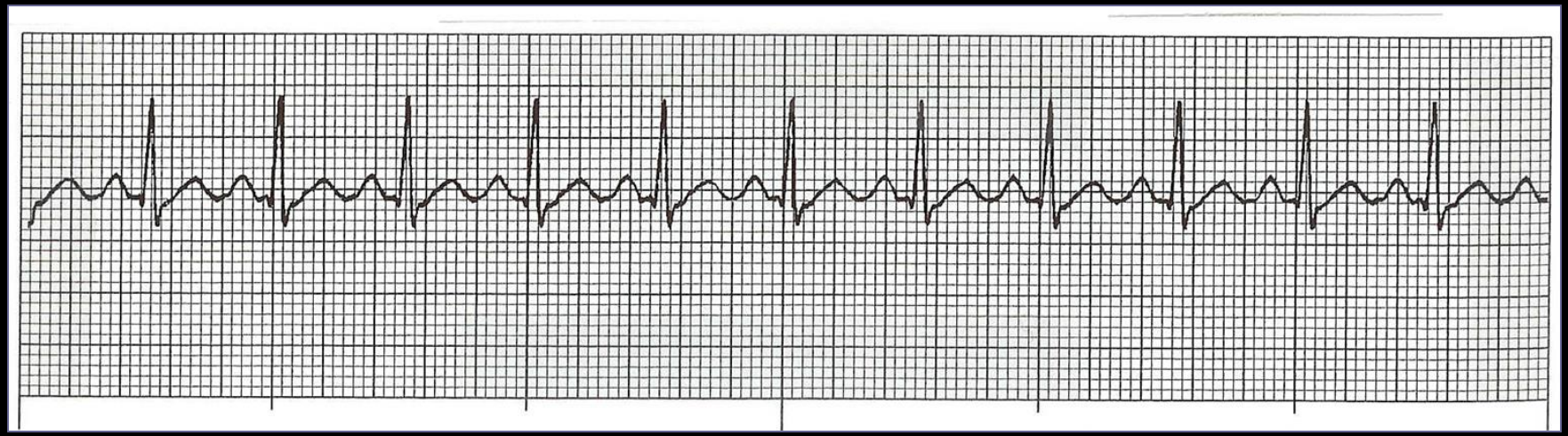
Normal Sinus Rhythm



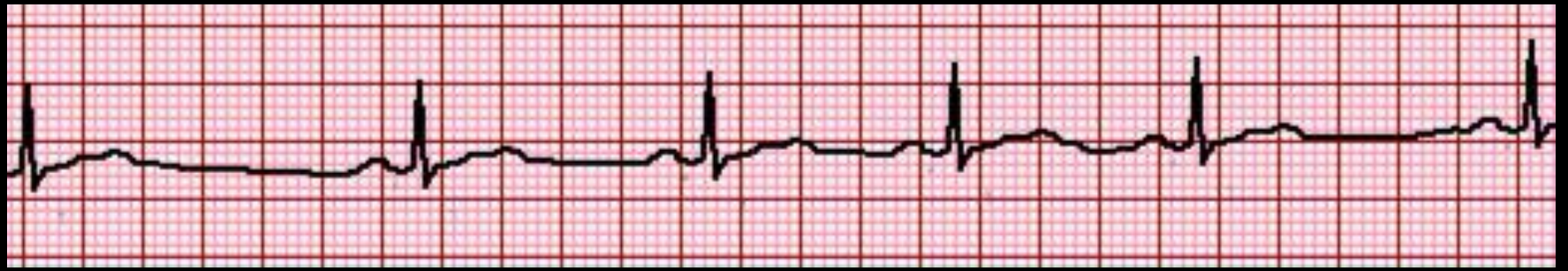
Sinus Bradycardia



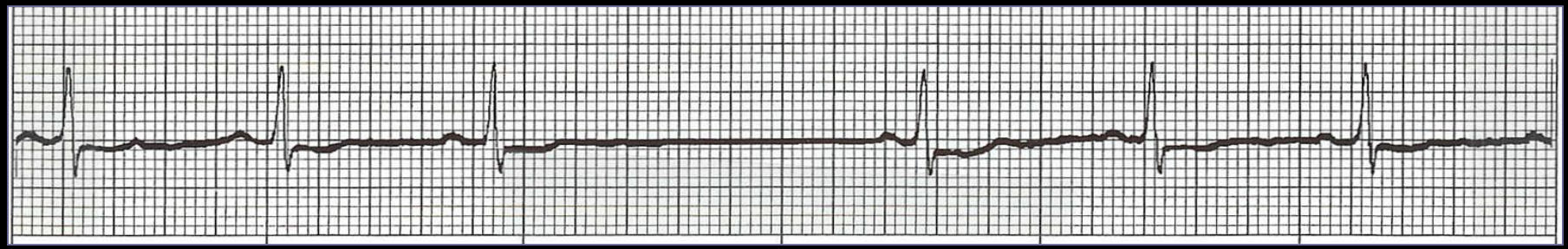
Sinus Tachycardia



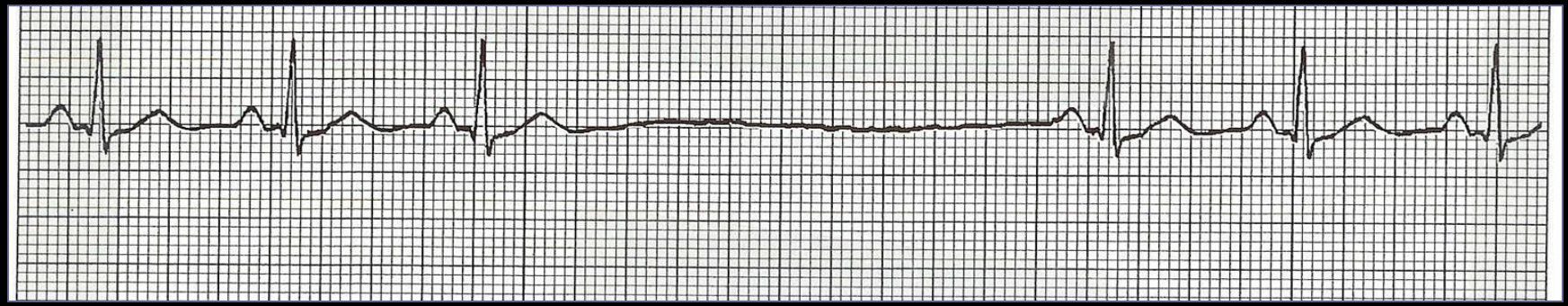
Sinus Arrhythmia



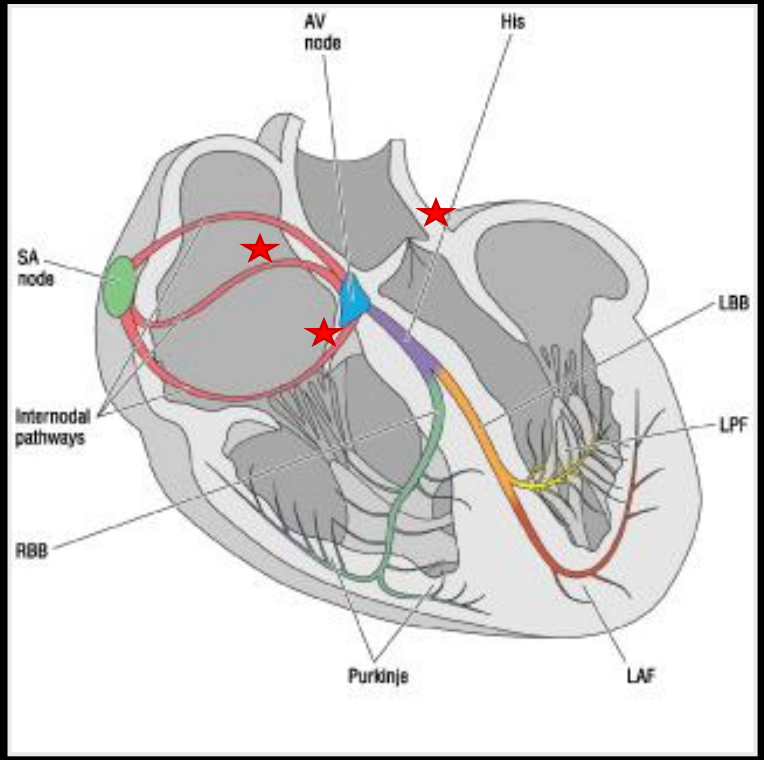
Sinus Block



Sinus Arrest



ATRIAL RHYTHMS



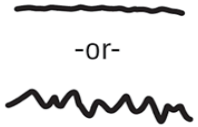
The P Wave

Sinus Tachycardia

Ectopic Atrial Tachycardia
Multifocal Atrial Tachycardia

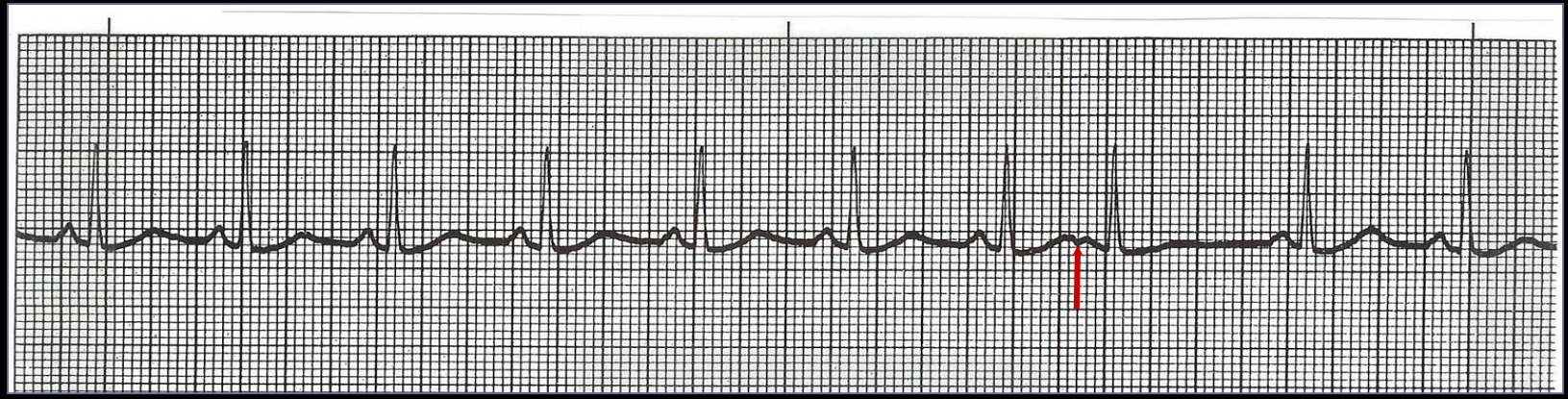
Junctional Tachycardia
AVNRT

Atrial Flutter



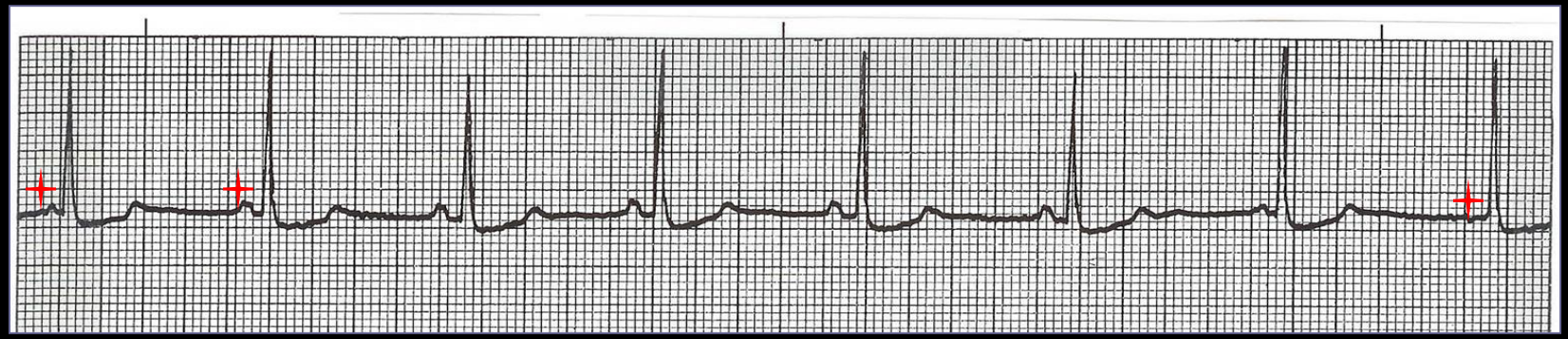
Atrial Fibrillation

Premature Atrial Contractions (PAC)

