**The History of Technology in Medicine**

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The history of medical technology can be dated back many centuries. However, the use of computers in the medical field only really came to be during the 1970s. Before then, the inventions and discoveries of many different medical devices have already been done and have shaped the way medicine is practiced in the modern day. Some of the earliest medical technology that has been recorded are prosthetic devices that were made in Egypt and of wood and leather in 950 BCE as well as Greek and Roman surgical equipment that set the pattern of modern equipment between 300-500 CE (Yale School of Medicine 2019). In the 1960s, the discovery of medical technology increased alongside the quality of life and life expectancy. Medical technology has made a great contribution to the practice of medicine, from the quality of care to the longevity and quality of life.

The advancements in technology have been very important in the medical field. They have an extensive history beginning many centuries ago; however, an increase in discoveries and inventions began to occur in the 1950-60s. In 1950, the first successful cardiac pacemaker was developed by an electrical engineer, John Hopps (Yale School of Medicine 2019). *Medical devices timeline* (2020) states, “The bulky device, worn externally on the patient’s belt, plugs into an electric wall socket and stimulates the heart through two metal electrodes placed on the patient’s bare chest.”

In 1958, Hal Anger invented an imaging device that enabled healthcare professionals to detect tumors and make a diagnosis. This is done by imaging gamma rays being emitted interacting with a light-emitting crystal. The light is then detected by a sensitive camera, then the image is able to be read by a physician (*Medical devices timeline* 2020).

In 1959, the technology and applications for ultrasound as a tool in diagnostic imaging for obstetrics and gynecology was developed by Ian Donald (*Medical devices timeline* 2020). *Medical devices timeline* (2020) states:

“Ultrasound displays images on a screen of tissues or organs formed by the echoes of inaudible sound waves at high frequencies (20,000 or more vibrations per second) beamed into the body. The technique is used to look for tumors, analyze bone structure, or examine the health of an unborn baby.”

In the 1950s, John Charnley developed the first artificial hip replacement procedure, also known as arthroplasty. In 1962, Charnley planned to use a new material suitable for artificial hip joints. *Medical devices timeline* (2020) states, “...he devises a lowfriction, high-density polythene suitable for artificial hip joints and pioneers the use of methyl methacrylate cement for holding the metal prosthesis, or implant, to the shaft of the femur.” His principles are then also applied to other joint replacements. Titanium became the metal of choice for arthroplasty due to its strength to weight ratio and the human body does not reject it (*Medical devices timeline* 2020).

In 1960, the first internal pacemaker was developed by Wilson Greatbatch. It was made using two commercial silicon transistors. This internal pacemaker was implanted into 10 severely ill patients, the first patient lived for another 18 months, while another lived for another 30 years (*Medical devices timeline* 2020).

In 1962, the first positron emission tomography (PET) camera was invented by Sy Rankowitz and James Robertson. “It uses the annihilation of positrons, an anti-matter form of electrons, to produce two gamma rays directed in opposite directions. The two gamma rays detected simultaneously indicate a line where the positron was produced” (*Medical devices timeline* 2020). This scan is usually done to discover the presence of cancer and to look into the effects of cancer therapy (*Medical devices timeline* 2020).

In 1963, Francis L’Esperance began to work on a treatment for diabetic retinopathy, a complication with diabetes and one of the leading causes of blindness in the United States of America, using a ruby laser photo-coagulator. In 1965, L’Esperance began to work with Eugene Gordon and Edward Labuda in designing a procedure for eye surgery using an argon laser. In early 1968, L’Esperance finally began to use the laser to treat diabetic retinopathy (*Medical devices timeline* 2020).

In 1969, Tom Clemens invented the first portable glucose monitor. This device was manufactured by the Ames Diagnostics. This allowed patients to monitor their condition at home, providing patients with diabetes a much healthier and better quality of life (*Medical devices timeline* 2020).

In 1971, the first soft contact lenses officially became a new product. This was a result of years of research done by Czech scientists Otto Wichterle and Drahoslav Lim. The research of the soft contact lens was based on the invention of hydrophilic gel, “...a polymer material that is compatible with living tissue and therefore suitable for eye implants” (*Medical devices timeline* 2020). Soft contacts allow more oxygen to reach the cornea compared to hard plastic lenses (*Medical devices timeline* 2020).

