

Hearing Loss and Ear Surgery in the 21st Century

By: Michael Cho, MD

Hearing is comprised of a conductive and sensorineural component. Sound waves enter the ear canal and hit the ear drum, causing vibrations to be conducted through three ear bones (the ossicular chain), into the fluid filled inner ear (cochlea). This portion of sound conduction is defined as the *conductive component*. The *sensorineural component* is when the mechanical vibrations are converted in the inner ear to electrical impulses and then conducted via nerve fibers to the brain.

Hearing loss disorders affect 1 in 5 Americans. There have been many recent advances in technology and ear surgery that enable us to treat many of these conditions. A complete audiogram by a licensed audiologist should be performed in order to distinguish between the following possible causes.

Conductive Hearing Loss

Wax impaction is one of the most common reasons for hearing loss. It is caused by devices that push wax into the ear canal such as cotton swabs, hearing aids, and hands free ear buds. Certain wax dissolving drops or office irrigations can be helpful, but if the wax is not fully removed and there is retained water, an ear canal infection or otitis externa may result. An Otolaryngologist should be sought to microscopically remove the wax and to treat any infections that do not respond to antibiotics in 7 days.

Surfer's ear (exostoses) are bony growths in the ear canal that result from cold water exposure in surfers, divers, or ocean swimmers. They can cause conductive hearing loss by closing off the canal with water and result in infections. Exostosis resections

have become quite safe with the arrival of intraoperative Neuro Integrity Monitoring Systems or NIMS (Figure 1). Facial electrodes alert us whenever we are close to the facial nerve and prevent facial paralysis. The new handheld pencil sized micro drills cut through bone with ease, allowing a quicker and more precise removal of the exostoses without injury to the underlying ear drum.



Figure 1

Cholesteatomas (benign skin growths) and ear cancers can also block hearing. Using NIMS we are more safely able to surgically resect them. In removing these growths however, the ossicular chain is usually partially removed. Due to modern microscopic titanium prostheses (Figure 2.), which range in size from 2-4mm, we are able to replace the ossicles and restore hearing to normal levels. The same is true for other disorders causing disruption of the ossicular chain, such as ear drum perforations, otosclerosis, and traumatic ear injuries.



Figure 2

Sensorineural Hearing Loss

The majority of hearing loss occurs gradually due to age, genetics, and past noise exposure.

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This can lead to difficulty communicating, alienation, and depression. It is imperative to maintain a quality of life by seeing an experienced and reputable audiologist. They will fit you with a hearing aid and adjust it to your needs and life circumstances. Lyric® is a new

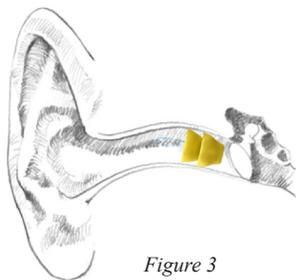


Figure 3

insertable hearing aid that is placed in the ear for several months at a time. It is invisible to the outside observer and allows one to shower with it in (Figure 3).

Soundbite is another device for patients with hearing loss in one ear.

It is a small device that clips to an upper tooth and amplifies hearing through the skull into the good ear (Figure 4). This helps you recognize where sound is coming from and prevents accidents due to one sided hearing loss.



Figure 4

Sudden sensorineural hearing loss (SSNHL) is defined as a drop in hearing that occurs rapidly within a 72 hour period. Most workups for this

condition do not reveal a cause, but an MRI should be performed to check for a brain tumor or stroke. One should be suspicious of SSNHL if you have hearing loss in the absence of pain or other obstruction as reported by a primary doctor. It is imperative to see an Otolaryngologist to be treated with steroids within 14 days of hearing loss. Oral steroids are the mainstay of SSNHL treatment but recent research has also supported injections of steroid directly into the middle ear.

Summary

The above highlight just a few of the new treatments, devices, and technologies, that have made progress in treating one of the most common conditions affecting the general public today – hearing loss.

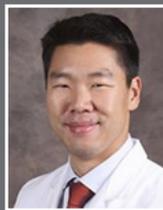
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Dr. Cho received his Bachelor of Science from Massachusetts Institute of Technology (M.I.T.) after doing immunology research with Nobel Laureate, Susumu

Tonegawa. He went on to earn his Medical Degree at the University of California, San Francisco School of Medicine where he also completed a Howard Hughes Medical Institute Research Fellowship in wound healing. He stayed at UCSF to complete his residency in Otolaryngology – Head and Neck Surgery, becoming Board Certified in Otolaryngology – Head and Neck Surgery and a Fellow of the American College of Surgeons.

He has authored several papers and book chapters in topics ranging from wound healing growth factors to inner ear lesions. He has served on the Mission Hospital Cancer Committee and has interests in head and neck cancer, ear surgery, and advanced sinus surgery.

His philosophy on patient care is to try to treat everyone like family. One can never go wrong.

Personally he enjoys playing grass volleyball in the summer, surfing at San Onofre, and having a glass of his favorite red wine from Martinelli Vineyards.

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