SIMULASI

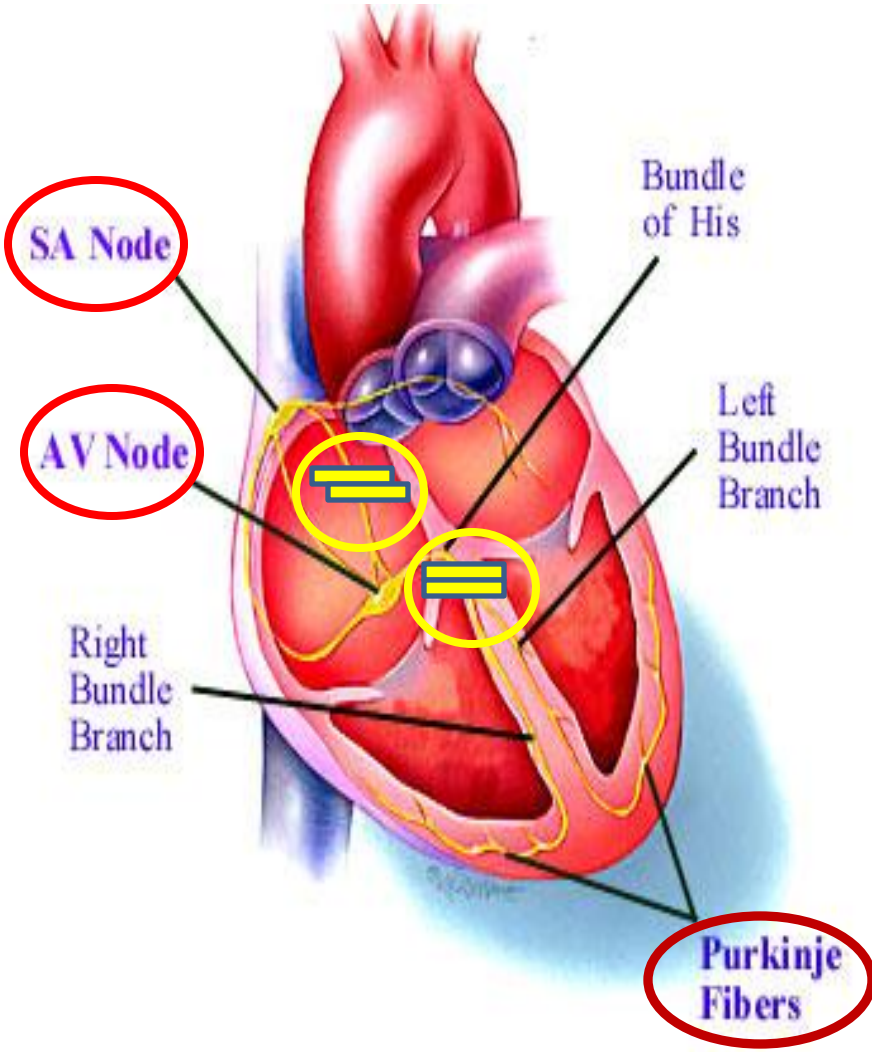
BASIC ECG INTERPRETATION 1 LEAD

TAHAP II

ARHYTMIA

1. Gangguan pembentukan impuls

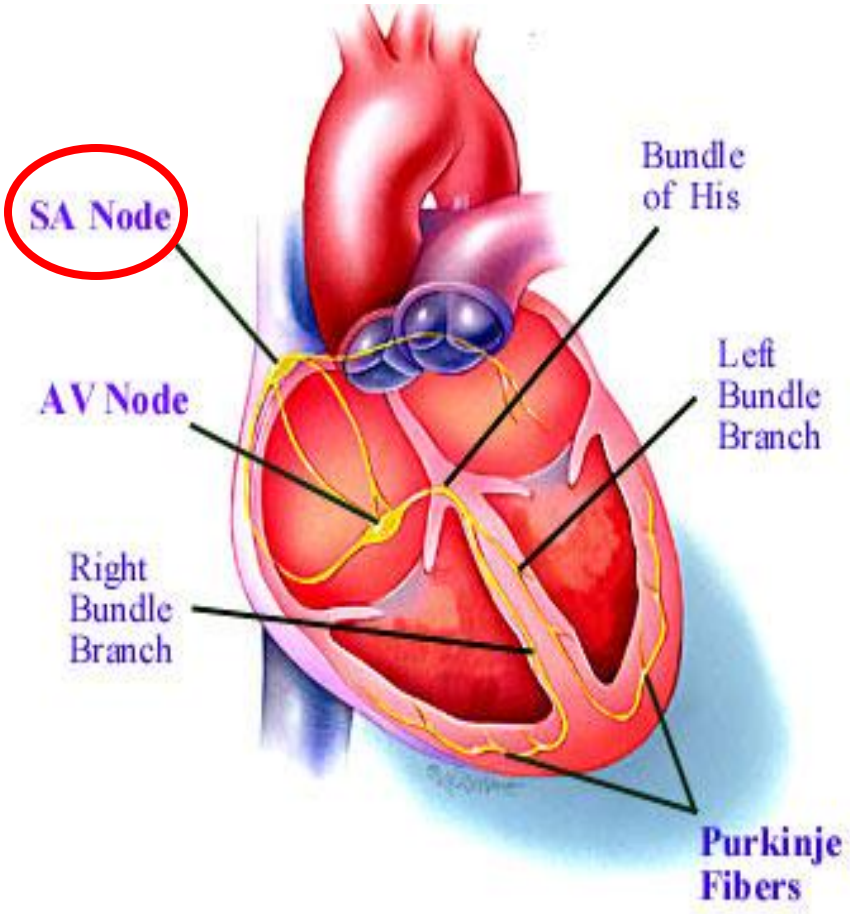
2. Gangguan penghantaran impuls



JENIS – JENIS ARITMIA
GANGGUAN PEMBENTUKAN IMPULS

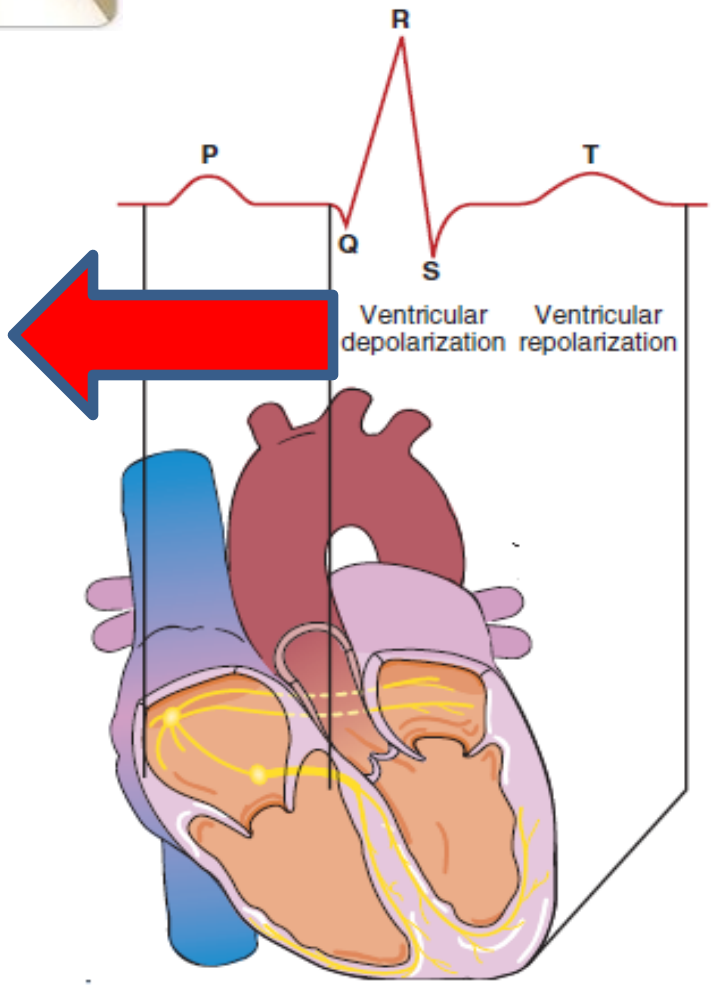
SA NODE RHYTHM

- SINUS BRADIKARDI
- SINUS TAKIKARDI
- SINUS ARITMIA
- SINUS ARREST



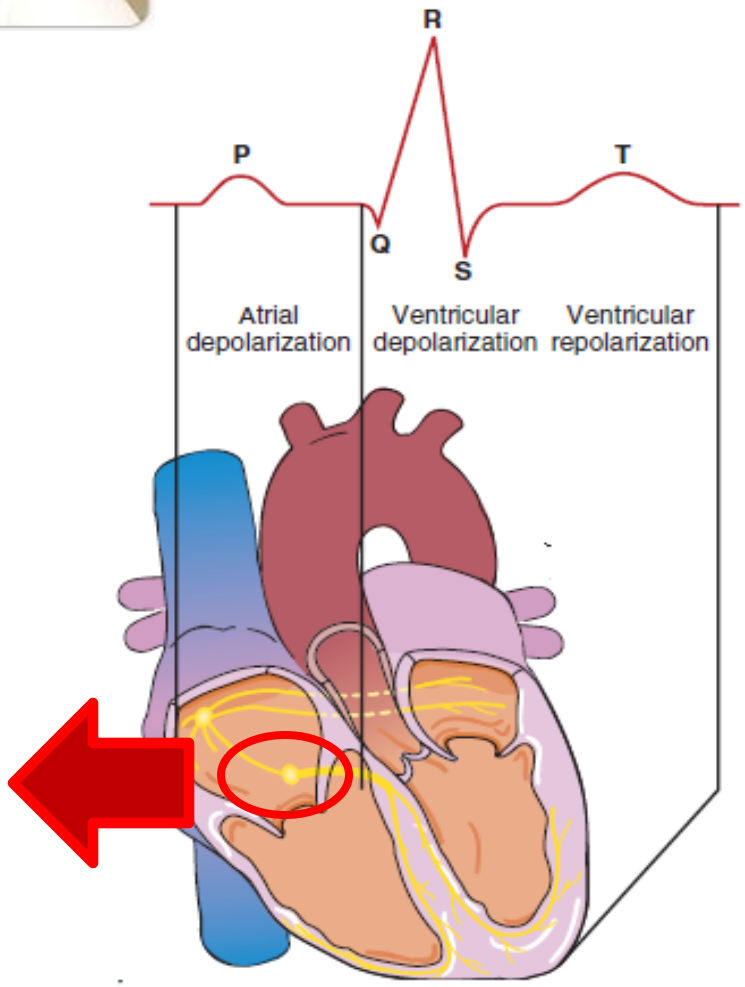
ATRIAL RHYTHM

- WANDERING ATRIAL PACEMAKER (WAP)
- PREMATUR ATRIAL CONTRACTION (PAC)
- ATRIAL TACHYCARDIA
- SUPRAVENTRICULAR TACHYCARDI (SVT)
- ATRIAL FLUTTER
- ATRIAL FIBRILASI (AF)



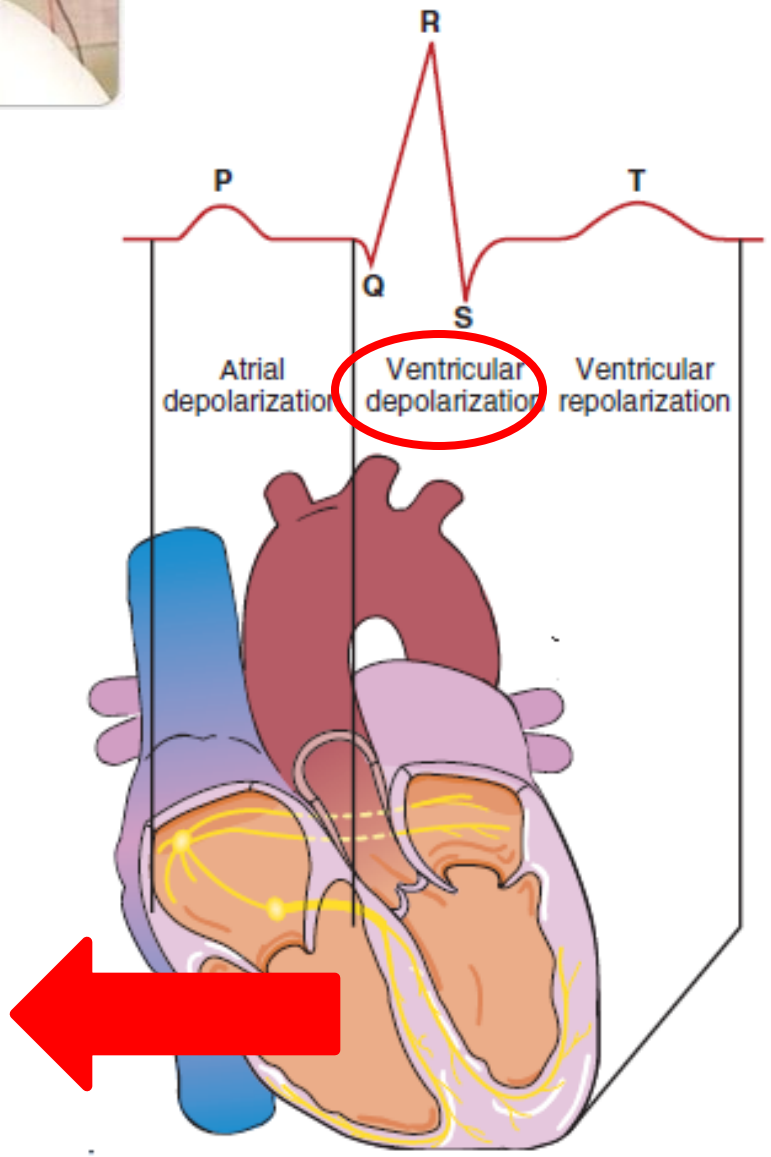
AV NODE RHYTHM

- JUNCTIONAL RHYTHM
- JUNCTIONAL TACHYCARDI
- ACCELERATED JUNCTIONAL RHYTHM
- PREMATUR JUNCTIONAL TACHYCARDI
- JUNCTIONAL ESCAPE BEAT



VENTRICULAR ARRHYTHMIA

- IDIOVENTRICULAR RHYTHM
- ACCELERATED IDIOVENTRICULAR RHYTHM
- PREMATURE VENTRICULAR CONTRACTION (PVC)
- PVC BIGEMINY
- PVC TRIGEMINY
- VENTRICULAR TACHYCARDI
- VENTRICULAR FIBRILASI



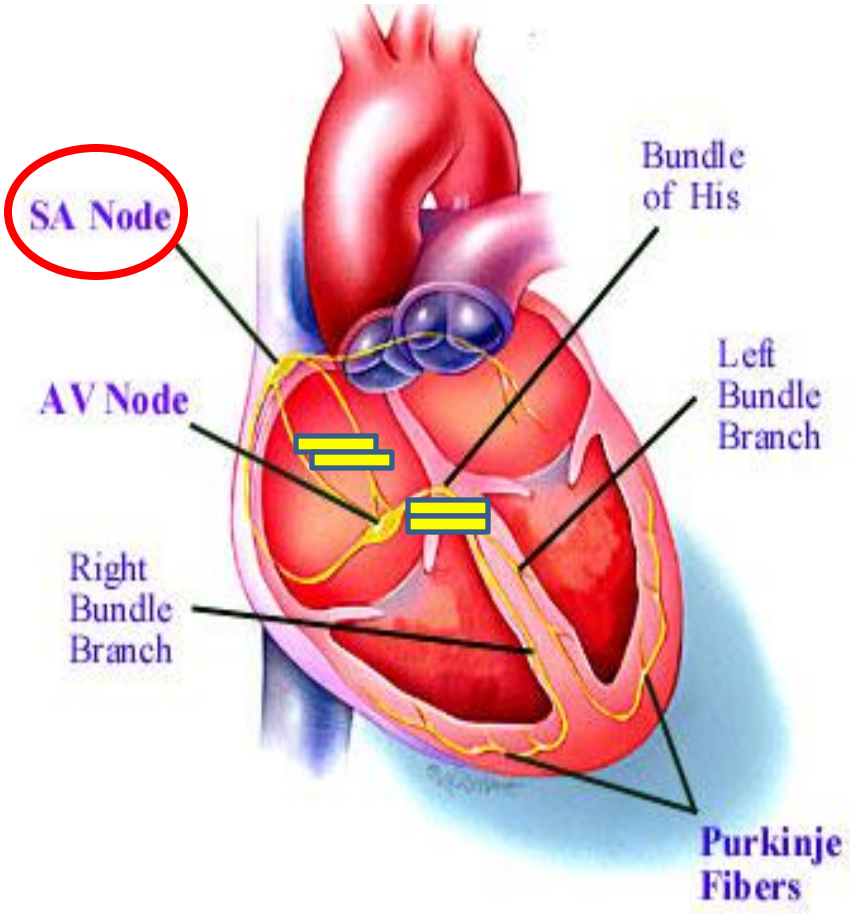
JENIS – JENIS ARITMIA
GANGGUAN HANTARAN IMPULS

SA BLOCK

AV BLOCK DERJAT 1

AV BLOCK DERJAT 2

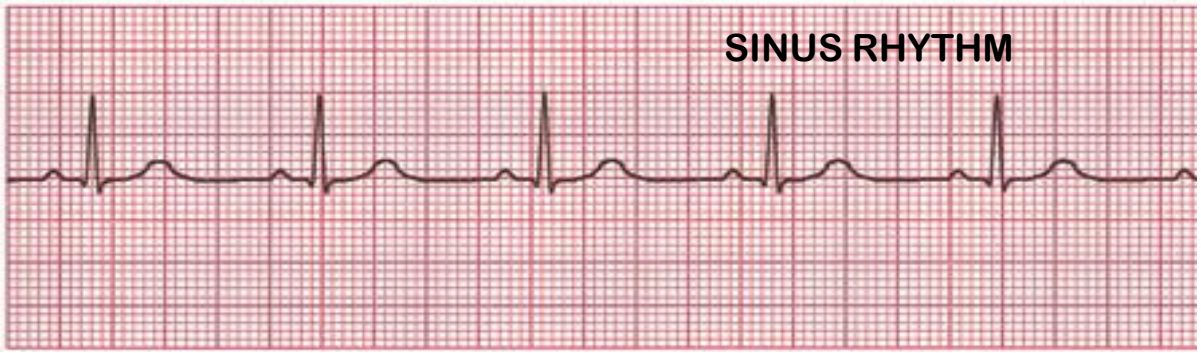
AV BLOCK DERJAT 3



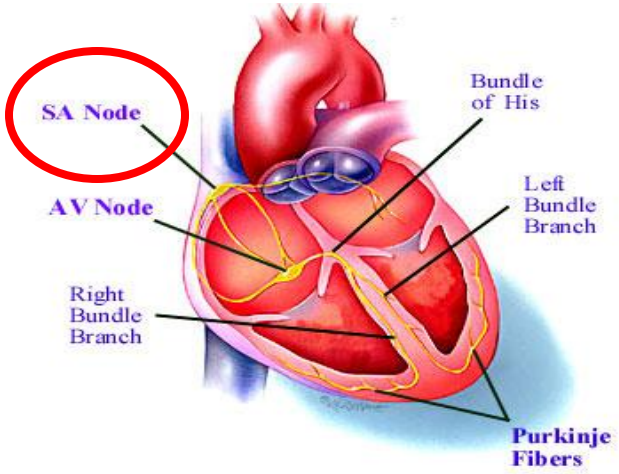
ECG STRIPS

Normal Sinus Rhythm (NSR)

