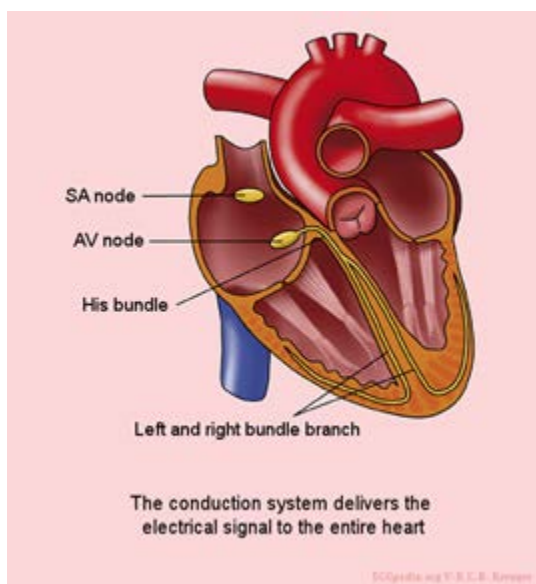


## Patient Resources: Heart Block

### Overview

The heartbeat normally begins in special cells called the sinus node in the top right chamber of the heart (the right atrium). The sinus node, which is also called the sinoatrial or SA node, sends out electrical signals that travel along special pathways in the heart to the atrioventricular (AV) node before continuing down to the pumping chambers at the bottom of the heart, called the ventricles.

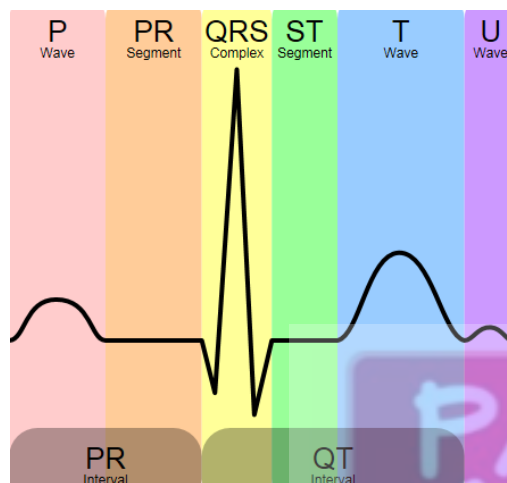


When the heart cells become electrically excited, the chambers “contract” resulting in a coordinated pumping of the top and bottom chambers of the heart. When the electrical signals travel slowly or get interrupted, this can affect the coordination between the atria and the ventricles and how well the heart is able to pump blood to the body.

Heart block, also called atrioventricular block or AV block, is a term for any block of the electrical impulses in the heart. It does not refer to a physical block of the blood supply or blood flow through the heart. It occurs when the electrical signals originating from the sinus node are either delayed or completely prevented from traveling to the

ventricles. This can be caused by congenital defects in the heart’s conduction system – which can occur in hearts with or without structural congenital heart disease – or can result from other circumstances, such as infection, surgery, or treatment with certain medications.

There are three main types of heart block – first degree, second degree, and third degree. Second-degree heart block is further divided into two different subtypes. Before we go too much farther, it is important to take a moment and remember that heart block can actually be a regular or “normal” finding in healthy individuals. Highly-trained athletes can have first-degree heart block at rest because their heart is so well conditioned by exercise. Even non-athletes can have second-degree heart block during deep sleep from stimulation of a specific nerve in the body. When a person faints, they may have evidence of temporary heart block. A diagnosis of heart block does not always require your healthcare team to provide a treatment or intervention.



The diagram above shows terms that members of your healthcare team to talk about different parts of an ECG. The diagnosis of heart block is based on the relationship between the P-wave, which is the signal coming from the sinus node, and the QRS complex, which is the electrical response in the ventricles.

When the heart is in normal sinus rhythm without heart block, there is a P-wave before every QRS complex and a QRS after every P-wave.

