Hearing Aid

Kaushik Mitra

Associate Professor, Burdwan Medical College
Purba Bardhaman, West Bengal
ORCID Id: https://orcid.org/0000-0002-8865-373X

Hearing loss has existed since the beginning of humankind, and it's reasonable that these early people would have experimented with various treatments. But what exactly these early people had tried are unknown to us. Hearing loss is mentioned in ancient Egyptian manuscripts, and the ancient Greeks and Romans developed their own treatments for deafness. These typically included various medical concoctions and the occasional object placed into the ear canal.

The first records of hearing aid usage date back to the 13th century. According to some studies, medieval humans used animal horn to create primitive hearing instruments. This raw material was most likely obtained from cattle, specifically cows and rams.Hearing instruments were made from hollowed-out animal horns.Because they couldn't amplify sound, they were ineffective, but funnel-shaped items would serve as the dominant form of hearing aid.

Until the 16th century, it was widely assumed that people with hearing loss also suffered from a variety of other ailments. So, no extra importance was given to deafness.However, a Spanish monk named Pedro Ponce taught a nobleman's deaf sons how to read, write, speak. Then only, the treatment of deafness gained some importance.

The first officially recognized hearing aid debuted in the seventeenth century. These devices, known as ear trumpets, worked in the same manner as animal horns did: they funnelled sound waves to the ears. These trumpets came in a number of shapes and sizes and were made of everything from sheet iron to animal horns.

The ear trumpet, invented in 1634, marked the first significant step toward the development of hearing aid technology. However, its use did not become common until more than a century and a half later! Cumbersome and somewhat cartoonish, ear trumpets and their next generation, the speaking tube, were not truly useful in controlling hearing loss concerns among the masses.

Collapsible ear trumpets debuted in the 18th century, making hearing aids more portable. They were frequently custom-made for specific individuals and were becoming more popular. The next improvement occurred in the late 18th century, with the introduction of the foldable ear trumpet. Frederick C. Rein was the first to commercially manufacture these trumpets around 1800. Rein designed acoustic headbands to conceal the hearing devices within the user's hair, making them less visible.By the nineteenth century, ear trumpets were being manufactured commercially alongside other hearing aids such as hearing fans and speaking tubes. Ludwig van Beethoven had several handcrafted ear trumpets and used them for years. They are on display at the Beethoven Museum in Bonn, Germany.

Alexander Graham Bell's invention of the telephone in 1876, which included technology to alter the loudness, frequency, and distortion of sounds, inspired the development of the first hearing aid.People could now hear each other through a receiver without having to be physically there, sometimes better than in face-to-face interactions.This innovation spurred Thomas Edison, who had hearing loss himself, to build on Bell's original design and create a carbon transmitter that not only increased the electrical signal but also the number of decibels.Edison's carbon technology quickly became a major role in hearing aid development. While the narrow frequency range and scratchy sound were annoying, carbon hearing aids remained the top choice until the turn of the century.

Miller Reese Hutchison invented the first electric hearing aid in 1898. His design utilized an electric current to augment weak signals.Miller Reese Hutchison was an American electrical engineer and inventor. He developed some of the first portable electric devices, such as a vehicle horn.These gadgets helped to amplify voices, which the listener could hear through a speaker held to their ear.Hutchison assembled an electrical hearing aid for one of his friends; it was called the "akouphone" when it was first developed around 1895.Hutchison became interested in the innovation after

Correspondence Address:

Dr Kaushik Mitra
Associate Professor, Burdwan Medical College
Purba Bardhaman, West Bengal
ORCID Id: https://orcid.org/0000-0002-8865-373X

meeting a childhood friend, Lyman Gould, who was deaf due to scarlet fever. In addition to his technical skills, Hutchison had taken classes at the Medical College of Alabama to study ear anatomy. He established the Akouphone Company in Alabama to commercialize the gadget, but its original massive tabletop design proved impractical.

In 1913, the first commercially made hearing aids were introduced. These devices were heavy and not very portable. In the 1920s, vacuum-tube hearing aids were developed; these tubes were capable of converting speech into electric impulses, which were subsequently amplified.Beginning in the 1920s, advances in vacuum-tube technology resulted in lower-voltage, battery-powered hearing devices.These devices were still cumbersome but small enough to be worn on the body. Vacuum tubes significantly enhanced the amount of amplification available in hearing aids, allowing for the treatment of more severe hearing loss.

Transistors replaced the vacuum tubes in the mid-twentieth century, resulting in hearing aids that were pocket-sized and lower in weight. The concept of miniaturization was introduced alongside other technological developments spurred by World War II, which was critical to the advancement of hearing aids. The transistor was invented in 1948. Transistors could replace vacuum tubes in prior types of hearing aids, making them smaller, requiring less battery power, and producing less distortion.

The introduction of microprocessors in the 1970s further downsized hearing aids, and wearable analogue devices became commonplace throughout the decade. They were simple and magnified all sounds, including possibly undesirable noise, but some could be set to suit different listening situations. 1980s saw the creation of high-speed processors and microcomputers. Analogue devices evolved into hybrid devices until the City University of New York developed the first fully digital hearing aid in 1982.

1996 marked the official transition of hearing technology to digital. Improvements to their design and functionality increased their power and comfort, and these gadgets now offer more acoustic customisation than ever before. Streaming, automatically adjusting to specific surroundings, filtering out background noise, and detecting falls are just a few of the capabilities available in today's hearing aids, which are always evolving.

Hearing aids underwent numerous redesigns as our grasp of technology advanced. This helped to ensure that they were always fit for function and that there was little self-consciousness when wearing them. Even Bluetooth enabled hearing aids are available now. Several types of hearing aids are now available such as, behind-the-ear (BTE), in-the-ear (ITE), receiver-in-the-ear (RITE), in-the-canal (ITC), contralateral routing of signals/ bi-contralateralrouting of signals(CROS/BiCROS) etc.

Bibliography

1. Miller Reese Hutchison. In: Wikipedia [Internet]. 2024 [cited 2024 Mar 29]. Available from: https://en.wikipedia.org/w/index.php?title=Miller_Reese_Hutchison&oldid=1197709212

2. History of hearing aids. In: Wikipedia [Internet]. 2023 [cited 2024 Feb 3]. Available from: https://en.wikipedia.org/w/index.php? title= History_of_hearing_aids &oldid=1186211940

3. Salcott. Audiology & Hearing Health. 2023 [cited 2024 Mar 29]. The History of Hearing Aids. Available from: https://www.audiologyandhearing.com/blog/history-of-hearing-aids/

4. Magicss. Hearing Aid History: From Ear Trumpets to Digital Technology [Internet]. IEEE Pulse. 2020 [cited 2024 Mar 29]. Available from: https://www.embs.org/pulse/articles/hearing-aid-history-from-ear-trumpets-to-digital-technology/

5. Rd HSV 16103 WLY, Houston SF, Office:855-8916 T 77084. The History of Hearing Aids | Hearing Systems | Blog [Internet]. https://hearingsystemsinc.com/. 2019 [cited 2024 Mar 29]. Available from: https://hearingsystemsinc.com/the-history-of-hearing-aids/

Madame de Meuron with ear trumpet

Picture Courtesy: http://www.wochen-zeitung.ch/pic/artikel/14745.jpg