Rate: Normal (60–100 bpm)
Rhythm: Regular
P Waves: Normal (upright and uniform)
PR Interval: Normal (0.12–0.20 sec)
QRS: Normal (0.06–0.10 sec)



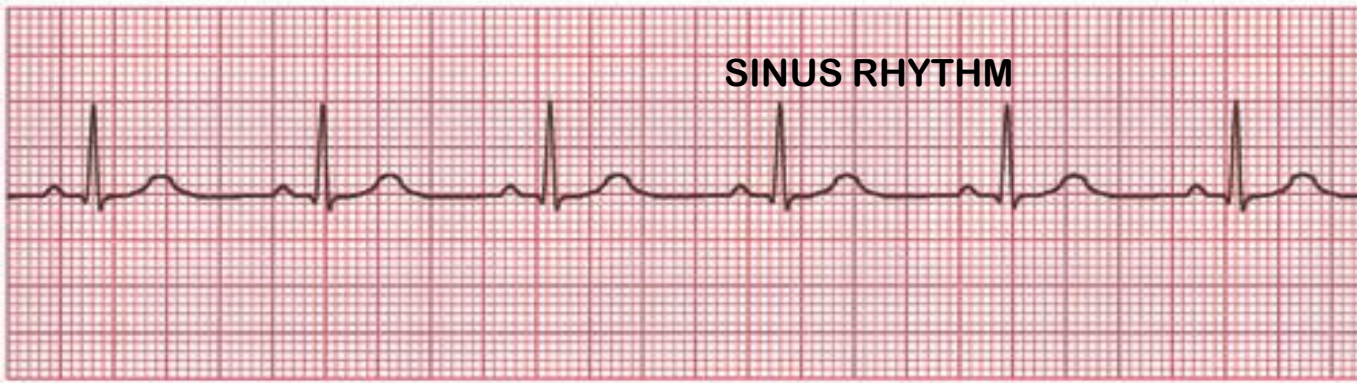
SINUS RHYTHM

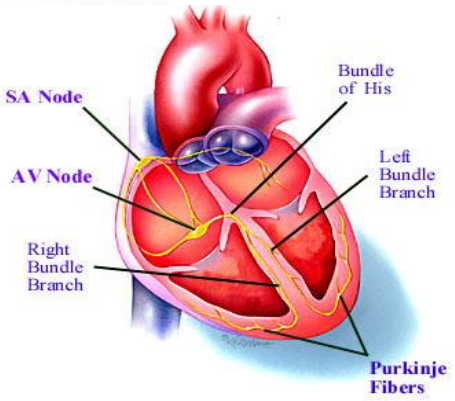


Sinus Bradycardia

- Results from slowing of the SA node.

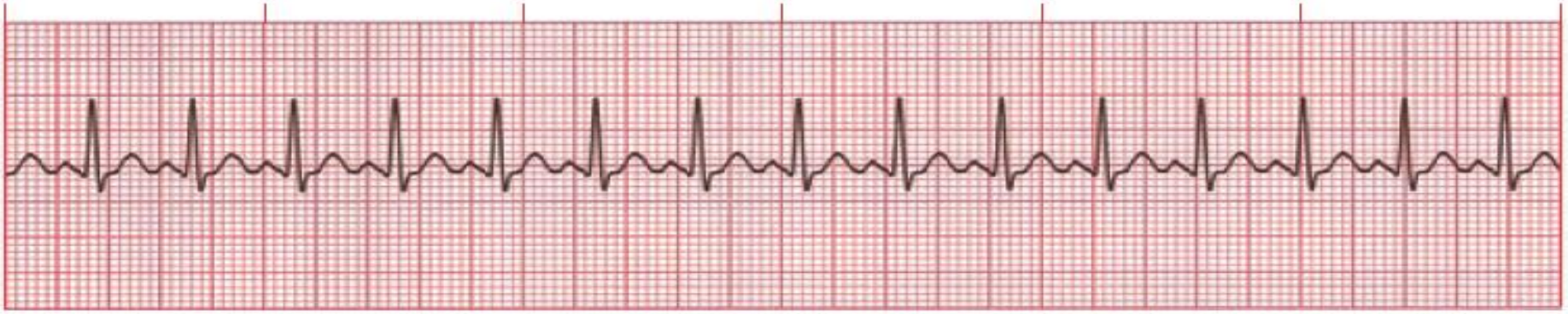
Rate: Slow (<60 bpm)
Rhythm: Regular
P Waves: Normal (upright and uniform)
PR Interval: Normal (0.12–0.20 sec)
QRS: Normal (0.06–0.10 sec)





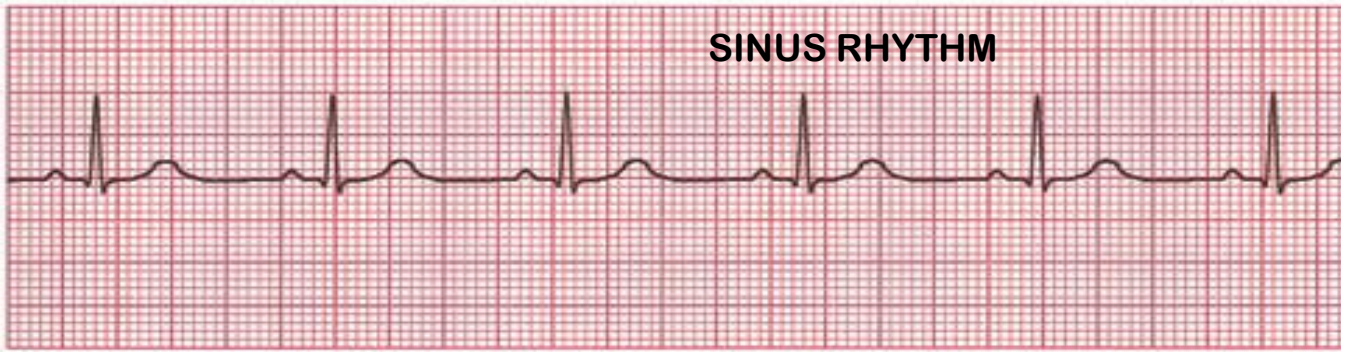
Sinus Tachycardia

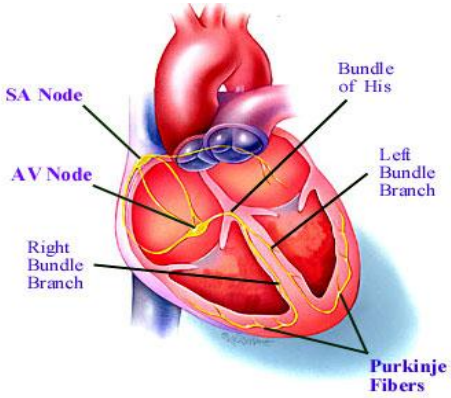
- Results from increased SA node discharge.



Rate: Fast (>100 bpm)
Rhythm: Regular
P Waves: Normal (upright and uniform)
PR Interval: Normal (0.12–0.20 sec)
QRS: Normal (0.06–0.10 sec)

SINUS RHYTHM



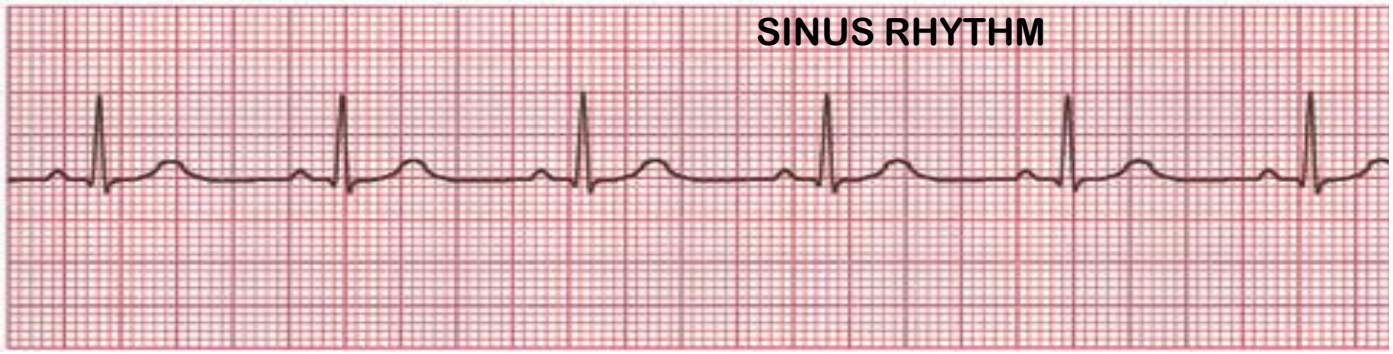


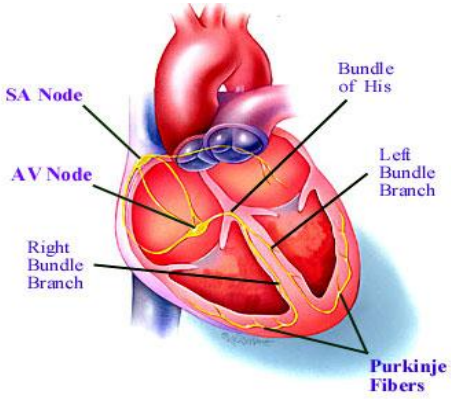
Sinus Pause (Sinus Arrest)

- The SA node fails to discharge and then resumes.
- Electrical activity resumes either when the SA node resets itself or when a lower latent pacemaker begins to discharge.
- The pause (arrest) time interval is not a multiple of the normal P-P interval.

Rate: Normal to slow; determined by duration and frequency of sinus pause (arrest)
Rhythm: Irregular whenever a pause (arrest) occurs
P Waves: Normal (upright and uniform) except in areas of pause (arrest)
PR Interval: Normal (0.12–0.20 sec)
QRS: Normal (0.06–0.10 sec)

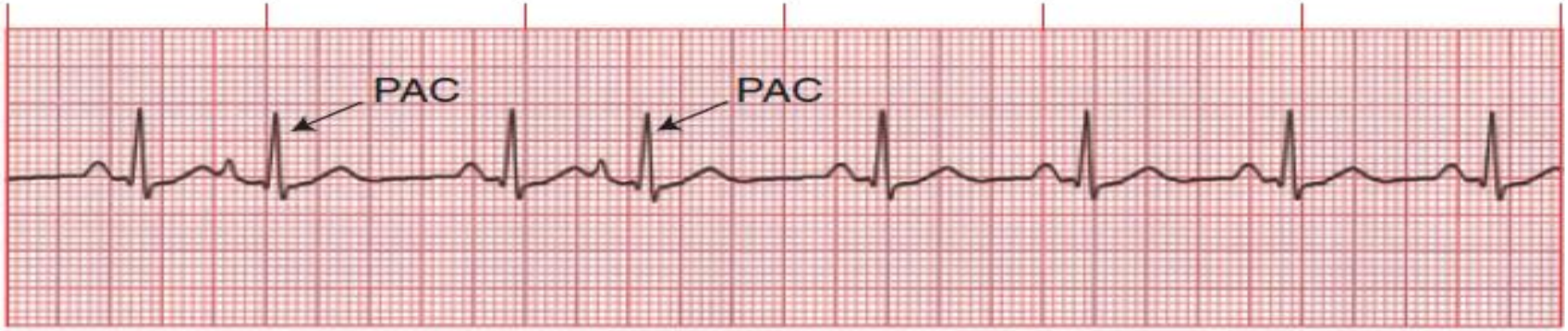
SINUS RHYTHM





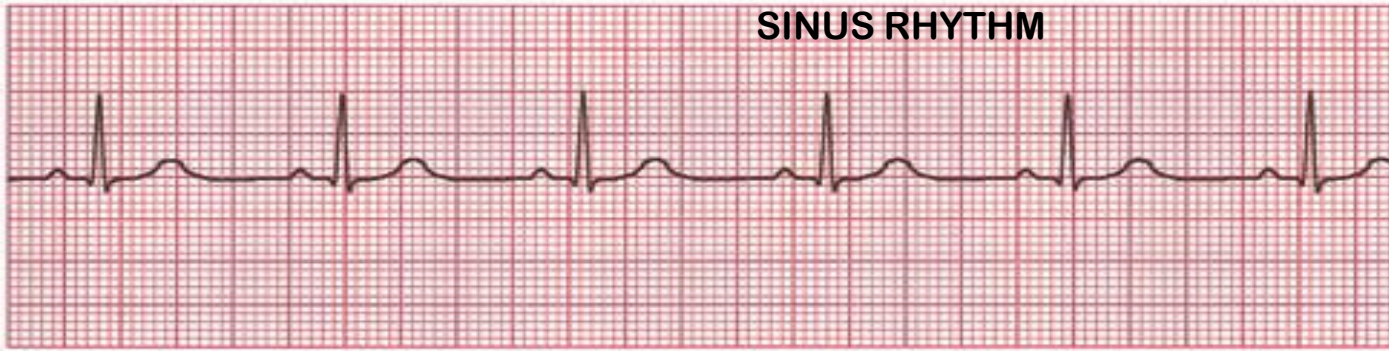
Premature Atrial Contraction (PAC)

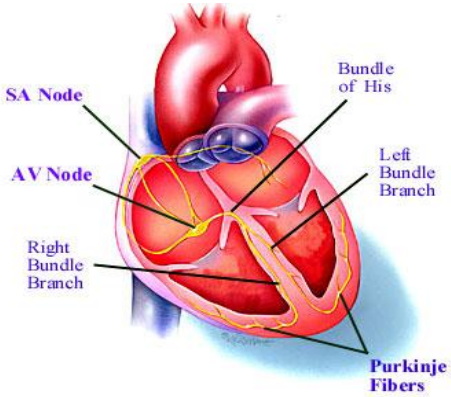
- A single complex occurs earlier than the next expected sinus complex.
- After the PAC, sinus rhythm usually resumes.



Rate: Depends on rate of underlying rhythm
Rhythm: Irregular whenever a PAC occurs
P Waves: Present; in the PAC, may have a different shape
PR Interval: Varies in the PAC; otherwise normal (0.12–0.20 sec)
QRS: Normal (0.06–0.10 sec)

SINUS RHYTHM



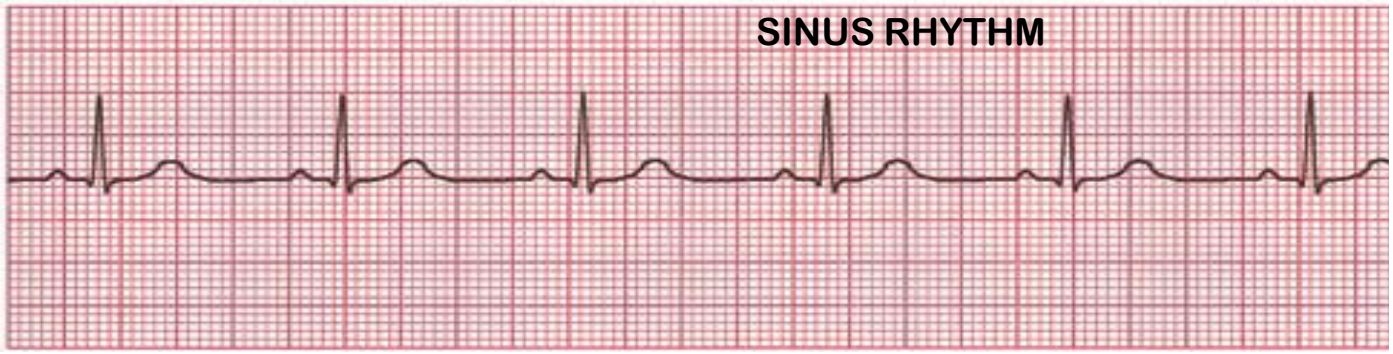


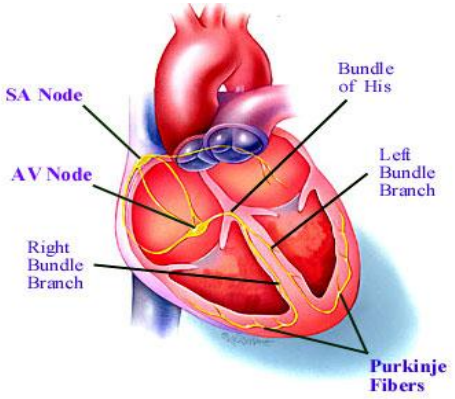
Atrial Tachycardia

- A rapid atrial rate overrides the SA node and becomes the dominant pacemaker.
- Some ST wave and T wave abnormalities may be present.

