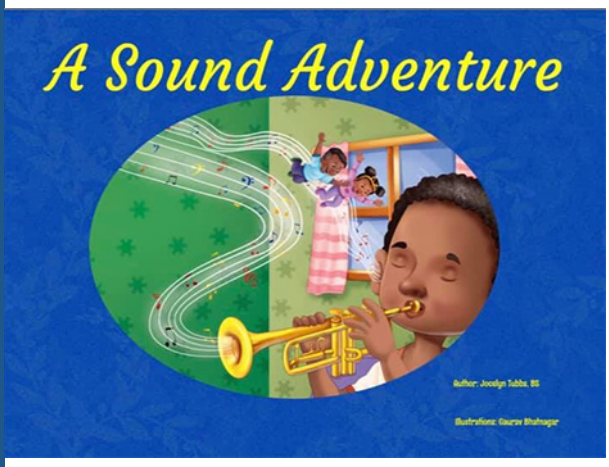
September 2019

Minnesota Academy of Audiology

Newsletter



By Jocelyn Tubbs, Au.D.
Illustrations by Gaurav Bhatnagar

Feature Story

A Sound Adventure

A Sound Adventure is a book that was created to help teach children about hearing and how sound makes its way from our ears all the way to our brains, providing us with the perception of sound. Dr. Jocelyn Tubbs noticed how little both children and adults knew about basic hearing and decided to create a tool to help showcase how our ears work. This story takes little adventure siblings, Jason and Ciara, on a journey where they follow music notes through their dad's waxy ear canal, marvel at the three tiniest bones in the body, and dance with the hair cells in the cochlea!

Dr. Tubbs is a recent graduate from Pacific University, Oregon. She completed her externship at Advanced Audiology Concepts in Mentor, Ohio. Dr. Tubbs is an Ohio native, having grown up in Cincinnati, and earning her Bachelor of Science degree in Communication Sciences and Disorders at Bowling Green State University.

Dr. Tubbs also noticed the strong lack in diversity among audiology and health and science careers. African Americans have been underrepresented in science-based careers for decades (Lewis, 2003). *A Sound Adventure* is an intriguing story of two African American children following the flow of music through the auditory pathway, showing the anatomy and physiology of the ear. Characters that relate to young African Americans can help capture their attention and provide an entryway to science-based education and careers. Although it is important to raise awareness to *all* children and their parents about hearing, this story is intended to help African American children become excited about science with the hopes they will pursue a career in healthcare and add more diversity.

Hearing is often taught that it only involves our pinnas, the cartilaginous part of the ear we can see. Because hearing loss is one of the most common ailments in childhood (Das, 1990), the book is being written to educate children about hearing. *A Sound Adventure* combines learning and fun in an engaging story that teaches how the whole auditory system works. The story depicts the multiple steps sound takes once it enters the outer ear and travels to the brain. It unravels the basic steps of the auditory pathway in a way that children can follow and understand.

Society tends to associate hearing loss more with older adults and it is often overlooked in children. Ten to fifteen percent of school-aged children are affected by hearing loss, according to Smith, Bale Jr., White (2005). Though, it is worthy to note the incidence of acquired sensorineural hearing loss in children has decreased over the past few decades due to vaccinations, early diagnoses, and treatments. However, there are other types of hearing loss that should be addressed and treated early. Educating parents of small children about hearing is a means to raise awareness about

cont.

In This Issue

Coding Corner

Can a midwife submit an order to audiology for a MN Medical Assistance Beneficiary?

This question comes from an MAA member, who says, "I know that nurses cannot, but can a midwife?" Our Coding & Reimbursement Committee answers the question.

First we looked to the Medicare regulation which, in part, can be applied to our MN MA rules. Medicare Chapter 15 80.3 of the Medicare Benefit Policy Manual requires an order from a physician or where allowed by State and local law, by a non-physician practitioner NPP, for a beneficiary to have an audiology test covered by Medicare.

Next question, does the state of Minnesota consider a midwife to be a qualifying non-physician practitioner? The Minnesota Medical Board of Practice replied to our question that they do not regulate midwives. Certified midwives are regulated by the Board of Nursing, so it seemed the answer may be no. But then we found the answer in this definition:

> The MN DHS definition for Practitioner of the healing arts: any person who engages in the practice of medicine or surgery, the practice of osteopathy or a practitioner whose scope of practice under state law includes the diagnosis of disease or health condition and prescribing treatment. For rehabilitation services, these practitioners are limited to physicians, physician assistants, nurse practitioners, podiatrists, dentists, clinical nurse specialists and certified nurse midwives.