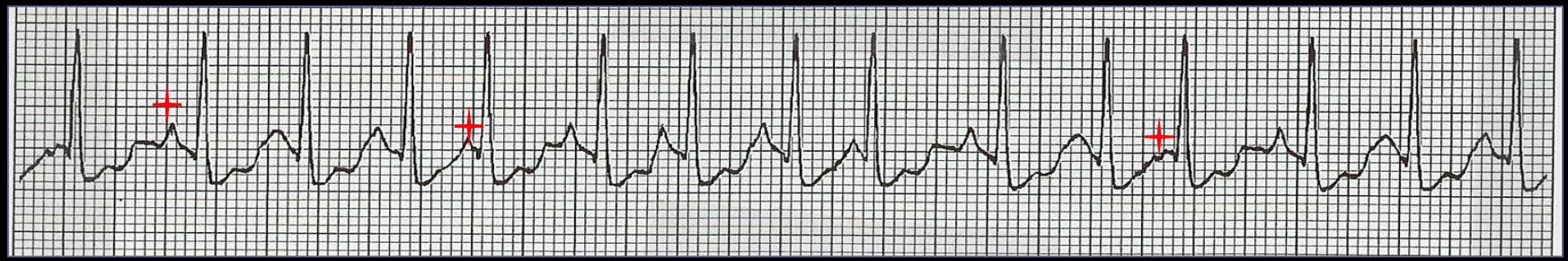


PAC

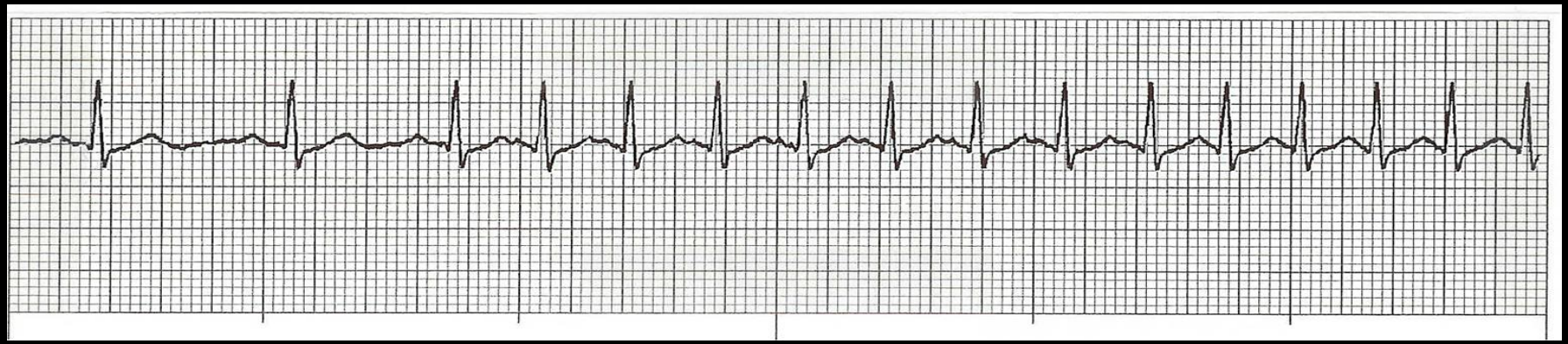
Multifocal Atrial Rhythm



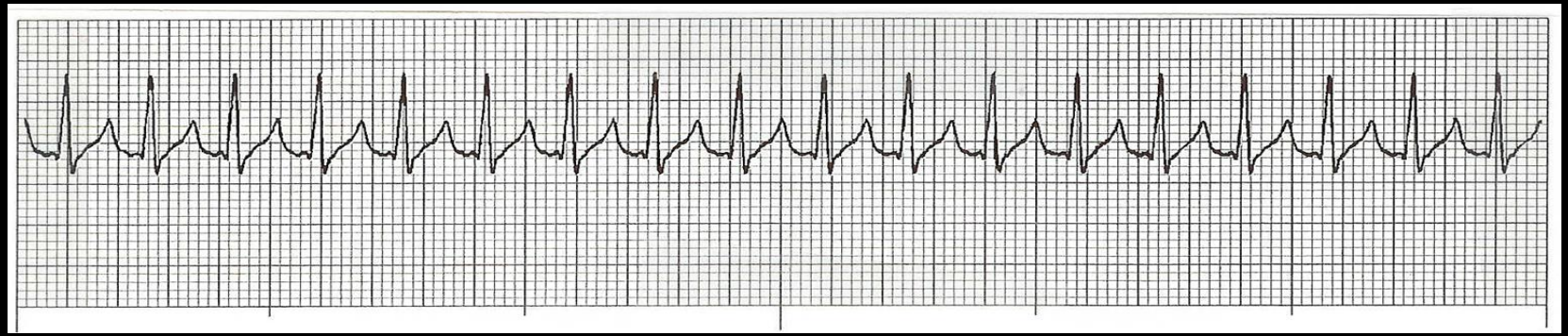
Multifocal Atrial Tachycardia (MAT)



