Sinus Rhythm

Sinus Rhythm:

Sinus Rhythm originates from the SA Node (Sinoatrial Node) which initiates each heartbeat. The electrical impulse originating in the SA Node travels across the atria, causing atrial depolarization, and can be seen as a P wave on the ECG tracing. This means Sinus Rhythm always has one P wave before each QRS or 1:1 AV conduction. The term "Normal Sinus Rhythm" implies that the patient is in Sinus Rhythm and all measured rhythm characteristics are within normal limits. If the PR, QRS or heart rate were to fall outside of the normal limits the rhythm interpretation label would change. If the patient's heart rate were to exceed 100 bpm this would be considered **Sinus Tachycardia**. If the patient's heart rate were to fall below 60 bpm this would be referred to as **Sinus Bradycardia**. For example, a patient in Sinus Rhythm with a heart rate of 50 bpm and a QRS of .14 seconds would be referred to Sinus Bradycardia with a Bundle Branch Block (IVCD).

Normal Sinus Rhythm

- HR between 60-100 bpm
- Regular R-R interval
- P wave for every QRS (1:1 ratio)
- PR between .12-.20 sec
- QRS between .06-.10 sec
- QT between .36-.44 sec

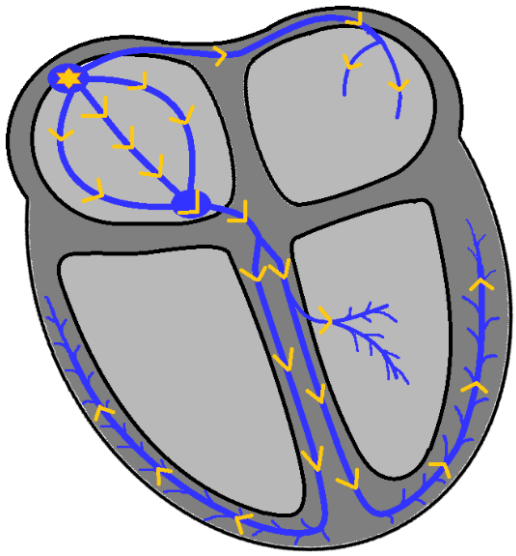
Sinus Tachycardia

- HR > 100 bpm

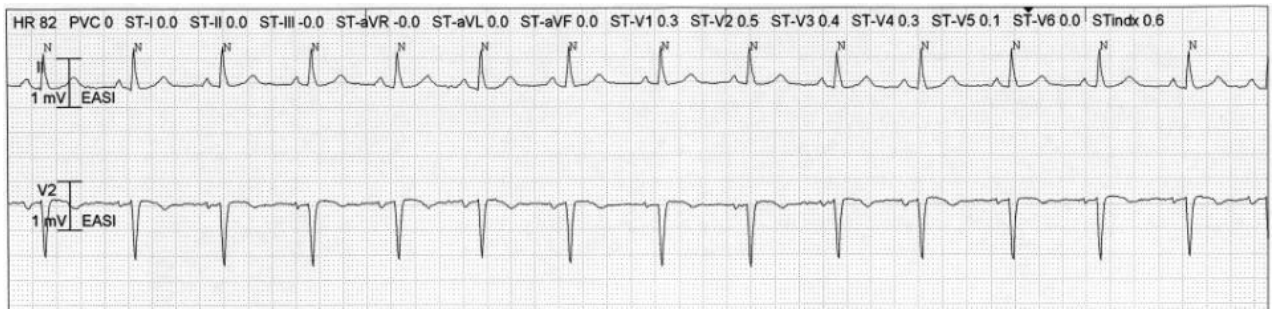
Sinus Bradycardia

- HR < 60 bpm

Figure 3.1