Answer: A certified *nurse* midwife is considered a non-physician practitioner who can submit an order for audiology. But there are two levels of midwife. We believe that a certified midwife would not qualify.

We are hopeful for the passage of The Medicare Audiologist Access and Services Act (H.R. 4056), so that some of the extra time, resources, expenses, and delays of care that results from having to obtain orders for our services will be reduced for our patients with Medicare. If passed, it will still be up to MN DHS to determine if orders will still be needed for MA beneficiaries, as they are now.

A publication of the Minnesota Academy of Audiology, distributed to MAA members with information pertinent to the field of audiology. Information contained in this publication is obtained from sources considered to be reliable; however accuracy and completeness cannot be guaranteed.

Address all questions and comments to the editors:
Ashley R. Hughes, Au.D., FAAA
Rachel E. Allgor, Au.D., FAAA

A Sound Adventure, *cont.*

the importance of hearing healthcare for children.

This past year, Dr. Tubbs presented a clinical poster about A Sound Adventure at both the Ohio Audiology Conference and the American Academy of Audiology Conference. She spoke to many audiologists and hearing professionals about the book and the reasons behind its creation. Due to the large amount of positive feedback, it will be published and for sale in September, 2019. Dr. Tubbs is very excited to bring awareness to the field of audiology and basic hearing health.

"Come join Jason and Ciara on a musical journey and learn how sound travels through our ears! Follow along as you see the different structures of the ear and solve the mystery of how music makes it way from our ears to our brains!"

Photos from the top:

Jason and Ciara fly into their Dad's ear along with the music coming from his trumpet!

Jason and Ciara make their way through the ear canal and find the eardrum.

Jason and Ciara swim with the music notes in the inner ear, as they land on hair cells.

Featured Advertiser

Hear Better, Live Better: Livio AI Detects Falls Accurately and Alerts Others

Justin R. Burwinkel, Au.D. and Buye Xu, Ph.D.

Accidental falls are a significant health risk for older adults, can often lead to a loss of independence, and frequently shape the course of a person's later years of life. Reports have shown that 40% of individuals who live at home after the age of 65 will fall at least once each year[1]. The risk of falling has also been shown to be greater among patients who would benefit from treatment in hearing clinics than among their age-matched peers[2]. In fact, a study conducted by Dr. Frank Lin, at John Hopkins University's Cochlear Center for Hearing and Public Health, identified a 1.4-fold increase in incidence of falls for every 10 decibels (dB) of measured hearing loss[3].

The Livio® AI Healthable™ hearing aid – the world's first, ear-level fall detection and alerts system – offers piece of mind in a miniaturized and convenient package. Unlike other fall-detection devices, which hang around the neck or are worn on the wrist, Livio AI benefits from the anatomy and physiology of the human body.

During typical, daily activities and instances of falls, muscles in the neck work with the balance system of the inner ear to protect and stabilize the head. Since hearing aids are worn on the head, they are naturally less prone to mistake daily activities for falls than the devices worn on other parts of the body[4]. Instead, head-worn fall-detection devices may be tuned to capture a greater number of falls, while still having a low number of false alarms.

To objectively evaluate the accuracy of Livio AI, a laboratory study was conducted. Participants wore binaural Livio AI hearing aids and the Philips Lifeline® AutoAlert, a pendant-style fall-detection device, during simulated falls and daily activities. The Philips Lifeline® AutoAlert is classified by the U.S. Food and Drug Administration (FDA) as a Class II (Exempt) medical device intended for continuous operation as a personal emergency response system*. The results follow.

Method

Ten young participants each experienced eight types of falls and near-falls. The participants also performed eight different types of Activities of Daily Living (ADLs). The conditions each participant undertook are summarized in Table 1. Three trials were acquired for each condition. The fall-detection state of the Livio AI hearing aids and the fall-detection pendant were recorded for each trial. The analysis consisted of 240 falls, 240 near-falls, and 240 ADLs.