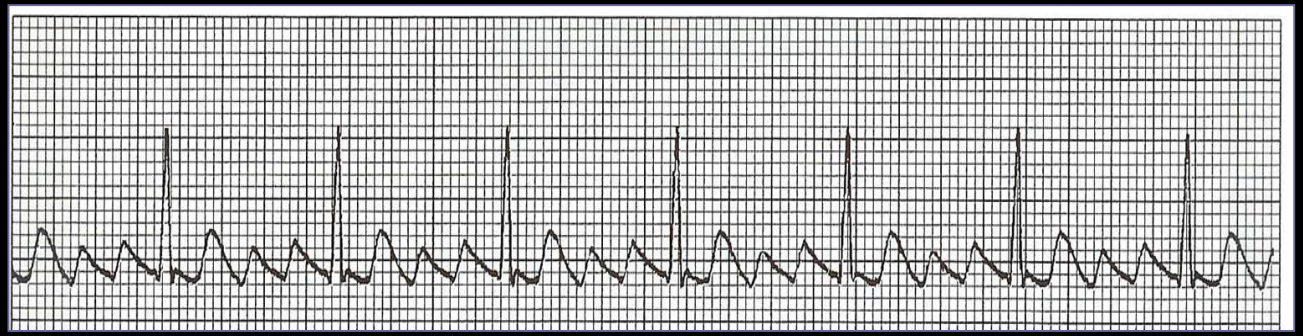
Paroxysmal Atrial Tachycardia



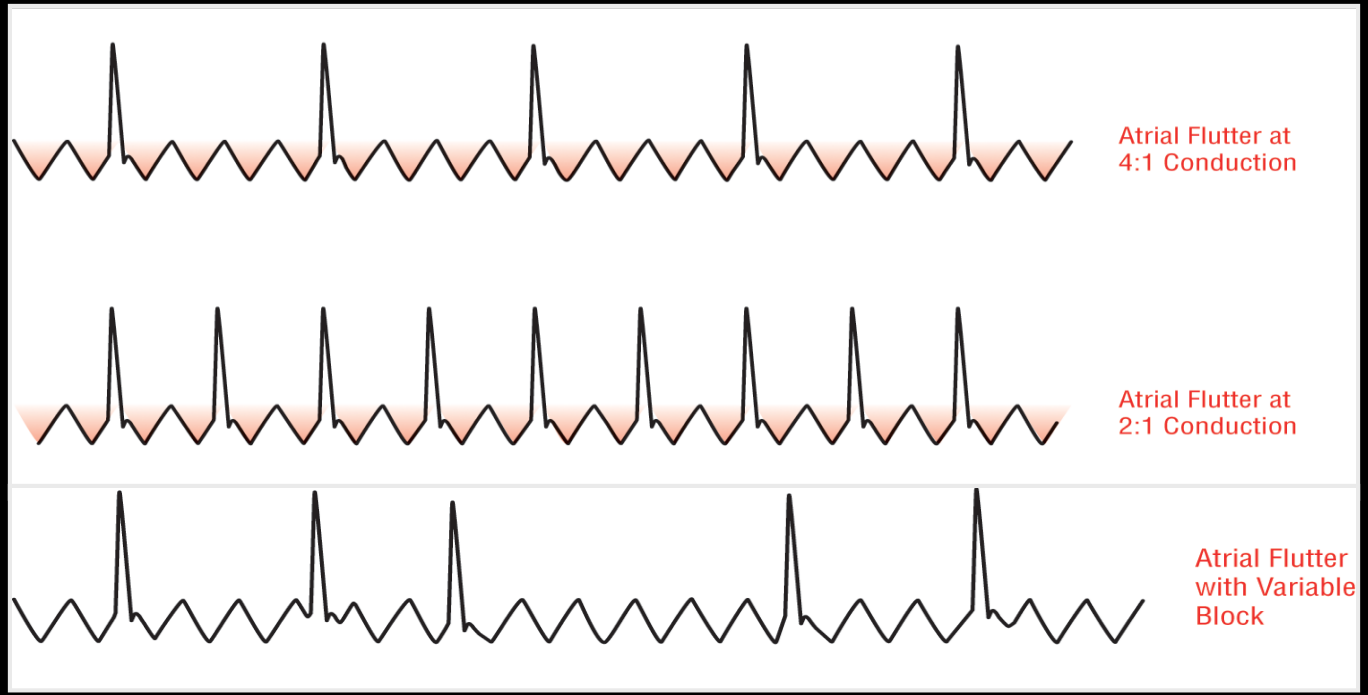
Supraventricular Tachycardia



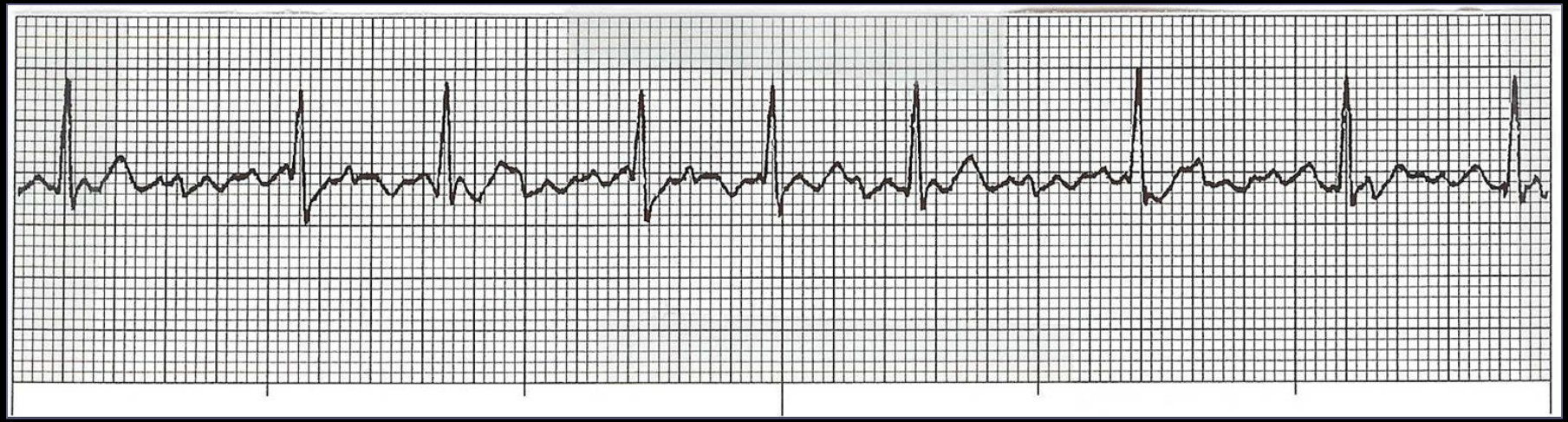
Atrial Flutter



Atrial Flutter



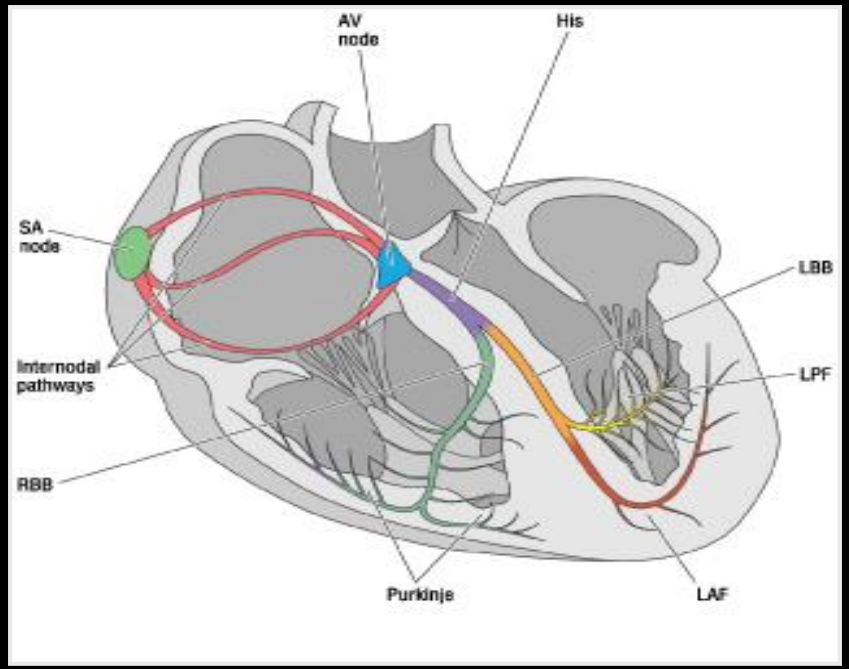
Atrial Fibrillation



Spectrum of Presentations

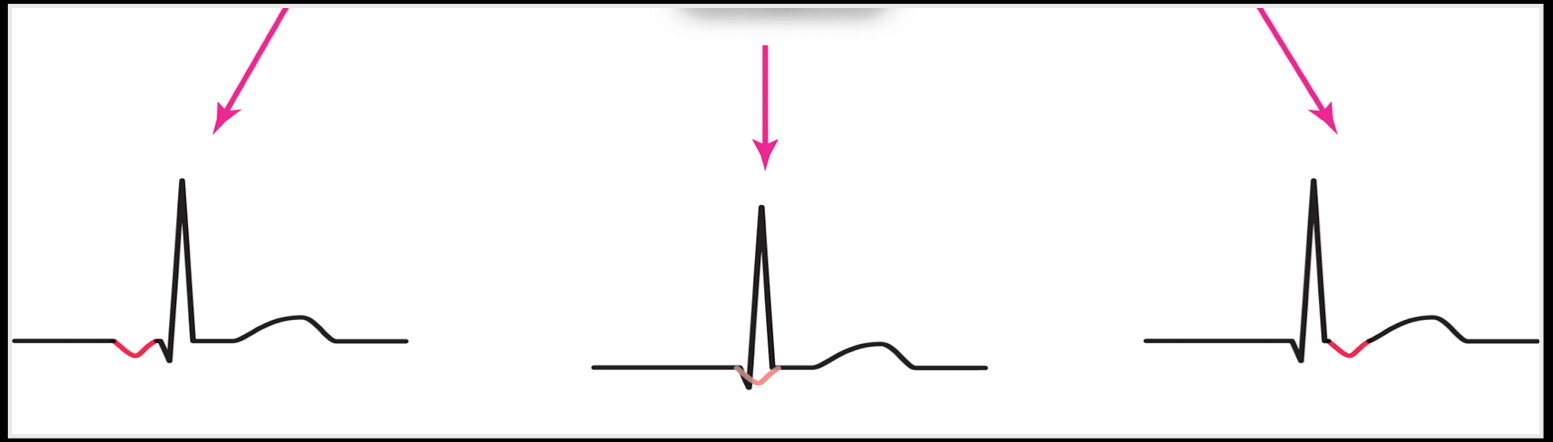

Lead II

JUNCTIONAL ARRHYTHMIAS

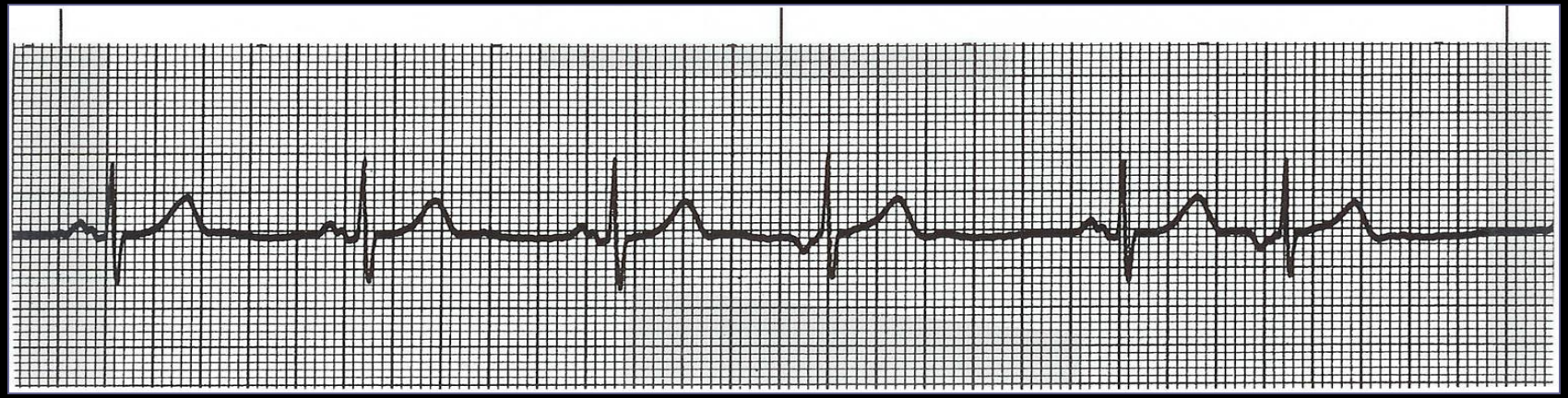


What Happens when the AV Node Fires

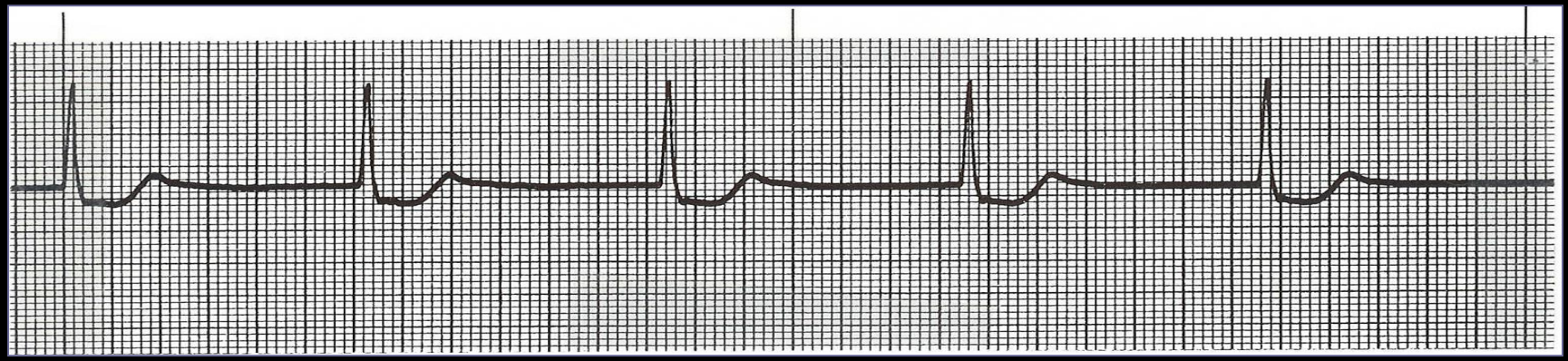
- Inverted P wave caused by retrograde conduction to the atria



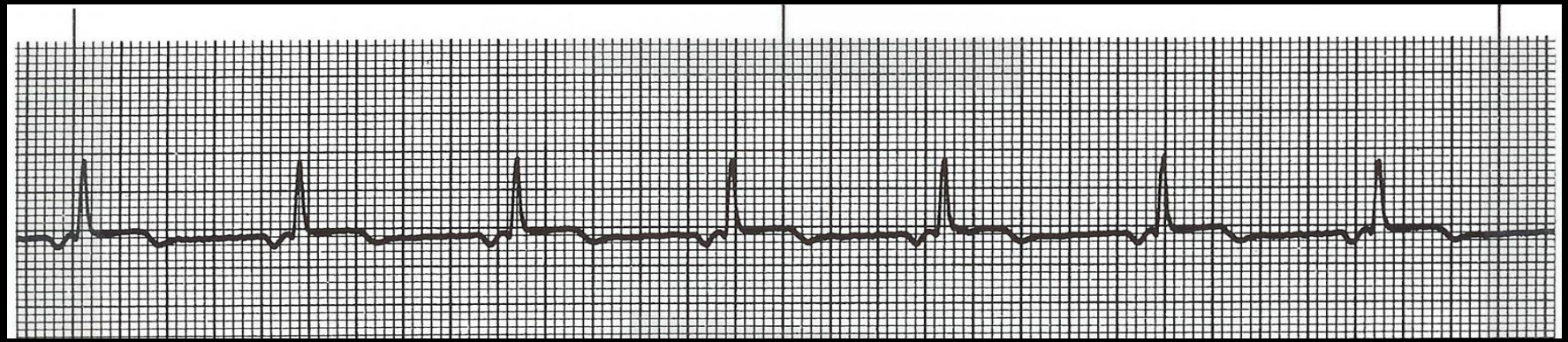
Premature Junctional Contraction (PJC)



