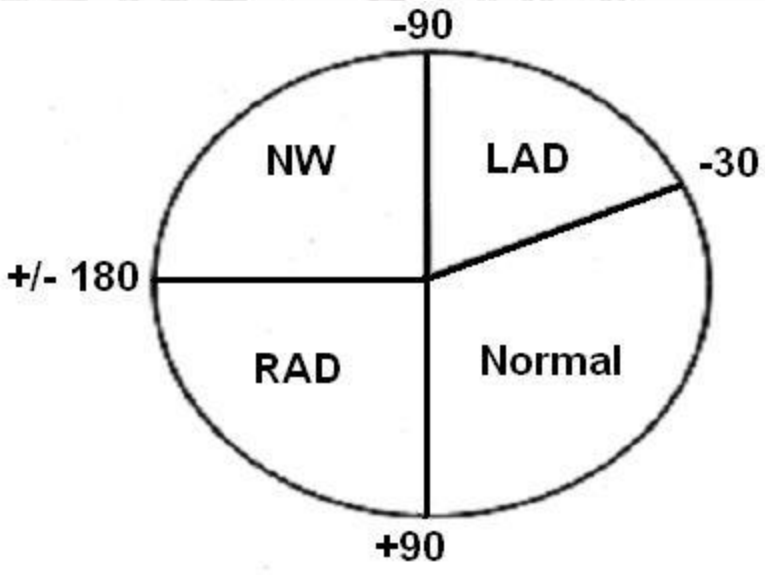
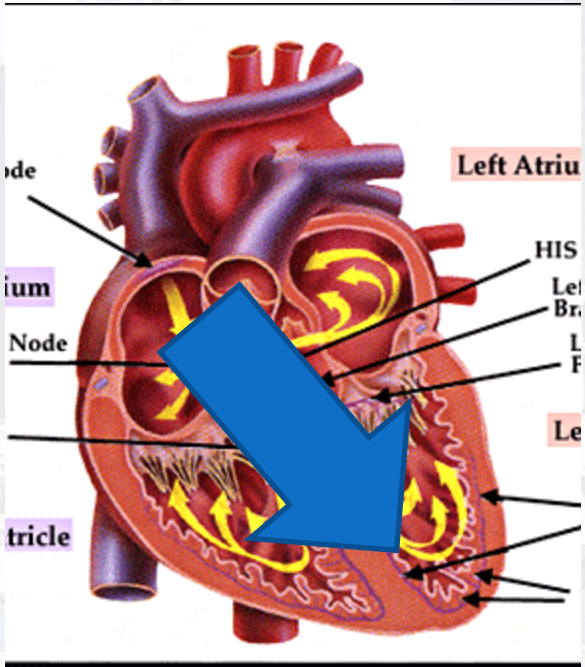
Axis Deviation/Heart Blocks

12 Lead EKG

- Axis determination
  - Axis is the general flow of electrical activity in the heart
  - Normal
    - -30 to 90 degrees