- *First-Degree AV block* - In first-degree block, all of the signals that originate from the sinus node travel down to the ventricles, but the time for these beats to go across the AV node is consistently longer than accepted normal ranges.
- *Second-Degree Mobitz I AV block (Wenckebach)* - If a patient has Wenckebach (WHEN-key-bock) heart block, the time it takes to conduct consecutive sinus beats to the ventricles becomes longer and longer, until eventually a beat is “dropped,” or does not conduct down to the ventricles.
- *Second-Degree Mobitz II AV block* - Mobitz II AV block occurs when every now and again one sinus beat is blocked and fails to reach the ventricles. There can be a pattern to the block – for example, every other beat is blocked from the ventricles - or it can be sporadic, with random beats dropping.
- *Third Degree AV block (Complete Heart Block)* - When a patient has complete heart block, the electrical activity of the top and bottom of the hearts is not coordinated in any way. It also means the patient may not raise their ventricular heart rate appropriately, even when the body needs the ventricles to pump more blood, such as during exercise or while playing sports.

## Symptoms

Except for complete heart block, most AV block does not cause symptoms. If the ventricular rate is too slow, symptoms can include:



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- Feeding difficulty in infants
- Headaches
- Fatigue
- Dizziness or lightheadedness
- Syncope (fainting or passing out)
- Decreased exercise endurance/tolerance

Patients with third degree heart block may, but do not always, have symptoms at rest. This depends on whether they were born with heart block (called congenital heart block) or they developed heart block after they were born (called acquired heart block). Symptoms also can be affected by the speed of a patient's "escape rhythm," or the rhythm that comes automatically from the bottom of the heart. This rhythm is slower than a rhythm coming from the sinus node and is not as good at responding with a higher heart rate when the body needs the heart to work harder. This is what can cause symptoms with exercise – an escape rhythm may meet the body's needs at rest, but cannot respond to increased demand with activity.

## Diagnosis

The diagnosis of heart block is made based on specific findings noted on your electrocardiogram (ECG). Specifically, your healthcare team will look at the relationship between the electrical signals from the top of the heart and the electrical signals in the bottom of the heart.

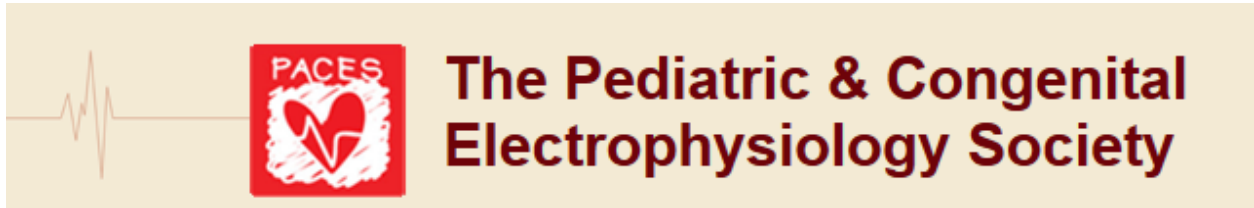
After a diagnosis of heart block has been made, your healthcare team may order additional testing. This may include a long-term monitor such as a Holter monitor to determine the frequency and severity of the heart block. Holters or other long-term monitors may be worn again for routine rhythm monitoring or if there is a concern about worsening heart block or symptoms.

Another common test after the diagnosis of heart block is an exercise stress test. This is done to see how well the patient's conduction system responds to increased cardiac demand from the rest of the body. A patient with first or second degree heart block at rest may or may not develop higher degrees of AV block, as well as more symptoms, with exercise.

## Treatment

Some causes of heart block are actually reversible. For example, if the heart block is a side effect of a medication treating another condition, is there an alternative medication that can provide the same benefit without the side effect? Is there an infection or other temporary situation that is affecting the heart's ability to conduct electrical signals in a normal fashion?

If a patient's heart block is not from a reversible cause, and the patient meets other criteria based on his or her resting heart rate, symptoms, or other information gathered by their



healthcare team, the only treatment for heart block is implantation of a permanent pacemaker. For more information on pacemakers, please visit our [visit our ICD/Pacemaker Overview page](#).



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