In 1972, the first computerized axial tomography scanner (CAT scan), or CT scan, was developed by Godfrey Hounsfield and Allan Cormack. With the assistance of a computer, “...the device combines many x-ray images to generate cross-sectional views as well as three-dimensional images of internal organs and structures” (*Medical devices timeline* 2020). It is used to guide the position of equipment or treatments. CAT scans would eventually be primarily used for the diagnosis of brain and spinal disorders (*Medical devices timeline* 2020).

In 1978, the first cochlear implant surgery was done by Graeme Clarke. Advancements in integrated circuit technology allowed Clarke to design the first cochlear implant. *Medical devices timeline* (2020) states, “Advances in integrated circuit technology enable him to design a multiple electrode receiverstimulator unit about the size of a quarter.”

In 1979, the first portable insulin pump was invented. The pump was designed to imitate the body’s release of insulin. The device provides a dose of insulin through tubes that were inserted into the abdomen. The first pumps were large and heavy so they had to be carried in a backpack. In the modern day, the pumps are now smaller and lighter (*Medical devices timeline* 2020).

In the 1970s, the first arthroscope was invented. Surgeons were able to look into joints and other surgical areas using an arthroscope. Advancements in fiber-optic technology led the path for the invention of the arthroscope. *Medical devices timeline* (2020) states:

“...an instrument the diameter of a pencil, containing a small lens and light system, with a video camera at the outer end. Used initially as a diagnostic tool prior to open surgery, arthroscopic surgery, with its minimal incisions and generally shorter recovery time, is soon widely used to treat a variety of joint problems.”

In the 1980s, the foundation of the modern day controlled drug delivery technology was developed by Robert Langer. With the use of pellets and non degradable polymer, Langer creates “...a porous structure that allows the slow diffusion of large molecules” (*Medical devices timeline* 2020).

In 1982, the first permanent artificial heart was implanted into a patient. The artificial heart was made of silicon and rubber and the device was designed by the collaboration of many. The patient lived for another 112 days with the artificial heart (Medical devices timeline 2020).

In 1985, the implantable cardioverter defibrillator (ICD) designed by Michel Mirowski was approved by the FDA. The device was designed to monitor and correct abnormal hear rhythms. For a patient to receive this device, they are required to survive two cardiac arrests to qualify (*Medical devices timeline* 2020).

In 1987, a deep-brain electrical stimulation system was implanted into a patient with Parkinson’s disease. The implantation was done by Alim-Louis Benabid. This treatment, though experimental, was also used to treat dystonia (*Medical devices timeline* 2020).

In 1987, the first laser surgery on the cornea was performed by Steven Trokel. *Medical devices timeline* (2020) states:

“Nine years later the first computerized excimer laser—Lasik—designed to correct the refractive error myopia, is approved for use in the United States. The Lasik procedure has evolved from both the Russian-developed radial keratotomy and its laser-based successor photorefractive keratectomy.”

In 2002, a unit that combines CT and radiation delivery methods was developed by researchers in Wisconsin. The unit gave more effective treatments and lowered patient side effects. The system supplies a full 360 degree rotation of radiation and effectively treats the whole tumor (*Medical devices timeline* 2020).

In 2009, technology that allows amputees to have control over an advanced prosthetic arm was reported to be being developed by the Defence Advanced Research Projects Agency (DARPA) of the United States government. This technology will allow amputees to control the prosthetic the way they would with an actual arm. The prosthetic uses sensors to send signals to the limb to move it in whatever direction the user desires (*Medical devices timeline* 2020).

As seen, technological advancements have had a massive impact on the field of medicine. Technology has improved the quality of care, quality of life, and increased life expectancy significantly over the past 70 years. It has also vastly supported patients, healthcare professionals, as well as society as a whole. Ongoing advancements in medical technology will continue on involving these aspects of medicine and patient care. As the development of more medical technology comes, the quality of life and the life expectancy will continue to increase.

Work Cited

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