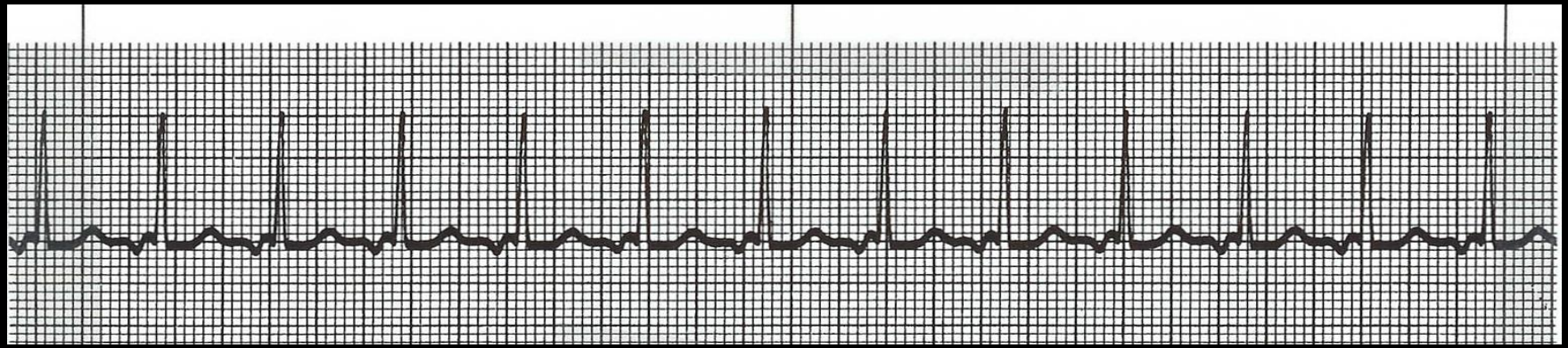
Junctional Escape Rhythm



Accelerated Junctional Rhythm



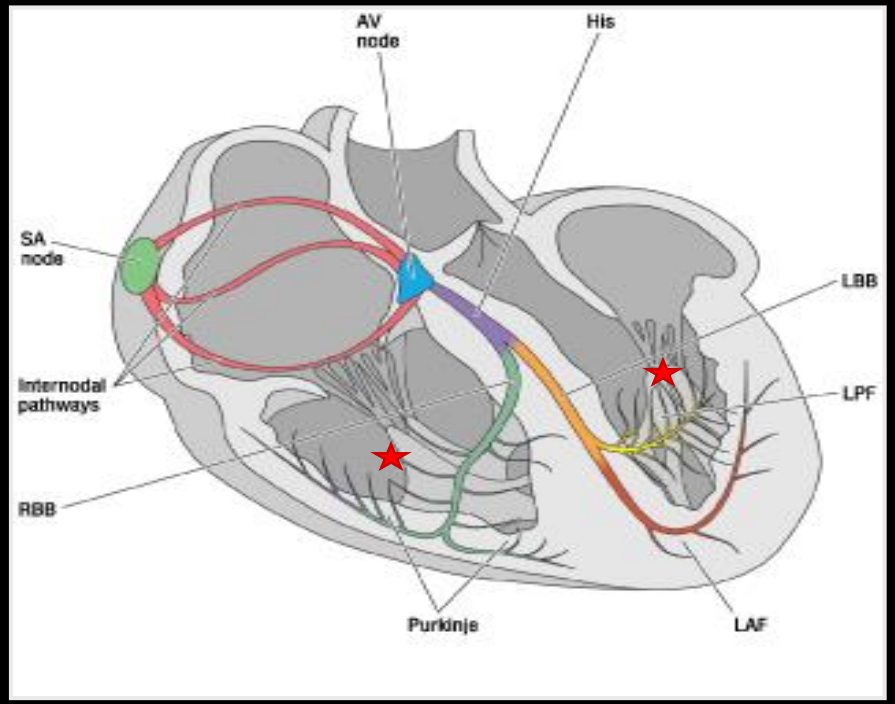
Junctional Tachycardia



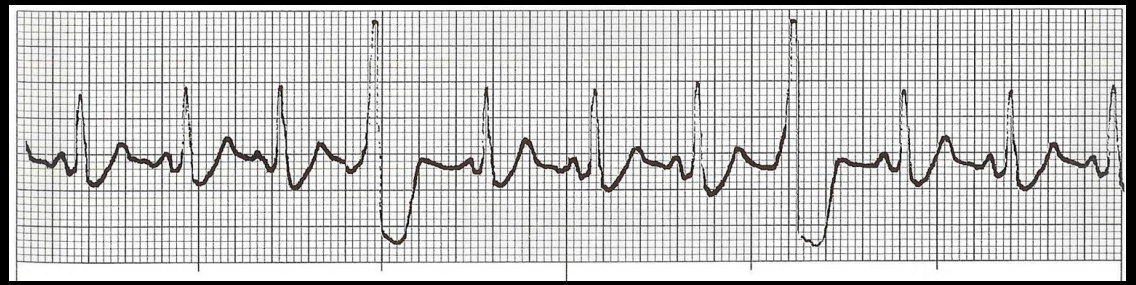

5

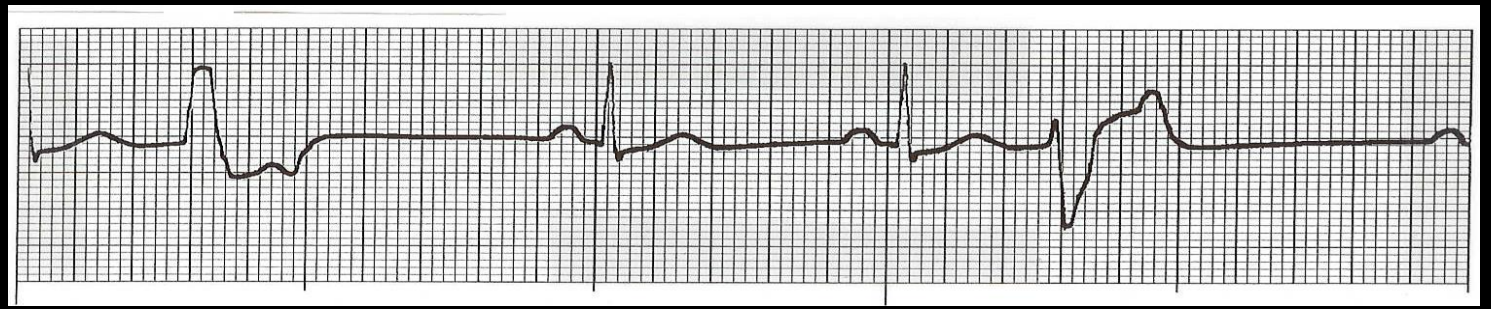
What is the name of abnormal accessory conduction pathway between the atria and ventricles that is seen in WPW?

VENTRICULAR RHYTHMS

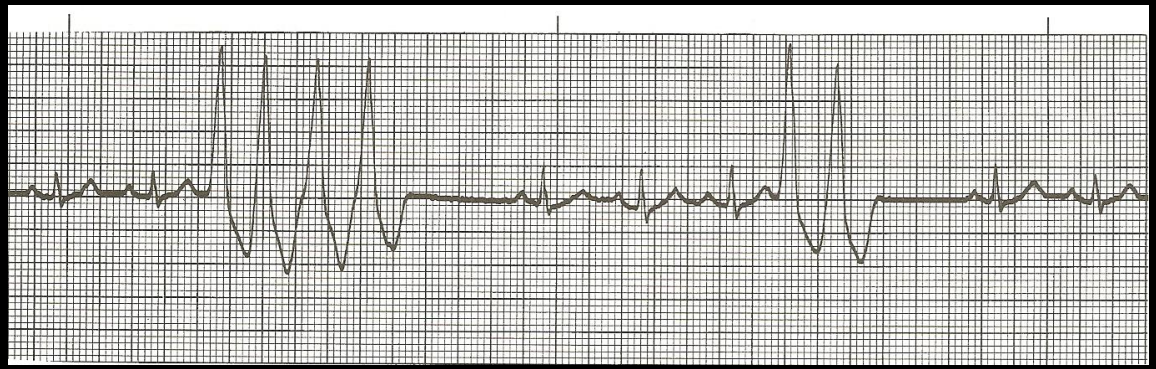


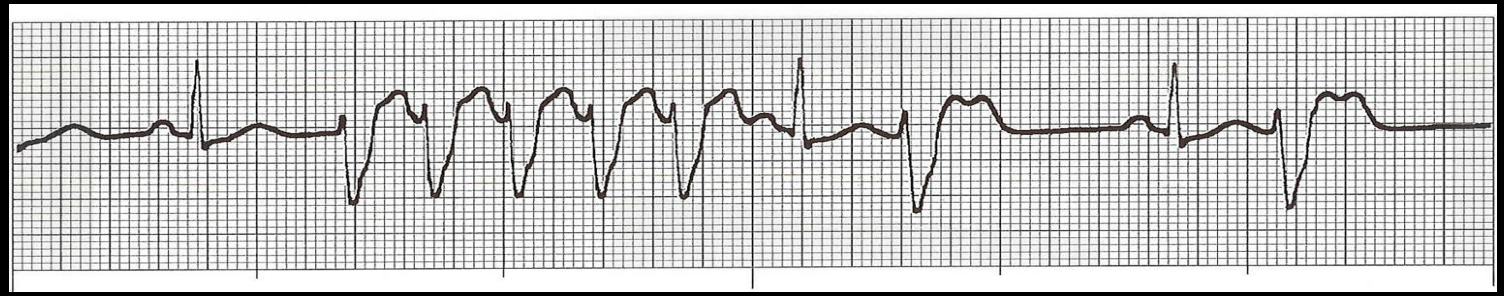
Premature Ventricular Contractions (PVC)



