

# Brief history of pacemakers - 2008

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The first external pacemaker was designed and built by the Canadian electrical engineer John Hopps in 1950. A substantial external device, it was somewhat crude and painful to the patient in use.

A number of inventors, including Paul Zoll, made smaller but still bulky external devices in the following years. The pacemakers built in the late 1950s were bulky, relied on external electrodes, and had to be plugged into a wall outlet. External electric shocks were frequently too traumatic for young heart block patients, and the AC-operated pacemaker could fail during a power blackout.

The first implantation into a human was made in October 1958 by a Swedish team using a pacemaker designed by Rune Elmqvist and Åke Senning.

The device failed after three hours.

A second device was then implanted which lasted for two days. The world's first implantable pacemaker patient, Arne Larsson, survived the first tests and died in 2001 after having received 22 different pacemakers during his lifetime. In February 1960, an improved model relying on better materials was implanted in Montevideo, Uruguay.

That device lasted until the patient died of other ailments, 9 months later. The early Swedish designed devices used rechargeable batteries, which were charged by an induction coil from the outside. Devices constructed by the American Wilson Greatbatch entered use in humans from April 1960 following extensive animal testing. The first patient lived for a further 18 months. The early devices suffered from battery problems - every patient required an additional operation every 24 months to replace the batteries. Others who contributed significantly to the technological development of the pacemaker in the pioneering years were Bob Anderson of Medtronic Minneapolis, Geoffrey Davies of Devices Ltd in England, Barouh Berkovits and Sheldon Thaler of American Optical, Geoffrey

Wickham of Telectronics Australia, Walter Keller of Cordis Corp. of Miami and Hans Thorander who joined previously mentioned Rune Elmquist of Elema-Schonander in Sweden.

Pacemakers require wires (called leads) to both send the pacing pulses to the heart and sense the intrinsic rhythm of the heart. The first pacemakers required these leads to be placed surgically on the outer surface of the heart. In the mid 1960s, the first transvenous leads were placed. This allowed the placement of pacemakers without opening the thoracic cavity and therefore without the use of general anaesthesia. The first American-made nuclear-powered pacemaker was developed and implanted at Newark Beth Israel Medical Center in Newark, New Jersey.