

device cards

Transplant

A healthy donor heart has become available for surgery and implantation.



Pros

- Ready for implantation immediately
- No mechanical wear-and-tear
- No external connectors
- Not battery-powered

Cons

- Potential immune response
- Expensive to maintain (requires a lifetime of immunosuppressant drugs)

Transplant waitlist

Place the patient on the waitlist for a heart transplant



Pros

- No mechanical wear-and-tear
- No external connectors
- Not battery-powered

Cons

- Transplant opportunity may not come
- Potential immune response

Thoratec Pneumatic Ventricular Assist Device

Artificial organ

Pulsatile flow, assists function in one or two ventricles. This device is not for long term use. It is meant to assist the patient until a transplant become available or the patient's heart recovers.



Pros

- External pump (can be used in smaller patients)
- Mimics pumping of the heart (pulsatile)
- Most mature technology today

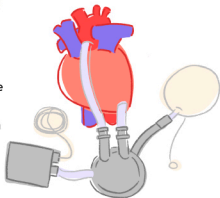
Cons

- External pump (increased risk of infection because tubes need to cross the skin)
- Mechanical wear-and-tear
- Needs valves

Arrow LionHeart Pump

Artificial organ

Uses an electrical motor to squeeze a blood sac, causing the blood to get pumped. This device is designed for long term implantation.



Pros

- Fully implantable (no external wires needed)

Cons

- Large (can only be implanted into larger chests)
- Electrically powered (needs to be charged)

Thoratec Heartmate II

Artificial organ

Most commonly used to assist the left ventricle. This device can be implanted for long term use or be used until a transplant becomes available.



Pros

- Small device
- Fewer moving parts, simpler device
- Less energy needed
- Portable design with backpack

Cons

- System has higher stress which can destroy red blood cells and platelets
- Electrically powered (needs to be charged)
- Wire needs to cross the skin to provide electricity (increased risk of infection)

SynCardia TAH

Artificial organ

Temporary total artificial heart (replaces both ventricles). This device is most commonly used until a transplant becomes available. Clinical trials are ongoing for long term use.



Pros

- Large and small versions (not for children though)
- Portable design with backpack

Cons

- Electrically powered (needs to be charged)
- Wire needs to cross the skin to provide electricity (increased risk of infection)
- More complicated surgery required

ABIOMED AbioCor Artificial Heart

Artificial organ

Hydraulic pump driven. Total heart replacement (replaces both ventricles) designed for patients who are generally older and illeligible for a transplant.



Pros

- Fully implantable
- Increased mechanical durability due to design

Cons

- Large (can only be implanted into larger chests)
- Electrically powered (needs to be charged)
- More complicated surgery required
- Relatively new technology (more chanches to lead to failure or complications)

Cardiac patch

Tissue engineering

Assists the heart so that the patient can regain enough heart function. Patch is grown and then placed onto the damaged heart through open heart surgery.



Pros

- Low risk of immune response because own stem cells are being used
- No mechanical wear-and-tear
- No batteries, recharging necessary
- Cells stay active longer on a patch compared to stem-cell injections

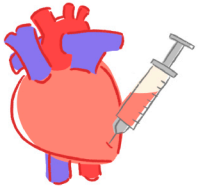
Cons

- Very new therapy (long term effects not researched)
- Needs time to be grown (not available for implantation immediately)

Stem cell therapy

Tissue engineering

Stem cells taken from the patient's bone marrow is injected into the heart. Stem cells have the ability to develop into different types of cells that can help heal damaged tissue.



Pros

- Low risk of immune response because own stem cells are being used
- No mechanical wear-and-tear
- No batteries, recharging necessary

Cons

- Very new therapy (long term effects not researched)
- Needs time to be harvested (not available for implantation immediately)
- Not yet proven to be safe or beneficial