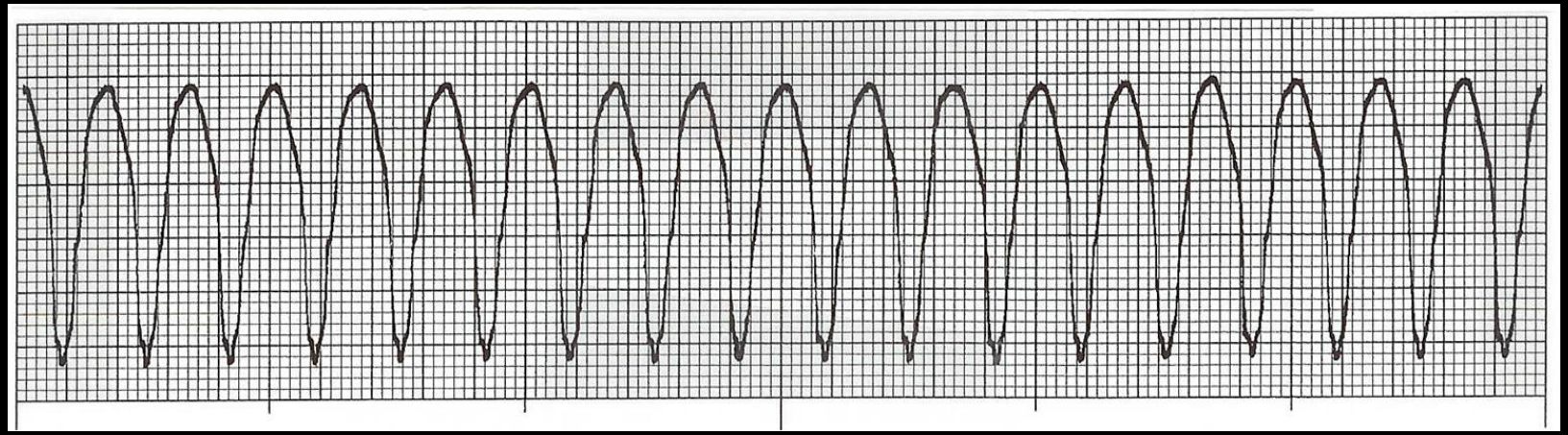


PVC

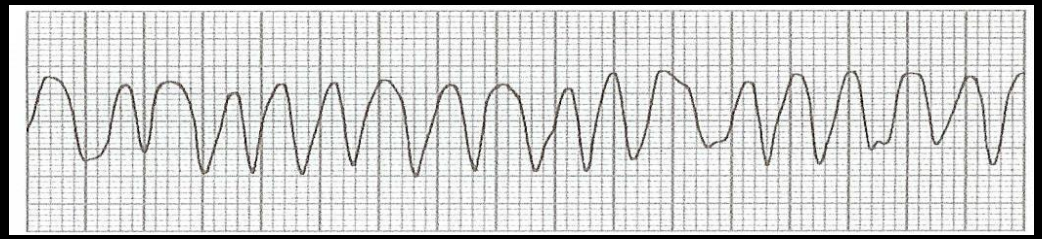


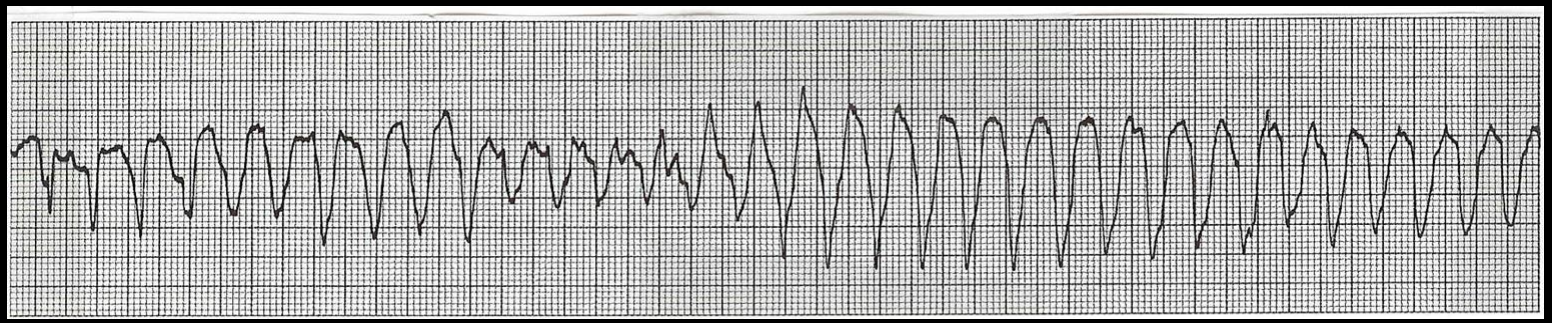


Monomorphic Ventricular Tachycardia

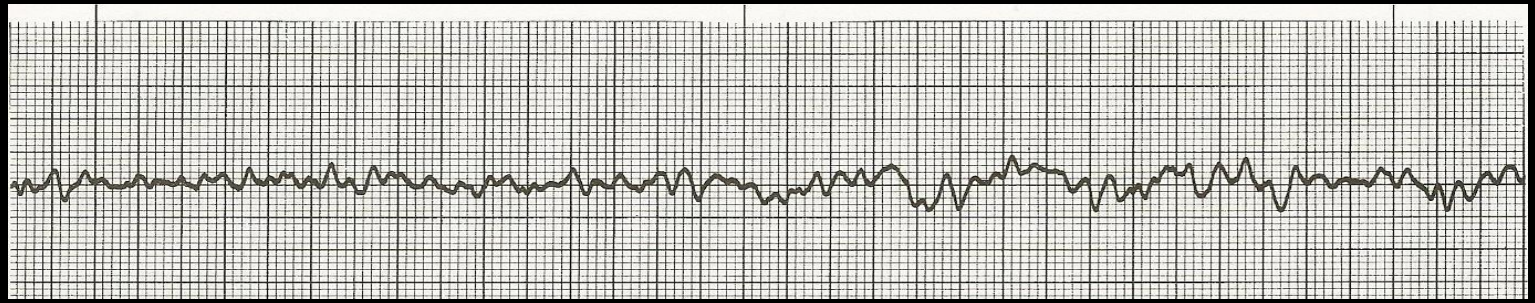


Polymorphic Ventricular Tachycardia

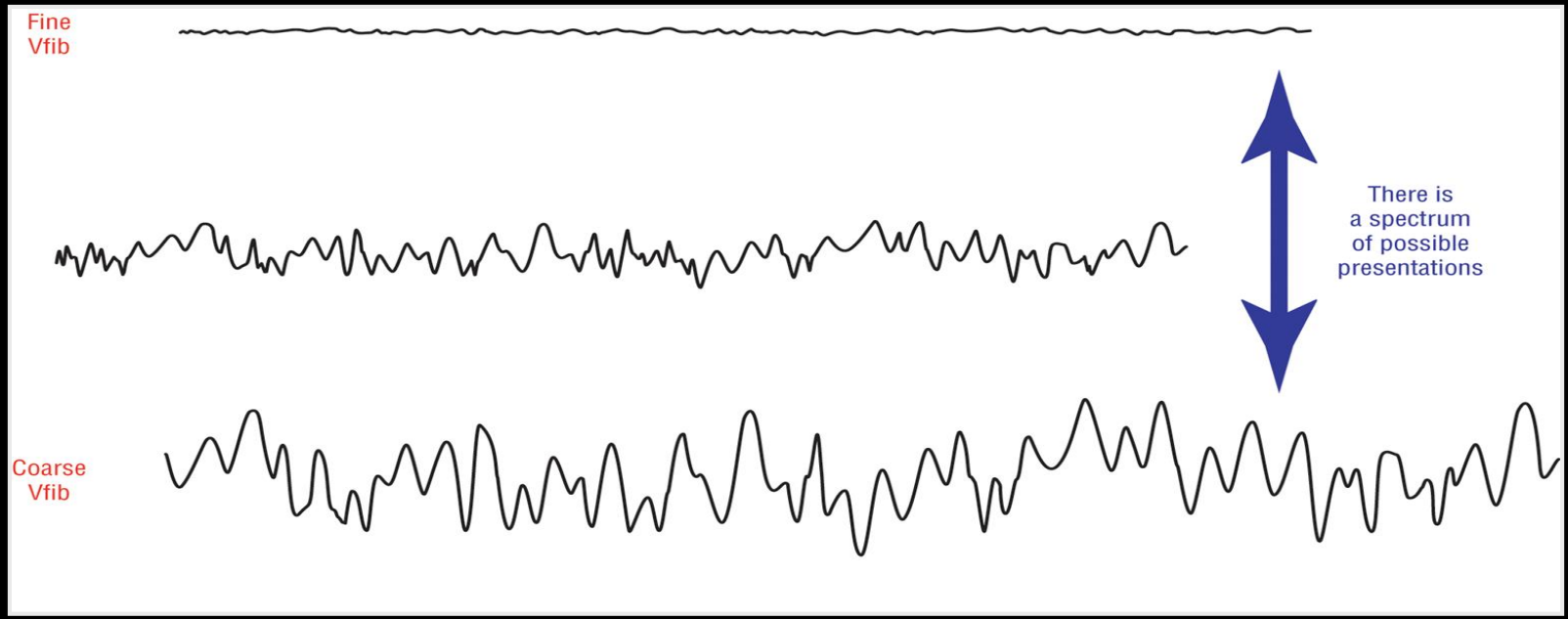




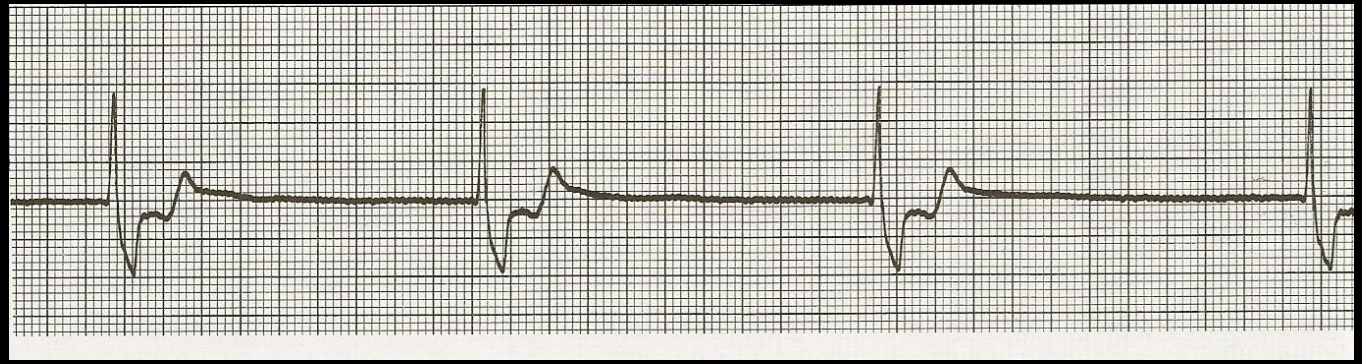
Ventricular Fibrillation



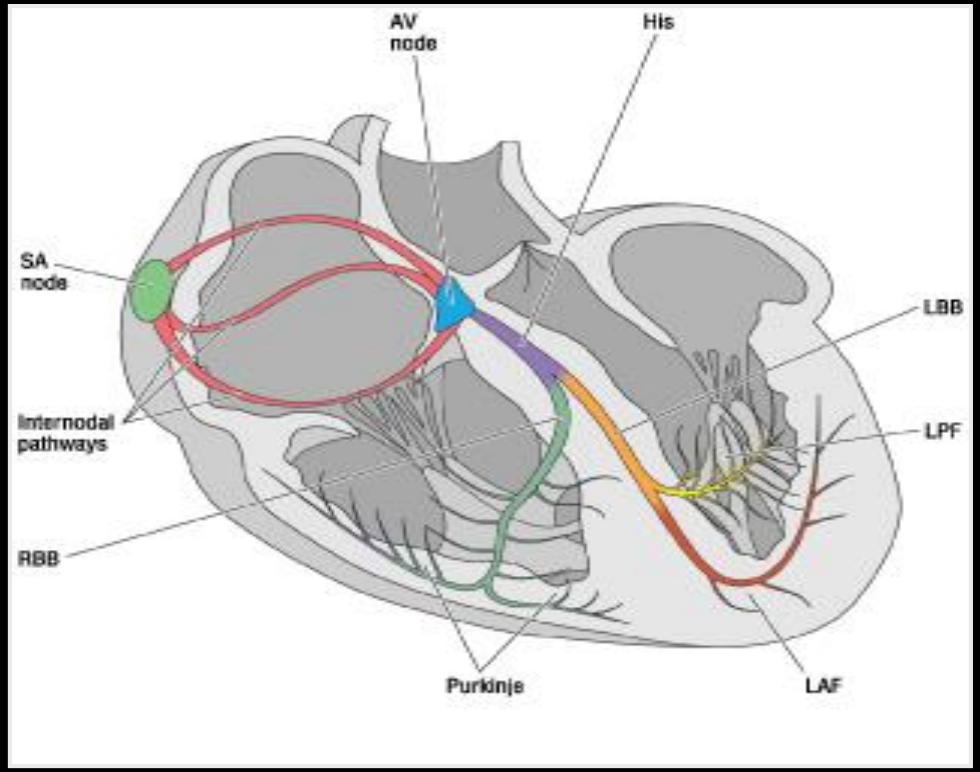
Fine vs. Coarse Vfib



Idioventricular Rhythm
(Ventricular Escape Rhythm)



