The Ear Drum

Virginia Lions Hearing Foundation & Research Center, Inc.
Box 800477 UVA Health System
Charlottesville, VA 22908-0477
434-296-5466

2010

Message from the President

Dear Fellow Lions:

Many years ago a young woman told attendees at a Lions International Convention how a touch of another's hand to hers touched her "soul" and changed the darkness of her mind. This touch changed her whole world. This touch gave her the world. She said she "found herself, the world, and God." After this experience, she was able to make a difference in the world to others through her touch. She reached out in 1925 at the Lions International Convention when she posed a challenge to us Lions, then and now, to reach out and help the blind and the **deaf.**

If someone who could not see nor **hear** made a difference that is still going on in our world today, surely we who are blessed with sight or **hearing** or both can do our best not to let those around us down. As your president of the Virginia Lions Hearing Foundation and Research Center, I'm requesting that you help this year, like you never have before, with encouragement and gathering of donations from clubs and generous contributors. Help to give **the world of sound** to those who need it most with just a touch. It will make a difference for years to come just like it did for, (you guessed it) Helen Keller.

Yours in Service,

Jessie

Lion Jessie Garrett, PDG
President, VLHF

Executive Director's Message

Lions of MD 24:

During the year-ending holiday season many people become especially appreciative of their own health, wealth, and good fortune; they seek opportunities to help others who are less fortunate. For members of the Lions family in Virginia, however, this season of good will and helping others extends throughout the year. We proudly proclaim every month that "We Serve". Our service touches other people's lives; it changes, improves, and often extends people's lives.

The members of the Hearing Foundation's medical team also work intensely to assist people with hearing-related problems with patient care and both basic and applied research projects. Through our Lions Club contributions to the Virginia Lions Hearing Foundation and Research Center, Inc., we Lions assist Hearing Foundation Medical Director Dr. George Hashisaki and his fellow researchers to achieve their projects' goals. And we shall create more miracles through their service.

If your Lions Club did not donate to the Hearing Foundation last year, please do so this year. If your Lions Club did contribute, please do so again this year. Your continuing financial support to hearing research is a prime example

of your adherence to the Lions motto. We serve with funds as well as with work.

Yours in Lionism,

Don

Lion Don Colley, PCC
Executive Director, VLHF

Why Do We Have Two Ears?

Brad Kesser, MD

The human auditory system is exquisitely tuned so that we can hear in difficult conditions. In a one-on-one conversation, in a quiet room, most of us do not have any difficulty hearing. But how often are we in such an "artificial" situation? The world around us is noisy and getting noisier. Noise pollution has been a major concern among hearing healthcare professionals for many years. Not only can noise pollution, if loud enough, cause hearing loss, but noise pollution can affect our ability to focus, to concentrate, to read, and to hear. Take that one-on-one conversation in a quiet room and move it to a crowded stadium, or outside where traffic whizzes by, or to a cocktail party, and that conversation becomes much more challenging. In fact, the difficulty we have hearing in background noise is often called "the cocktail party effect."

Having two ears allows us to "focus" on the speaker even in the presence of background noise. Try plug-ging one ear and going to a noisy restaurant. Really hard to hear, isn't it? Now remove the plug and note how much easier it is to hear with two ears. In patients with hearing loss in one ear ("unilateral" hearing loss), the speaker's words are competing against all that background noise for the listener's one good ear. We counsel patients with unilateral hearing loss to eliminate background noise, to face the person talking, to find the quietest table in the restaurant, and to stand near the corner of a room at a party (or at least near a wall with the good ear to the outside). These are strategies to help hearing in not only those with hearing loss in one ear but all patients with hearing loss.

Hearing in both ears ("binaural" hearing) also allows us to determine the direction of sound – sound localization. The ability to localize a sound is a very subtle but important mechanism by which we hear in background noise. Say you're standing in a circle of friends having a conversation. Your ability to locate sound in space allows you to target the speaker without having to look at the speaker's lips. This helps you to "keep up" with the conversation. People with uni-lateral hearing loss can't keep up. Because they cannot rely on their ears to locate the sound source (speaker), they have to use their eyes to see whose lips are moving to tell who is doing the talking. Once they finally figure out who is speaking, they can lock their

eyes on the speaker's lips and hear that person speaking. Unfortunately, many times that speaker has finished talking and the next person has already begun to speak. People with unilateral hearing loss stay one step behind the conversation.

