

Pacemaker and ICD Developments Fact Sheet

Fact Sheet

1958



First fully implantable pacemaker Arne Larsson became the first person to receive a fully implantable pacemaker in a groundbreaking operation in Stockholm, Sweden. Mr. Larsson went on to enjoy a full, active life until his death in 2001 at age 86. At that time, he had received 22 pacemakers over a period of 43 years. His passing was unrelated to any cardiac or device problem.

1962

First permanent endocardial pacing leads produced by Siemens-Elema Endocardial leads, threaded through a patient's vein into the heart, replaced the common practice technology of attaching leads to the outside of the heart. This advancement allowed doctors to implant pacemakers without opening the chest, significantly reducing procedure risk.

1979



First pacing system to use bi-directional telemetry to allow reprogramming of an implanted device With the introduction of the Programalith pacemaker, physicians were able to “communicate” noninvasively with an implanted device and reprogram it without surgery.

1981

First microprocessor-based pacemaker The Tachylog™ device was a tachycardia-terminating pulse generator controlled by a microprocessor that offered four programmable tachy-terminating programs. Adopting computer technologies to accommodate increased capabilities significantly enhanced a physician's ability to adjust pacemaker settings and obtain diagnostic information.

1989



First dual-chamber, rate-modulated pacemaker released in the U.S. The Synchrony™ pacemaker was the first dual-chamber, rate-modulated pacing device, which allowed the paced rate to increase during exercise while maintaining AV synchrony.

1992



Launch of Auto Mode Switch (AMS) AMS is designed to improve patient comfort through smoother rate transitions, improve hemodynamics, prevent rapid ventricular response to atrial tachyarrhythmias and maintain cardiac output during AMS episodes.

1993

Development of DeFT Response® technology Approximately 10% of patients have high defibrillation thresholds (DFTs), either at or post-implant. The set of algorithms now known as DeFT Response technology was the first to give physicians a quick and noninvasive tool for managing high DFTs. The technology was developed over a series of devices, beginning with the Cadence™ ICD (implantable cardioverter defibrillator) in 1993.

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1993



First FDA-approved ICD with back-up pacing capabilities The Cadence™ ICD combined ICD and pacing features into a single device, providing optimal, synchronized therapy.

Previously, patients who needed both ICD and pacing therapy had to get two separate devices, which were not capable of interacting. By combining ICD and pacing features into a single device, patients could receive optimal, synchronized therapy.

1995



World's smallest pacing device, the Microny® pacemaker, introduced for smaller patients The Microny pacemaker weighs approximately 14 grams and is roughly the size of a half-dollar.

1995

Introduction of AutoCapture™ Pacing System AutoCapture Pacing System, first incorporated into the Microny® and Regency® devices, was the first algorithm designed for pacemakers to monitor ventricular capture on every beat of the heart, and then deliver the minimum amount of energy required for pacing—extending battery life while maximizing patient safety by ensuring heart rate support. If capture was lost in association with the primary pulse, a high output back-up pulse was delivered within the next 100 ms.

1996



FlatCap® capacitors change the size and shape of ICDs A capacitor is necessary to ensure a 3.5 volt battery can provide the more than 750 volts required to deliver “shock” therapy. Flat capacitors, first introduced in the Contour™ ICD, replaced the original, bulky capacitors, greatly reducing the size of ICDs, allowing devices to be placed in the upper chest rather than the abdomen.

2001



First pacemaker with Atrial Fibrillation Suppression capabilities The Integrity™ AFX pacemaker was the first U.S. device to offer clinically proven stimulation therapy to suppress symptomatic atrial fibrillation. AF is known to be a common risk factor for stroke and can greatly diminish a person's quality of life.

2006

First algorithm to calculate optimal timing cycles for CRT patients in about a minute The Merlin® Patient Care System and Model 3510 Programmer software were the first products to feature QuickOpt® technology, which uses an exclusive algorithm to automatically calculate optimal timing cycles. Previously, optimizing timing cycles required patients to undergo expensive and time-consuming echocardiography. The QuickOpt algorithm makes the calculation in about a minute.

2006



Launch of a unique lead insulation developed specifically for use with pacemakers and ICDs Optim® lead insulation is the first hybrid lead insulation material specifically designed for implanted pacing and defibrillation systems, combining the flexibility of high-performance silicone rubber with the strength and tear resistance of polyurethane. Both the Riata® ST and Tendril® 1888 leads were launched in 2006 with this new insulation.

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2009



First-to-market single-pin connector system The SJ4 connector is designed to simplify implants by streamlining defibrillation connections into a single terminal pin and reducing the number of set screws. This streamlined design helps to reduce pocket bulk.

2009



First pacemaker with RF telemetry from implant through follow-up The Accent® RF pacemaker and Anthem® RF CRT-P (cardiac resynchronization therapy pacemaker) feature RF telemetry that enables secure, wireless communication between the implanted device and the programmer used by the clinician or a home monitor, making it the first integrated system of pacing devices with wireless telemetry from implant through follow-up.

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