Rate: 150–250 bpm
Rhythm: Regular
P Waves: Normal (upright and uniform) but differ in shape from sinus P waves
PR Interval: May be short (<0.12 sec) in rapid rates
QRS: Normal (0.06–0.10 sec) but can be aberrant at times

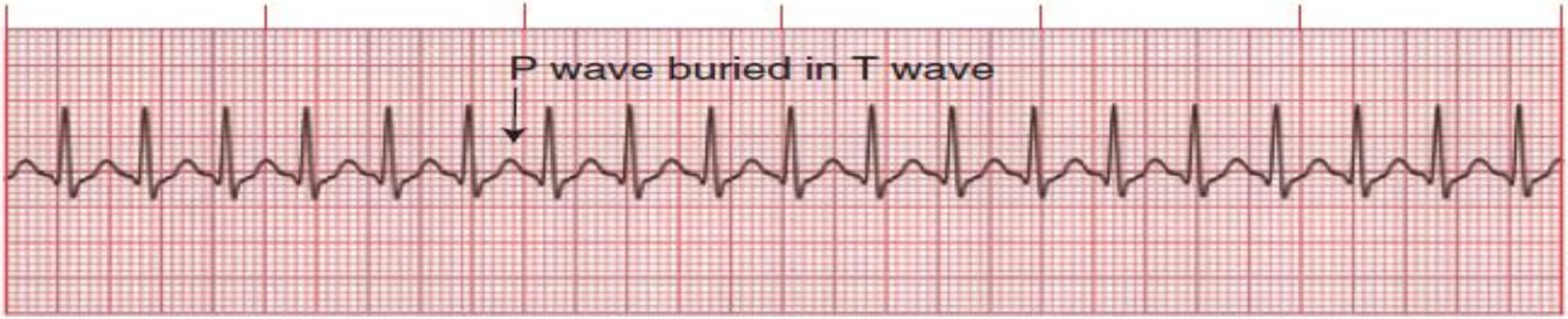
SINUS RHYTHM





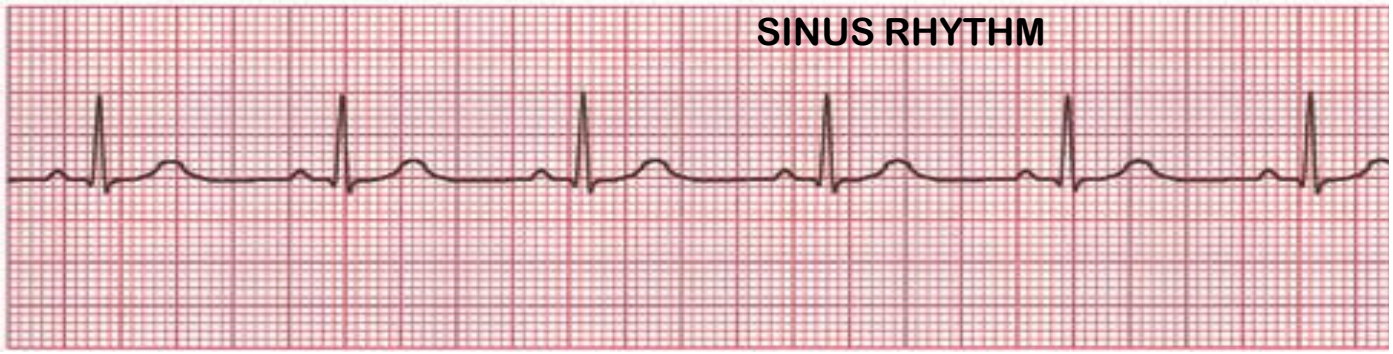
Supraventricular Tachycardia (SVT)

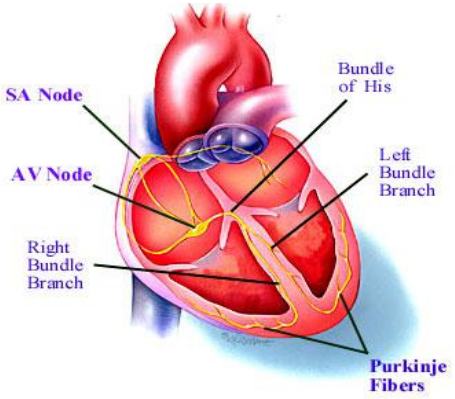
- This arrhythmia has such a fast rate that the P waves may not be seen.



Rate: 150–250 bpm
Rhythm: Regular
P Waves: Frequently buried in preceding T waves and difficult to see
PR Interval: Usually not possible to measure
QRS: Normal (0.06–0.10 sec) but may be wide if abnormally conducted through ventricles

SINUS RHYTHM



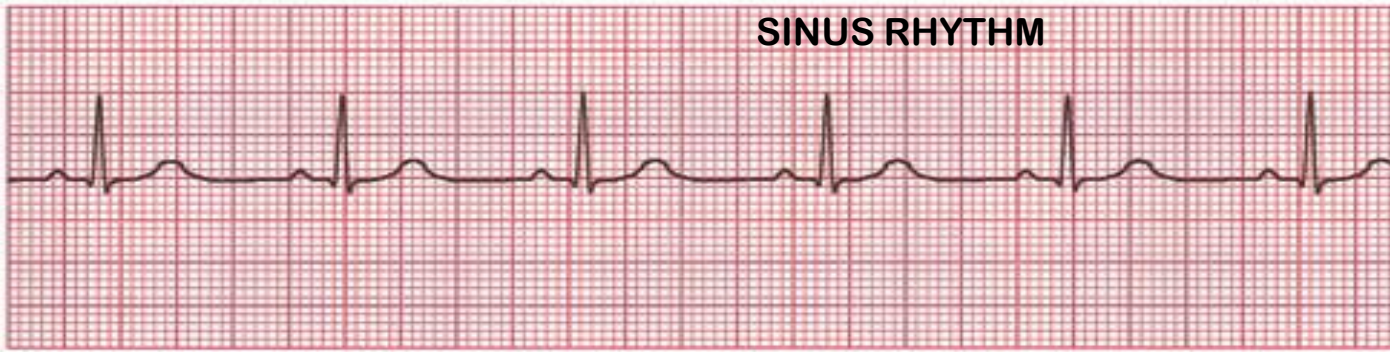


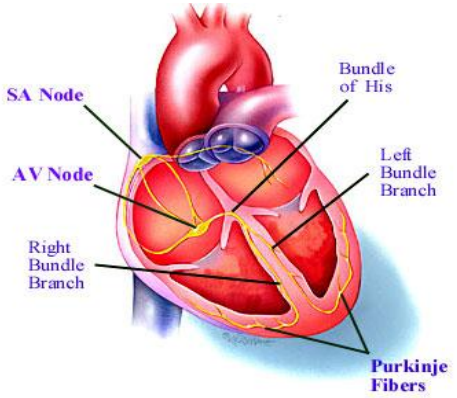
Atrial Flutter (A-flutter)

- AV node conducts impulses to the ventricles at a 2:1, 3:1, 4:1, or greater ratio (rarely 1:1).
- Degree of AV block may be consistent or variable.

Rate: Atrial: 250–350 bpm; ventricular: slow or fast
Rhythm: Usually regular but may be variable
P Waves: Flutter waves have a saw-toothed appearance
PR Interval: Variable
QRS: Usually normal (0.06–0.10 sec), but may appear widened if flutter waves are buried in QRS

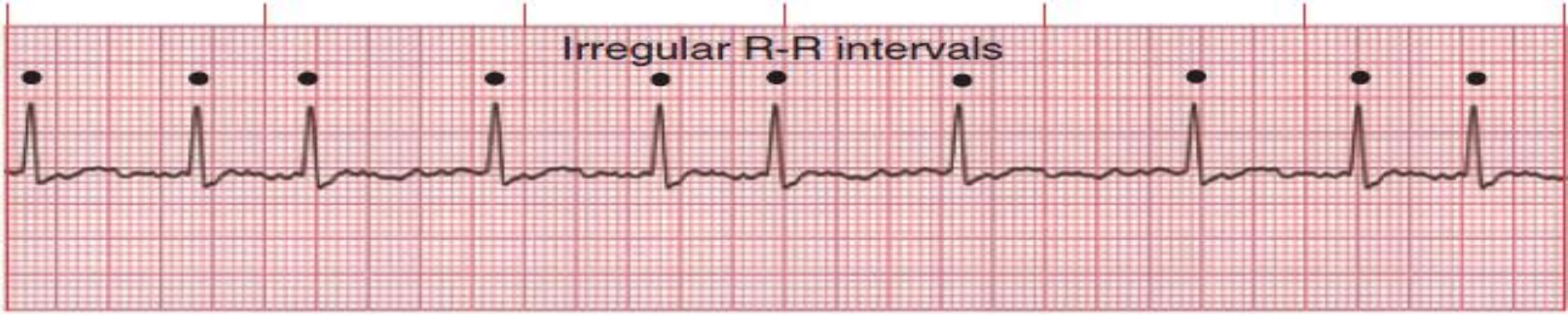
SINUS RHYTHM



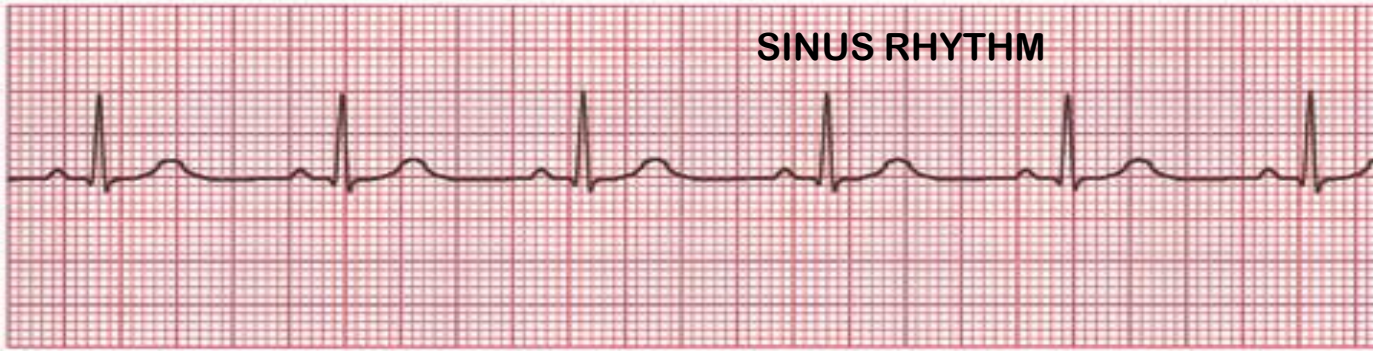


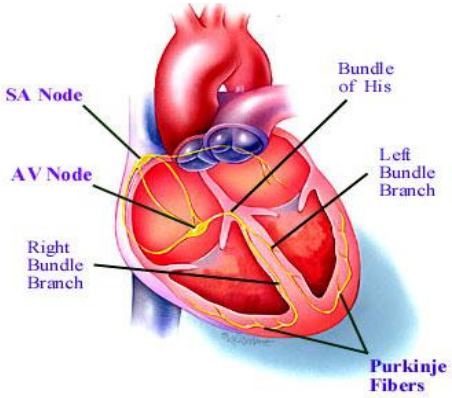
Atrial Fibrillation (A-fib)

- Rapid, erratic electrical discharge comes from multiple atrial ectopic foci.
- No organized atrial contractions are detectable.



Rate: Atrial: 350 bpm or greater; ventricular: slow or fast
Rhythm: Irregular
P Waves: No true P waves; chaotic atrial activity
PR Interval: None
QRS: Normal (0.06–0.10 sec)



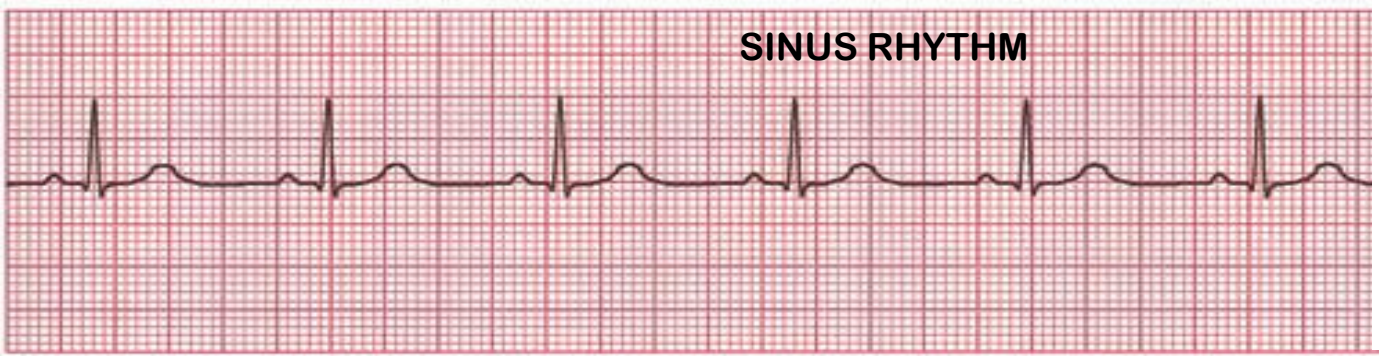


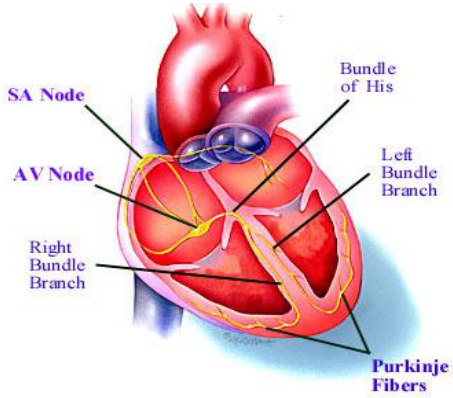
Wolff-Parkinson-White (WPW) Syndrome

- In WPW an accessory conduction pathway is present between the atria and the ventricles. Electrical impulses are rapidly conducted to the ventricles.
- These rapid impulses create a slurring of the initial portion of the QRS called the delta wave.

Rate: Depends on rate of underlying rhythm
Rhythm: Regular unless associated with A-fib
P Waves: Normal (upright and uniform) unless A-fib is present
PR Interval: Short (<0.12 sec) if P wave is present
QRS: Wide (>0.10 sec); delta wave present

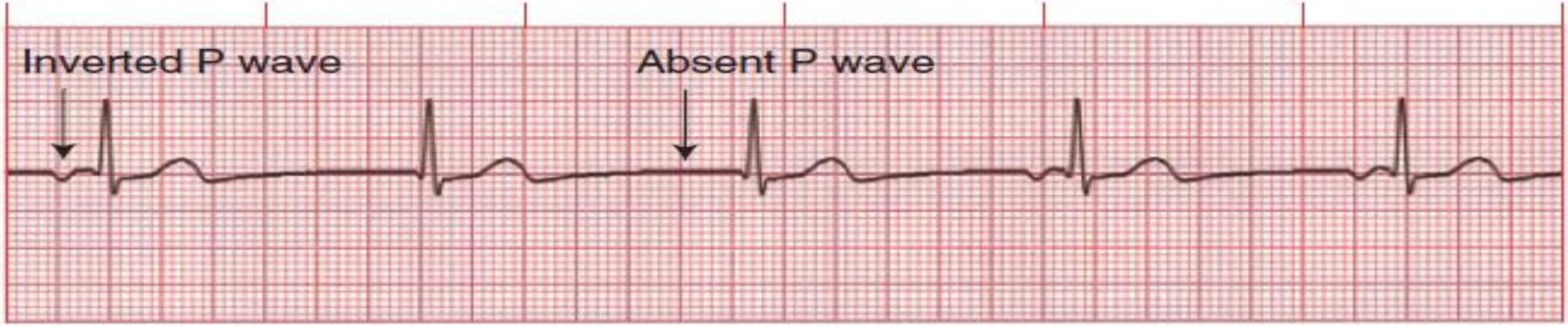
SINUS RHYTHM





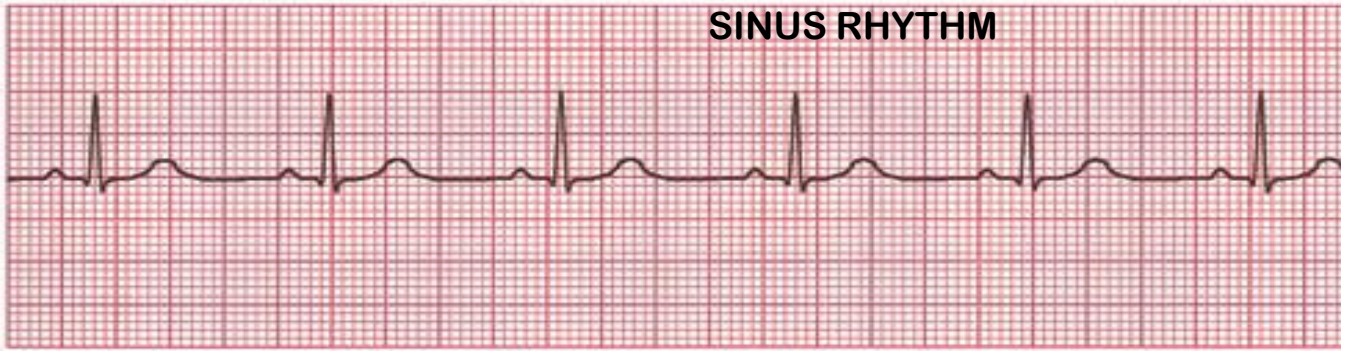
- The atria and SA node do not perform their normal pacemaking functions.
- A junctional escape rhythm begins.

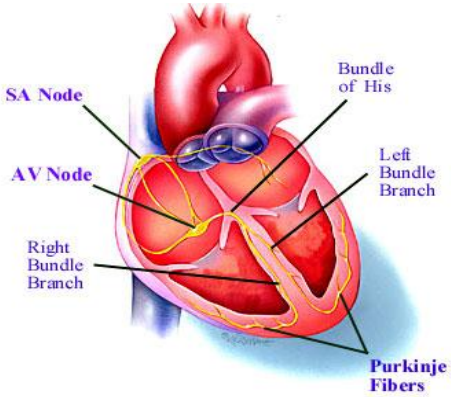
Junctional Rhythm



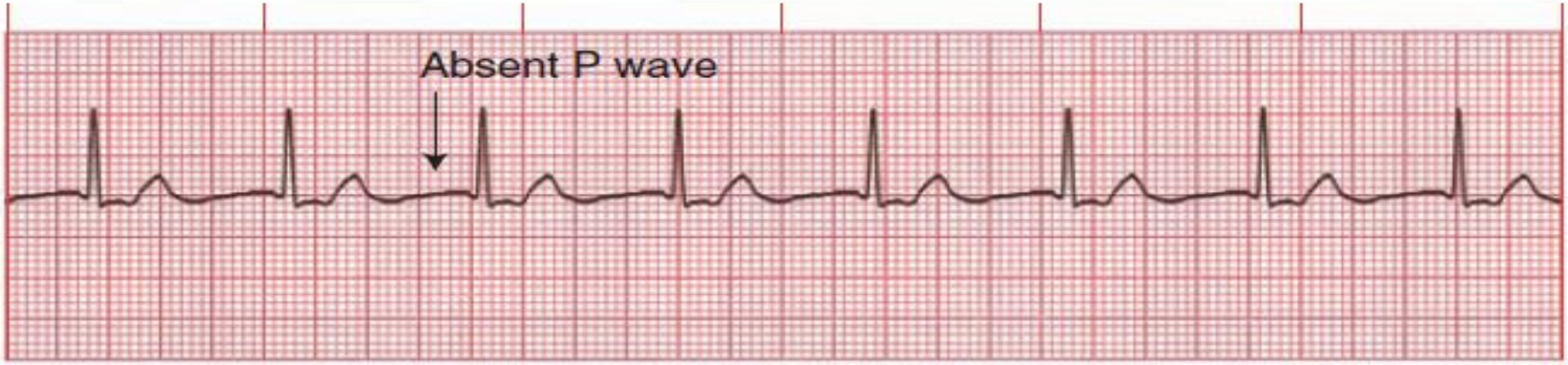
Rate: 40–60 bpm
Rhythm: Regular
P Waves: Absent, inverted, buried, or retrograde
PR Interval: None, short, or retrograde
QRS: Normal (0.06–0.10 sec)