The data were collected at the Injury Prevention and Mobility Laboratory at Simon Fraser University. All participants provided written, informed consent, and the experimental protocol was approved by the Research Ethics Board of Simon Fraser University.

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Falls	1	Slip forward on moving platform
	2	Slip backward on moving platform
	3	Trip by ankle tether
	4	Incorrect weight transfers due to a misstep
	5	Incorrect weight transfers while rising from sitting
	6	Incorrect weight transfers while descending from standing
	7	Hit or bumped by padded object
	8	Loss of consciousness/Collapse
Near-falls	1-8	Same as fall conditions, but the participant was able to recover balance before reaching the ground
ADLs	1	Normal walking
	2	Standing quietly
	3	Descending from standing to sitting on a chair
	4	Descending from standing to lying on the ground
	5	Rising from sitting to standing
	6	Picking an object up from the ground
	7	Ascending stairs
	8	Descending stairs

Table 1. Fall, Near-fall, and Activities of Daily Living (ADLs) trials performed by each participant

Fall Detection Through AI, *cont.*

Results

The Livio AI hearing aids were more accurate at detecting falls than the Philips Lifeline AutoAlert fall-detection pendant. Both systems were robust against false-positive detections during activities of daily living. A summary of sensitivity and specificity across all participants and trails is provided in Table 2. A breakdown of sensitivity rate for each type of Fall is provided in Table 3.

	Philips Lifeline Auto Alert	Starkey® Livio AI
True falls detected (Sensitivity rate)	198 (82.5%)	221 (92.1%)
False positives during Near-Fall trials (specificity rate)	1 (99.6%)	6 (97.5%)
False positives during ADLs trails (specificity rate)	0 (100%)	0 (100%)

Table 2. Sensitivity and specificity rates of Starkey Livio AI hearing aids and Philips Lifeline AutoAlert pendant across all participants and trails. A total of 240 trials took place for each of: Falls, Near-falls, and ADLs.

	Philips Lifeline Auto Alert Sensitivity (%)	Starkey® Livio AI Sensitivity (%)
Backward slip	93.3	96.7
Forward slip	53.3	90.0
Trip	66.7	100
Incorrect transfer due to misstep	73.3	93.3
Incorrect transfer during rising from sitting	93.3	93.3
Incorrect transfer during descending from standing	96.7	90
Hit or bump	86.7	86.7
Loss of consciousness or lower limb collapse	96.7	86.7
Mean	92.5	92.1
Range	53.3 - 96.7	86.7 - 100

Table 3. Breakdown of Starkey Livio AI hearing aids and Philips Lifeline AutoAlert pendant sensitivity during the trials for each fall type. A total of 30 trials took place for each Fall type.

Discussion

Both the Philips Lifeline AutoAlert pendant and Starkey Livio AI hearing aids performed perfectly during the Activities in Daily Living in the present study. The Starkey Livio AI hearing aids produced a slightly higher false-positive rate during trials where the participants began to fall but recovered their balance before reaching the ground. The Starkey Livio AI hearing aids were able to detect more of the falls than the Philips Lifeline AutoAlert pendant and were an overall more accurate fall-detection device than the Philips Lifeline AutoAlert pendant.

Conclusion

Starkey's Livio AI* hearing aids detected falls as well as or better than the traditional fall detection device studied.

References

[1] Rubenstein, L. Z. Falls in older people: epidemiology, risk factors and strategies for prevention. Age Ageing 35, ii37–ii41 (2006).

[2] Criter, R. E. & Honaker, J. A. Audiology patient fall statistics and risk factors compared to non-audiology patients. Int. J. Audiol. 55, 564–570 (2016).

[3] Lin, F. R. & Ferrucci, L. Hearing Loss and Falls Among Older Adults in the United States. Arch. Intern. Med. 172, 369 (2012).

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I Just Identified a Child with Hearing Loss... Now What?

Kristi Gravel, Au.D., CCC-A, PASC

Welcome to Minnesota: the land of 10,000 lakes and over 68,000 annual newborn screenings for hearing loss. The Minnesota Early Hearing Detection and Intervention (EHDI) program indicates that about 150 newborns with permanent hearing loss are identified each year in our state. An additional 100 cases of transient hearing loss are identified in newborns which require audiological follow-up, approximately 11% of which ultimately have a confirmed permanent hearing loss after middle ears clear. Yet, a number of children are identified with hearing loss after the newborn period. Any licensed audiologist in Minnesota may see individuals under 18 years of age, however, for many audiologists, working with children is only a subset of their practice. Here, we present a refresher on what to do when diagnosing a hearing loss in a child or teenager.

