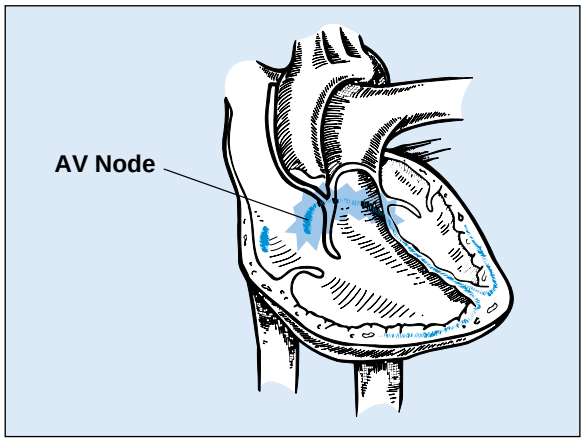
HEART BLOCK

The electrical signal from the SA node must pass through the AV node and continue on through the conduction pathways in the ventricles. The impulse may become slowed, irregular, or stopped at the AV node. This condition is called **heart block** because the electrical impulse is blocked from proceeding normally from the atria to the ventricles. Heart block is described as first, second, or third degree. How slow the ventricular rate becomes depends on the degree of heart block.



The electrical signal is slowed, stopped, or becomes irregular between the AV node and the conduction pathways in the ventricles.

Q Are there conduction disorders that result in a heartbeat that is too fast?

A Yes. Another conduction problem is **tachycardia** (pronounced tack-ee-car-dee-ah), which is an abnormally fast heart rate. In tachycardia, the heart pumps quickly but inefficiently. With tachycardia, as with bradycardia, the heart is not meeting the body's blood circulation demands. Tachycardia may originate in either the atria or ventricles and the location affects how it is treated.

Q How can I learn more about my heart and its conduction system?

A Your physician or cardiology nurse is best suited to answer questions about your heart.

Medtronic publishes a patient newsletter periodically. This newsletter contains educational articles of interest to pacemaker wearers. To read or print online, visit www.medtronic.com/rhythms/

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Medtronic, Inc.
Patient Services, V255
3850 Victoria St. N.
St. Paul, MN 55126-2978

Medtronic
When Life Depends on Medical Technology

United States of America
Medtronic, Inc.
7000 Central Avenue NE
Minneapolis, MN 55432-3576
USA
Toll-free: 1-800-551-5544
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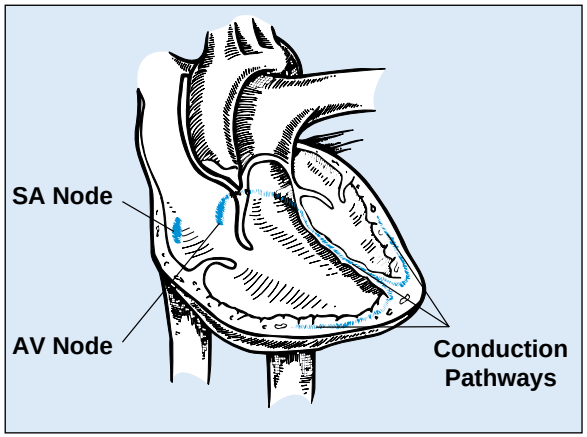
Medtronic
Restoring the Rhythms of Life

The Heart's Conduction System

Your heart has the remarkable ability to beat rhythmically. The healthy heart beats approximately 100,000 times a day and pumps about five quarts of blood each minute, or 75 gallons of blood every hour. Its steady rhythm sends oxygen-rich blood and nutrients to all your body's cells with every heartbeat.

Q *What makes the heart beat?*

A Your heart has its own electrical conduction system. Special tissues generate electrical signals that travel along pathways through the heart every time it beats.



The heart's electrical signal travels from the SA node to the AV node and through the conduction pathways of the heart.

THE SINOATRIAL (SA) NODE

Your heart's natural pacemaker is called the **sinoatrial** or **SA node** and is located in the upper right chamber of the heart **(right atrium).** The SA node produces very small electrical impulses which vary in rate depending upon your body's demands for oxygen- and nutrient-rich blood.

Typically the SA node initiates 60 to 80 heartbeats a minute in an average person at rest. It also responds to the need for a faster heart rate. If you are exercising or excited, your body will require greater blood circulation. A healthy SA node responds to these changes in the body and increases your heart rate accordingly.

THE ATRIOVENTRICULAR (AV) NODE

After the electrical impulse leaves the SA node, it travels through the upper half of the heart, causing the **atria** to contract, and then to a junction called the **atrioventricular** or **AV node**. From there, the impulse travels down the **conduction pathways** in the bottom half of the heart, causing the **ventricles** to contract. This synchrony of contractions forces the blood out of the heart and into the body.

If the heart's own electrical conduction signal is interrupted, delayed, or stopped, heart rhythm disturbances may result.

Q *What are the causes of heart conduction or rhythm problems?*

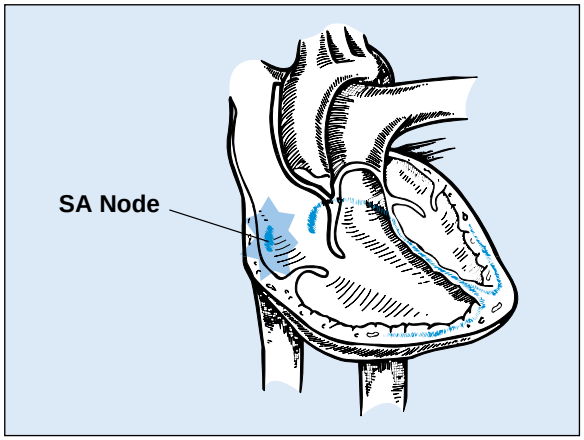
A There are many reasons why a heart's conduction system may become impaired. Perhaps a hereditary heart defect has affected the heart's rhythm. Certain illnesses or certain cardiac drugs may hinder the heart's naturally occurring rhythm. The conductive tissue of the heart may lose some of its ability to transmit electrical impulses because of the aging process. Sometimes a heart attack may leave scar tissue that prevents an electrical signal from proceeding through the heart. Any of these causes may result in **symptomatic bradycardia** (pronounced bray-dee-car-dee-ah). Symptomatic bradycardia is the most common reason for pacemaker therapy.

Q *What is bradycardia?*

A Bradycardia is a broad term meaning a heart rate that is too slow. Dizziness, fatigue, or fainting spells may result if your heart is unable to circulate enough blood for your body's needs.

Bradycardia may be caused by the following heart conduction problems:

SINOATRIAL (SA) NODE DISEASE



The electrical signal is stopped between the SA node and AV node.

Rhythm disorders that involve the SA node are classified under the broad term **Sick Sinus Syndrome.** If the SA node, your heart's natural pacemaker, loses the ability to initiate a heartbeat or increase the heart rate, the heart may not be able to respond effectively to the body's changing circulation demands. In response to Sick Sinus Syndrome, other tissues in the heart often take over the job of the SA node, but at an inconsistent rate or a rate that is too slow or too fast for normal activities.