HEART BLOCKS



Incomplete AV Block

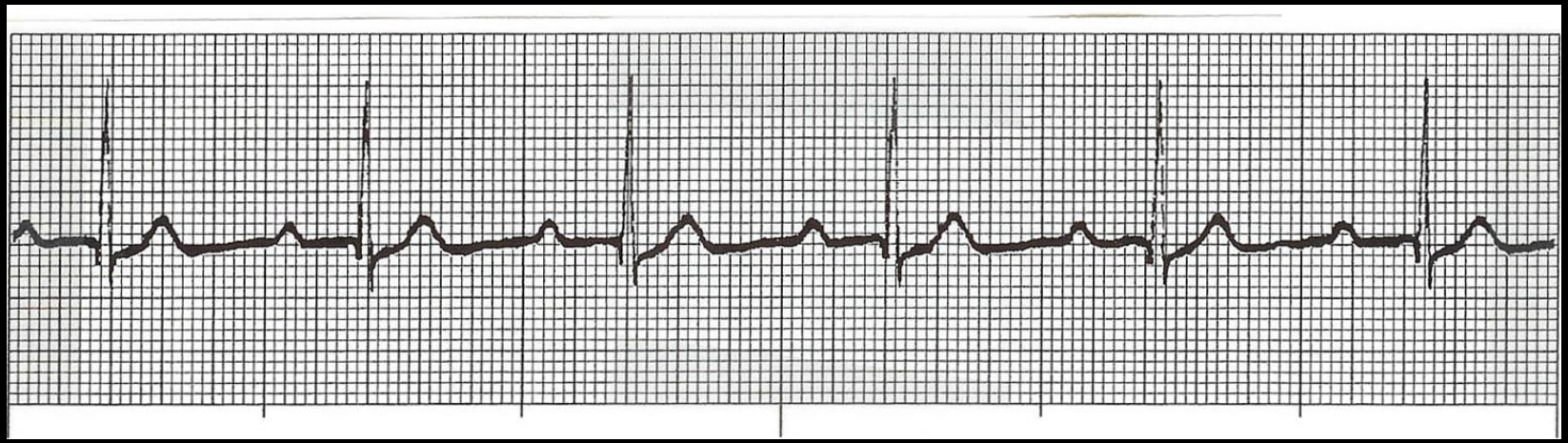
- First Degree

- Second Degree
  - Type I – Wenckebach
  - Type II

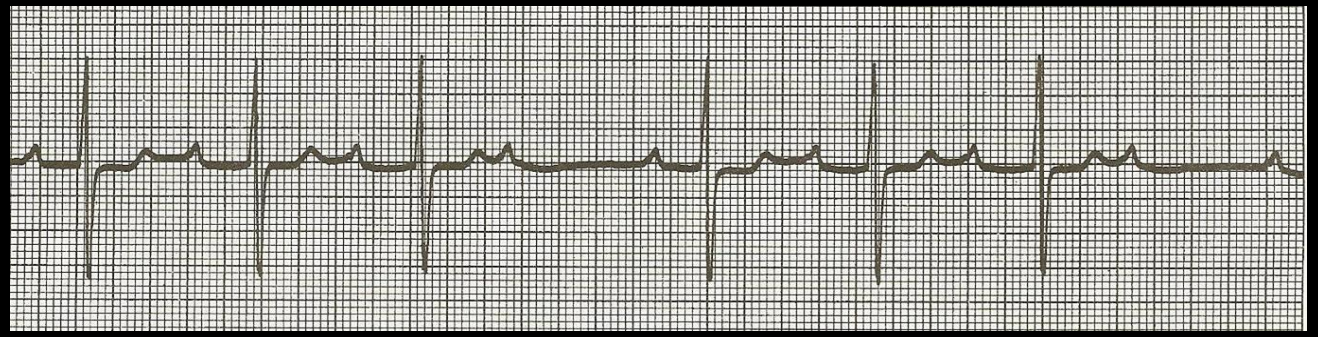
Complete AV Block

- Third Degree – Complete Heart Block

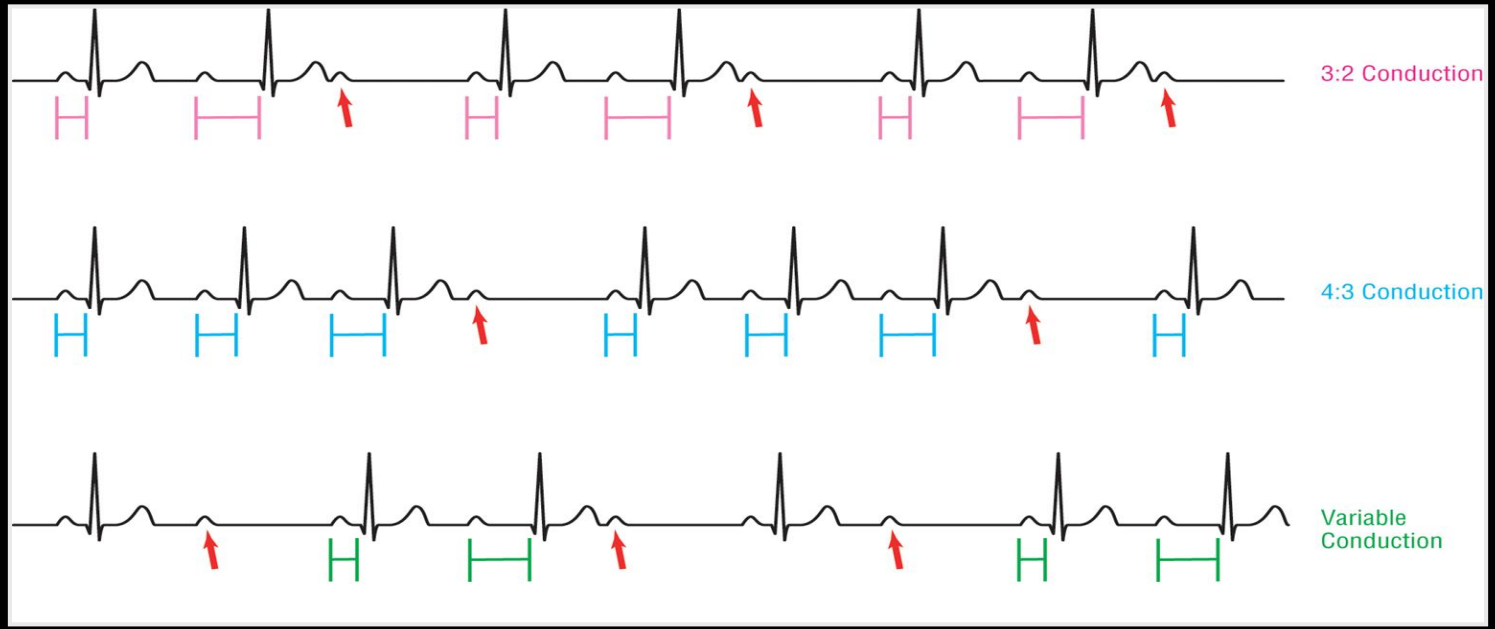
First Degree Heart Block



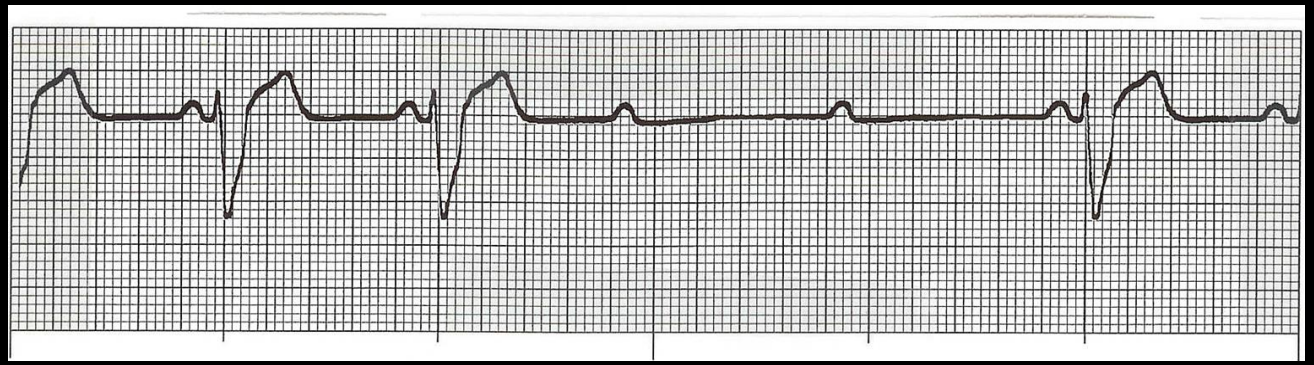
Second Degree Heart Block Type I - Wenckebach



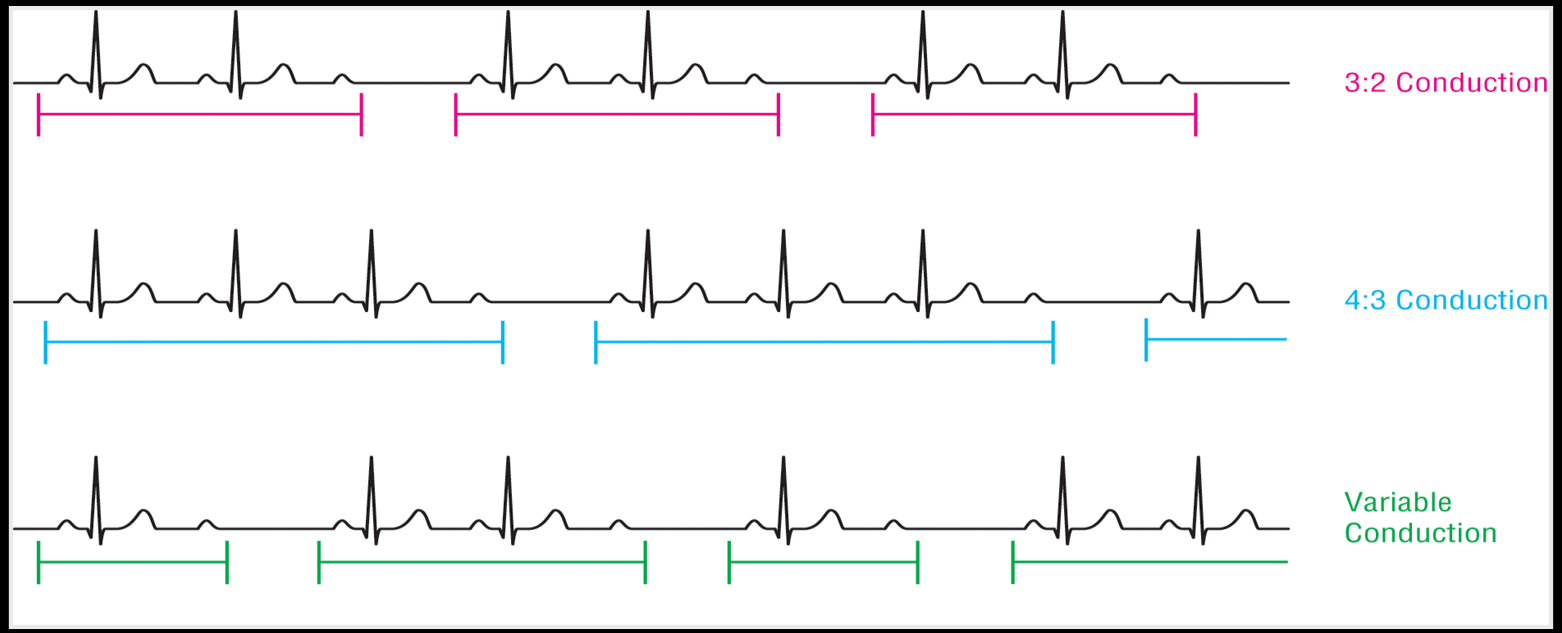
Examples of Type I Second-Degree AV Block



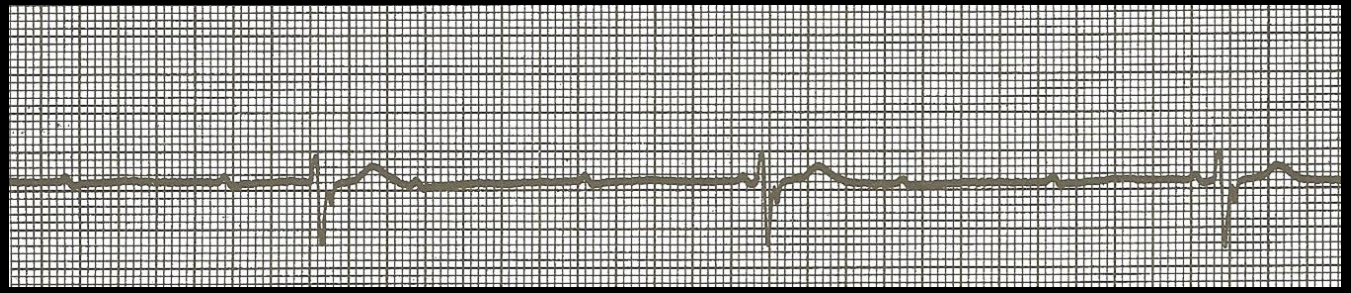
Second Degree Heart Block Type II



Examples of Type II Second-Degree AV Block



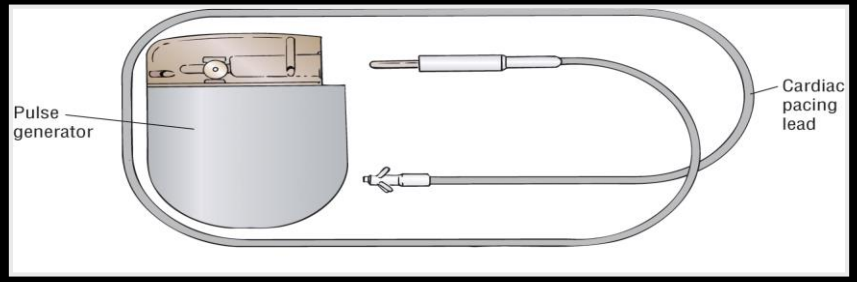
Third Degree Heart Block
AKA Complete ♥□ Block



Two Examples of Third Degree Block

What type of rhythm will have no or inverted p wave?

