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### **Heart Failure Device Therapy**

Implantable devices used for treating heart failure have been around since the 1940s since the pacemaker was developed. There have been few advances until the 1980s. Around that time research picked up once again. It wasn't until the mid 1990s though, that huge advancements were made. The advents of implantable cardioverter defibrillators (ICD) and cardiac resynchronization therapy pacemakers (CRT) have saved the lives of countless patients.

The goal of implantable devices is to assist the heart in functioning normally. They help in maintaining a normal beating rhythm or enhance the pumping of the left ventricle. There are also devices that can provide a life saving shock to the heart if it begins to beat too rapidly. Many of the devices have the ability to perform more than one of the aforementioned tasks.

The implantable cardioverter defibrillator acts as an internal defibrillator. When the heart undergoes ventricular tachycardia the ICD responds by sending a shock to the heart through two leads. This shock is intended to force the heart into a normal beating rhythm. Through clinical trials it has been shown that the ICD has effectively stopped 90% of cardiac arrest.

The pacemaker performs a similar task to the ICD. Where the ICD senses an increasing heart beat the pacemaker senses the slowing of the heartbeat, or bradycardia. Once the pacemaker sense the

bradycardia it sends impulses through 2 leads. Unlike the ICD the impulses sent by the pacemaker can't be felt and can occur without the patient knowing.

The CRT is specially designed for patients who have lost coordination between the left and the right sides of the heart. This means the left ventricle can't pump effectively, depriving the rest of the body of blood. The CRT performs the same job as the pacemaker but also monitors left ventricle and synchronizes the sides of the heart using 3 leads. The CRT works so well that it has shown to reverse the effects of heart failure.

There are many new advances being worked developed around the world. The EnPulse® Pacing System automatically adjusts itself without the aid of a doctor. It also allows the heart to beat on its own as much as possible, reducing the amount of unnecessary impulses on the ventricles. Also the EnPulse allows the patient to send their data to their doctor over the phone lines, removing the need for weekly visits.

These devices, along with ones in development, represent the saved lives of the millions of patients who use these devices.

### **References**

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