CI REHABILITATION in older adults

By Rebecca Novak Tibbitt
Photos: MED-EL

Age-related hearing loss (ARHL) is often perceived as being a normal and relatively inconsequential part of aging. However, investigators have recently discovered that hearing loss is independently associated with accelerated cognitive decline and an increased risk of incident dementia. Among a general adult population, hearing loss limits a person’s ability to participate in social activities and leads to a sense of isolation; this situation is amplified among older adults, who are already at risk for drifting away from vital social connections despite the link between social engagement and mortality. The social isolation associated with hearing loss in older adults is accompanied by a significant decline in quality of life. A growing body of literature suggests that older adults benefit from cochlear implants. Age alone is not considered a contraindication to hearing implant candidacy, including cochlear implants, middle-ear implants and electric-acoustic stimulation. While regaining the sense of hearing is a primary motivator for many older adults pursuing a cochlear implant, investigators are now studying if addressing the underlying hearing loss will also help mitigate the...
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negative psychosocial and cognitive outcomes that have been definitively linked with it.

Expectations and rehabilitation for older adults who receive cochlear implants for ARHL are different from other populations, including prelingually-deafened children and late-deafened adults who experienced sudden hearing loss due to viral infection. If the hearing loss has been long standing, other aspects of auditory function may have diminished, for example, auditory memory. This may have an impact on outcomes by reducing the eventual perceived benefit, or by slowing the process of restoring function. If there is an aspect of cognitive decline, the patient may see fewer gains and may come at a slower pace. If there is an aspect of social isolation, the chances for the older adult to practice their new hearing ability may be lessened, and so progress may be slower. These considerations do not mean this person is not a good candidate for a hearing implant, but awareness of these aspects should be part of a good counselling program pre-implant.

According to Barbara Weinstein, PhD, AuD, Professor and Founding Executive Officer of the City University of New York Health Sciences Doctoral Programs, expectations on the part of hearing health providers and
patients play a major role in the success (or failure) of hearing loss interventions for older adults. Three expectations include:

1. **Outcome expectation**
   - based on the evidence, a given intervention will lead to certain outcomes;

2. **Efficacy expectation**
   - the belief that one can successfully execute the behaviour requested to produce the important outcomes; and,

3. **Expectation of personal mastery**
   - the personal belief that one can successfully execute the behaviour to achieve the desired outcome.

According to Weinstein, "Both the patient and their providers 'have to believe to achieve!' Success without this belief is a rarity and lack of self-belief and self-worth on the part of the patient is an often under-appreciated barrier."

**Cochlear implants in older adults – auditory processing and rehabilitation considerations**

Auditory training is improvement of hearing and understanding through listening experiences. This can mean natural learning that is facilitated through the regular use of cochlear implants, or more targeted training such as speech-in-noise training and discrimination training. A basic tenant of neuroplasticity is that the brain will reorganise following sensory deprivation when exposed to sensory input. Researchers are currently examining exactly how in people with hearing loss areas of the brain tend to reorganise, in the hopes of better informing the design of interventions such as cochlear implants and processing technology. This research also ties into the effect that hearing loss plays on increased cognitive load and its connection to dementia.

One of the key objectives in cochlear implantation is the restoration of opportunity for communication with others. This is, therefore, an important consideration in the rehabilitation process for this population, and one which is often overlooked. "The proportion of older adults with cochlear implants is growing and this population has unique rehabilitation needs," said Donna Sperandio, MEd, LSLS Cert AVT, and Head of Rehabilitation for global hearing implant manufacturer MED-EL. "It is well known that for older adults, social connections diminish with both age and hearing loss, but these social connections can play an important role in the CI rehabilitation setting."

**Putting evidence into practice**

Adult learners tend to focus on a life task, and then work to address in a top-down process. For example, faced with a broken washing machine, they approach based on life experience (e.g., call for service or attempt to fix) and go from there. This is in contrast to a bottom up-process of needing to know the steps to troubleshooting a problem with a washing machine in case it ever breaks. Sperandio provides an example with hearing loss, "I can't follow the discussion when I'm at my book club" rather than "I need to learn how to listen in background noise, and this will lead to me being able to function at my book club."

Sperandio refers to "social connections" as any number of points of contact that the patient has with the outside world, from closer connections such as family and friends, colleagues and health care providers to the broader community such as encounters with staff at the supermarket or the post office.

Increasingly, social media can help maintain connectivity. Patient support organisations can provide outlets for people to not only share their experience in a non-judgmental environment, but also learn from other older CI users. TV and radio can provide one-sided opportunities to practice listening, and can be included in the rehabilitation mix.

These everyday encounters provide opportunities to "practice" hearing, build confidence and identify issues, both before and after implantation. Proactively discussing the role of social connections prior to implantation and how they can help is a strategic approach that can help align expectations.

Hearing health professionals can adopt several strategies that have long been effective in the care of older adults in general. "Time is a key factor with this population. Providers should acknowledge the need for more time and longer appointments both pre- and post-implant that allow for added processing and repetition. Do not expect that the patient will be 'in and out' of the door," says Sperandio. "Foster a 'safe' environment by explicitly giving permission to ask for repetition and clarification."

"You are a key first post-implant social contact and very much a part of your patient's support team," she
continued. CI recipients should be encouraged to bring someone else along to their appointments.

Speech perception is the opening that leads to opportunities for social connection. Studies have shown that while speech perception improves most in the first 3-12 months post implant, patients can continue to show improvement beyond that point. Improved speech perception results are the first step to allow social connections to increase. Performance of older CI recipients is significantly poorer in noisy surroundings; a circumstance that may be due to availability of cognitive resources for storage and retrieval functions of working memory.

Post-implantation is also a time to discuss strategies for conversation, including what to do if a conversation breaks down. Sperandio suggests offering a rehearsed phrase such as “I am hearing using my cochlear implant. I didn’t quite catch what you said, could you say it again more slowly?”

Tasks involved in adjusting to the new signal of a hearing implant are complex, and require intense cognitive resources. Issues of cognitive load may affect the overall performance of older adults. It is therefore helpful to acknowledge cognitive load as part of the rehabilitation process, which provides a more holistic and situation-specific rehabilitation approach.

Ways to address cognitive load include auditory sequencing (order of events), auditory processing (20 questions), auditory memory (remembering order), and auditory chunking (word matching and order). Executive functioning can be evaluated through prioritisation exercises, and activities that track retained information.

Listening endurance is another measurable during rehabilitation that can be applied to older adults, in terms of longer periods of attention during a conversation. Practice can be encouraged in this realm with online tools and audio books. Learning something new, such as words from another language or vocabulary from a field with their “own language” such as astronomy or physics can also help stimulate cognition and processing for any older adult, but particularly ones in a CI rehabilitation setting.

Nearly half of people 60 and older have poor hearing. By 2050, an estimated 910 million older adults around the world will be living with hearing loss. Life expectancies are expanding and in many developed countries, the population over 60 is the fastest growing cohort. Restoring the sense of hearing for older adults will become imperative, as this generation looks toward remaining healthy, active and engaged for many years to come. As older adults with hearing loss look toward their next two or three decades, cochlear implants have become a viable option for reconnecting with the world of sound and the world around. Thoughtful and evidence-based rehabilitation approaches for these patients can make a difference in this important conduit to social connections. I

*EAS indication is currently under IDE investigation in the USA.

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**REFERENCES**