SINUS RHYTHM



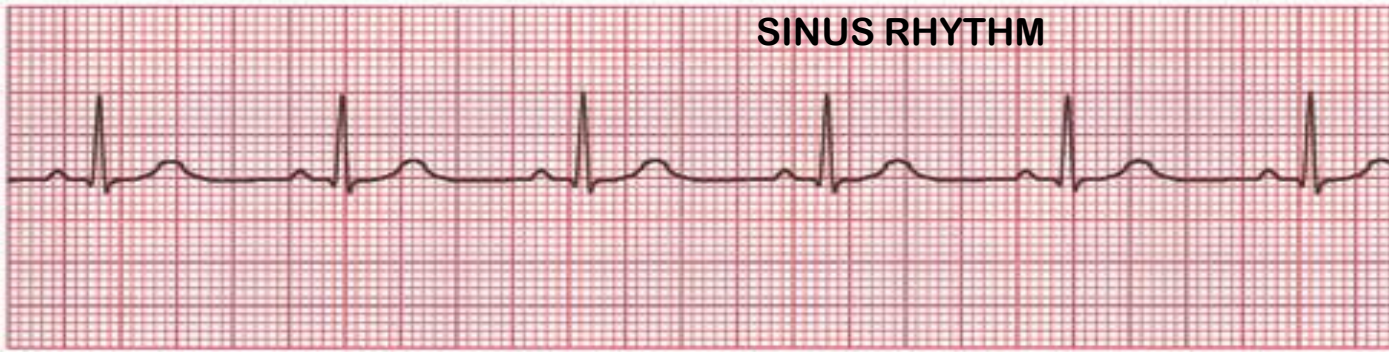


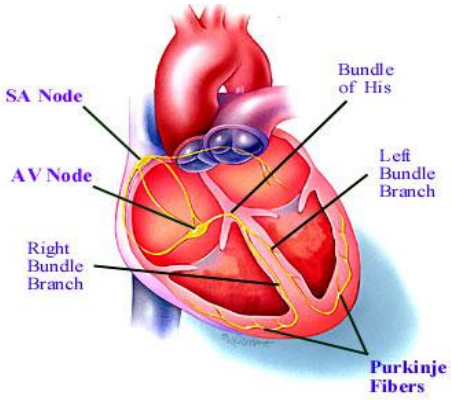
Accelerated Junctional Rhythm



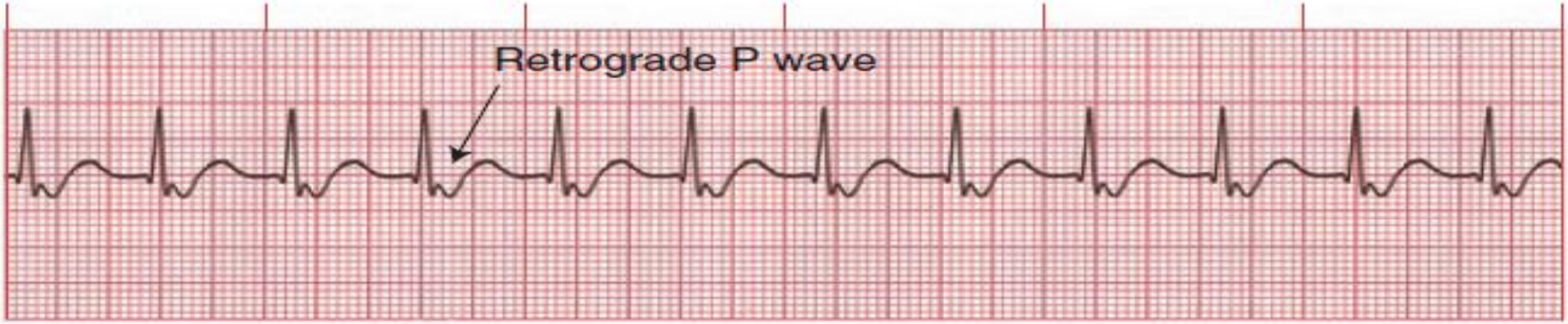
Rate: 61–100 bpm
Rhythm: Regular
P Waves: Absent, inverted, buried, or retrograde
PR Interval: None, short, or retrograde
QRS: Normal (0.06–0.10 sec)

SINUS RHYTHM



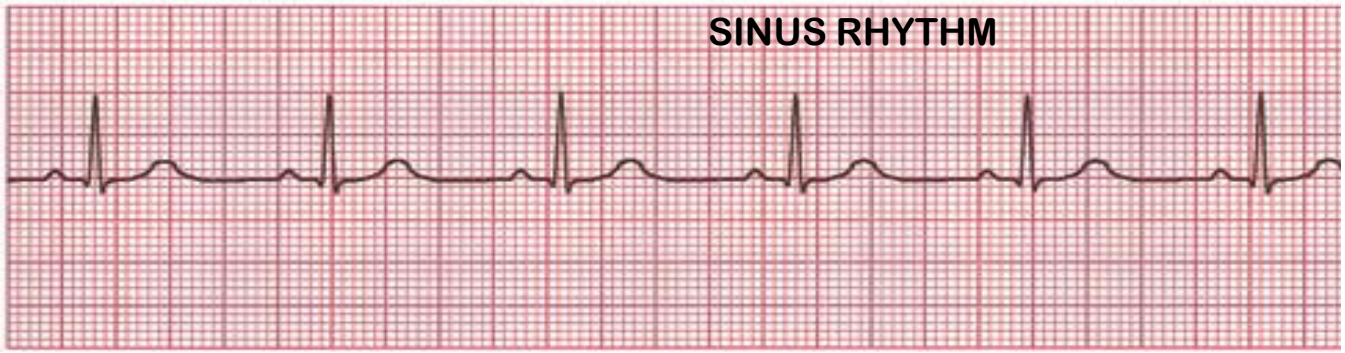


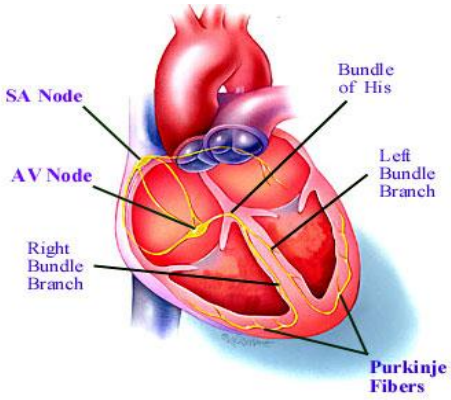
Junctional Tachycardia



Rate: 101–180 bpm
Rhythm: Regular
P Waves: Absent, inverted, buried, or retrograde
PR Interval: None, short, or retrograde
QRS: Normal (0.06–0.10 sec)

SINUS RHYTHM



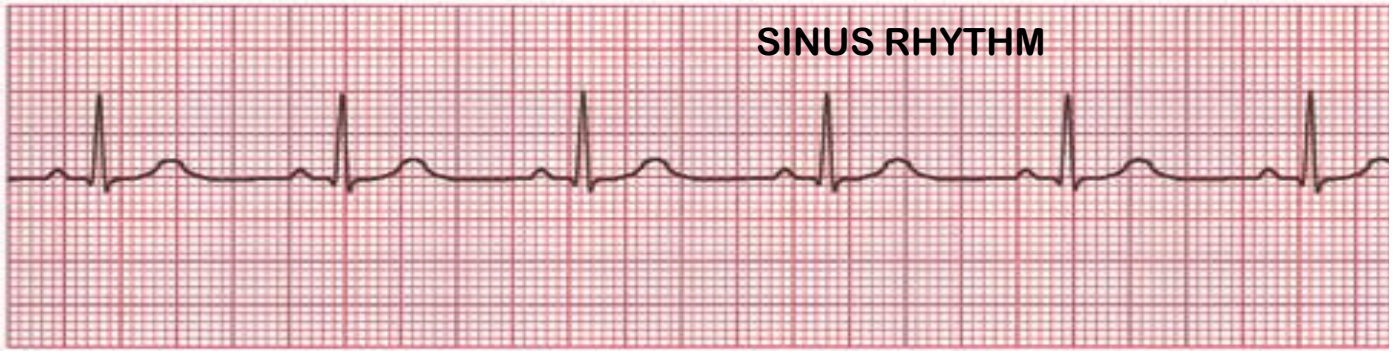


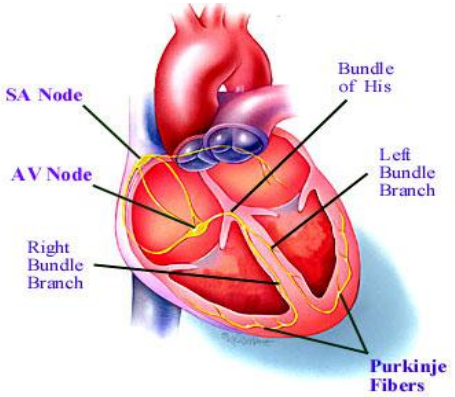
Premature Junctional Contraction (PJC)

- Enhanced automaticity in the AV junction produces PJCs.

Rate: Depends on rate of underlying rhythm
Rhythm: Irregular whenever a PJC occurs
P Waves: Absent, inverted, buried, or retrograde in the PJC
PR Interval: None, short, or retrograde
QRS: Normal (0.06–0.10 sec)

SINUS RHYTHM

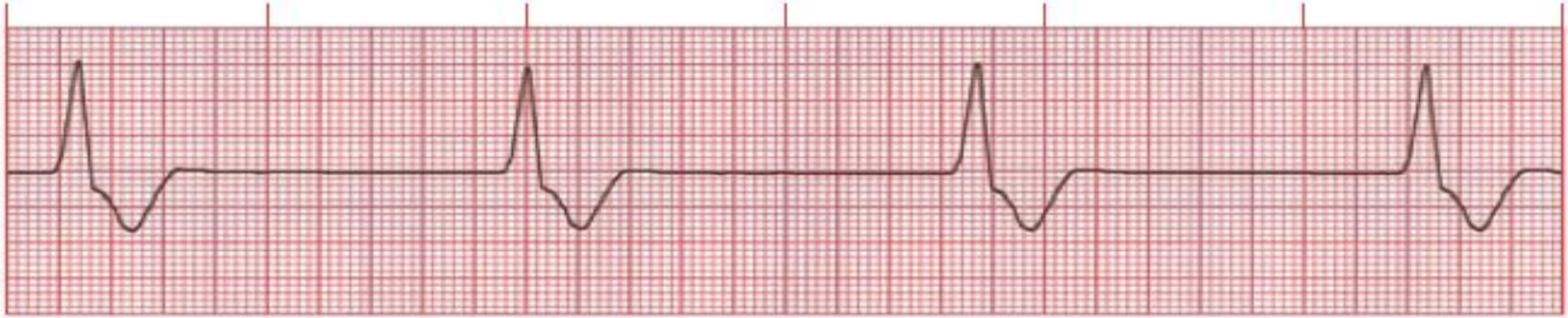




Ventricular Arrhythmias

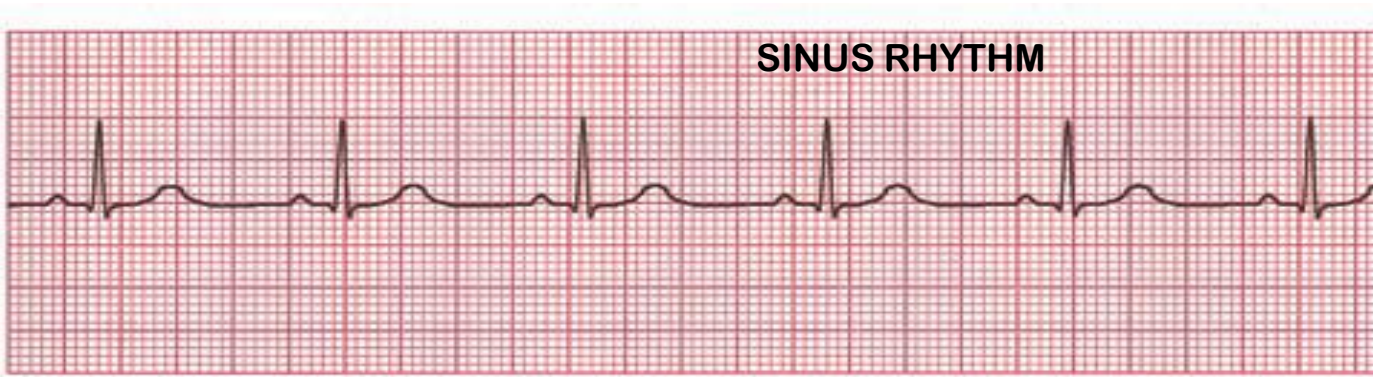
- QRS complex is >0.10 sec. P Waves are absent or, if visible, have no consistent relationship to the QRS complex.

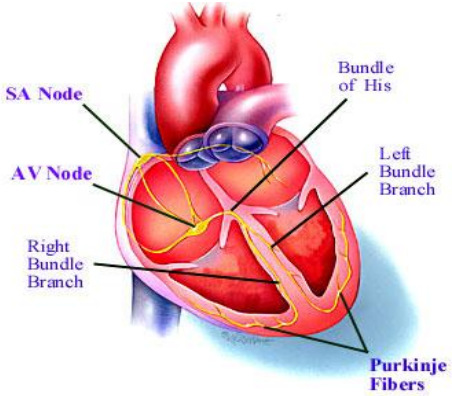
Idioventricular Rhythm



Rate: 20–40 bpm
Rhythm: Regular
P Waves: None
PR Interval: None
QRS: Wide (>0.10 sec), bizarre appearance

SINUS RHYTHM

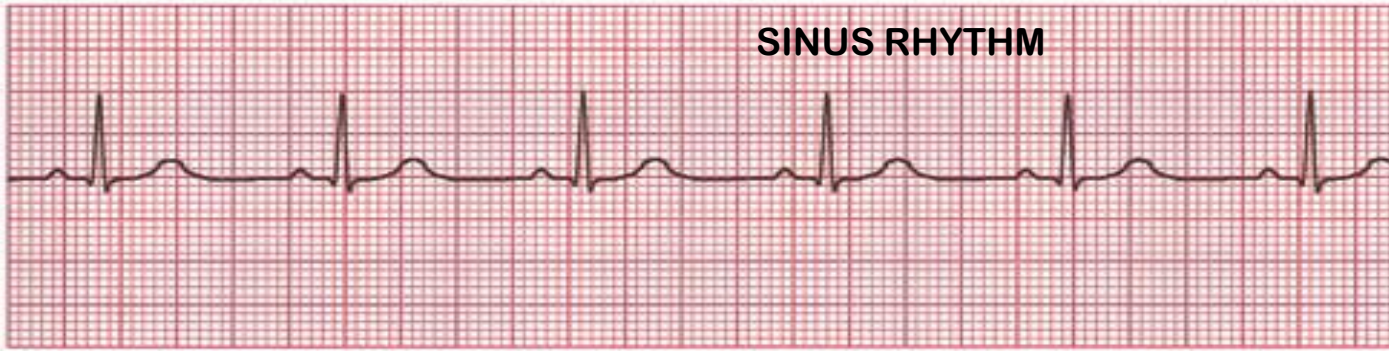


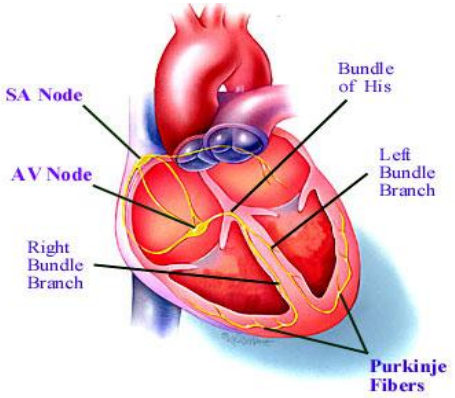


Accelerated Idioventricular Rhythm

Rate: 41–100 bpm
Rhythm: Regular
P Waves: None
PR Interval: None
QRS: Wide (>0.10 sec), bizarre appearance

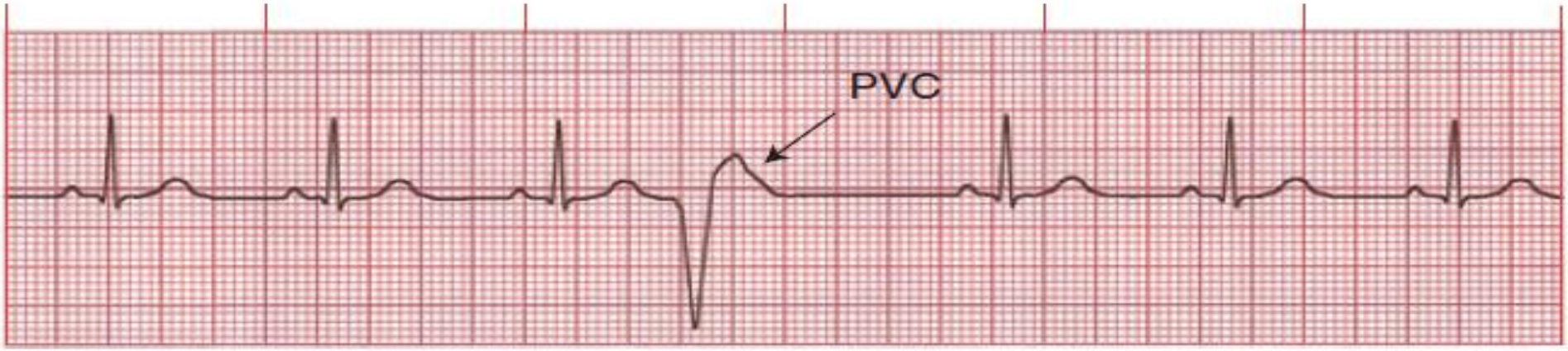
SINUS RHYTHM





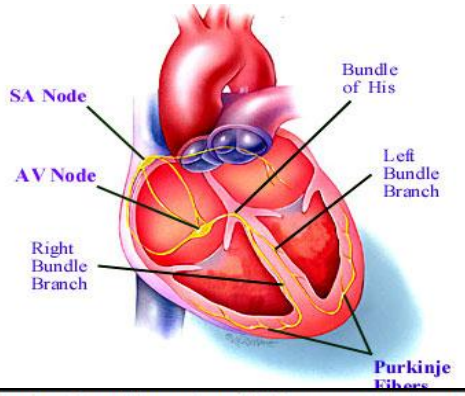
Premature Ventricular Contraction (PVC)

- Usually PVCs result from an irritable ventricular focus.
- PVCs may be uniform (same form) or multiform (different forms).
- The pause following a PVC may be compensatory or noncompensatory.



