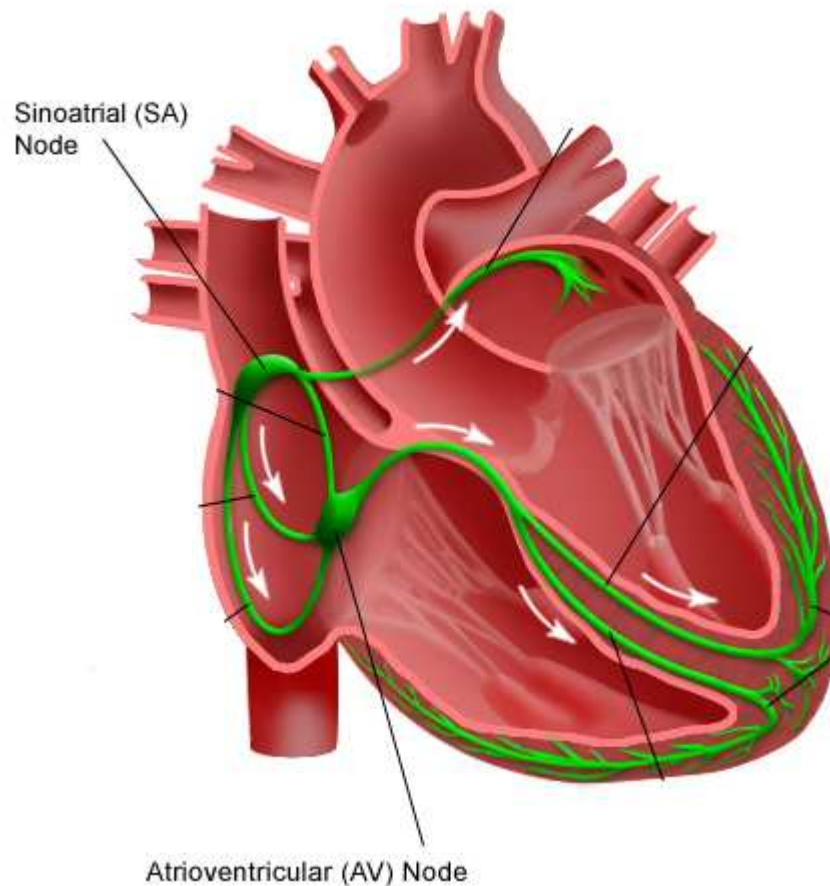


## Electrical System of the Heart



The heart is the only organ that can work totally independently of the brain. It can do this because it has its own electrical system, which causes contraction of the muscles, which creates circulation.

The SA node initiates the electrical impulse. The impulse travels around the atriums (top 2 chambers) causing them to contract. Once the impulse reaches the AV node, the node holds onto it for a fraction of a second. Then the AV node releases the impulse and it travels around the ventricles (the bottom 2 chambers) causing them to contract.

A malfunction of the electrical system can result in a heart attack and cardiac arrest. However, before the heart stops totally it will go through fibrillation. This is an irregular heart rhythm.

Regular heart rhythm



Bradycardia (irregularly slow)



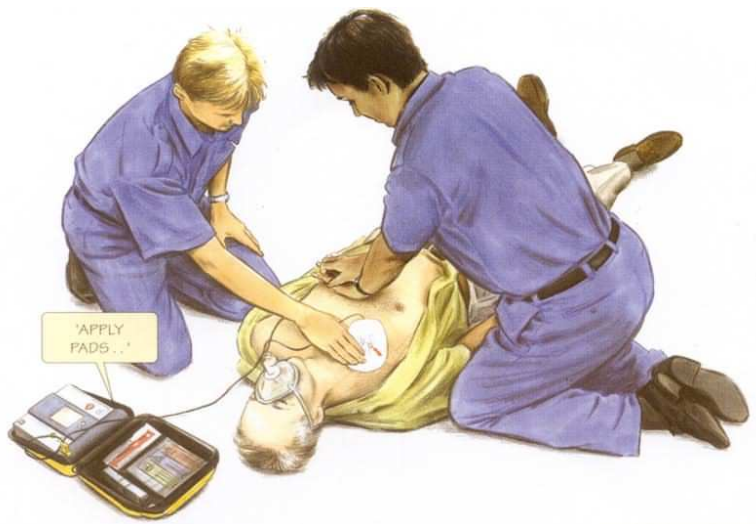
Tachycardia (irregularly fast and uncoordinated)



