

Artificial Hearts

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- An **artificial heart** is a prosthetic device that is implanted into the body to replace the biological heart.
- 2 types of artificial heart:
 - TAH(Total Artificial Heart)
 - Cardiac Assist device
- Benefit of a functional artificial heart would be to lower the need for heart transplants.
- The first artificial heart implanted in a living being was placed in a dog at the Cleveland Clinic in 1957; it survived about 90 minutes.
- April 4, 1969 Liotta and Cooley replaced a dying man's heart with a mechanical heart inside the chest. The patient woke up and recovered well. After 64 hours the artificial heart was removed and replaced by a donor heart. However; thirty-two hours after transplantation the patient died of what was later proved to be an acute pulmonary infection, most likely caused by an immunosuppressive drugs complication. If they left the artificial heart in place the patient may have lived longer.
- Modifications:
 - ✓ A ventricle with hemispherical diaphragms that did not crush red blood cells
 - ✓ An external heart driver that inherently regulated blood flow without needing complex control systems.
 - ✓ An ovoid shape to fit inside the human chest.
 - ✓ A more blood-compatible polyurethane that made the inside of the ventricles smooth and seamless to reduce dangerous stroke-causing blood clots.
- In 1982, Dr. DeVries implanted the artificial heart into retired dentist who survived 112 days with the device. Bill Schroeder became the second recipient, and lived for a record 620 days.
- AbioCor is the first fully implantable total artificial heart which unlike previous total artificial hearts does not require wires to external devices. The internal battery lasts for half an hour and a wearable external battery pack lasts for 4 hours. It is intended for critically ill patients who cannot receive a heart transplant. Some limitations of the current AbioCor is that because of its size it is implantable in only 50% of the male population and has a life span of 1 to 2 years.
- In 2006, an artificial heart was implanted into a 15-year old girl in Canada. It was intended to act as a temporary fixture until a donor heart could be found. Instead, the artificial heart (called a Berlin Heart) allowed for natural processes to occur and her heart healed on its own. After 146 days the Berlin Heart was removed.
- Disadvantages of artificial hearts :
 - Even though they should be permanent they are only functioning less than two years
 - An artificial Heart costs around \$250,000 without the cost of surgery.