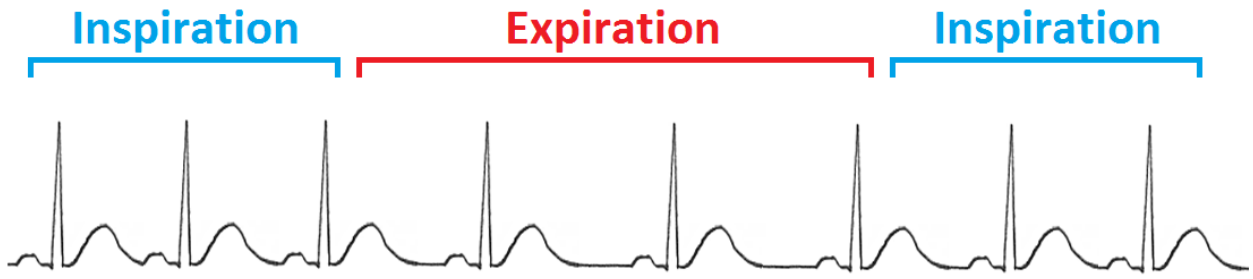
Example Strip: Sinus Rhythm



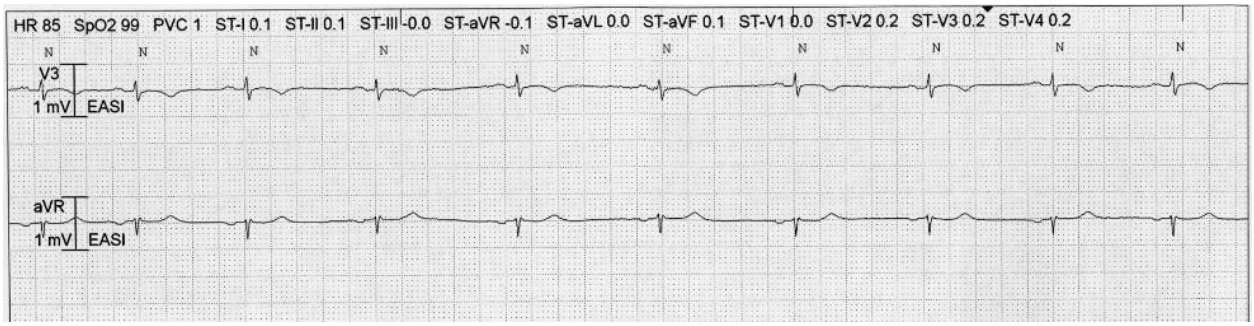
Sinus Arrhythmia

Sinus Arrhythmia is an irregular rhythm originating from the SA Node. It is characterized by its uniform P wave morphologies as well as its pattern of irregularity. The P wave morphologies (shapes) should be very similar because they are all coming from the SA Node and therefore take the same path across the atria. Uniform P wave morphology is an important characteristic because it differentiates Sinus Arrhythmia from Sinus Rhythm with PACs. The pattern of irregularity of Sinus Arrhythmia may vary depending on the cause. Sinus Arrhythmia also referred to as "Respiratory Sinus Arrhythmia" is commonly seen in young adults and is not considered pathological. It results from respiratory stimulation of the Vagus Nerve producing a pattern of irregularity corresponding to respiratory cycles. The **Vagus Nerve** is part of the Autonomic Nervous System and is responsible for parasympathetic regulation of the heart, lungs, and the digestive tract. Vagus nerve stimulation, otherwise known as Vagal Tone, by the respiratory cycle causes decreases in heart rate during expiration and increases during inspiration. This explains the cyclical pattern of irregularity as seen in figure 3.2.