If tachycardia occurs the rhythm may become so irregular that circulation will stop. At this point the person will become unconscious. Soon after that breathing will stop and the heart will stop shortly after that. CPR, along with defibrillation, is the best hope of resuscitation.

DEFIBRILLATION – AED

- Fibrillation is what happens in 80% of the cases when someone is unconscious from a heart attack. This is a condition where there is still electrical activity in the heart, but it is very irregular and erratic. As a result, the heart is not working properly to create circulation.
- An Automated External Defibrillator (AED) is a machine that is designed to administer an electric shock. The shock will momentarily cause the heart's electrical system to stop, then it will begin to work again with a regular rhythm. The main reason this works is because the heart has its own, self-sustaining, electrical system.
- A defibrillator can detect electrical signals from the heart and determine if a shock would benefit the person. The main factor is whether or not the heart is fibrillating. If the electrical rhythm is normal, or there is no electrical activity at all, then the machine will not shock.
- AEDs are slowly becoming more common. They have been shown to save many lives if they are used on the spot by trained bystanders, before the paramedics arrive. The key to this lifesaving machine is that it must be administered as soon as possible, because the casualty's chance of being saved decreases by about 10% with every minute of delay. CPR is still an important component in helping someone with no signs of circulation.



*Using a defibrillator:*

- These machines should only be attached/used on an unconscious non-breathing person. They are designed for adult and children over 25kg in weight.
- Bear the person's chest. Remove all clothing, including bras and jeweler. If needed shave the areas where the pads will be placed.
- Remove the covering from the pads and place one pad on the right hand side between the shoulder and the neck, just over the collarbone. Place the second pad on the left side about 3 inches below the left breast over the ribs. Look at the diagrams on the pads for more info.
- Plug the pads into the machine.
- Turn the machine on.
- Once the machine is on follow the machine's instructions fully. It will tell you exactly what to do. See next page for sample.
- First, the machine will analyze the heart's electrical activity. It will do this every two minutes regardless of what happens next.
- If the machine detects a non-shockable rhythm then the machine will tell you to begin CPR. In the meantime it will give you a two minute count down, at which point it will re-analyze.
- If the machine detects a shockable rhythm it will begin to charge. When it is ready it will tell you to deliver a shock. You do this by simply pushing the shock button.
- Before delivering the shock make sure no one, including you, is touching the person, as this is electricity and can be very dangerous.
- After the shock the machine will tell you to begin CPR. In the meantime it will give you a two minute count down, at which point it will re-analyze.
- This process will be repeated to a maximum of 9 times. At which point the machine will not shock again. But, if needed, continue CPR until paramedics arrive.

*Narration of a Defibrillator:*

Below is an example of what the instructions might sound like from a defibrillator once it is turned on. It will provide the user with step by step instructions. Always follow these instructions.

- Attach pads onto bear chest.
- Plug pads into machine.
- Analyzing.
- Do not touch the patient.
- Analyzing.
- Shock advised.
- Charging.
- Press the yellow button.
- Shock delivered.
- Begin CPR (for 2 minutes).
- Stop CPR.
- Analyzing.
- Do not touch the patient.
- Analyzing.
- Shock advised.
- Charging.
- Press the yellow button.
- Shock delivered.
- Begin CPR (for 2 minutes).
- Stop CPR.
- Analyzing.
- Do not touch the patient.
- Analyzing.
- No shock advised.
- Begin CPR.