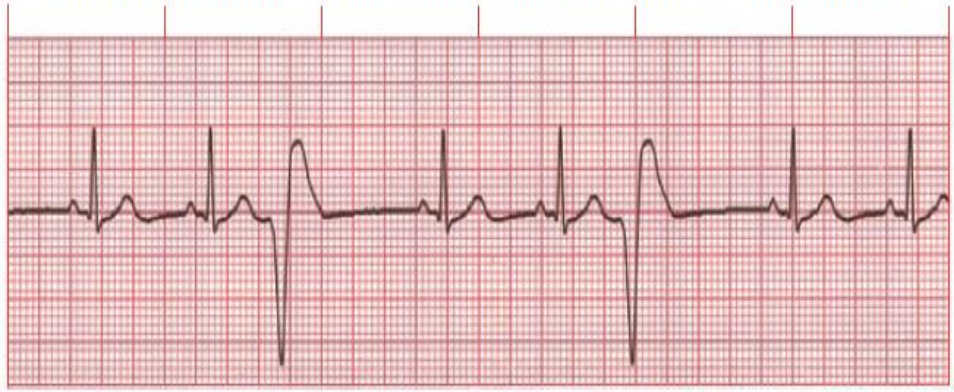
Rate: Depends on rate of underlying rhythm
Rhythm: Irregular whenever a PVC occurs
P Waves: None associated with the PVC
PR Interval: None associated with the PVC
QRS: Wide (>0.10 sec), bizarre appearance

PVC’S



Premature Ventricular Contraction: Ventricular Bigeminy (PVC every other beat)

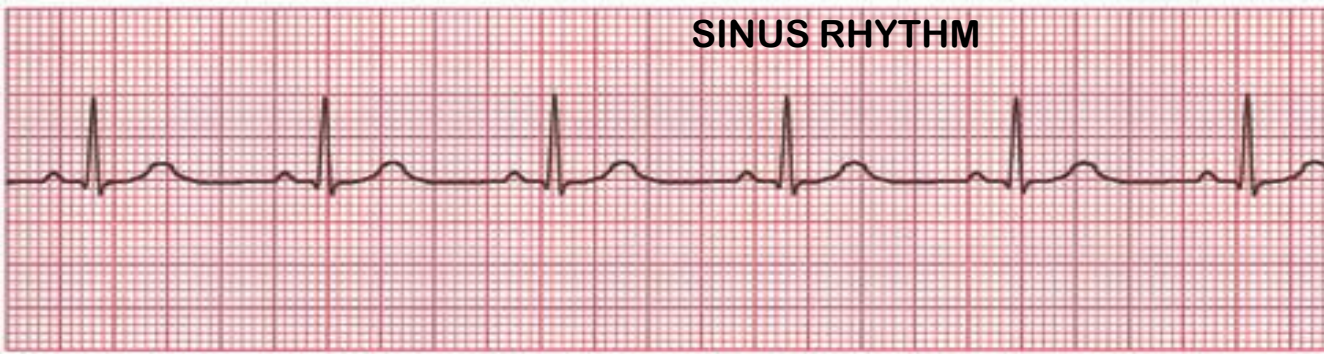
Premature Ventricular Contraction: Ventricular Trigeminy (PVC every 3rd beat)

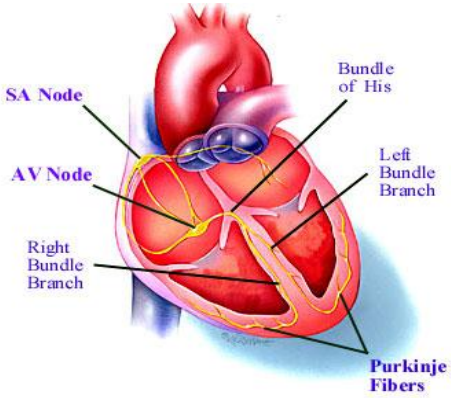


Premature Ventricular Contraction: Ventricular Quadrigeminy (PVC every 4th beat)

Premature Ventricular Contraction: Couplets (paired PVCs)

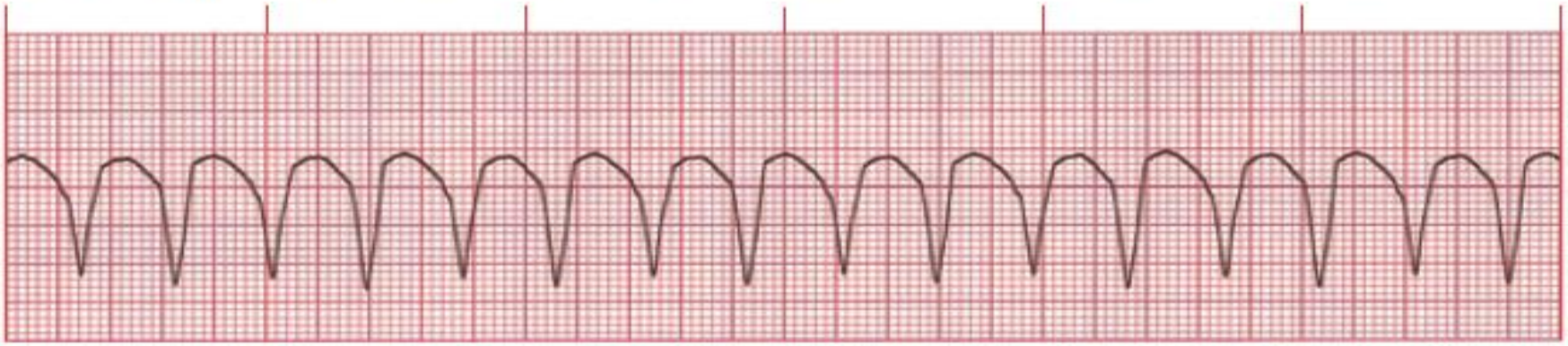
SINUS RHYTHM





Ventricular Tachycardia (VT): Monomorphic

- QRS complexes in monomorphic VT have the same shape and amplitude.



Rate: 100–250 bpm
Rhythm: Regular
P Waves: None or not associated with the QRS
PR Interval: None
QRS: Wide (>0.10 sec), bizarre appearance

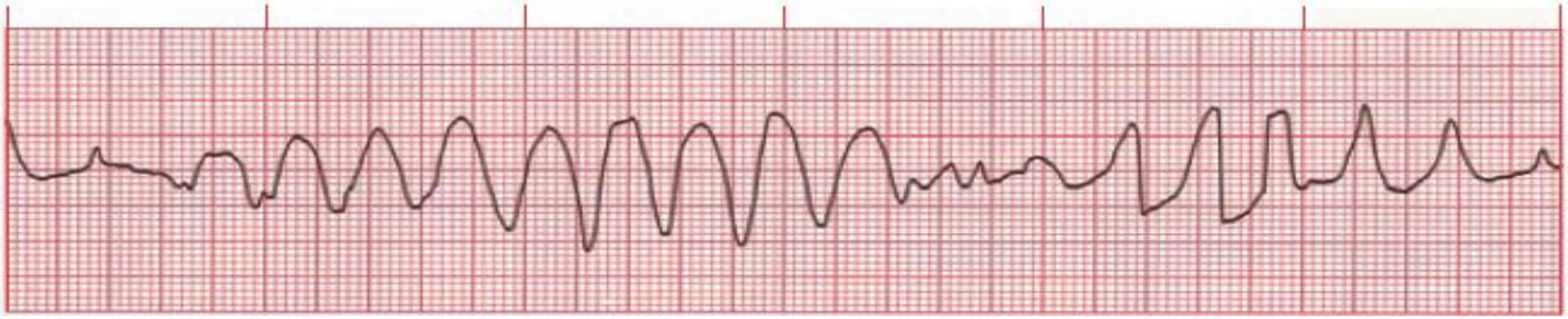
Ventricular Tachycardia (VT): Polymorphic

- QRS complexes in polymorphic VT vary in shape and amplitude.
- The QT interval is normal or long.

Rate: 100–250 bpm
Rhythm: Regular or irregular
P Waves: None or not associated with the QRS
PR Interval: None
QRS: Wide (>0.10 sec), bizarre appearance

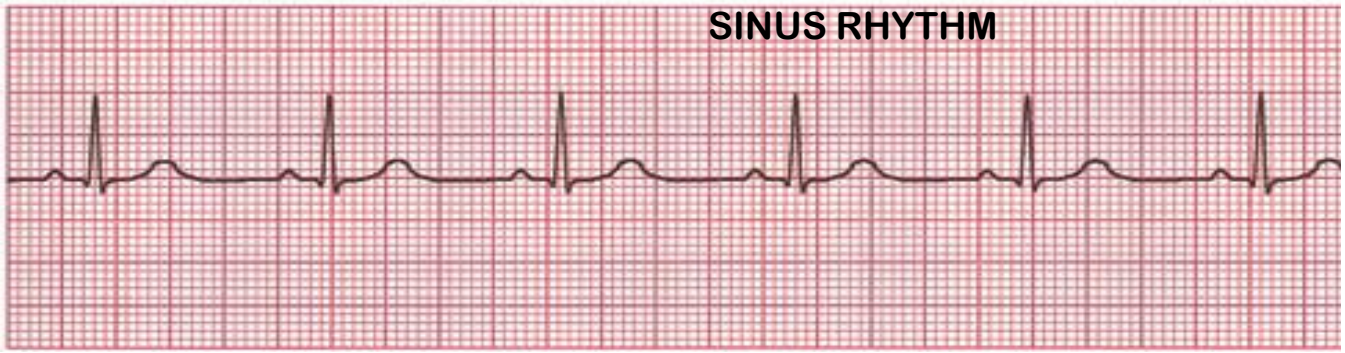
Torsade de Pointes

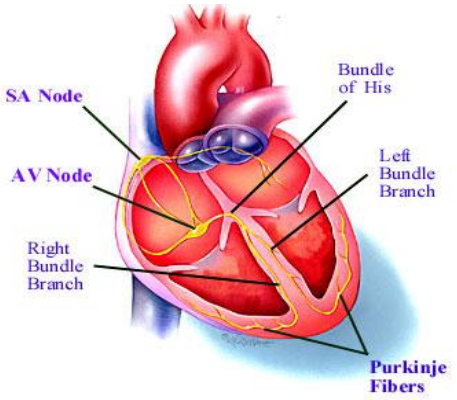
- The QRS reverses polarity and the strip shows a spindle effect.
- This rhythm is an unusual variant of polymorphic VT with normal or long QT intervals.
- In French the term means "twisting of the points."



Rate: 200–250 bpm
Rhythm: Irregular
P Waves: None
PR Interval: None
QRS: Wide (>0.10 sec), bizarre appearance

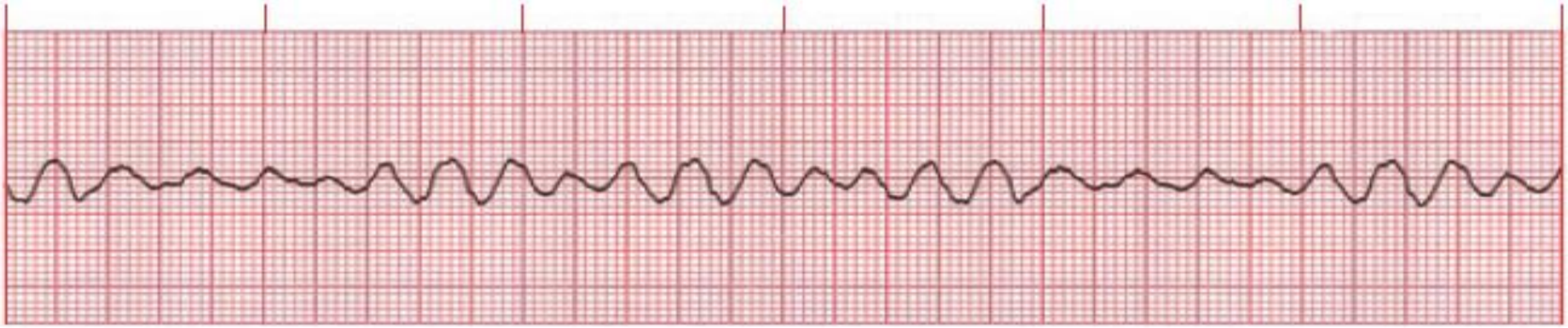
SINUS RHYTHM





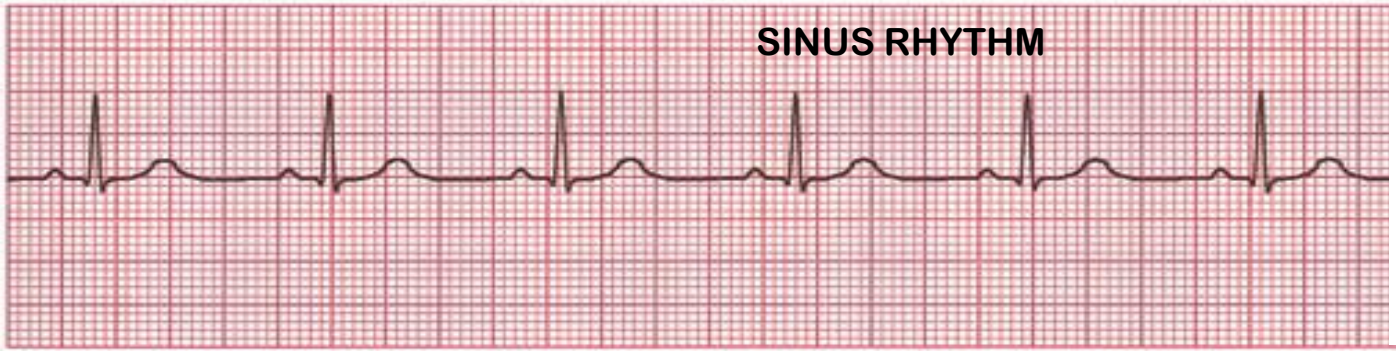
Ventricular Fibrillation (VF)

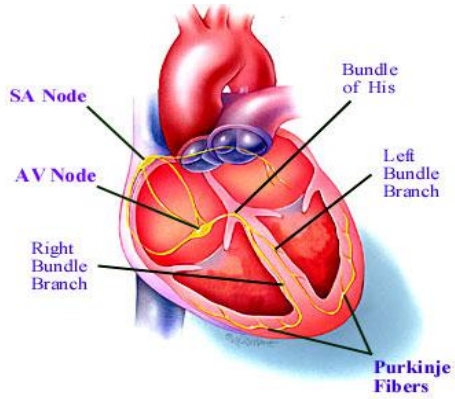
- Chaotic electrical activity occurs with no ventricular depolarization or contraction.
- The amplitude and frequency of the fibrillatory activity can be used to define the type of fibrillation as coarse, medium, or fine.



Rate: Indeterminate
Rhythm: Chaotic
P Waves: None
PR Interval: None
QRS: None

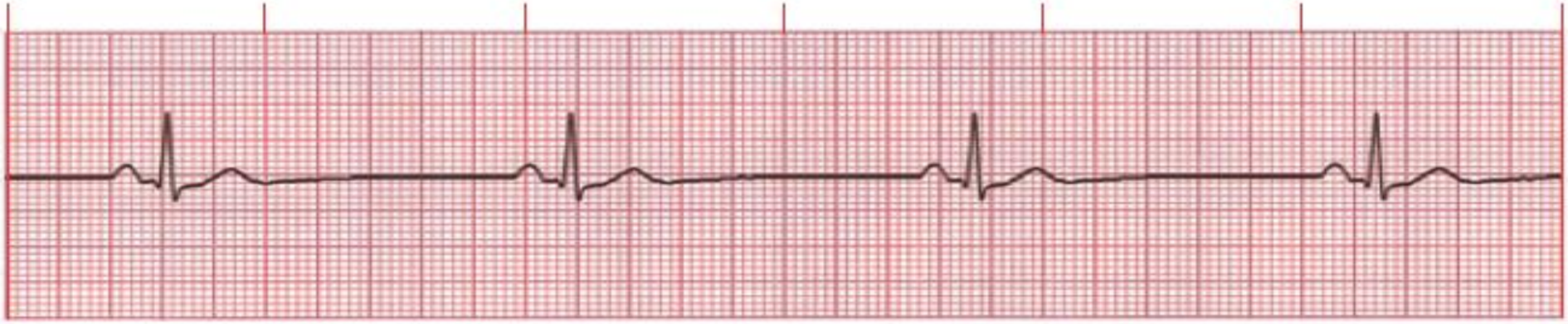
SINUS RHYTHM





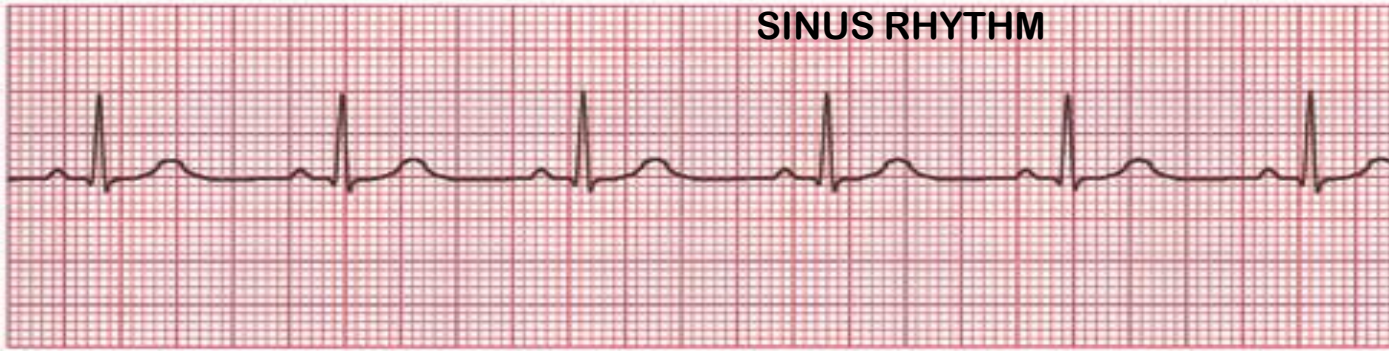
Pulseless Electrical Activity (PEA)

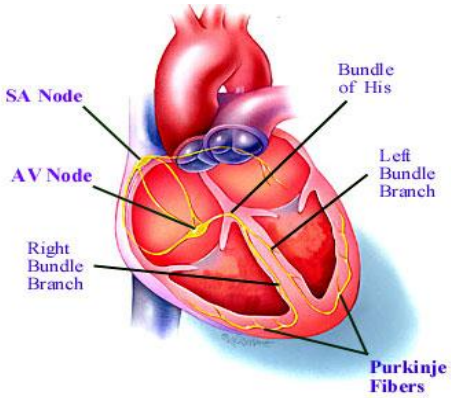
- Monitor shows an identifiable electrical rhythm, but no pulse is detected.
- Rhythm may be sinus, atrial, junctional, or ventricular in origin.
- PEA is also called electromechanical dissociation (EMD).



Rate, rhythm, P waves, P-R interval, and QRS: Reflect underlying rhythm.