12 Lead EKG

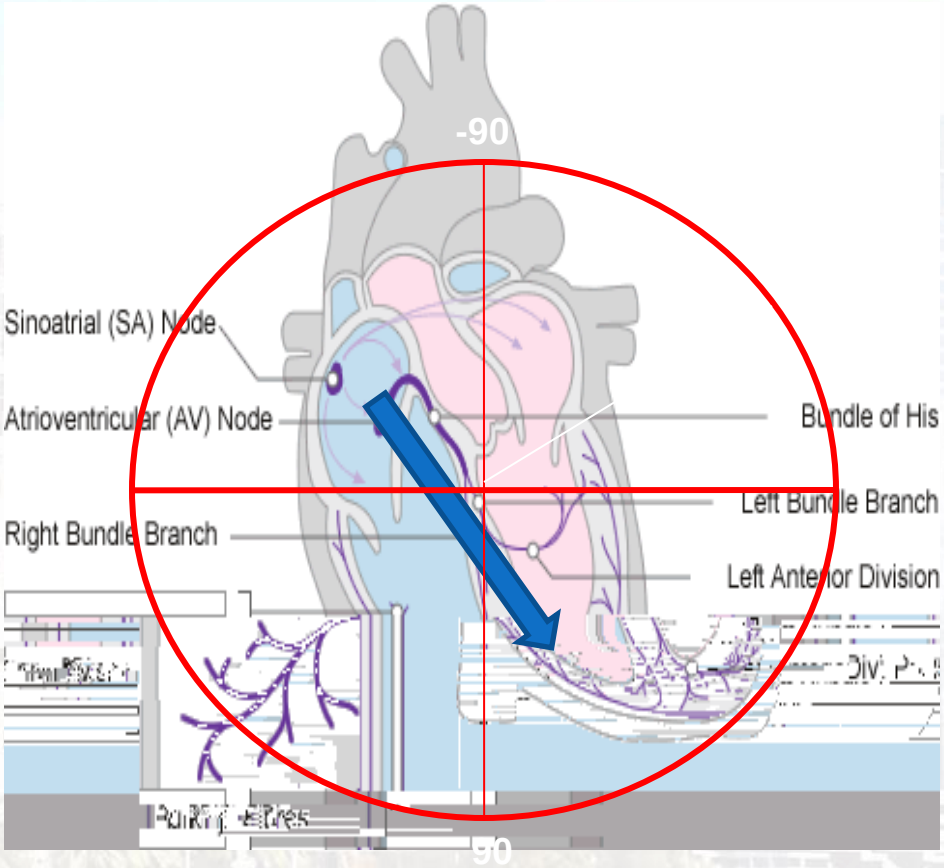
- Axis determination
  - Why is this important?
    - Understanding axis can help to diagnose VT versus SVT with aberrancy
    - Used to diagnose hemiblocks
    - Can help to identify patients that are high risk for conduction abnormalities and becoming hemodynamically unstable

12 Lead EKG

- Axis determination
  - This is done through either looking at leads I, II, III or I and aVF
    - We will be using Leads I, II, III
  - What is normal?

12 Lead EKG

- Normal axis
  - Lead I – Upright QRS
  - Lead II – Upright QRS
  - Lead III – Upright QRS

