

Mechanical artificial hearts

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The possibility of maintaining life artificially in animals or parts of animals has excited the interest of many over the last century. Since the late nineteenth century, scientists have tried to develop a mechanical device that could restore oxygen to the blood and remove excess carbon dioxide, as well as a pump to temporarily supplant heart action. But technological constraints and negative publicity held back the work. It became clearer that reproducing an organ with unique muscle tissue able to be revived despite a heart attack as well as beat more than 100, 000 times a day would be much more difficult than originally thought. The task involves not just mimicking the mechanics of the heart but its interaction with the brain.

The significance of heart is no less profound today, but now it assumes an aura of pragmatism with concern for healthfulness which has resulted in the development of the mechanical heart. In patients with advanced heart failure, their heart isn't strong enough to pump sufficient blood for normal activities, leaving them greatly fatigued and frequently bedridden with difficulty breathing. Mechanical heart pumps are designed to help the heart pump blood from the left ventricle to the aorta, increasing flow throughout the body. A mechanical heart is designed to reduce the total workload of a heart that can no longer work at its normal capacity. These hearts consist of equipment that pulses the blood between heartbeats or use an artificial auxiliary ventricle (left ventricle assist device, LVAD) that pumps a portion of the normal cardiac output. Because such devices usually result in complications to the patient, they have generally been used as a temporary replacement until natural hearts can be obtained for transplantation.

Two artificial hearts have been invented in the US, the Jarvik 7 and the AbioCor, but both have drawbacks: the first has wires that protrude through
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the skin, and the second can produce blood clots that can lead to stroke.

The mechanical heart restores hemodynamic stability; raising blood pressure and helping vital organs recover, as much as possible, in preparation for a heart transplant. For persons who do not heart transplant candidates, the mechanical heart has allowed prolonged time with family and friends, and time to enjoy desired activities. Patients can even go home with a fully implanted mechanical heart.

Advantages of the mechanical heart are that it is readily available and there is no need for immunosuppressive drugs, which can compromise renal function and leave the patient susceptible to infection. Also, these patients already suffer from organ damage or stress, due to the heart's impaired ability to pump efficiently. The decreased blood flow that results from organ damage and stress impairs the functioning of vital organs such as the liver, kidney, and brain.