Back to the Basics

When identifying hearing loss in a newborn or older child, follow the Minnesota EHDI program model:

1. REPORT to the Minnesota Department of Health (MDH)
2. REFER to Early Intervention (School District/Educational Team)
3. CONNECT with other families through Minnesota Hands & Voices

Report to MDH

The MDH Newborn Hearing Screening Program expects that any **newly confirmed permanent hearing loss in children through 10 years of age** will be reported. "This reporting process is shared with all new Minnesota audiologists in the mailing with licensing information," notes Dr. Darcia Dierking, audiologist with the Child and Family Health Division of MDH.

Audiologists should report any new identification of hearing loss in children through 10 years of age by completing the Diagnostic Audiology Reporting Form and including the audiology report in a fax to MDH at (651) 215-6285.

Refer to the School District/ Educational Team

Following reporting of hearing loss to MDH, a child with confirmed permanent hearing loss should be referred to their educational program. For children age five and under, this can be done online. For older children, the clinical audiologist should:

- Ask the parent(s) which school their child attends, including the district in which they live.
- Obtain a signed release of information form in the clinical visit to share the audiology report and audiogram with the school district's educational audiologist.
- MAA has obtained permission to share the statewide contact list of Educational Audiologists under the "Find an Audiologist" section of the website.
- Fax or mail the audiology report and audiogram to the educational audiologist who covers the district the child attends.

What happens after the referral to the early intervention team or educational audiologist? "The educational audiologist will review the audiogram to determine if the child meets audiologic criteria to qualify for deaf and hard of hearing services," says Dr. Claire Schleicher, audiologist with St. Paul Public Schools. If the school does not have a recent audiogram, the educational audiologist will test the child in a quiet setting in the school.

Connect with Minnesota Hands & Voices (MNHV)

While audiologists understand the impact of hearing loss on listening in challenging environments, most audiologists have not parented a child with hearing loss. MNHV is a non-profit organization of parents who are trained to "Guide by Your Side" other parents who have a child with hearing loss. Once a release of information form has been completed to share the family's information with Hands and Voices, audiologists can make secure professional referrals online, by phone (651-265-2435), or fax (651-265-2318).

MNHV Director Laura Godfrey shares that "MNHV has the unique capability to connect families with other families who have children with similar hearing differences, whether they are in their neighborhood, across the state, or even across the country. Connections can be made over the phone or in person at one of the many events held around the state all year long. MNHV serves families who have children that are identified from birth to 21 and help the family throughout their lifelong journey with their child. Additional programs of ASTra (educational advocacy) and DHH guides (role models to help the

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Child Hearing Loss, *cont.*

families understand their child's hearing difference) are more benefits of referring families with MNHV."

Putting All the Pieces Together

The MDH Newborn Hearing Screening Advisory Committee created an "Initial Identification of Hearing Loss" checklist. This document can be edited and uploaded to a child's medical record to ensure that the child is receiving appropriate care and follow-up regarding his/her hearing loss.

MN EHDI provides guidelines on making the above referrals, including medical referrals. Specifically, referral to an otolaryngologist is recommended, followed by at least one eye examination to determine visual acuity. A genetics consultation should also be offered, given that over 50% of childhood hearing losses are related to a genetic cause, and determining the etiology of a hearing loss can guide medical and audiologic management.

In Summary

- Report new hearing loss identification to MDH for children through 10 years of age.
- Refer to the educational audiologist for school-age children (educational audiologist contact information available on MAA website.
- Refer to *Help Me Grow* for children 0-5 years of age.
- Connect families to MNHV to receive additional support.
- When in question, reach out to MN EDHI at ehdi@state.mn.us or 651-201-3737 (phone).

Kristi Gravel, Au.D., is a pediatric audiologist at the Lions Children's Hearing & ENT Clinic at the University of Minnesota Masonic Children's Hospital in Minneapolis, Minnesota. Dr. Gravel holds Pediatric Audiology Specialty Certification through the American Board of Audiology. She is currently president-elect for the Minnesota Academy of Audiology and serves as co-chair of the Membership Development Committee.

