

The Dilemma of Central Presbycusis

By Dennis A. Colucci, AuD, MA

The brain's ability to process sound into meaningful events is notably altered by aging and, specifically, by hearing loss and cognition. The central degradation caused by peripheral hearing loss, independent of other influences, can result in memory loss, dementia, and Alzheimer's disease.

Known determinants that delay cognitive changes include level of education, physical exercise, intellectual engagement, social networking, friendships, and a healthy diet. Remarkably, most of these factors are related to hearing acuity and auditory skills.

Recent investigations have shown that hearing loss is associated with a reduction in whole brain and regional volumes (*Neuroimage* 2014;90:84-92). After adjustment for other conditions, including cardiovascular risk, it was estimated that the brain's aging is accelerated by 6.4 years in those with a speech-frequency pure-tone average greater than 25 dB.

In terms of functional abilities, a cross-sectional analysis in a separate study demonstrated that hearing loss was associated with equivalent effects on cognitive test scores as seven years of aging (*J Gerontol A Biol Sci Med Sci* 2011;66[10]:1131-1136).

Even more evidence comes from research indicating that patients who perform very poorly (< 50%) on the Synthetic Sentence Identification–Ipsilateral Competing Message or Dichotic Sentence Identification test are at seven to 12 times the risk of developing Alzheimer's disease within the subsequent three to 10 years (*Arch Otolaryngol Head Neck Surg* 2011;137[4]:390-395; *J Am Geriatr Soc* 2002;50[3]:482-488).

BEYOND DEFAULT PRESCRIPTIONS

Without competent hearing care, patients experience declining quality of life from a treatable condition.

Furthermore, audiological rehabilitation is not easy. It can't be simplified by a system that places technology as the answer to hearing loss, rather than a tool of a qualified provider and hearing therapist.

Clinically, a diagnostic evaluation may include a complete hearing evaluation, loudness tolerance scaling, otoacoustic emissions, auditory brainstem response to complex sounds, immittance, speech-in-noise tests, and a Mini-Mental State Examination or Montreal Cognitive Assessment if cognition is in question.

With this knowledge, the audiologist and primary care physician can proceed with amplification and specialist referrals as they start the process of developing and renewing the patient's engagement.

To achieve the best outcome and maximize neuroplastic changes, hearing aid fitting must start with hard clinical findings, followed by verification and validation studies to ensure brain-friendly processing and to avoid negative neuroplasticity and misophonia.

No longer is choosing a default prescription—a best-fit scenario out of the 1,430 available (*AudiologyOnline*; Apr. 9,



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2012)—and getting the patient's blessing acceptable practice, especially since patients don't know what constitutes maximum benefit until it is provided and scientific measures to guarantee that outcome are made available.

A number of questionnaires are available to help assess outcomes. I use the Abbreviated Profile of Hearing Aid Benefit (APHAB). Nevertheless, the most rewarding finding is when the patient tells me that I have changed his or her life forever.

Creating maximal engagement requires a variety of hands-on audiological services, with the goals of social normalization and reduction in isolation.

These services consist of patient profiling; developing a collaborative relationship; providing varying degrees of directive counseling with music therapy, auditory training, and situational listening skills instruction; and qualifying the benefits of amplification while removing communication stress.

While not all patients are willing to use computerized instruction, auditory training can be streamlined if patients are directed to utilize their hearing aids during all waking hours, venture into acceptable social situations, and avoid long periods of quiet time by listening to music or television, or by participating in other engagements. I use activities of daily living as a benchmark for directive counseling in this area.

Delaying hearing loss intervention is not only profoundly detrimental to individual quality of life, but also to the ailing healthcare system, as one in three seniors die with Alzheimer's or another dementia at a cost of \$203 billion a year in the United States (*Alzheimer's Facts and Figures*; Alzheimer's Association).

With this knowledge, the new role of audiology becomes obvious as we shift gears toward treatment of central presbycusis. [\[1\]](#)



Dr. Colucci is a clinical and forensic audiologist in private practice in Laguna Hills, CA.