



PACEMAKERS, FROM START TO SMALLEST

A TALE OF PACEMAKER EVOLUTION

Pacemakers have come a long way, and improved millions of lives, since their 1949 invention. They were bulky boxes plugged into walls for power until 1958 when Medtronic developed a four-inch, battery-powered box that could be taped to patients' chests. The devices soon became small enough to be implanted in the body but needed frequent recharging, until Medtronic first commercially produced implantable pacemaker technologies in 1960. Later developments include technology that adapts pacing rate to activity levels, MRI-safe devices and finally, today's new Micra[®] Transcatheter Pacing System (TPS) —so tiny it's delivered via a catheter and implanted directly into the heart, free of leads.

Learn about Micra TPS: [medtronic.com/us-en/patients/treatments-therapies/pacemaker/micra.html](https://www.medtronic.com/us-en/patients/treatments-therapies/pacemaker/micra.html)

Medtronic



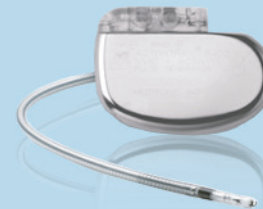
WEARABLE EXTERNAL
PACEMAKER

1958



IMPLANTABLE
PACEMAKER

1960



RATE RESPONSIVE
PACEMAKER

1986



MRI CONDITIONAL
PACEMAKER

2011



TRANSCATHETER
PACEMAKER

TODAY

283g



WEIGHT THEN
The first wearable pacemaker weighed **over half a pound** and was worn externally around the patient's neck.



WEIGHT NOW
The Micra TPS is implanted in the patient's heart and weighs **about the same as a penny**.



The leadless pacemaker is delivered via a minimally invasive procedure and is **cosmetically invisible**.

approx 4x2.5 in



SIZE THEN
1958

size of a large vitamin



SIZE NOW
2016