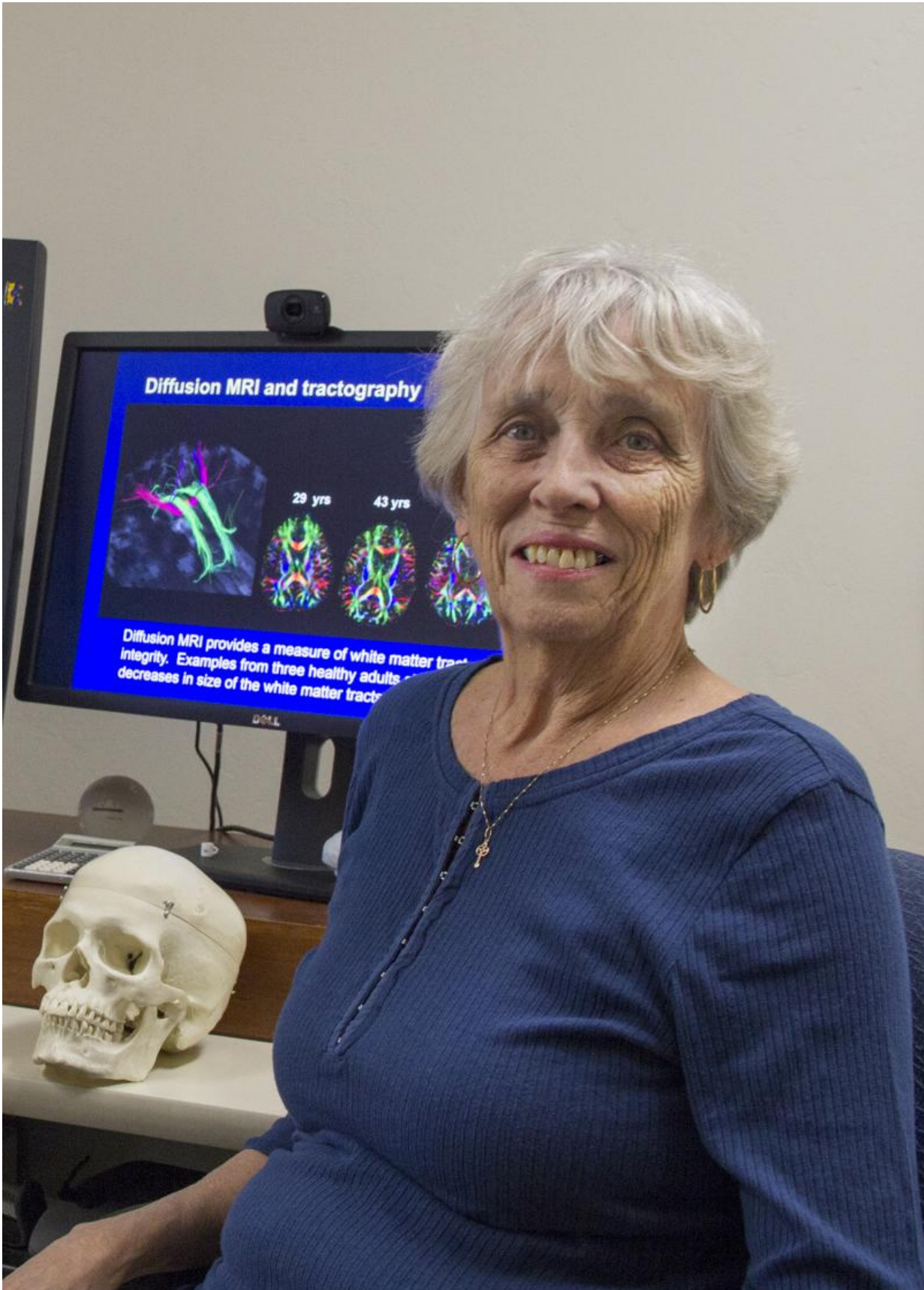


Auditory deprivation from hearing loss may cause cognitive decline

May 25 2015, by David Mogollón



Betty Glisky

A University of Arizona collaborative study among the Departments of Otolaryngology – Head & Neck Surgery; Speech, Language and Hearing Sciences; and Psychology received approval in early May to begin accepting human subjects in an effort to determine whether older adults suffering from prolonged hearing loss receive a cognitive boost after cochlear implant surgery.

The study's underlying hypothesis is that seniors suffering prolonged hearing loss also may suffer cognitive loss due to auditory deprivation—and that improved hearing with cochlear implants can halt and potentially reverse that cognitive decline, improving quality of life.