Message From Your President

Calling All Audiologists!

Rebecca A. Younk, Au.D.

In my May "Letter from the President," I sent out a challenge to each of our members to do the following to celebrate 25 years of MAA.

1. **Talk to ONE fellow Audiologist about joining and volunteering with MAA.**
2. **Cultivate ONE Friend of Audiology.**
3. **Volunteer for ONE committee.**

Thank you to everyone who completed one or more of the challenges! It is so important for the organization and our profession to get as many of our colleagues involved as possible – now more than ever!

As you may have heard by now, the American Academy of Audiology (AAA), the Academy of Doctors of Audiology (ADA), and the American Speech-Language-Hearing Association (ASHA) sent a joint statement in support for the Medicare Audiologist Access and Services Act of 2019. This legislation will allow beneficiaries direct access to both diagnostic and therapeutic services of audiologists, eliminating unnecessary barriers to our patients.

In light of this, I am adding a fourth way to show your support of the profession and celebrate 25 years of MAA.

4. **Contact your legislators and tell them to cosponsor the Medicare Audiologist Access and Services Act (H.R.4056).**

The Academy of Doctors of Audiology has a simple tool which will allow you to choose your appropriate legislator with a template you can use. It is as easy as a click of a button and a few keystrokes. Simply follow this link and the directions.

As my tenure comes to a close, I would like to thank each of our members for their hard work and dedication to the profession of audiology. It has been my honor to serve as President of the Minnesota Academy of Audiology.

Taking a "Smart" Case History: The Dizziness Symptom Profile

Devin L. McCaslin, Ph.D.
Director, Vestibular and Balance Laboratory
Associate Professor, Mayo Clinic College of Medicine

Audiologists who see patients with dizziness on a routine basis understand how important the case history is to the management of this difficult patient population. In most instances, patients with dizziness are being referred to us by a physician in order to rule in or rule out peripheral or central vestibular dysfunction. The challenge for us as audiologists is that laboratory testing (e.g., caloric testing and vestibular-evoked myogenic potentials) can often be normal in the presence of certain types of vestibular disorders.

In cases such as this, one could simply do the testing, record the results as normal (or abnormal) and provide them to the ordering dizziness specialist. However, I would posit that during the time we spend testing, we have an enormous opportunity to extract critical information that can both enable the ordering physician to determine the source of the dizziness faster.

Most clinics that perform vestibular assessments (at minimum videonystagmography) allot 45 minutes to an hour for an evaluation. If the clinic is capable of more comprehensive testing (e.g., rotational testing or vestibular-evoked myogenic potentials) then perhaps this could be doubled. When vestibular testing is initially ordered by the medical professional it is most likely (not always) going to occur soon after the patient has reported the onset of symptoms. For example, it is not uncommon for a patient to experience a severe episode of rotary vertigo at night and schedule an appointment with the primary care physician the next day. If the vertigo is particularly severe they may elect to go to the emergency department. Regardless of the initial appointment, there is a high likelihood that the patient will be referred from the generalist to a specialist which, in our case, is commonly an otolaryngologist.

Depending on the symptoms (e.g., vertigo) the otolaryngologist will often order vestibular laboratory testing and perhaps imaging to assist with their differential diagnosis. Once the patient arrives for their vestibular evaluation the audiologist has the chance to not only provide critical information about the status of the central and peripheral vestibular system through testing but also has the time to take a careful case history. A thorough and clear case history, in many cases, along with laboratory testing can facilitate getting the patient the correct treatment in a timelier manner.

The challenge in treating and managing patients with dizziness is that there is no "one" physician that can treat all its forms. For example, if a patient presents with recurring spells of rotatory vertigo that are accompanied by roaring tinnitus, aural fullness and fluctuating hearing loss in one ear, then Meniere's disease would be a likely diagnosis and the most appropriate provider would be an otolaryngologist. In the case of a patient that reports the onset of rotary vertigo, light and sound sensitivity, nausea, and a focal headache following a meal of red wine and chocolate, migrainous vertigo may be on the short list and neurologist with expertise in headache would be the best choice to handle treatment. Vestibular laboratory testing in both these disorders is extremely variable and may often be completely normal.