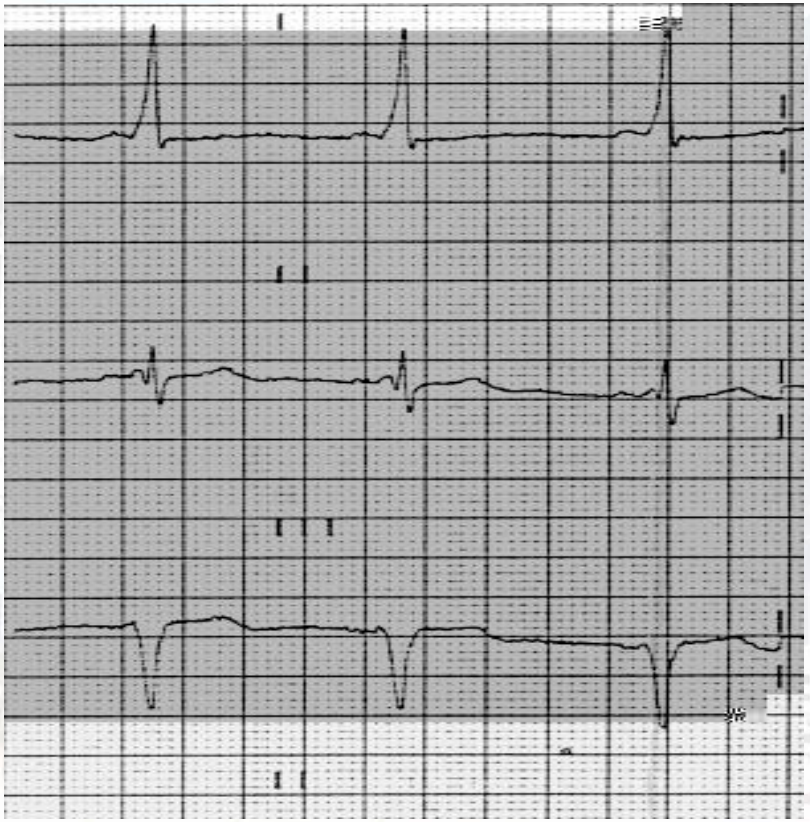


12 Lead EKG

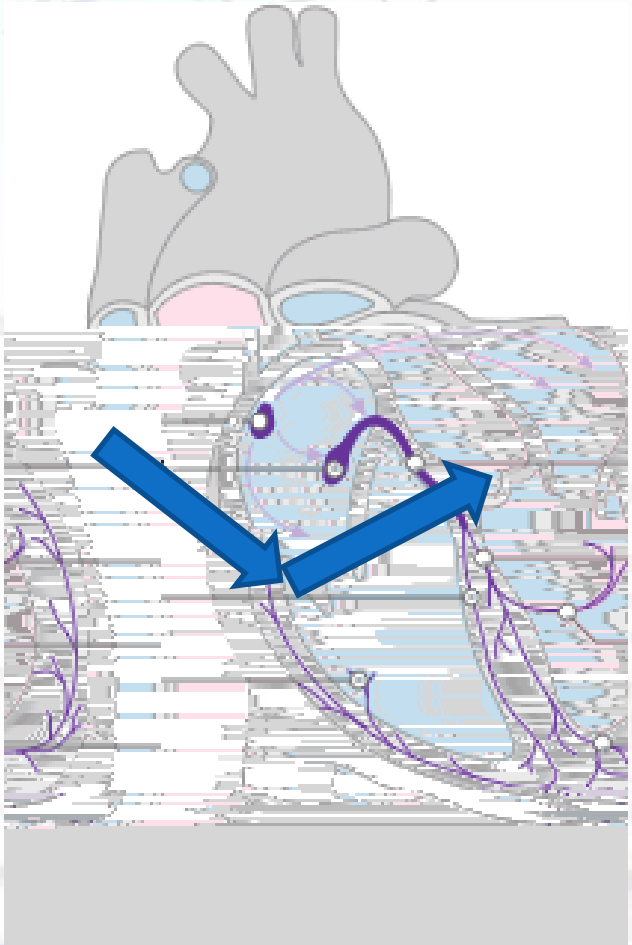
- Lets make this a little easier

Axis	Lead I	Lead II	Lead III	Additional
Normal -30 to 90	Upright	Upright	Upright	
Physiologic Left axis -40 to 0	Upright	Upright or Biphasic	Down	
Pathologic Left Axis -40 to-90	Upright	Down	Down	Anterior Hemiblock
Right axis 90 to180	Down	Upright or biphasic	Upright	Posterior Hemiblock
Extreme Right Axis 180 to -90	Down	Down	Down	Ventricular origin