The study is led by otologist/neurotologist Dr. Abraham Jacob, director of the UA Ear Institute, associate professor and vice chair of [otolaryngology](#), who is working closely with Betty Glisky, professor and department head, psychology, and Nicole Marrone, speech, language, and hearing sciences assistant professor and James S. and Dyan Pignatelli/Unisource clinical chair in audiologic rehabilitation for adults.

Jacob, a surgeon who specializes in cochlear implants, will perform this procedure on more than 75 patients, many of them over the age of 72, this year at Banner – University Medical Center Tucson.

As an example of the outcomes he sees among implanted patients, he mentions the wife of a patient in his 90s who told him that she and her husband hadn't had a meaningful conversation in 20 years. "Now, after cochlear implant surgery, they are able to talk over a cup of coffee. That

is huge," he said.

Another patient in his 80s was scoring about 20 percent on speech understanding tests prior to cochlear implants. Now he's scoring more than 80 percent, Jacob said.

Jacob also noted a father in his 70s and his son, who go on an annual hunting trip with a long drive that takes hours—all in silence because of the father's hearing loss. After cochlear implants, they arrived at their destination and realized they were having a conversation during the entire trip.

"It's amazing," Jacob said. "He told me it's all these little things you realize you have not heard or done for years, things you used to take for granted, that you value most."

A paper published on Feb. 25, "The impact of cochlear implantation on cognition in older adults: a systematic review of clinical evidence"—which includes among its authors Jacob, Marrone and Dr. Mindy Fain, UA Center on Aging co-director and chief of the Division of Geriatrics, General Internal Medicine and Palliative Medicine in the UA Department of Medicine—frames the issue. It reviews 3,800 papers on cochlear implants, older adults and cognition, finding no studies specifically evaluating a causal link between hearing rehabilitation with cochlear implants and cognitive function. Since then, a European group has looked into this question and reported the first evidence that such a causative link may exist.

"We felt that the best way to establish causation was to do an intervention study and determine if making people's hearing better would potentially make measurable cognitive testing on these people better," Jacob said.

The new study aims to enlist seniors age 72 or older who have suffered long-term, significant hearing loss. These patients would be assessed by Jacob as part of a medical cochlear implant evaluation. If deemed candidates for implantation, they would be offered study participation. These patients would undergo pre- and post-surgery cognitive assessment using a comprehensive battery of tests. The tests were developed by the UA psychology department's Aging and Cognition Lab to assess the impact of improved hearing on a patient's cognitive understanding and retention over time.

"Psychology is interested in ways to maintain cognitive function with age or to slow cognitive decline," Glisky said. "It's likely hearing loss contributes to cognitive decline, although the exact mechanisms are unknown. There's virtually nothing known about whether improving hearing through interventions such as cochlear implants might slow or even reverse these declines."

Recent evidence suggests that social interaction helps to maintain cognitive function with age, she said, while [hearing loss](#) often makes social engagement difficult for older people because they can't easily follow or participate in conversations. This study explores the potential benefits of [cochlear implants](#), not only for hearing but also for social engagement and cognitive functions, such as working memory and executive control functions.

In late March, Marrone spoke at the American Academy of Audiology convention in San Antonio on "Hearing Loss in Older Adults: Public Health Implications and Management."

"I would say it's very important to look at broader outcomes for hearing rehabilitation and how it can affect cognitive ability for seniors," she said. "It's so crucial for older adults to stay connected and engaged in social life as they get older. We're really interested in ways to support

that and healthy aging. That's one of the things I'm really excited about with this collaboration."

Marrone noted their joint paper published in BMC Geriatrics was led by Gina Miller, a clinical audiology student who graduated this spring, and will be the subject of a doctoral dissertation project for Suzanne Moseley, under Glisky, and James Shehorn, under Marrone. Jacob underscores that while other places in the nation may have a larger overall population, most do not have a larger group of healthy, active [older adults](#) than Arizona. Therefore, southern Arizona better fits the model for this type of a study, he said.

"This positions our group well for answering the question whether improved hearing improves cognition among seniors," Jacob said. "We have funding in place, students in place and test batteries in place—and we're just hoping that we can get patients intrigued enough to participate."

More information: "The impact of cochlear implantation on cognition in older adults: a systematic review of clinical evidence." *BMC Geriatrics* 2015, 15:16 [DOI: 10.1186/s12877-015-0014-3](https://doi.org/10.1186/s12877-015-0014-3)

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