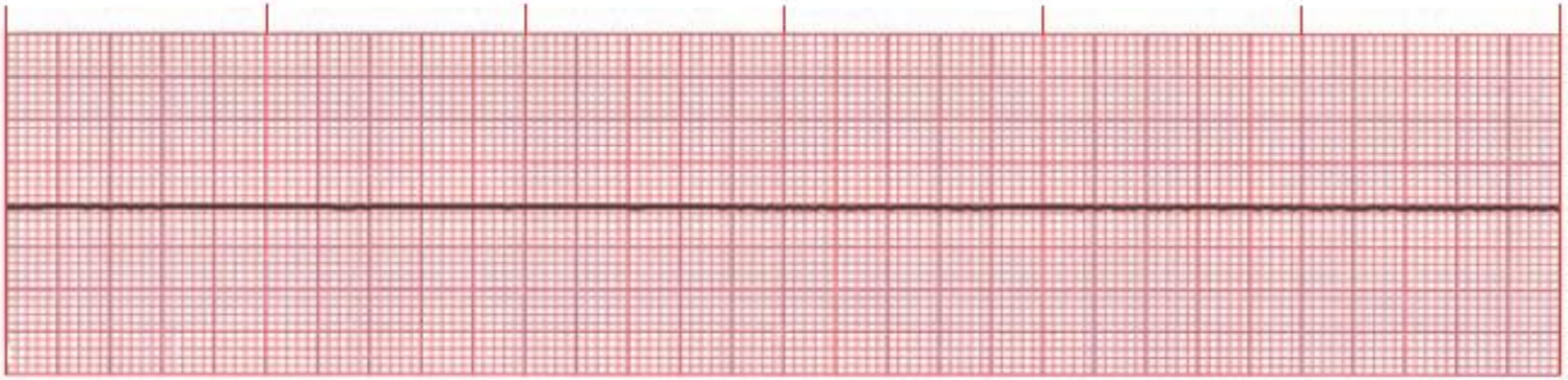
SINUS RHYTHM





Asystole

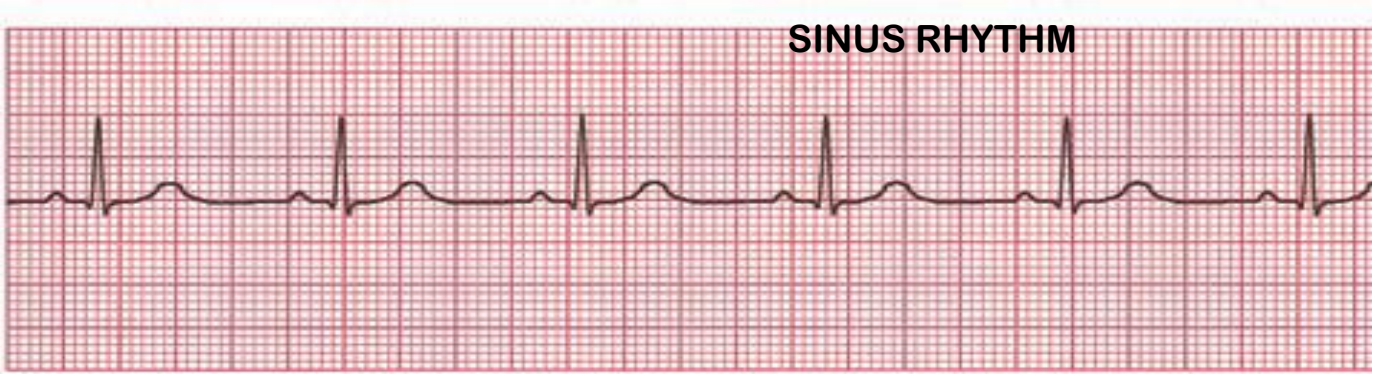
- Electrical activity in the ventricles is completely absent.

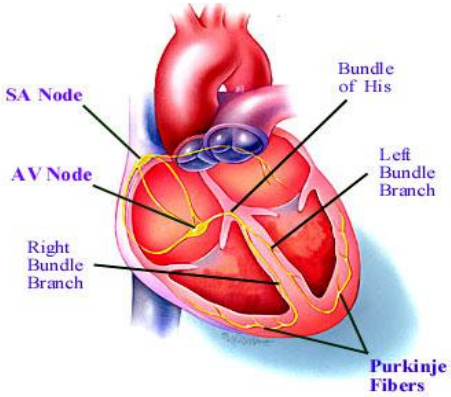


Rate: None
Rhythm: None
P Waves: None
PR Interval: None
QRS: None

BLOCK RYTHM

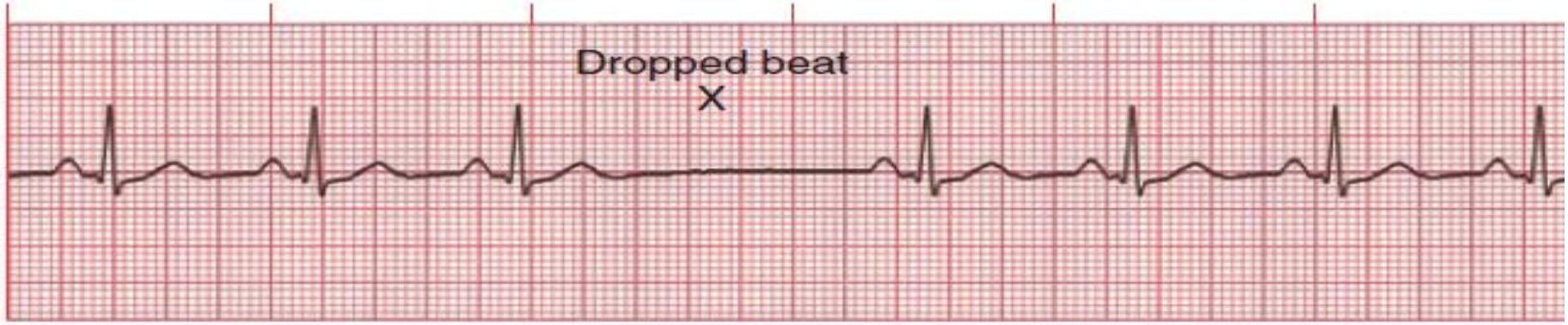
SINUS RHYTHM





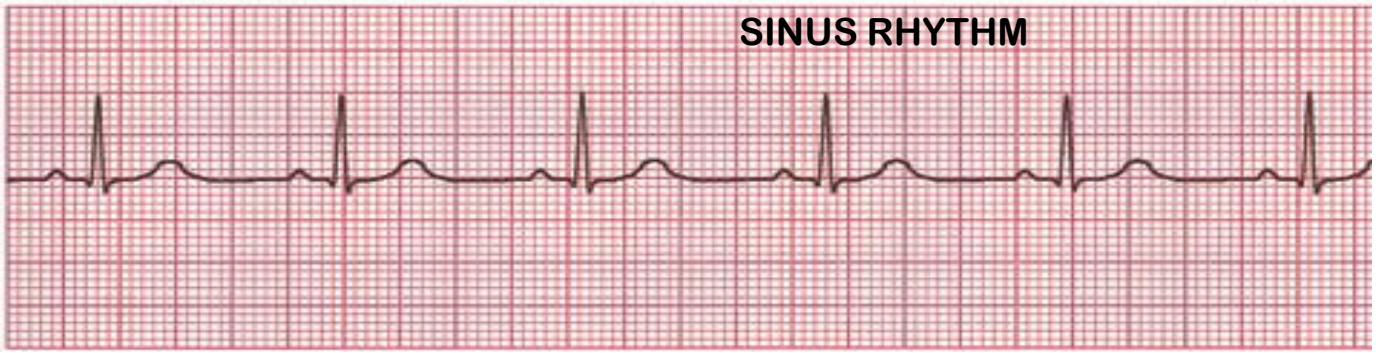
Sinoatrial (SA) Block

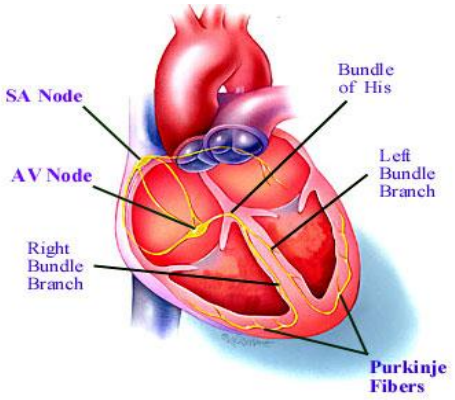
- The block occurs in some multiple of the P-P interval.
- After the dropped beat, cycles continue on time.



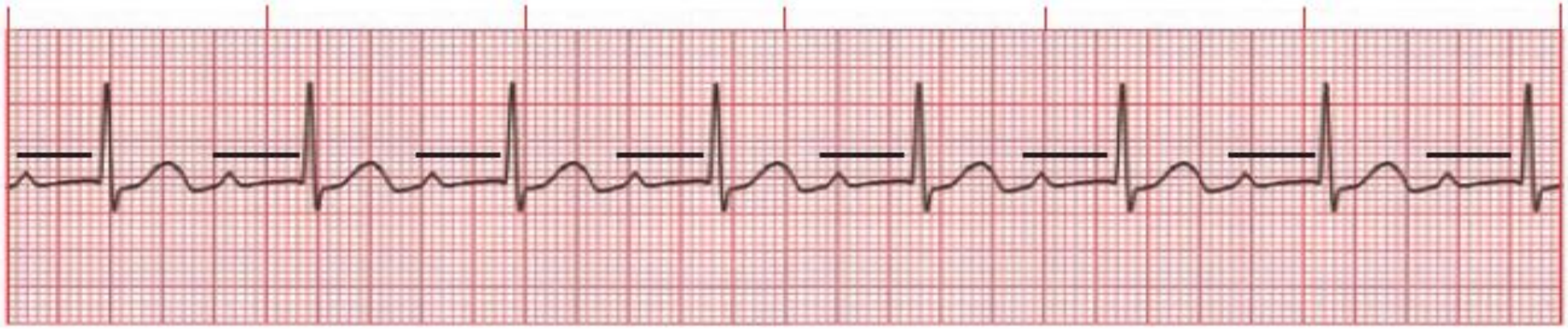
Rate: Normal to slow; determined by duration and frequency of SA block
Rhythm: Irregular whenever an SA block occurs
P Waves: Normal (upright and uniform) except in areas of dropped beats
PR Interval: Normal (0.12–0.20 sec)
QRS: Normal (0.06–0.10 sec)

SINUS RHYTHM



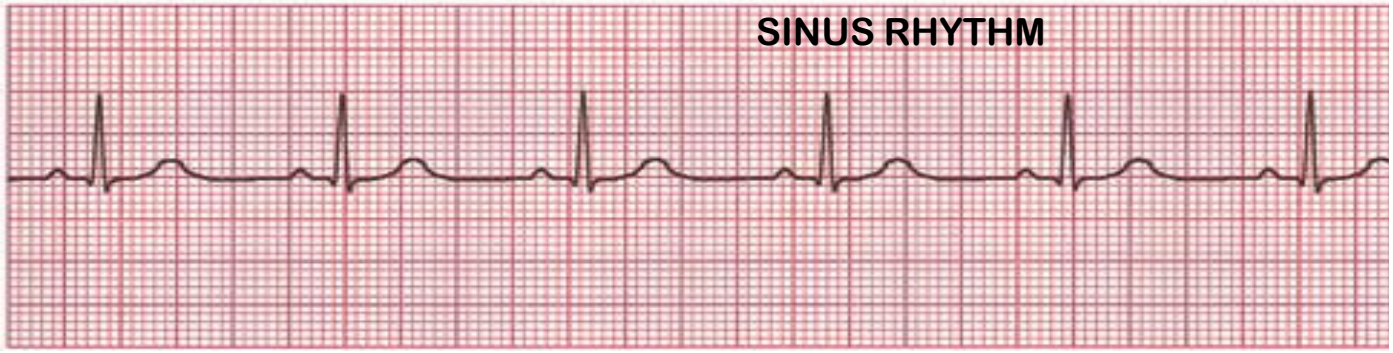


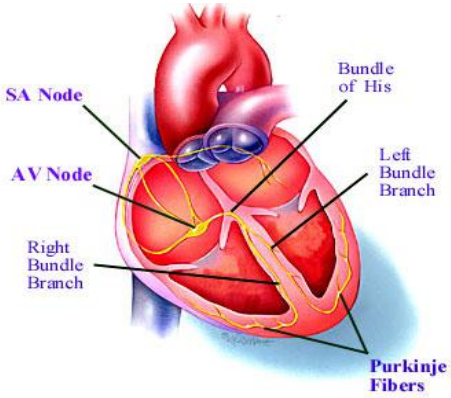
First-Degree AV Block



Rate: Depends on rate of underlying rhythm
Rhythm: Regular
P Waves: Normal (upright and uniform)
PR Interval: Prolonged (>0.20 sec)
QRS: Normal (0.06–0.10 sec)

SINUS RHYTHM

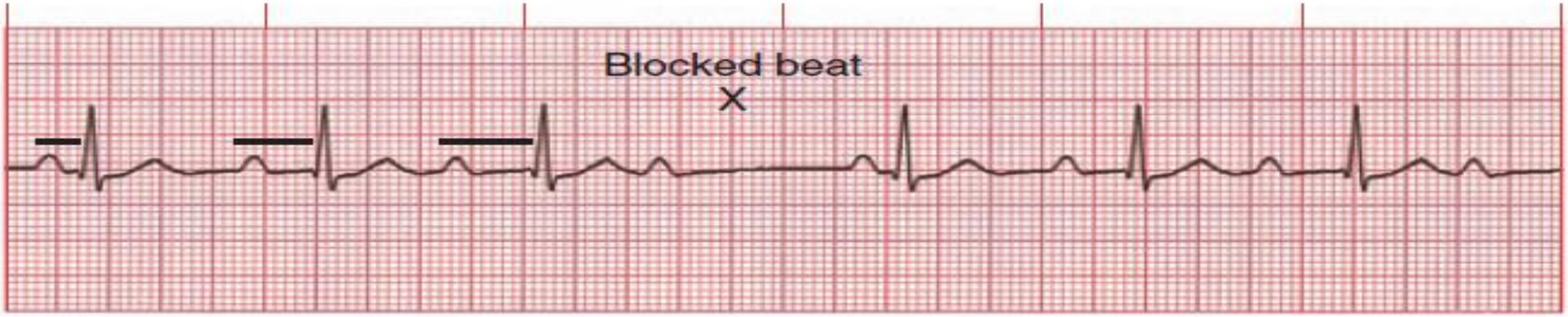




Second-Degree AV Block

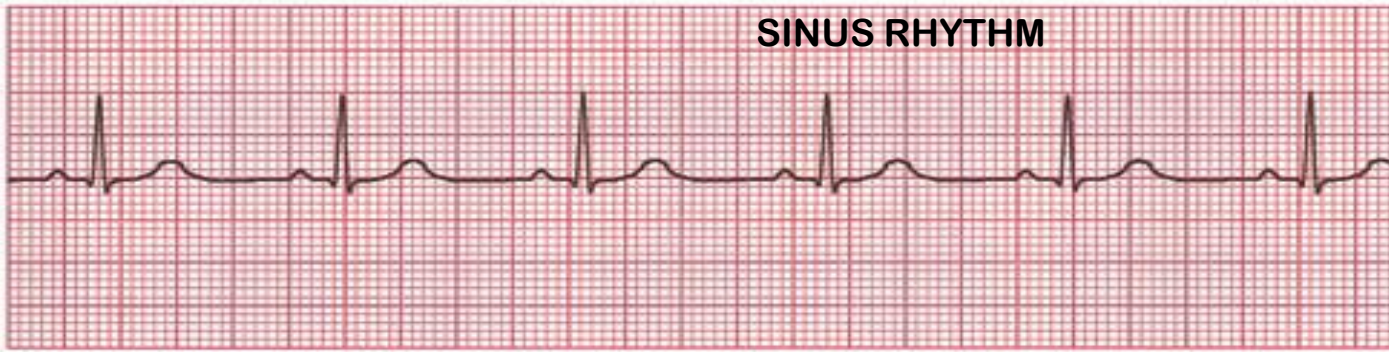
Type I (Mobitz I or Wenckebach)

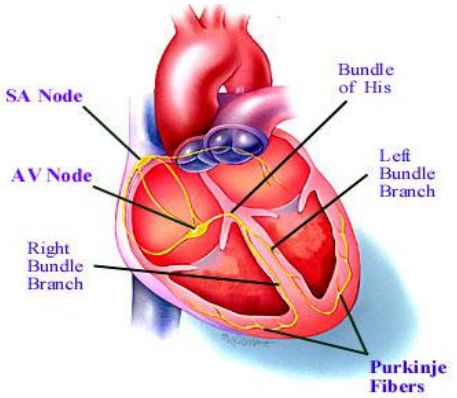
- P-R intervals become progressively longer until one P wave is totally blocked and produces no QRS. After a pause, during which the AV node recovers, this cycle is repeated.



Rate: Depends on rate of underlying rhythm
Rhythm: Irregular
P Waves: Normal (upright and uniform)
PR Interval: Progressively longer until one P wave is blocked and a QRS is dropped
QRS: Normal (0.06–0.10 sec)

SINUS RHYTHM





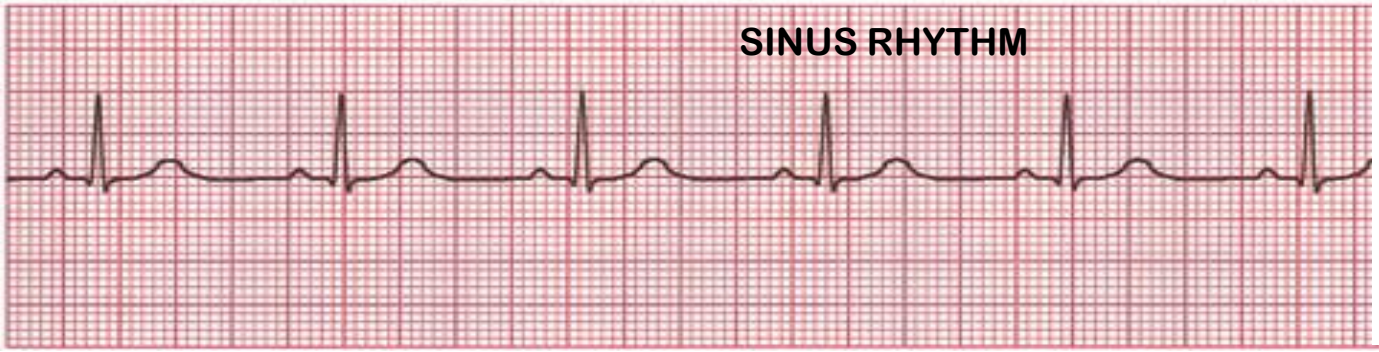
Second-Degree AV Block

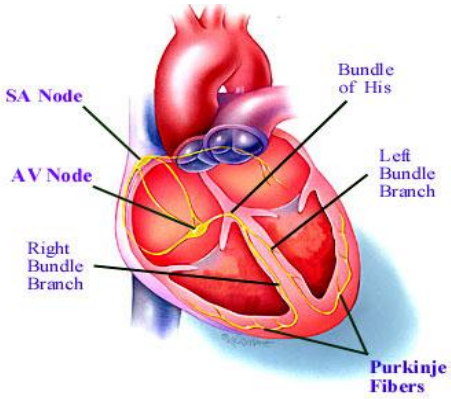
Type II (Mobitz II)

- Conduction ratio (P waves to QRS complexes) is commonly 2:1, 3:1, or 4:1.
- QRS complexes are usually wide because this block usually involves both bundle branches.

