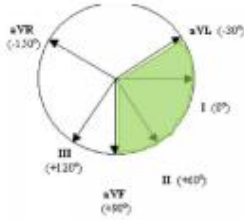


# GUIDE TO ECG READING

1. Know ECG Principle (Hardware, vector)
  - Depolarize to that vector (lead), produce positive signal.
2. Understand normal electrophysiology of the heart
  - Anatomy, conduction pathway, automaticity & subsidiary pacemaker cells
3. Read ECG systematically
  - Describe findings → know criteria (pattern recognition) → Clinical application

1. Standard Calibration: X = 25 mm/sec; Y = 10mm/mV
2. Rate: 300 – 150 – 100 – 75 – 50 Qr # beats on ECG x 6 (10 sec/strip)
3. Axis: "limb leads"
  - QRS upright in I, II = normal axis
  - Farther left than -30° (aVL) → LAD
  - Farther right than +90° (aVF) → RAD
4. Rhythm: is it NSR? Y/N → Deal w/ it later
5. P wave: Atrial depolarization
  - a. Sinus? (upright in I, aVF?)
  - b. Atrial enlargement?



LAE: 2 humps		RAE: tall peaked P's	
>120 msec in lead II	> 1 mm deep in V1	>2.5 mm tall in lead II	>1.5 mm tall in V1

## 6. PR interval: AV block?

1 <sup>st</sup> degree	Prolonged PR only (> 200 msec)		
2 <sup>nd</sup> degree "P w/o QRS"	Mobitz Type I (Wenkebach)	Increasing PR (student gets lazier over the semester)	
	Mobitz Type II	Dropped PR (unpredictable student: randomly doesn't hand in homework)	
3 <sup>rd</sup> degree Complete heart block	Total AV dissociation: atria and ventricles pacing themselves		

## 7. QRS complex: Ventricular depolarization

- a. Normal depolarization? Y/N (width < 110 ms, shape, height)
- b. > 110 msec → think BBB or ventricular complex

RBBB		LBBB	
RSR' in V1, V2	Wide S wave in I, V6	Wide slurred R in I, aVL, V5-V6	
May see ST depression or TWI in R precordial leads		ST and T displaced opposite major QRS deflection → makes ST changes uninterpretable	

## c. Ventricular hypertrophy:

LVH: (usually see with LAE, LAD)		RVH	
Sokolow-Lyon: S (V1) + R (V5 or V6) ≥ 35		Cornell: R (aVL) + S (V3) > 28 (M) or > 20 (F)	R > S (V1) or R (V1) ≥ 6 mm or S (V5, V6) ≥ 6 mm

8. ST segment: elevated or depressed? → if yes → MI or other problem!
9. T wave: generally – should be same direction as QRS. If weird → think K+ problem!
10. QT: should be < 1/2 of R-R interval

## Then other stuffs: (which also important!)

- a. Arrhythmia: if not sinus
    - i. Tachy or bradycardia
    - ii. Narrow/wide complex?
    - iii. Regular or irregular?
  - b. Clinical Disorder:
    - i. Ischemia/ infarction (Q waves, ST elevation/depression, TWI)
    - ii. pattern recognition
    - iii. see ABIM ECG coding sheet
- d. Then practice, practice, and practice**