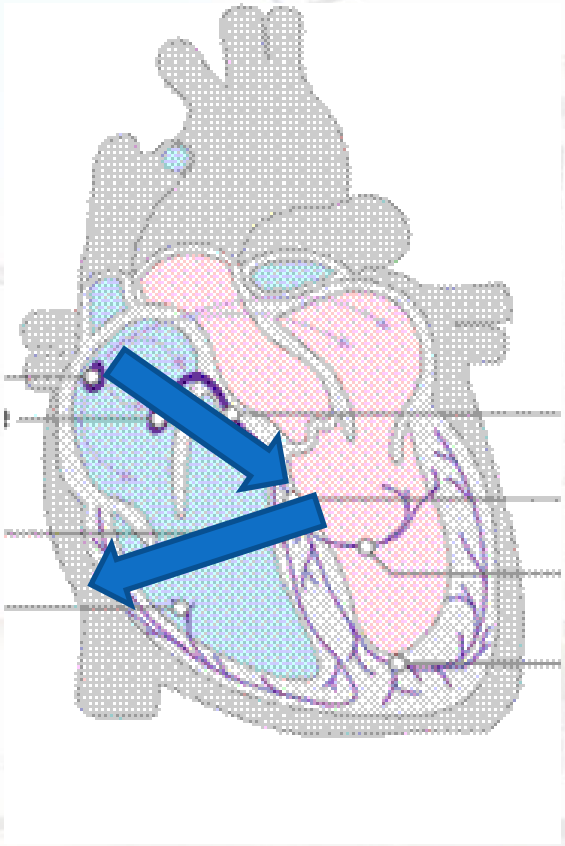
12 Lead EKG

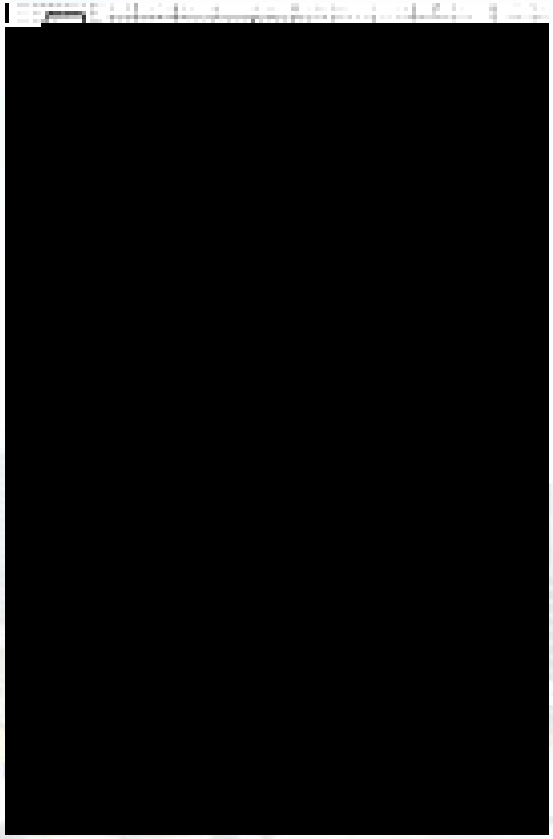


12 Lead EKG

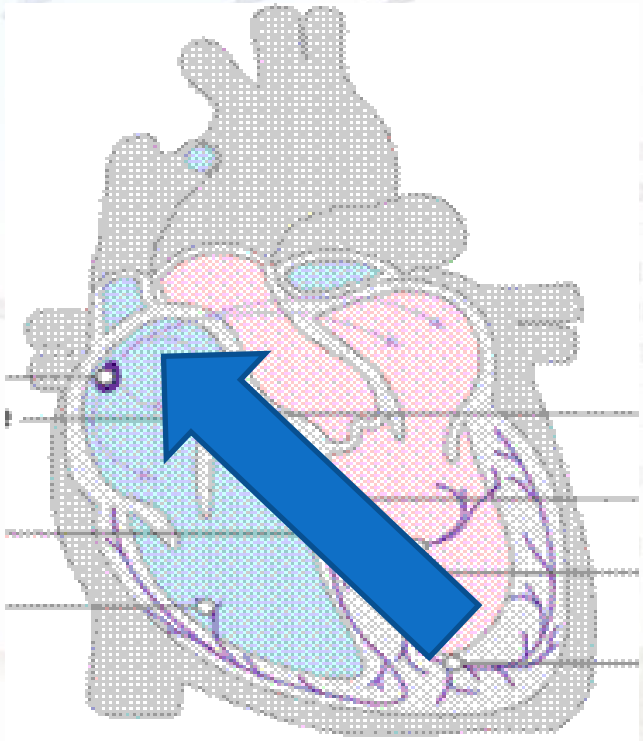


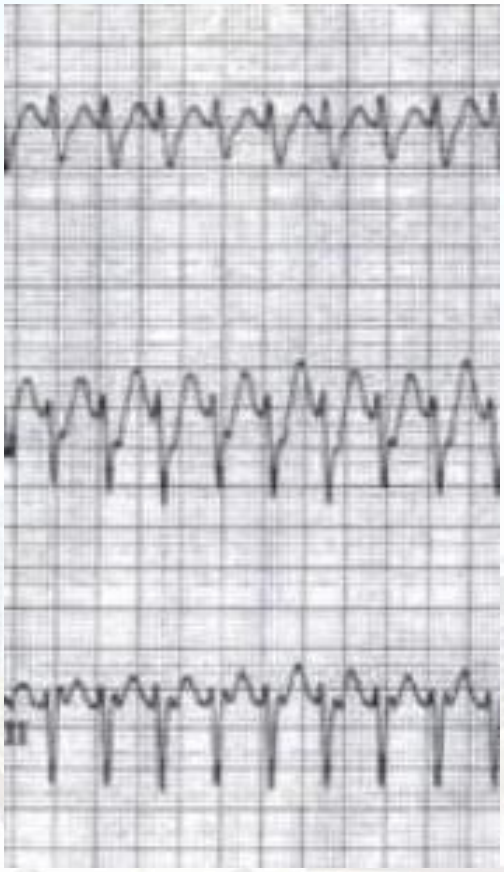
12 Lead EKG





12 Lead EKG

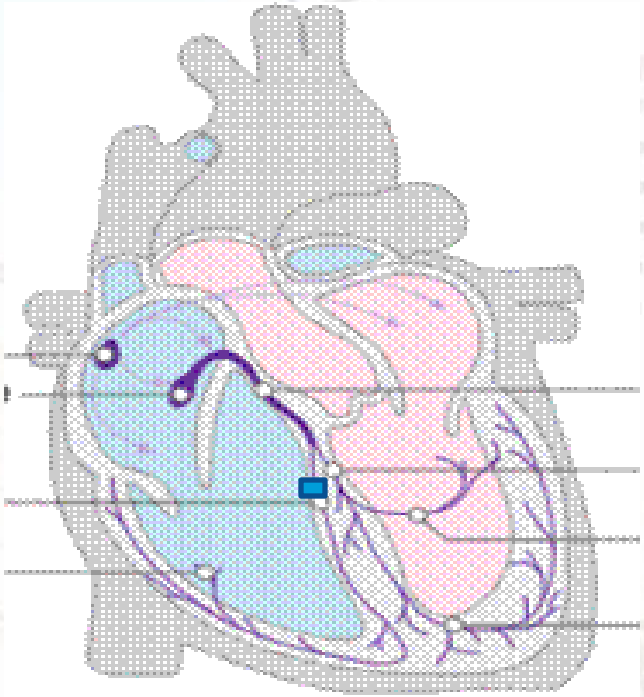


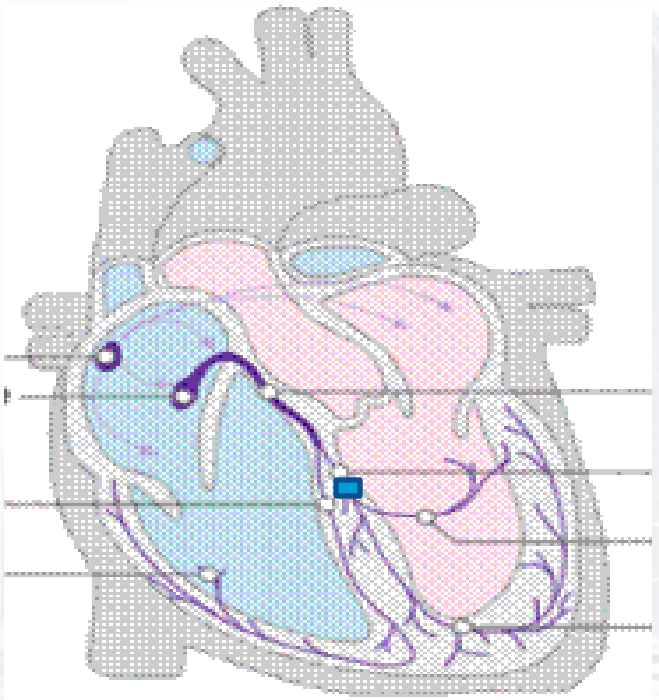


12 Lead EKG

- Bundle Branch Blocks
  - Eliminated synctium
    - With impulses for one side or the other blocked, the opposite side must send the impulse across the septum
      - This delay is what is seen in a QRS > 0.12
    - Result is ventricles do not contract together
      - If the QRS >0.17 then EF is 50% at the most….BE AWARE OF CARDIAC OUTPUT

12 Lead EKG





12 Lead EKG

- Bundle Branch Block identification
  - Identified using V1 or MCL1
  - QRS interval is greater than 0.12

12 Lead EKG

- Bifascicular blocks
  - Two fascicles are blocked
    - Both anterior/posterior hemifascicles
      - AKA - LBBB
    - Anterior *or* posterior *and* right BBB
  - These patients may go into complete heart block without warning
  - BP may drop precipitously

12 Lead EKG

- Severe blocks
  - Bifascicular block
  - 1st degree AVB + Hemiblock or BBB
  - 2nd degree AVB type II
  - Complete AVB