Rate: Atrial rate (usually 60–100 bpm); faster than ventricular rate
Rhythm: Atrial regular and ventricular irregular
P Waves: Normal (upright and uniform); more P waves than QRS complexes
PR Interval: Normal or prolonged but constant
QRS: Usually wide (>0.10 sec)

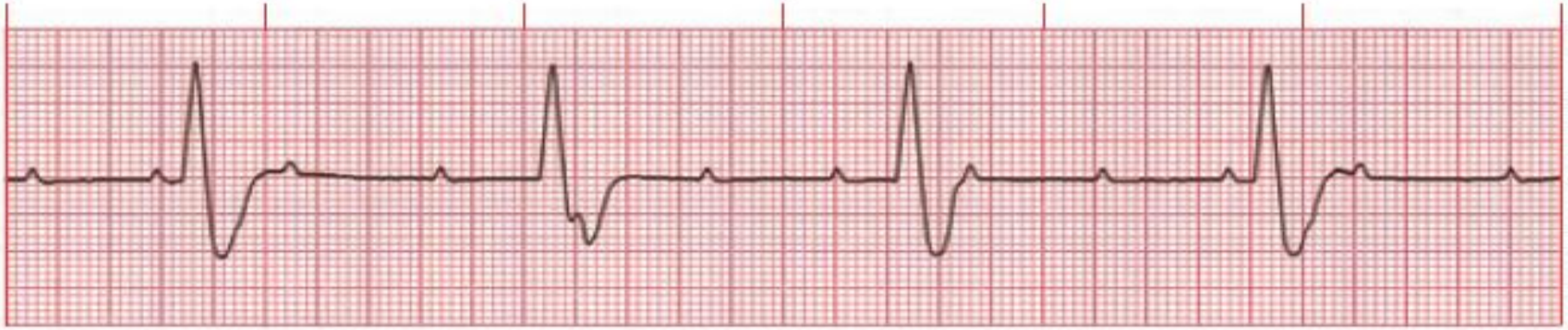
SINUS RHYTHM





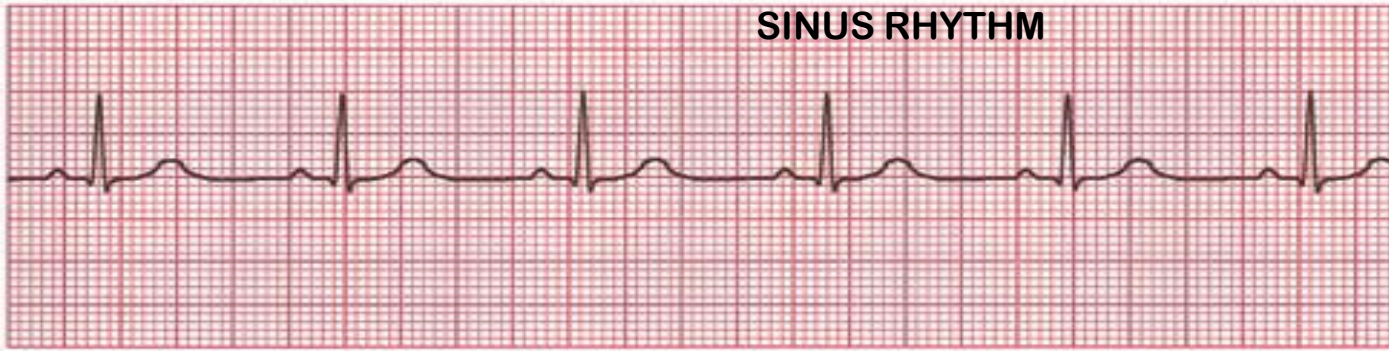
Third-Degree AV Block

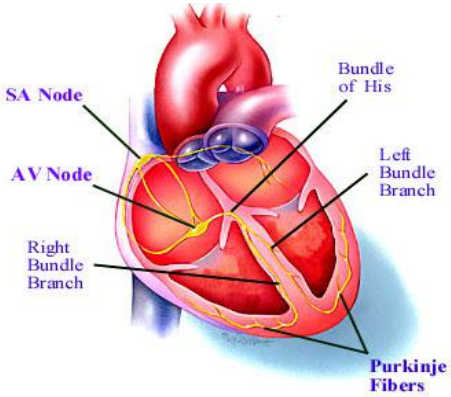
- Conduction between atria and ventricles is absent because of electrical block at or below the AV node.
- "Complete heart block" is another name for this rhythm.



Rate: Atrial: 60–100 bpm; ventricular: 40–60 bpm if escape focus is junctional, <40 bpm if escape focus is ventricular
Rhythm: Usually regular, but atria and ventricles act independently
P Waves: Normal (upright and uniform); may be superimposed on QRS complexes or T waves
PR Interval: Varies greatly
QRS: Normal if ventricles are activated by junctional escape focus; wide if escape focus is ventricular

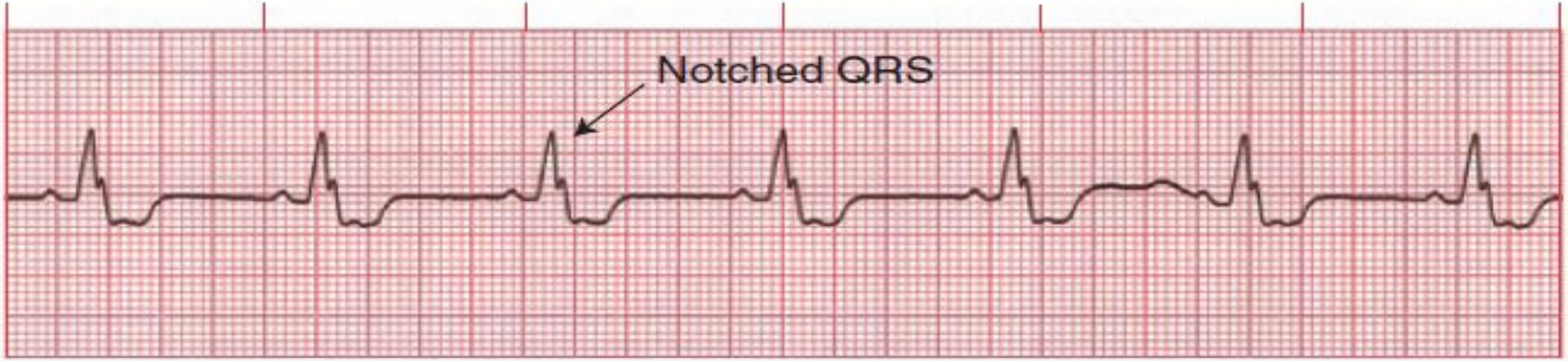
SINUS RHYTHM





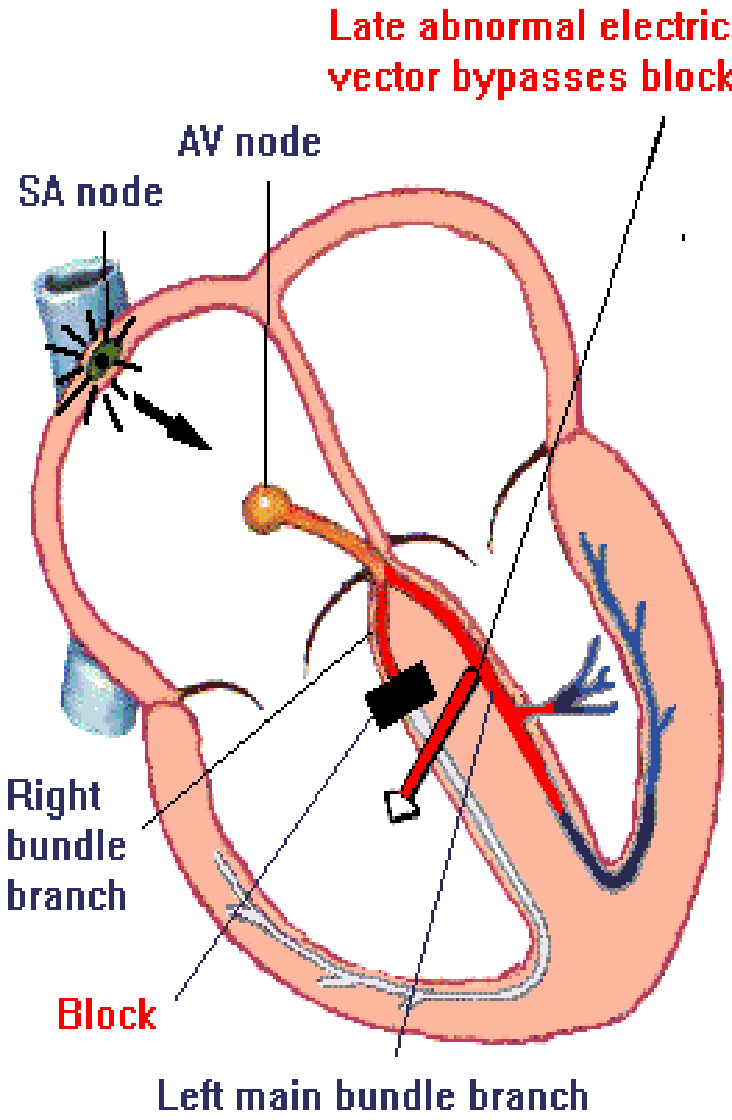
Bundle Branch Block (BBB)

- Either the left or the right ventricle may depolarize late, creating a "notched" QRS complex.

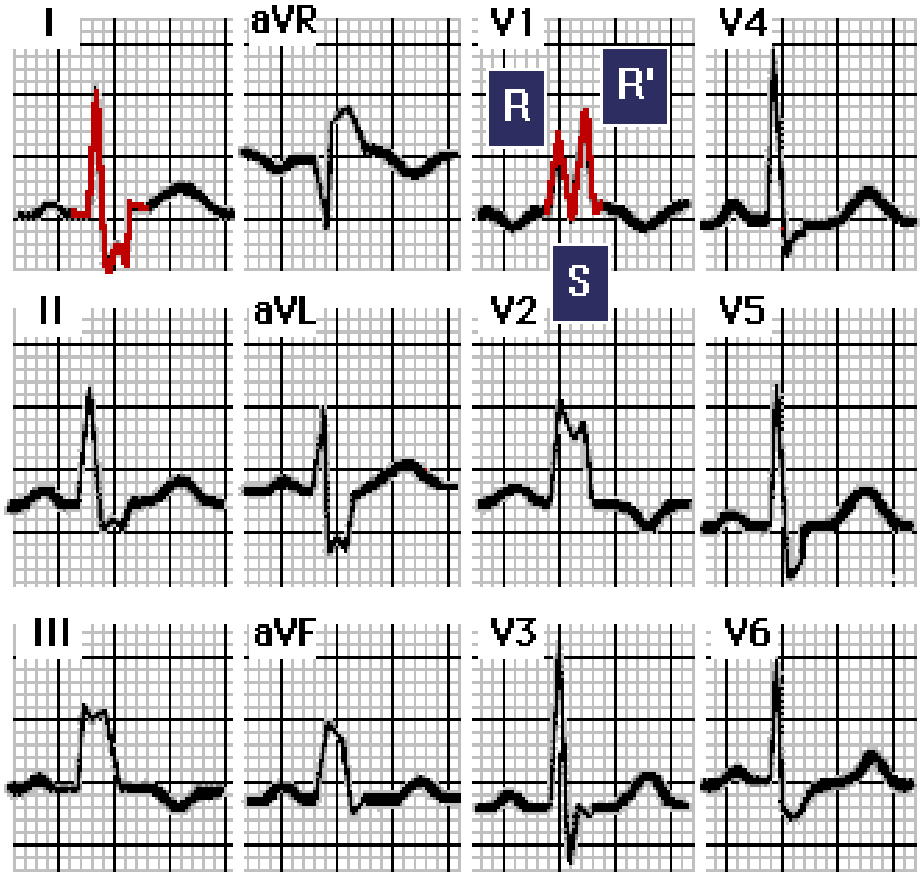


Rate: Depends on rate of underlying rhythm
Rhythm: Regular
P Waves: Normal (upright and uniform)
PR Interval: Normal (0.12–0.20 sec)
QRS: Usually wide (>0.10 sec) with a notched appearance

Right Bundle Branch Block



Total QRS prolonged (>= 0.12 second).
Terminal broad S wave in lead I.
RSR' complex in lead V1.