How do we locate sound in space? In 1907, Lord Raleigh proposed the duplex theory of sound local-ization. If a sound is to our right, the sound energy strikes our right ear just slightly (milliseconds) before it strikes our left ear. This interaural ("between ears") time difference is how we localize low frequency (bass) sounds. A sound source from the right side will also be just slightly louder in the right ear as compared to the left because our head acts as a "muffler" to mute the sound energy ever-so-slightly so that the intensity of the sound is slightly different (louder in the right in our example) between ears (interaural intensity difference). Interaural intensity difference is how we locate higher frequency sounds. Our brains are exquisitely tuned to time and intensity differences between the two ears so that we can locate sound in space. Interestingly, bats and owls are the species of animals that researchers study most to understand properties of sound localization.

We have embarked on a series of experiments to determine if a patient with aural atresia (closed ear canal and underdeveloped middle ear with no eardrum) can locate sound before surgery (they cannot) and then after surgery to open the canal, construct an eardrum and restore sound conduction to the inner ear. These children have a moderate to severe hearing loss in the atretic ear and, with surgery, many times can achieve borderline normal hearing. Our preliminary results show that early after surgery (1 month), they are not able to locate sound in space. We hope to gather some data over a longer period of time after surgery so that perhaps they "learn" to use their second ear.

We are also beginning to study children with profound sensorineural hearing loss who have received cochlear implants. The cochlear implant restores hearing to people with severe-profound nerve-type hearing loss (sensorineural hearing loss). Most times, we place one implant at a time. After placement of a single implant, children (and adults) cannot consis-tently locate sound in space. We would like to test children (and adults) after the second implant is placed to determine if they can learn to use their second ear (second implant) to locate sound in space.

Thus, we have lots of exciting research going on at the University of Virginia. We hope to someday be able to understand how the brain processes information it receives from the ears – these are all tests of auditory processing. This understanding will lead to strategies to increase our help to hearing impaired patients with both unilateral and bilateral hearing loss. As always, we so appreciate Lions support, time, and interest.

Board of Directors Meeting Schedule

The winter VLHF board of directors meeting will be on Saturday, January 22, 2011, in Riggs Audi-torium, beginning at 10:00 a.m. If the meeting has to be postponed because of inclement weather, it will be rescheduled for January 29.

The spring directors meeting will be on Saturday, April 16, 2011.

Sound Facts About Noise

More than 30 million Americans are exposed to hazardous sound levels on a regular basis. Individuals of all ages - children, adolescents, young adults, and older people - can develop noise-induced hearing loss. Noise-induced hearing loss can be caused by a one-time exposure to an extremely loud sound, impulse sound, as well as by repeated exposure to sound at various loudness levels over an extended period of time.

Exposure occurs in the workplace, in recreational settings, and at home. Noisy recreational activities include target shooting and hunting, snowmobiling, go-cart riding, woodworking and other noisy hobbies, playing with cap guns and model airplanes, and listening to popular music played at a high audio level.

Sources of harmful noise at home include vacuum cleaners, garbage disposals, gas-powered lawn mow-ers, leaf blowers, and shop tools. And where the person lives makes no difference. Both urban and rural set-tings offer their own noise on a daily basis.

Of the millions of Americans who have some degree of hearing loss, more than one-half have not had their hearing problems corrected. About one-third of hearing-impaired people can attribute their hearing loss, at least in part, to noise.

The loudness of sound is measured in units called decibels. Normal conversational speech is approx-imately 60 decibels; the humming of a refrigerator is 40 decibels; and heavy city-traffic noise can be 85 decibels. Sources of loud noises that cause hearing loss include motorcycles, firecrackers, and firearms, all emitting sounds from 120 to 150 decibels. Sounds of less than 80 decibels, even after long exposure, are unlikely to cause hearing loss.

Exposure to harmful sounds causes damage to the sensitive hair cells of the inner ear as well as to the hearing nerve. These structures can be injured by two

kinds of noise: loud impulse noise such as an explosion or loud continuous noise such as that generated in a woodworking shop or by a lawn mower. The ambient noise level is too high if a person must raise his voice to be heard at a normal conversational distance.

Hearing loss from noise is preventable. All individuals should understand the hazards of noise and should practice good health in everyday life.

- Know which noises can cause hearing damage (those above 85 decibels).
- Wear ear plugs or ear muffs to protect the ears from loud noises.
- Be alert to hazardous noise in the envir-onment.
- Protect children who are too young to pro-tect themselves.
- Make family, friends, and colleagues aware of the hazards of noise.
- Have periodic medical examinations by a physician and hearing tests by an audiol-ogist, a health professional trained to identify and measure hearing loss and to rehabilitate persons with hearing impair-ments.

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