

HISTORY OF HEARING INSTRUMENTS



1800: The first company to manufacture hearing aids on a commercial basis is established. The company manufactures hundreds of different hearing aids, most of which are tubes and trumpets in limited numbers.

1892: The first patent for an electrical hearing aid is filed. Other patents follow, but none of these ever reach production. The first hearing aid is produced - an earphone connected to a carbon microphone fastened on a battery box. During this time, Alexander Graham Bell has also been mentioned as the person who built the first earphone for amplifying sound for the hearing impaired. But, he never filed a patent for what was possibly the "first hearing aid".



1899: This is when the first commercially manufactured hearing aid becomes available. This table-model instrument is made of carbon, and costs \$400.

1933: The Bone Conductor is invented and used in hearing aids. It is used for all types of hearing losses, but is most effective in assisting people with middle ear diseases.



1934: The first vacuum tube hearing aid is designed by two manufacturing companies. This kind of device needs two batteries in order to operate, and is limited by the lifetime of the batteries, which is often only one day!! It consists of four elements: a microphone,

earphone/receiver, amplifier and two batteries.



1947: Up until now, hearing instruments are only worn on the body. They are heavy and expensive to use due to high battery consumption. But all this changes, when the transistor is invented. This proves to be a fantastic invention,

even for hearing instruments. It is small,



cheap, and effective, and has a very low battery consumption compared to vacuum tube instruments.



1952: "The junction transistor" is introduced. Due to its enhanced data, this transistor is very suitable for hearing aid constructions and many manufacturers introduce their first transistorized behind-the-ear instruments.

1954: The first hearing aid built into spectacles is produced using transistors.



1955: The first in-the-ear



hearing aid is developed. Due to their size and shape, most of the first in-the-ear instruments are often referred to as "at-the-ear" instruments, because they are attached to an ear mold and protrude outside the ear.

1959: Hearing instruments, which only fill the ear canal – known as "in-the-canal" (ITC) instruments – become a reality only after a smaller battery is developed.

1969: The first hearing aid, which utilizes a built-in directional microphone, is manufactured.

1972: The first integrated circuit made for hearing instruments with compression is developed. A prototype hearing aid, which incorporates special circuitry "to remove environmental noises from speech", is designed.

1980: Integrated circuit technology is being further developed. Many new circuits, which utilize analogue sound processing, are marketed at this time.

1988: Many programmable hearing aids are introduced. Using conventional analogue circuitry, they can be programmed electronically from a specially designed computer and software or a user-operated remote control, which also can be used to program the instrument.

1991: The first fully automatic hearing aid without a volume control containing two-channel non-linear sound processing is presented.

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1994: A programmable completely-in-the-canal instrument is introduced with two programs and volume control and is controlled by a remote.

1996: A 100% digital behind-the-ear hearing instrument is based on a new audiological rationale called Adaptive Speech Alignment, which splits sounds in seven tone bands and utilizes two different speech processors -one for vowels and one for consonants.

1997: The new chip-set for the digital behind-the-ear instrument with improved performance allows for a 3-step acclimatization program, advanced feedback management and in-situ assessment of the client's most comfortable listening range. Also, the first fully digital completely-in-the-canal instrument is introduced which use a remote control and cards to store the instrument's different user programs.

1998 - 2006: Development continues with digital hearings aids with noise management, feedback management, directional microphones, and multi-bands. Most people can have digital technology and it's getting better and better.

2006 - Present: Today, we are still shaping the history of hearing aids, and hearing aid technology is constantly being updated. For example, new technologies are being introduced that allow the user to be directly involved with the fitting of his or her hearing aids. Instead of using basic prescriptions based on a user's audiogram, testing can be performed, similar to the optical testing done in an ophthalmologist's office, to hone the hearing aid's settings for the specific user. From listening to a narrow band of sounds and making loudness judgments to filling out a questionnaire with specific information, end users are able to modify their hearing aid settings to suit their needs.



Rules that utilize "fuzzy logic" (a system of computer instructions enabling the computer to deal with ambiguities¹) are built into some of today's hearing aids. This allows use of these customized settings to

ensure that the hearing aid output is constantly optimized to the listener's needs for every sound in every environment. Clinical studies show that this new generation of hearing aid technology can provide consistently improved intelligibility of speech in quiet and noisy environments, more comfort for the user in the presence of loud sounds, greater audibility of soft sounds, and improved sound quality over conventional amplification schemes.

Not all hearing aid manufactures offer this hearing aid technology, but it is worth finding because it



can greatly improve a user's hearing when using the hearing aid. Newer hearing aids are also being offered with limited occlusion of the ear (the feeling of being stopped up), making them nearly invisible and allowing maximum improvement.

In addition, a brand new hearing aid technology known as ADRO (adaptive dynamic range optimization) is starting to become available from some manufacturers. This is one of the most significant changes in the recent history of hearing aids, as it is a major update from traditional compression circuits that were most often used with digital hearing aids.

ADRO allows the hearing aid to make constant adjustments to its algorithms using fuzzy logic, delivering to the user a higher level of sound quality and eliminating louder sounds quickly. Echoes are also eliminated. The latest generation of ADRO, which goes one step beyond what was originally offered, is presented by some companies in an ultra low delay product that delivers up to 32 channels, a large increase over earlier products that only offered seven or eight. Some products in this new generation of hearing aids also incorporate a newer, adaptive directional microphone.

The Future: The future of hearing aids will bring extremely exciting new options for all users, just in time for the aging baby boomer generation. Transducers are getting smaller, and at the same time, circuitry is shrinking rapidly. This means that ever smaller, increasingly more powerful hearing aids will be able to be produced. And consumers will find themselves in control of their own hearing again, as they become even more involved with the fitting and adjusting of their hearing aids. We've come a long way from ear trumpets, but hearing aid technology is continuing to evolve with time, and we still have a long way to go. Development has come a long way and has a long way to go.