Artificially Paced Rhythms



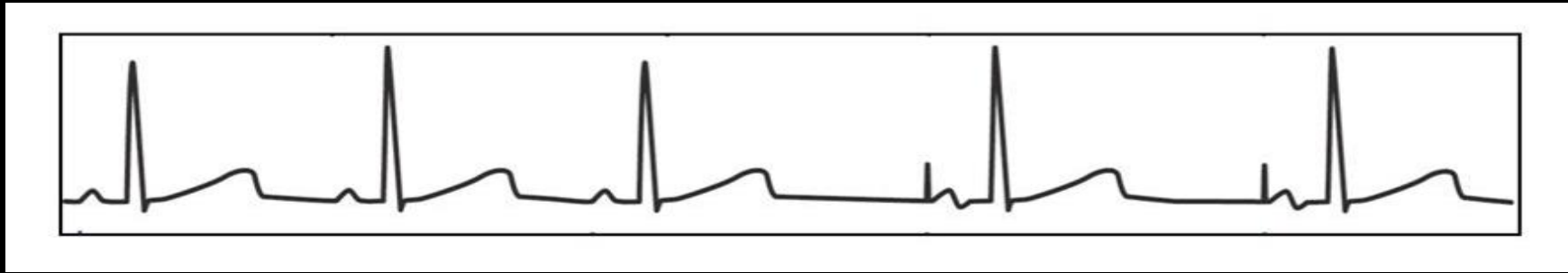
Indications

- Sinus Node Dysfunction
- Acquired AV Block
- Post MI
- Long QT Syndrome

Pacemaker Types

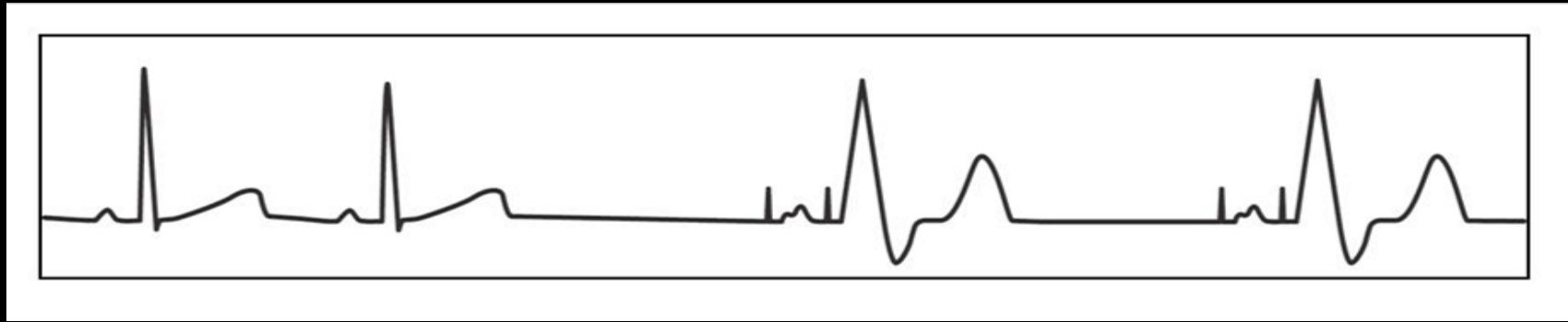
- Atrial
- Ventricular
- Dual Chamber

Atrial Paced

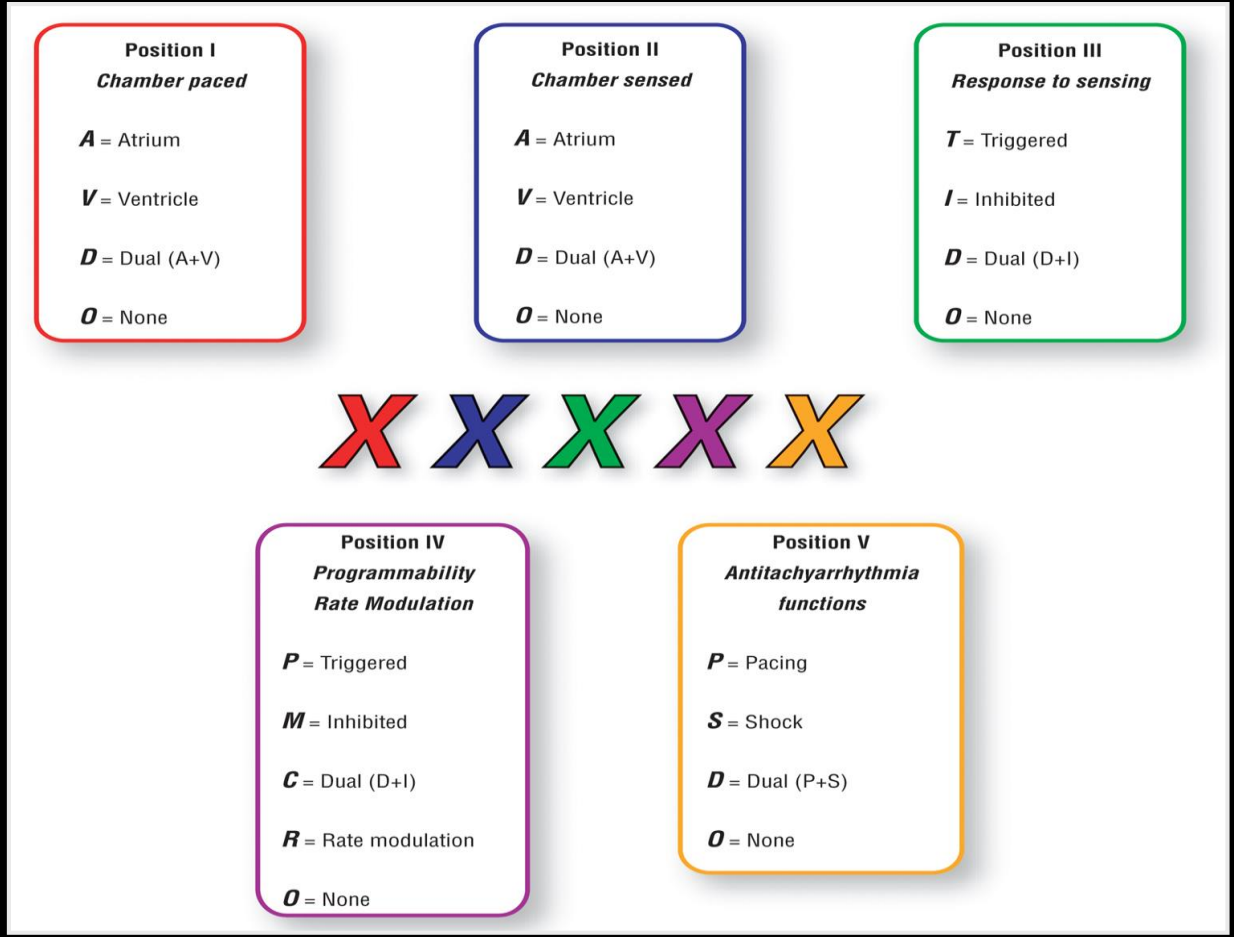


Ventricular Paced

Atrial & Ventricular Paced



The Pacemaker Code

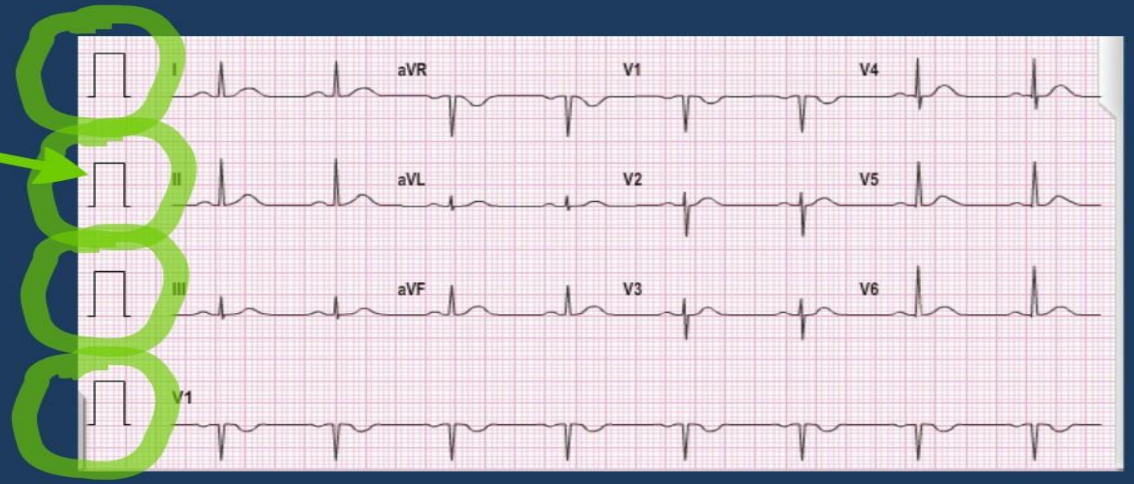



breaking down the
12 steps

1

Look at your paper?
Is it calibrated correctly

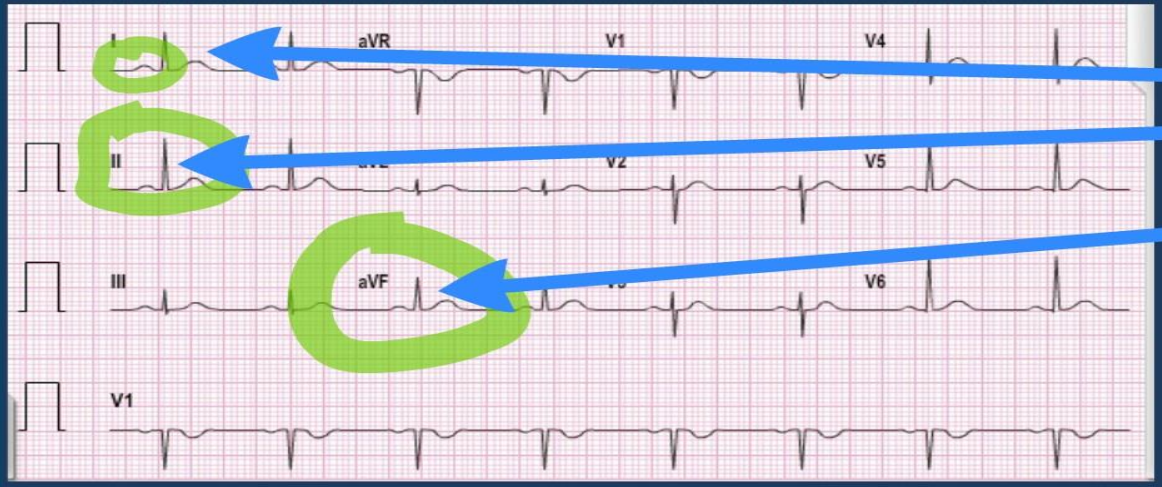
calibration marks



speed = 25mm/sec

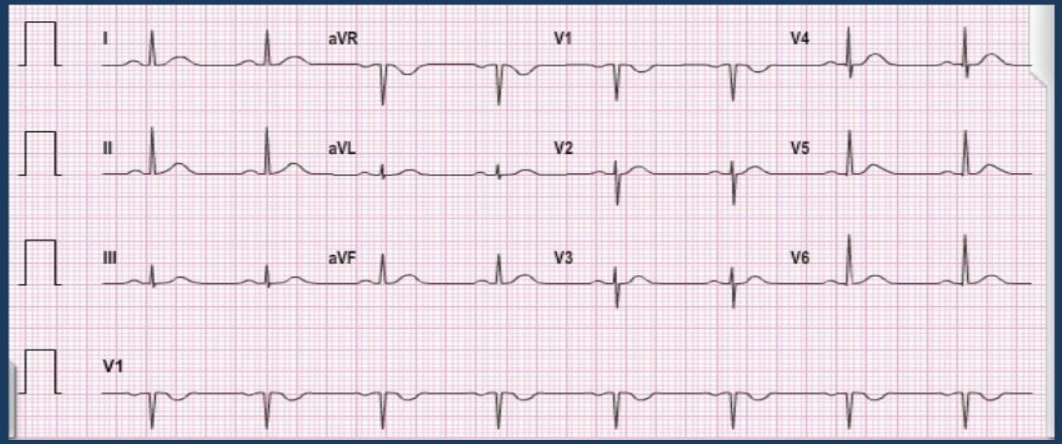
height= 10mm/mV

2 What is my rhythm? because it is not a dancer



- p waves?
- QRS regular?
- mind your Ps and QRSs
  is there a P for every QRS?

3 Rate it !



normal ?

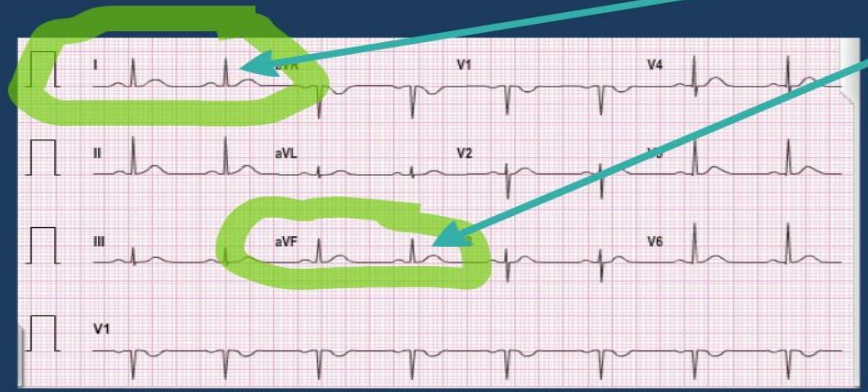
Fast ?

Slow ?

4 Am I off my axis?

look at lead I and aVF to determine axis

normal axis: positive R wave in lead I
positive R wave in aVF

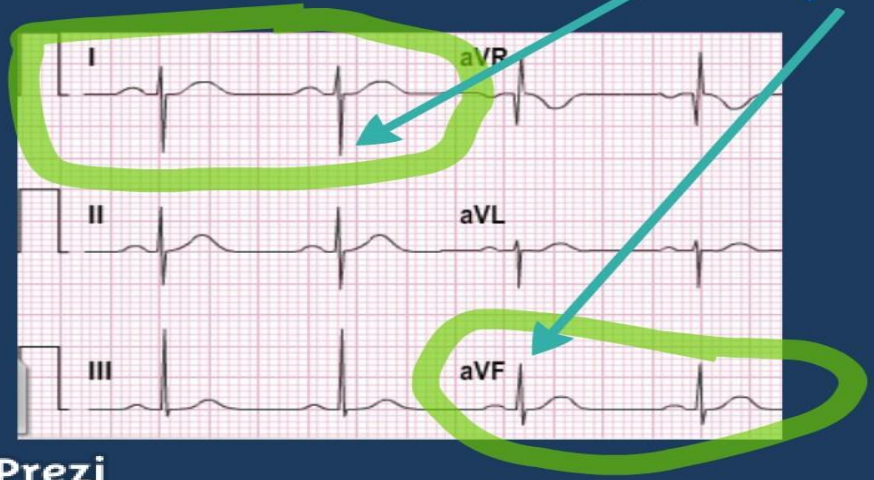


4

Am I off my axis?

look at lead I and aVF to determine axis

RIGHT axis deviation: negative R wave in lead I
positive R wave in aVF



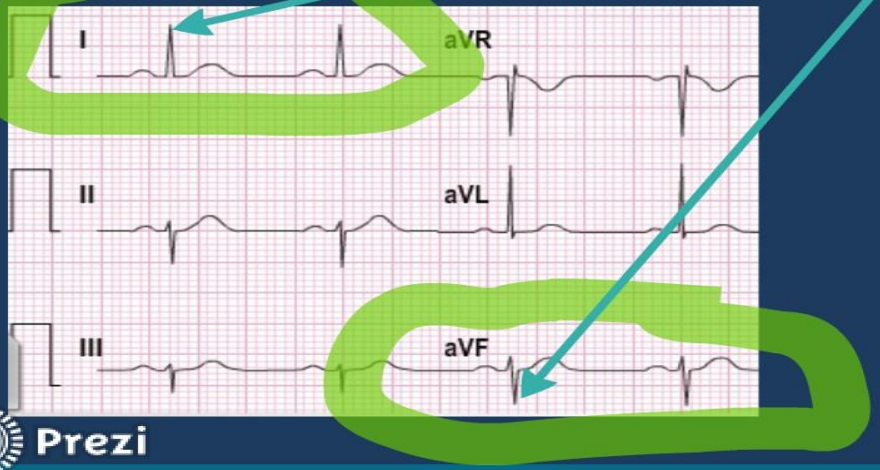
causes:

- RVH
- dextrocardia
- lateral MI
- PE
- ASD
- RBBB

4 Am I off my axis?

look at lead I and aVF to determine axis

LEFT axis deviation: positive R wave in lead I
negative R wave in aVF

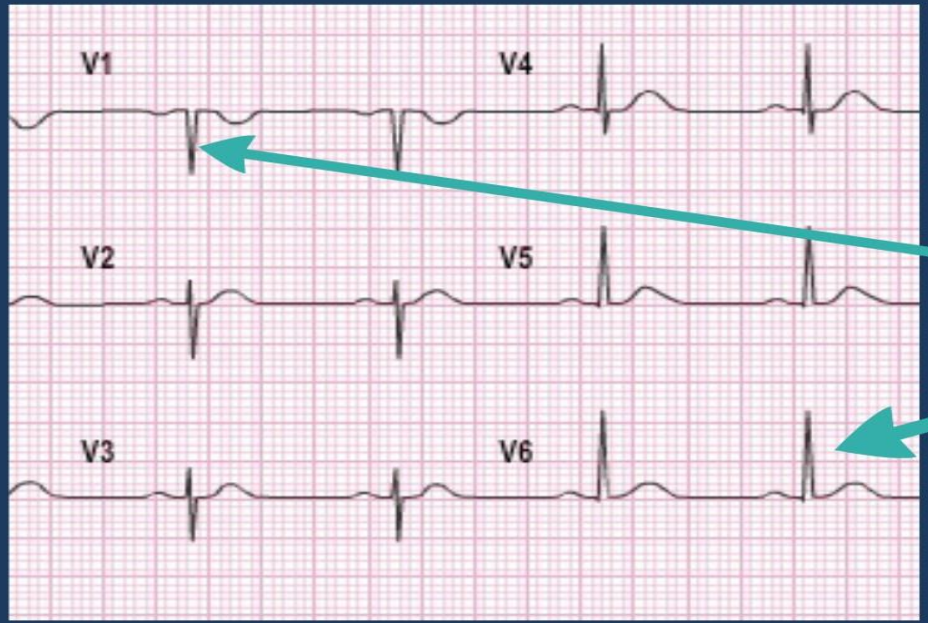


causes:

- LVH
- ↑ k^+
- inferior MI
- LBBB

5

Am I progressing nicely?