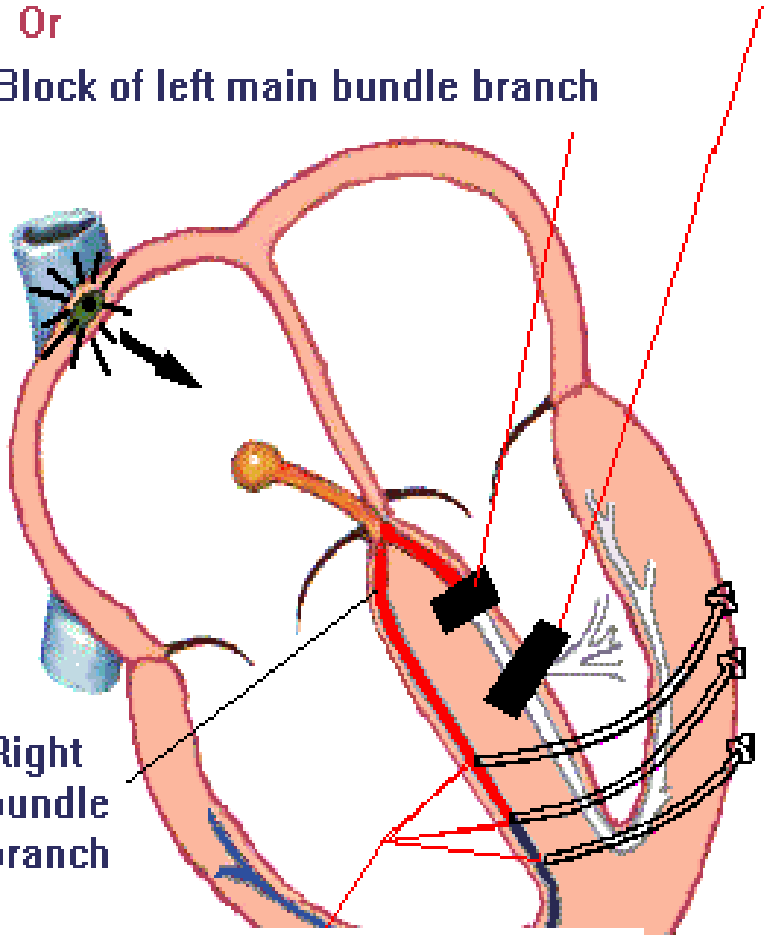


Left Bundle Branch Block

Block of left anterior or posterior fascicles

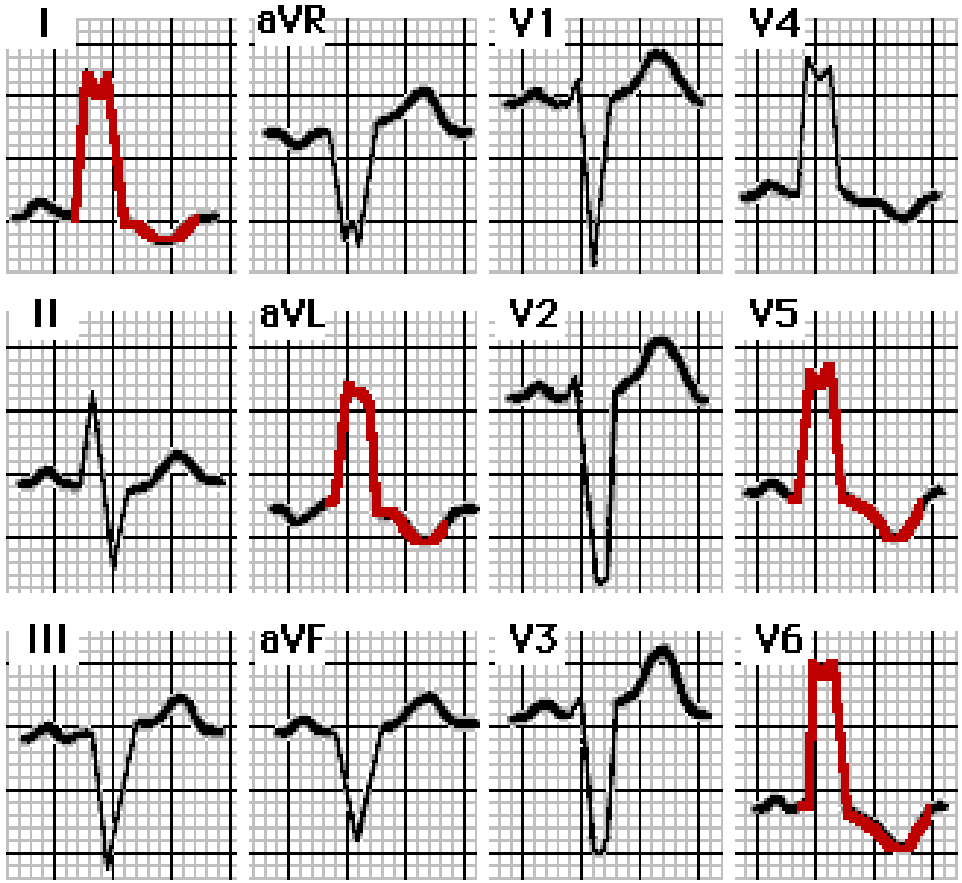
Or

Block of left main bundle branch



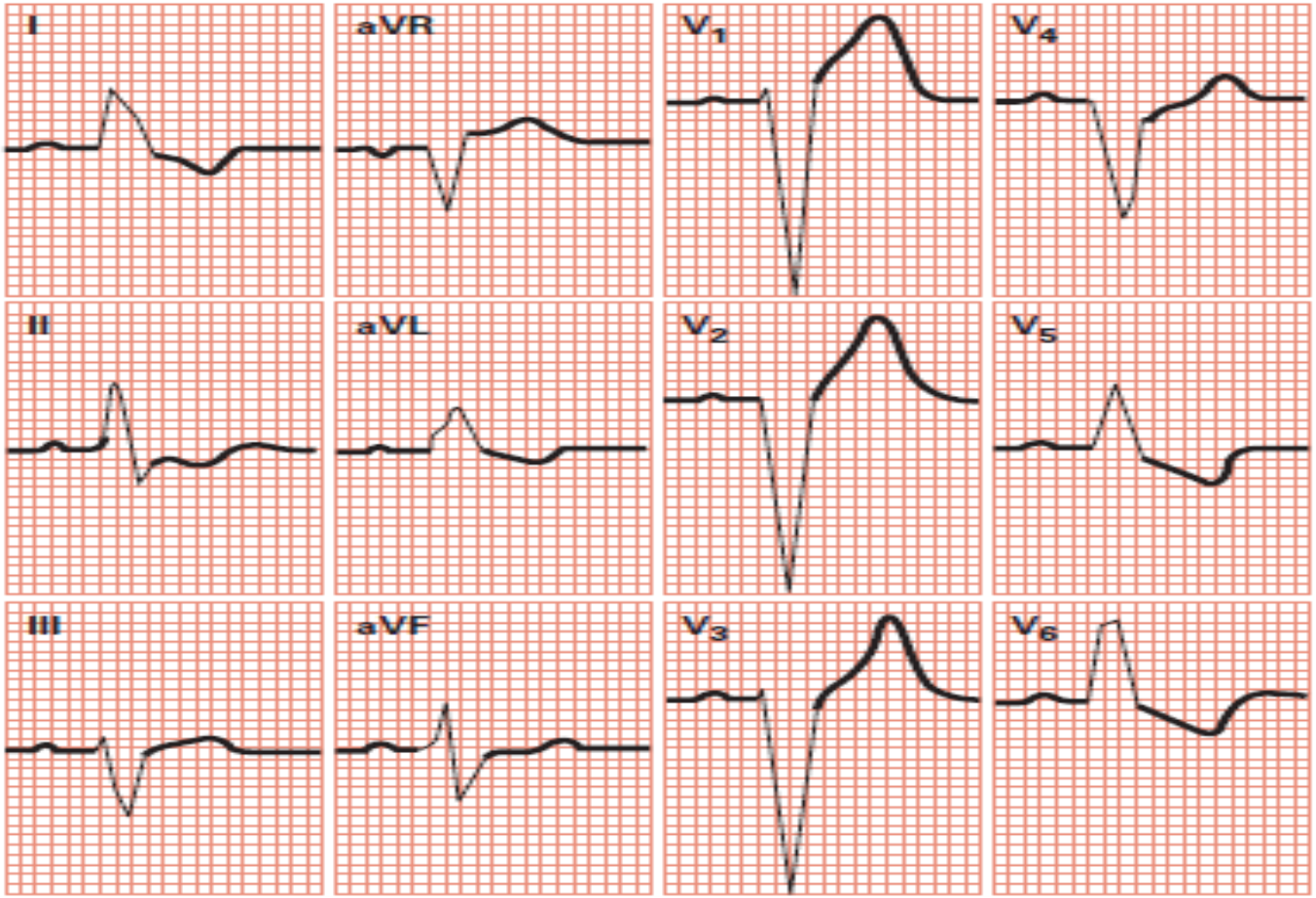
Electrical vector directed toward left ventricle as in normal, but delayed and prolonged

Wide QRS complex (>= 0.12 second), with ST depression in leads I, aVL, V5 and V6.



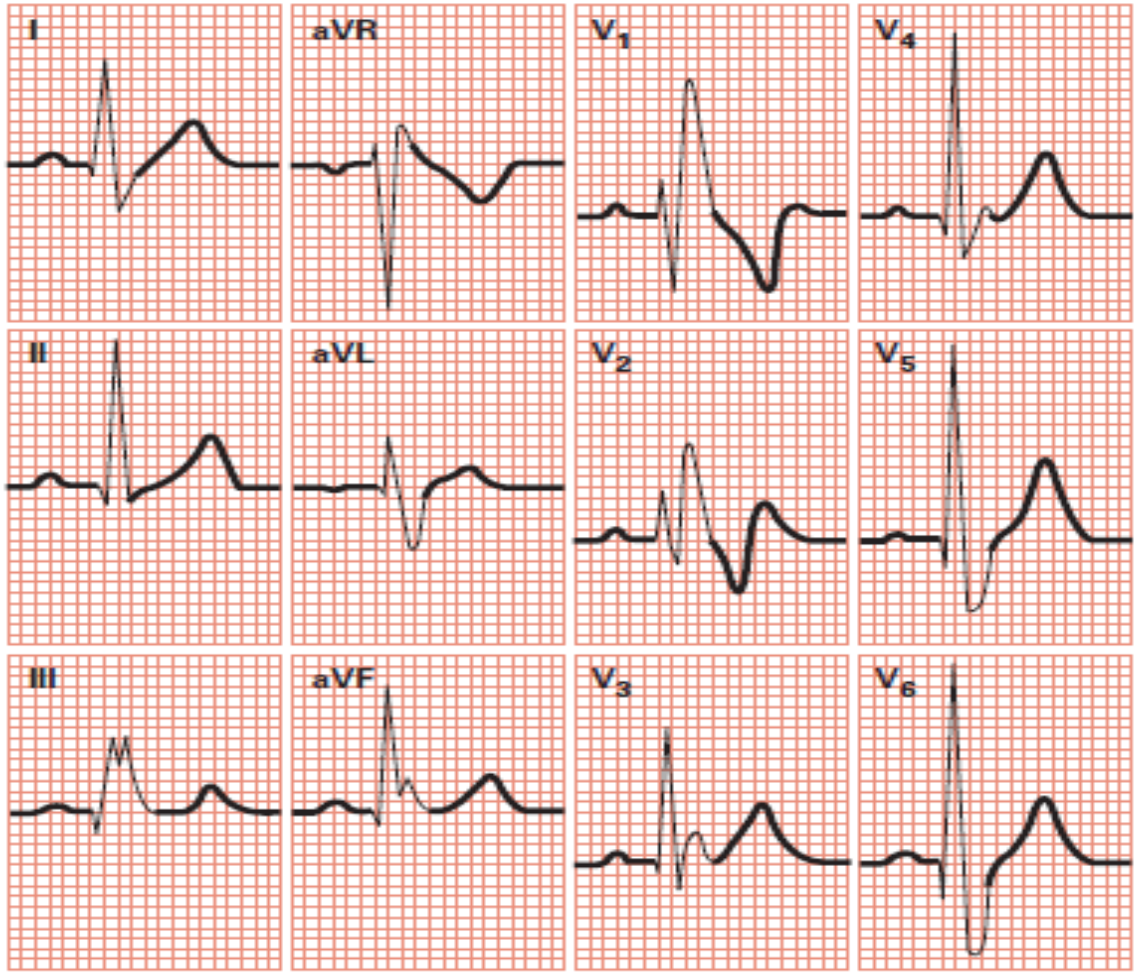
Left Bundle Branch Block

- QRS >0.10 sec
- QRS predominantly negative in leads V_1 and V_2
- QRS predominantly positive in V_5 and V_6 and often notched
- Absence of small, normal Q waves in I, aVL, V_5, and V_6
- Wide monophasic R waves in I, aVL, V_1, V_5, and V_6

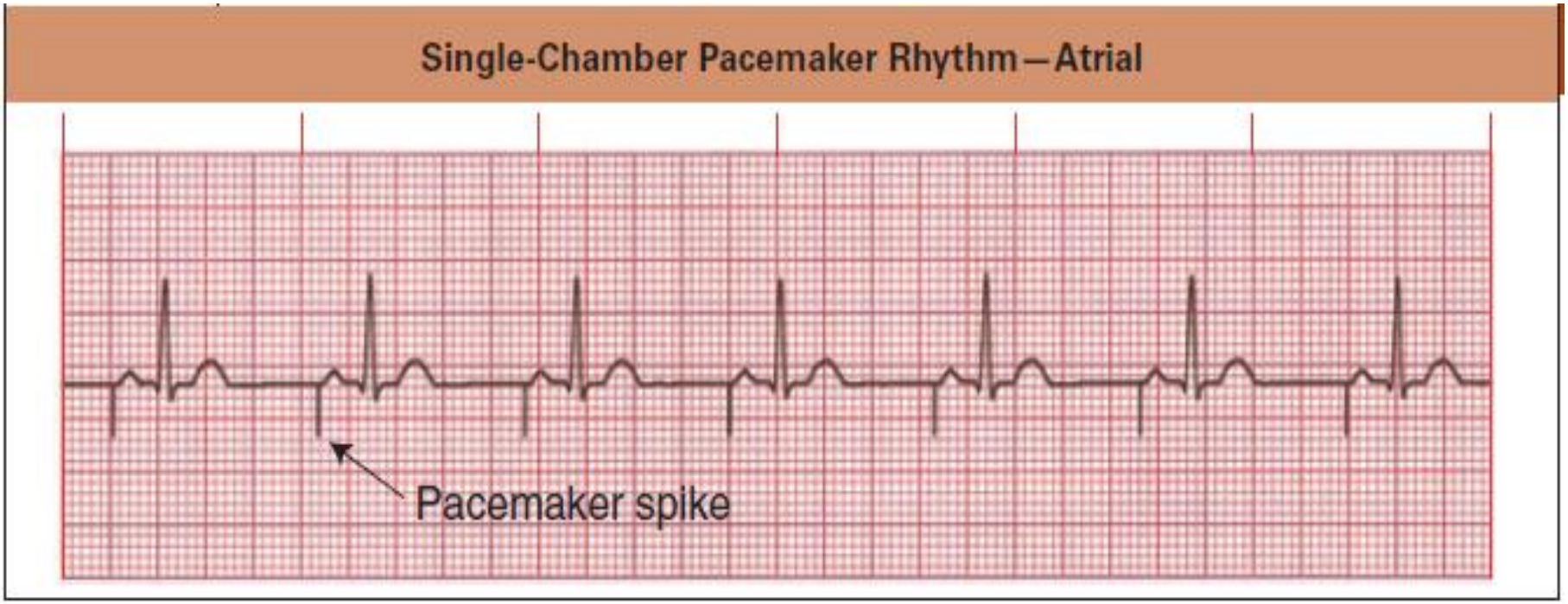


Right Bundle Branch Block

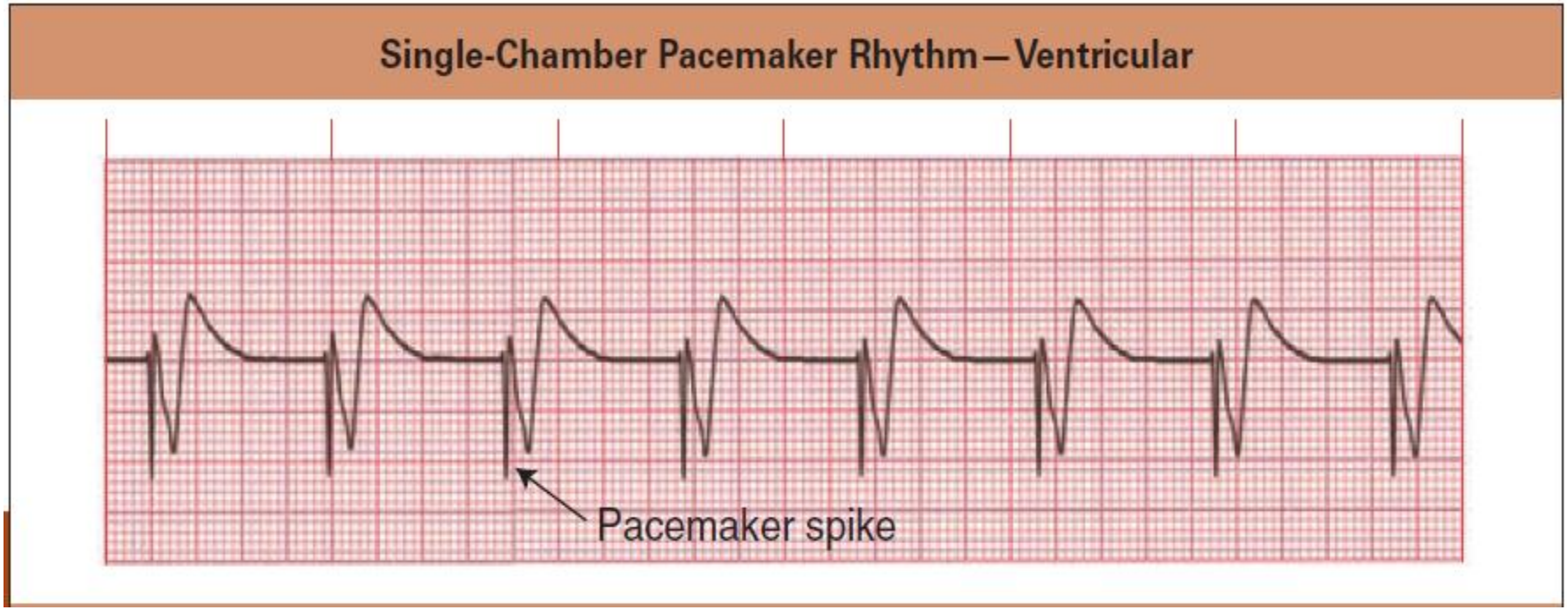
- QRS >0.10 sec
- QRS normal or deviated to the right
- Slurred S wave in leads I and V_6
- RSR′ pattern in lead V_1 with R′ taller than R



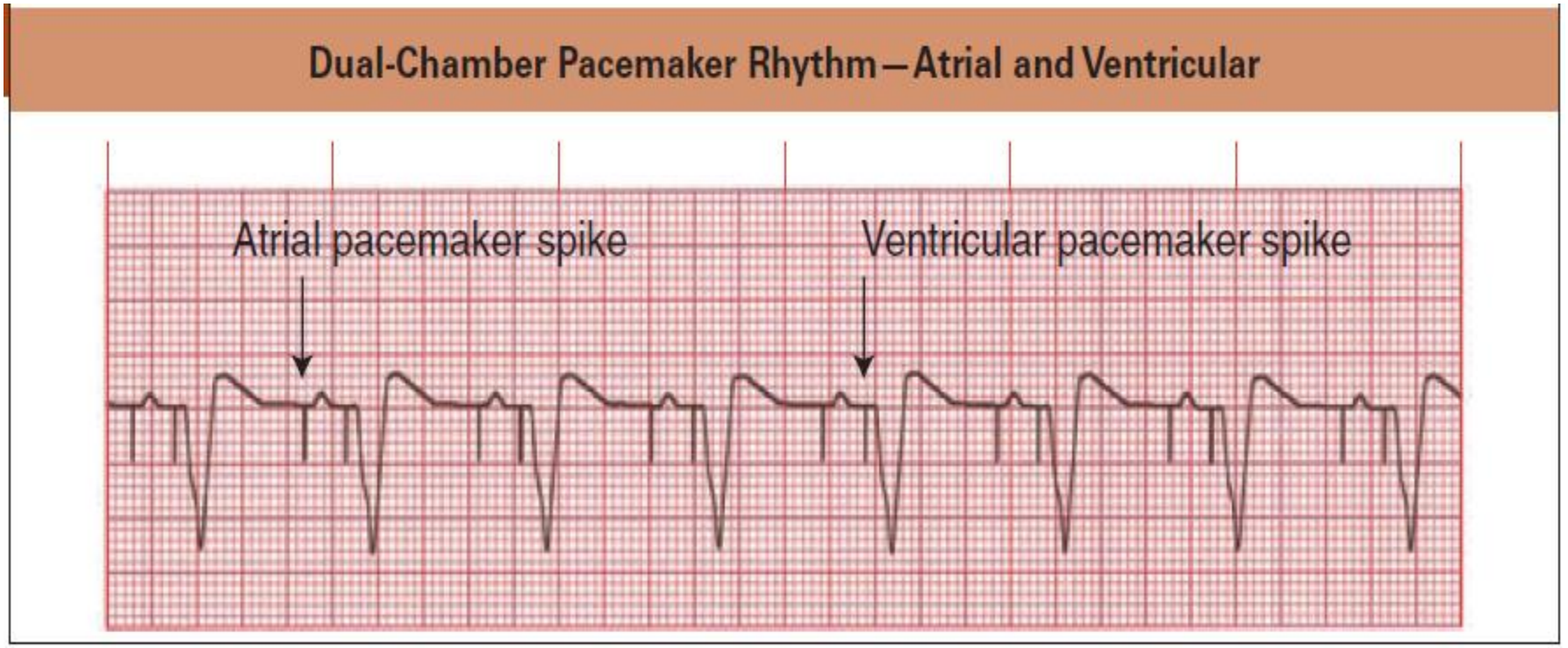
PACEMAKER RHYTHM



PACEMAKER RHYTHM



PACEMAKER RHYTHM



Artifact

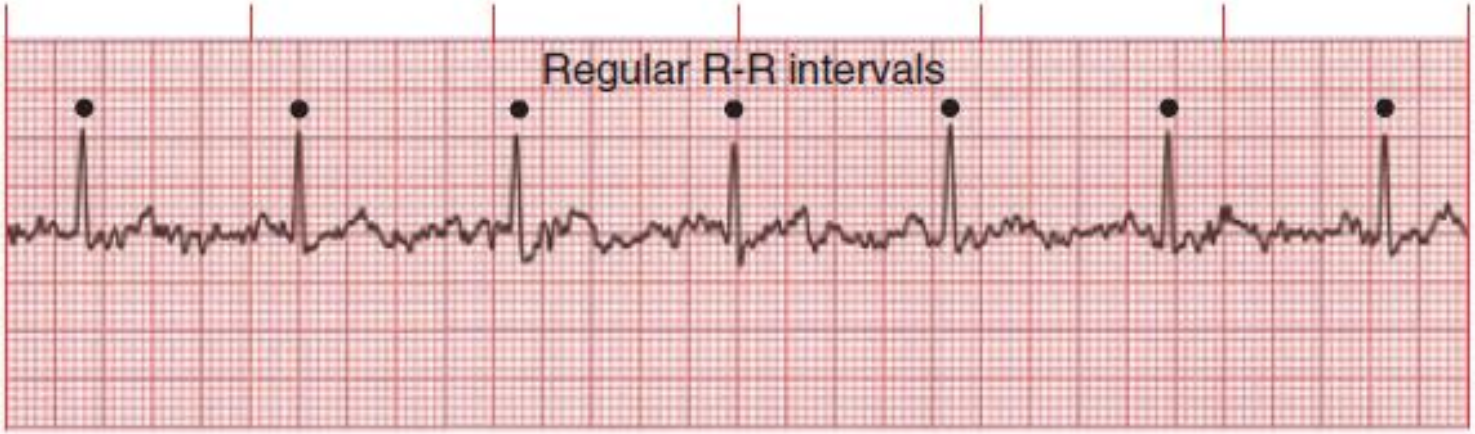
- Artifacts are ECG deflections caused by influences other than the heart's electrical activity.

Loose Electrodes

Baseline Varies with Respiration

60-Cycle Interference

Muscle Artifact



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