Figure 3.2



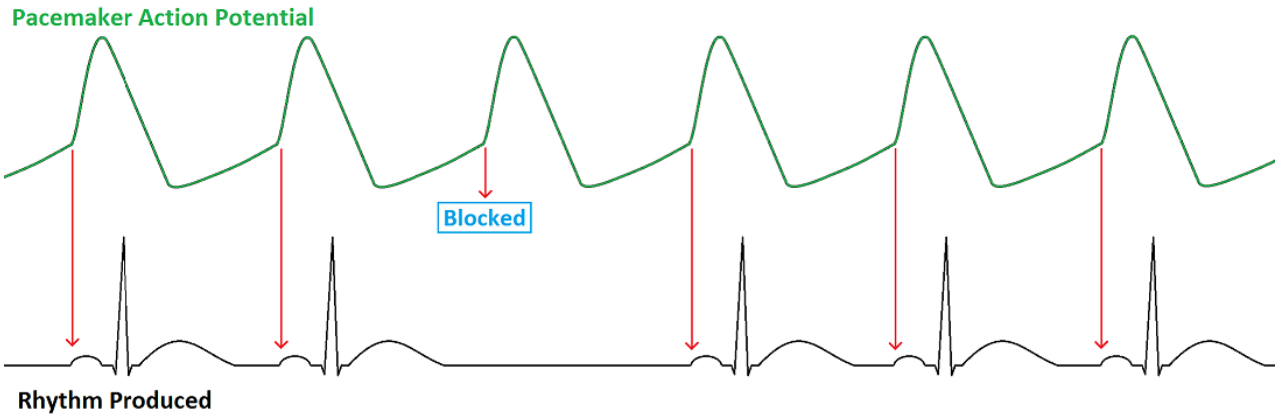
Example Strip: Sinus Arrhythmia



Sinus Exit Block

Sinus Exit Block occurs when the SA Node initiates depolarization but the electrical impulse is blocked internally before it can exit to the atria. If the electrical impulse never reaches the atria there will be no P wave seen on the ECG tracing as well as no corresponding QRS. It's important to note that because the depolarization of the SA Node was never interrupted the following P waves will fall on time. This means if Sinus Exit Block occurs once there will be exactly one cardiac cycle missing, as seen in Figure 3.3. This characteristic distinguishes Sinus Exit Block from Sinus Arrest.

Figure 3.3



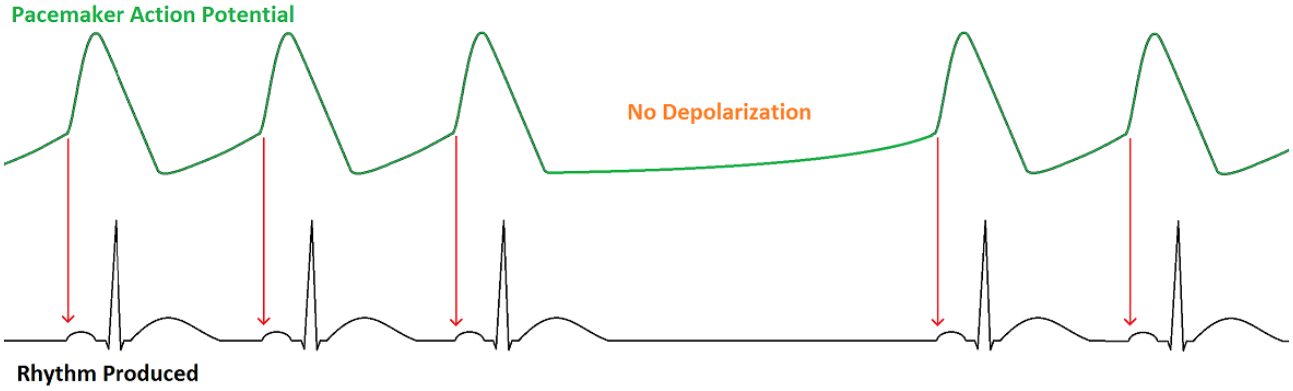
The green waves represent the action potentials of the SA Node as it depolarizes. The third action potential is blocked before it can exit the SA Node and depolarize the atria. The timing of the SA Node is not disrupted so the next P wave is on time resulting in exactly one missing P wave and QRS complex.

Example Strip: Sinus Exit Block

Sinus Arrest

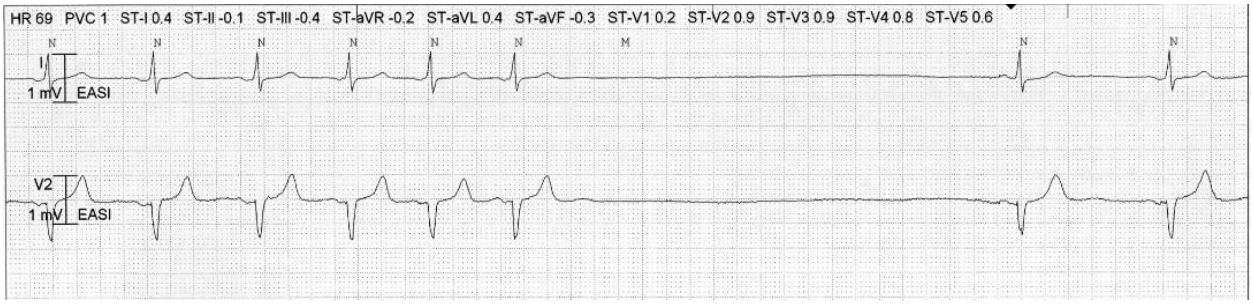
Sinus Arrest occurs when the SA Node fails to pace the heart. If the SA Node does not initiate atrial depolarization there will be no P wave seen on the ECG tracing. Sinus Arrest yields a pause of indefinite length and will not likely be a multiple of R-R intervals as with Sinus Exit Block.

Figure 1.4



In Sinus Arrest the depolarization of the SA Node is delayed resulting in a pause of indefinite length.

Example Strip: Sinus Arrest



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