R wave progession as expected?

completely negative VI

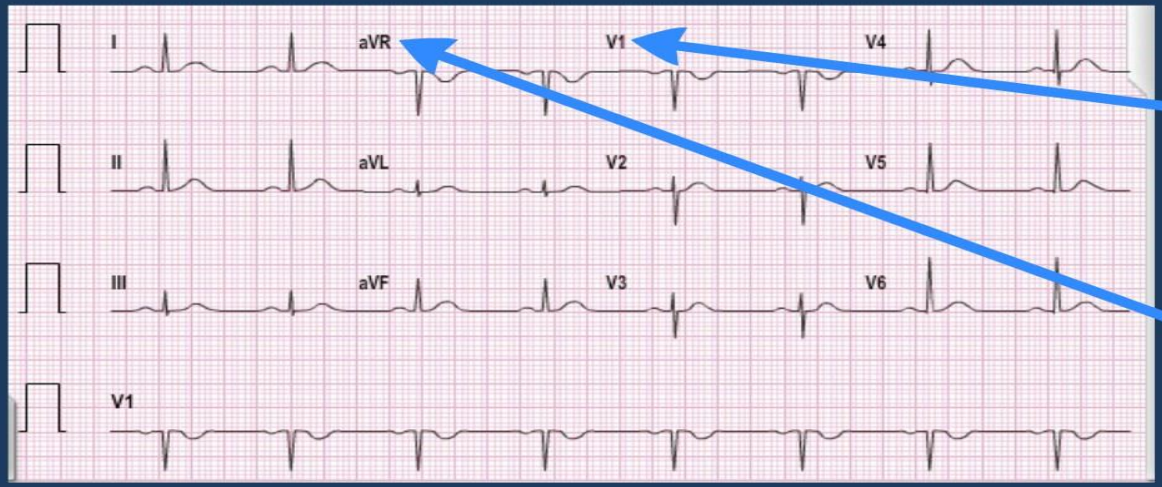
to

completely positive V6

not normal in:

- MI
- ventricular hypertrophy

6 What do my P wave look like?



biphasic?

positive?

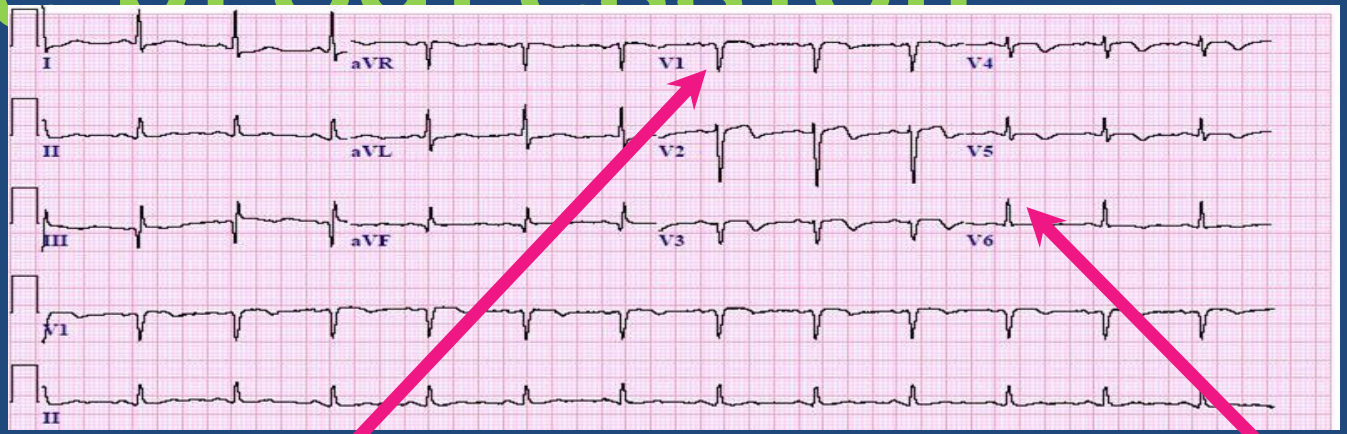
negative?

absent= junctional or ventricular rhythm

peaked= right atrial enlargement

notched= left atrial enlargement

Precordial leads V1–V6: R wave progression



R wave is completely negative in V1

R wave is completely positive in V6

7 I'll do my own PR, thank you

Pr interval?

short: < 0.12

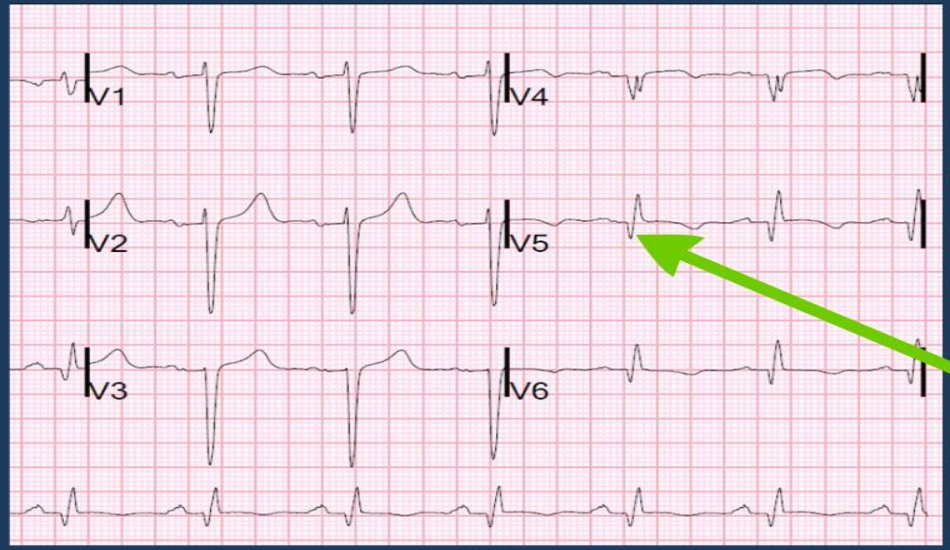
- WPW
- lown-ganong-levine
- av junctional

long: >.20

- av block
- increased vagal tone

8 Q waves?

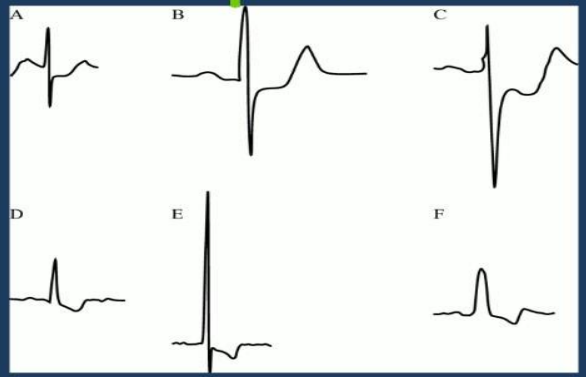
Queen Q Waves



q waves suggest old or occuring MI

10 ST segment, are you depressed?

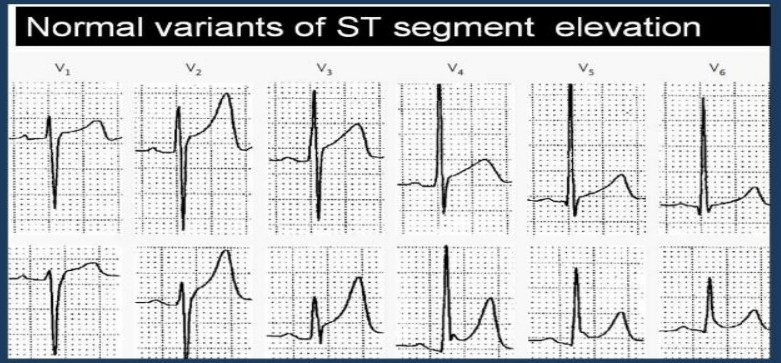
ischemia =
ST depression



Lack of energy?

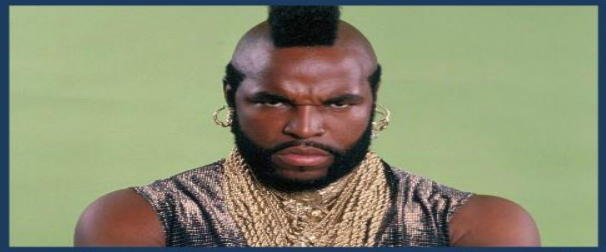
Tired all the time?

Maybe you are depressed?

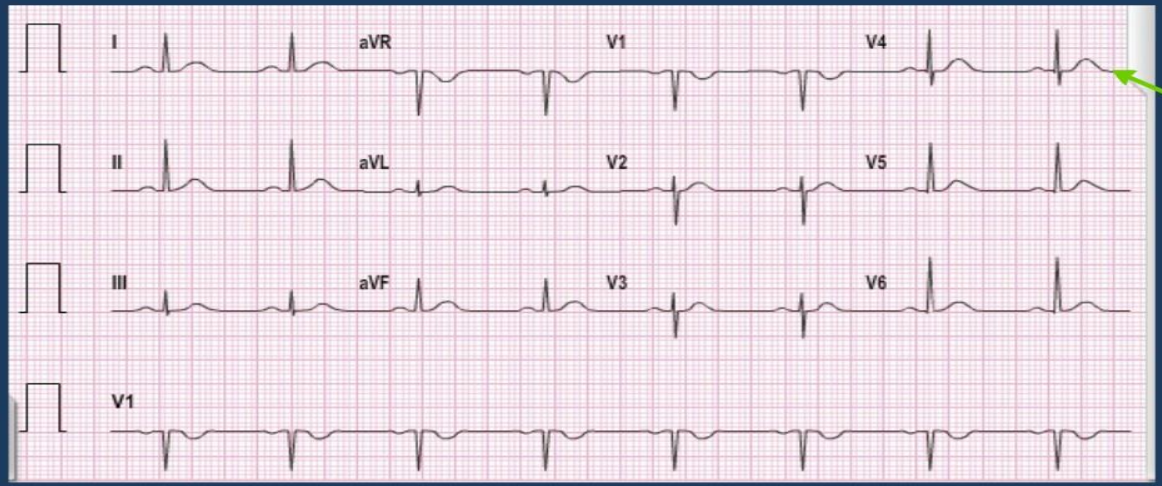


infarction =
ST elevation

11 Mr. T



I PITY the fool who does not take you seriously



- same direction as QRS
- <5 in limb leads
- <10 in chest leads

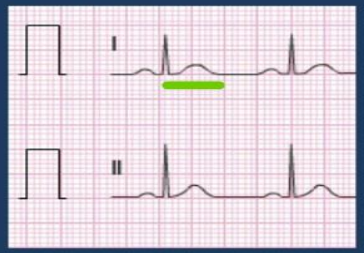
Tall Ts: high K

flat Ts: low K, ischemia

Long QT can also be congenital!

1 2 QT

how fast the ventricles repolarize after contraction



- >0.35 and <0.46
- too long or too short can cause arrhythmias

long:

- low lytes
- ischemia
- ICP

short:

- ↑calcium
- dig

Name an electrolyte disturbance that will length the QT?


10

Greater than what height of the R wave is considered a pathological Q wave?

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Thanks for playing folks