- Why it is important to recognize these?
  - When considering medications we need to be aware of these because some medications are contraindicated in these situations
    - i.e. – Lidocaine and Amiodarone are contraindicated in severe sinoatrial, atrioventricular, or intraventricular blocks

12 Lead EKG

- Why is it important to recognize these?
  - CO is compromised, especially in conjunction with AMI
    - Management of these patients must be fine tuned
    - Ensure adequate IV access
    - NTG drip maybe more appropriate due to having finer control than giving 400mcg SL
    - Be ready to pace and/or defibrillate these patients

12 Lead EKG

Few points to add per Dr. Marshall Frank:

- Always keep in mind that when interpreting an EKG to try to do so in a standardized manner. For example, I use Rate, Rhythm, Axis, Intervals, Enlargement/Low Voltage, Ischemia. If you analyze every EKG that you read for these parameters you will never miss anything. When you find an abnormality, it is vital to stop and consider the cause of the abnormality. It is not sufficient to say that the patient has a left axis, for example, and not consider why. The presence of axis deviation in the prehospital setting (for the most part) will not guide management too much but it is important to know the differential diagnoses of axis deviations.

12 Lead EKG

- Additionally, the easiest way to determine axis is to simply look at leads I and aVF. The methods that Matt shared are valid as well but I find simply looking at I and aVF the easiest. Take your thumbs and consider your left thumb as lead I and your right thumb as aVF. If both thumbs are up, the axis is normal. If the left thumb(lead I) is up and the right thumb (aVF) is down, there is left axis. If the left thumb (lead I) is down and the right thumb (aVF) is up, there is right axis. See image below.
-

12 Lead EKG

:

- _____
- Old Inferior MI
- Ventricular ectopy
- Paced rhythm
- LBBB
- WPW
- LVH
- left anterior fascicular block
- idiopathic

_____

- Acute pulmonary HTN (i.e., PE)
- Chronic lung disease (i.e., COPD)
- hyperkalemia
- sodium channel blocker toxicity
- WPW
- idiopathic

12 Lead EKG

- Finally, take caution in attempting to differentiate VT from SVT with aberrancy. There are at least three algorithms that I am aware of off the top of my head that attempt to differentiate VT from SVT with aberrancy and none of them have good sensitivity or specificity.