

It's Never Too Late for Better Hearing

BY BEVERLY SHAY

Since the age of 25, John Ayers has suffered varying degrees of hearing loss, in part due to a genetic condition which affects males in his father's family line. By the time he was in his early 50s, he was wearing hearing aids. Then in 2004, while working outside, he instantaneously lost all hearing in his left ear and had severe vertigo. A virus was the culprit.

Ayers began diligently pursuing a more effective treatment for his hearing loss. He found a cochlear implant (CI) surgeon, Robert Peters, M.D., in Dallas, and received his first implant in October 2005. Unlike hearing aids that only amplify sound, CIs use speech processors to convert sound into digital signals, which are then processed through the nervous system to provide hearing.

A cochlear implant is an electronic device, surgically implanted to provide hearing for the deaf or profoundly hard of hearing. To implant the device, a small metal plate is first inserted in the scalp behind and slightly above the ear; this plate is magnetic and holds a dollar coin-sized computer chip. The doctor then drills through the mastoid to the cochlea. An electrode array is inserted into the cochlea next to the nerve endings found within the cochlea. The processor itself is worn behind the ear and is similar in appearance to certain hearing aids. It contains batteries, a miniature computer processor and has a magnetic lead, which attaches to the plate in the scalp. Following a six-week healing process, the recipient is "activated" – the chip is turned on, and via computer, programmed.

"It's like having a child in your head who does not know what he is hearing," Ayers described the period of time involved in "mapping" the signals into sounds that make sense. "What most people don't realize is your eyes and ears act in tandem to provide

hearing. "It's something you do without thinking about it." The next few years became a journey of hearing restoration for him.

Ayers' delight in his recouped hearing has led him to participate in research that will most likely benefit others more than himself. Having successfully received an implant in his right ear in February 2007, at age 73, Ayers was asked to apply for a position as a test subject at the Binaural Hearing and Speech Lab at the Waisman Center, University of Wisconsin-Madison, under Ruth Litovsky, Ph.D. The center was originally funded in the 1960s by the late Joseph Kennedy, due to his family's personal interest in disabilities.

"I immediately became excited about the prospect of reversing roles – from being on the receiving end of help and care, to the possibility of being a giver," Ayers recalled enthusiastically. For three-and-a-half days, two doctoral candidates, Smita Agrawal and Gary Jones, performed rigorous tests involving 25 speakers and panels of 100 words shown on a computer. Ayers was asked to identify sounds and locate where they were coming from in noisy environments. The tests were designed to provide data that would lead to the improved ability of CI users to identify sound location, as well as isolate and discriminate between speakers. Ayers has since participated in three such research projects.

Ayers quickly found that the better he did on the tests, the more they tested him, increasing the complexity of each progressive test. "I was told they wished to get the best set of data obtainable by pushing [us to our] limits," Ayers remarked, indicating that all he wanted to do once the day was over was sleep!

The advanced tests worked on hearing focus. People with natural hearing can automatically tune out or ignore those sounds they do not wish to hear in order to focus their attention on those they want to listen to. Being quite familiar with the challenge of hearing in crowded rooms, Ayers was eager to give the testers every last bit of data he could.

In another research project, Ayers wore a SPEAR 3 research speech processor directly connected to the lab computer. This time they observed the mapping control of Ayers' speech processor by enabling him to better "center" the sounds to the left, center or right of his forehead and to handle and identify more than one sound arriving simultaneously. Under examination was the stereophonic hearing our brains naturally provide.

Following his time with the University of Wisconsin, Ayers received a call from the University of Texas at Dallas (UTD) in



John Ayers speaks to a health support group about hearing loss.

Photo by Jack Chamblee

From left: Philip Loizou, Ph.D., director of the University of Texas at Dallas Electrical Engineering Lab; John Ayers, bilateral cochlear implant recipient; and doctoral candidate Lu Yang.

Photo courtesy of John Ayers



Richardson, Texas. The UTD electrical engineering department has been developing equipment to program CIs with algorithms to more accurately process sounds. Kostas Kokkinakis, Ph.D., a postdoctoral research associate at UTD, working in the cochlear implant and speech processing lab of Philip Loizou, Ph.D., states, “The aim of my work is the development of signal processing strategies that can improve speech recognition of cochlear implant users in noisy social settings and reverberant environments.” Ayers has been a part of this research, which includes electrical stimulation, as well as implementation and evaluation of the CI algorithms for efficacy in speech processing.

Participating in these research projects has inspired Ayers to become more involved in hearing loss education at churches, schools, hospitals and service clubs. “I find many people are reluctant to talk about hearing loss,” he says. By informing them of resources and

progress, as well as research going on in the field, along with his own

testimony and obviously improved hearing, Ayers desires to bring awareness and hope to those with similar hearing loss. He reflects: “The Lord is so good to humankind to give people the desire and know-how to devise such marvelous equipment in order to restore hearing for those with deafness.” ■

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It's Never Too Late to Win an Oticon Focus on People Award Either

Few people can say they've worn hearing instruments for 86 years. Having just celebrated his 100th birthday, Julius Barthoff of Needham, Mass., a winner of the 2009 Oticon Focus on People Award, has been an inspiration to countless individuals with hearing loss, with perfect hearing and everyone in between since 1923. He has developed buttons – “Speak up, I'm Hearing Impaired!” – and index card-sized instructions – “I am profoundly hearing impaired. We can communicate by following these simple rules...” – that he happily shares, providing a practical resource to the many people with hearing loss he has encountered over the years. More recently, Barthoff successfully lobbied for his local library to install a TTY telephone and advised fellow senior citizens on hearing loss and hearing aids. Barthoff is a widower who lives on his own and continues his commitment to doing a good deed daily. Each morning, he delivers the newspapers to each apartment door in his senior residence – propping them up “just so” so that when a resident opens the door, the paper falls neatly in.

Oticon also honored Paige Stringer of Seattle, Wash., for advocacy; Kristin Grasberger of Mechanicsburg, Pa.,



100-year-old Julius Barthoff, a winner of the Oticon Focus on People Award, celebrates with his audiologist, Eve Adler (l.) and his ENT, Rebecca Stone.

Photo courtesy of Oticon Inc.

a freshman at James Madison University for her academic achievement; and David Woodruff, Au.D., of San Diego, Calif., for his charitable audiology work. ■

The Digital Conversion...In the Ear

BY JAMIE MORRISON, ASSOC. EDITOR

In February, when the U.S. television industry converted fully from analog to digital, some individuals had to obtain converter boxes to enable their older analog TVs to convert the digital signal to analog. Each time a sound

makes its way through the ear canal to the inner ear, a similar, though reversed, conversion occurs in the cochlea, as analog sound is converted to digital. And it's the job of Geng-Lin Li, Ph.D., to find out more about how