A thorough and clear case history, in many cases, along with laboratory testing can facilitate getting the patient the correct treatment in a timelier manner.

Accordingly, a careful documentation of the characteristics of the patient's symptoms, the duration of the symptoms, and comorbid medical conditions are key to an accurate diagnosis. The challenge is that taking a conventional case history interview can be time consuming and depending on the patient, frustrating. All of us have had patients where extracting the key components of case history is either lost in side stories or wrapped up in descriptions of other ailments that may have no bearing on the diagnosis and management of their dizziness.

While I was a clinician in Nashville at Vanderbilt, my colleagues and I constantly struggled with the above scenario and set out to develop a "directed" case history device. It was the goal of this project to develop a

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Case History, *cont.*

case history form that could be taken quickly and would only require short responses from the patients regarding their symptoms. To accomplish this we first needed to decide what disorders we should "go after" with the questionnaire. We decided that in order to be efficient we should constrain the tool to identify the most commonly encountered disorders in our clinic (i.e., Meniere's disease, benign paroxysmal positional vertigo-BPPV, vestibular neuritis, vestibular migraine, and persistent postural perceptual dizziness-3PD).

Based on the accepted diagnostic criteria for each disorder, we developed key items (i.e., questions) that were converted into short statements. Patient responses were recorded using a psychometric scale called a Likert scale which is an accepted way of measuring levels of agreement or disagreement in survey research.

It was our intention to design the questionnaire in such a way as it could be completed by the patient in ten minutes or less and scoring would be automatic. Accordingly, we decided to provide five choices for the patient's response which ranged from "strongly disagree," to "disagree," to "neutral" to "agree" and then lastly to "strongly agree". The output of the device would be a graph illustrating the most likely dizziness diagnoses for the medical provider to consider in the differential diagnosis (Figure 1). We decided to call the questionnaire the Dizziness Symptom Profile (DSP).

Based on our interactions with primary care physicians and other frontline medical personnel, we felt this would be useful in their day to day interactions with this difficult to manage population of patients. For example, if the score from the DSP indicated that BPPV was the likely cause of the patient's dizziness, then perhaps positioning maneuvers should be done in order to confirm or deny BPPV. Likewise, if the patient scores highly on the questions directed at identifying vestibular migraine then perhaps pharmaceutical and/or non-pharmaceutical treatments shown to treat vestibular migraine should be considered or a referral to a specialty provider for headache.

In order to develop the instrument we set up a three-part study. Our first phase consisted of developing the list of items (i.e., questions) for each of the disorders that we determined should be included. Experience from experts in

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Case History, *cont.*

vestibular management and assessment as well as an internationally agreed upon criterion for each disorder were used to create the first version of the DSP which consisted of 64 questions. We then administered this first version of the DSP to 162 patients and evaluated statistically (i.e., exploratory factor analysis) which questions the subgroups of patients answered similarly. Using statistics we were also able to eliminate the questions that participants did not answer consistently.

Once the questions that did not contribute were removed we randomized the questions and began the second phase of the study. The shorter version of the tool consisted of 35-items. The questions were once again randomized and then administered to 352 patients (from Mayo Clinic and Vanderbilt University Medical Center) and an analysis similar to the first was employed (referred to as a confirmatory factor analysis – CFA). Following the confirmatory analysis we were left with 31-items which, as stated earlier, could be completed in most cases in less than ten minutes.

The final part of the study consisted of determining the agreement between the DSP and the physician's differential diagnosis. In this regard we adjusted the scoring procedure for the device so that we had a threshold score for the DSP that would indicate that a particular disorder should be considered in the differential diagnosis.

In our comparison study we administered the DSP to 195 patients with the primary complaint of dizziness. Patients were asked to fill out the instrument prior to their appointment in the vestibular laboratory which was scored at the time of the appointment. All of the patients included in the study were scheduled to see a physician following their vestibular function testing. Upon arriving at their appointment with the physician, a case history and physical examination was completed and the specialist would rank-order their differential diagnosis for dizziness. We then compared what the most likely cause/s of dizziness was according to the DSP to the ear specialist's differential diagnosis. It was determined that the DSP results were in agreement with the differential diagnosis of the ear specialist ~70% of the time. The highest agreement was for BPPV and the lowest for superior canal dehiscence.

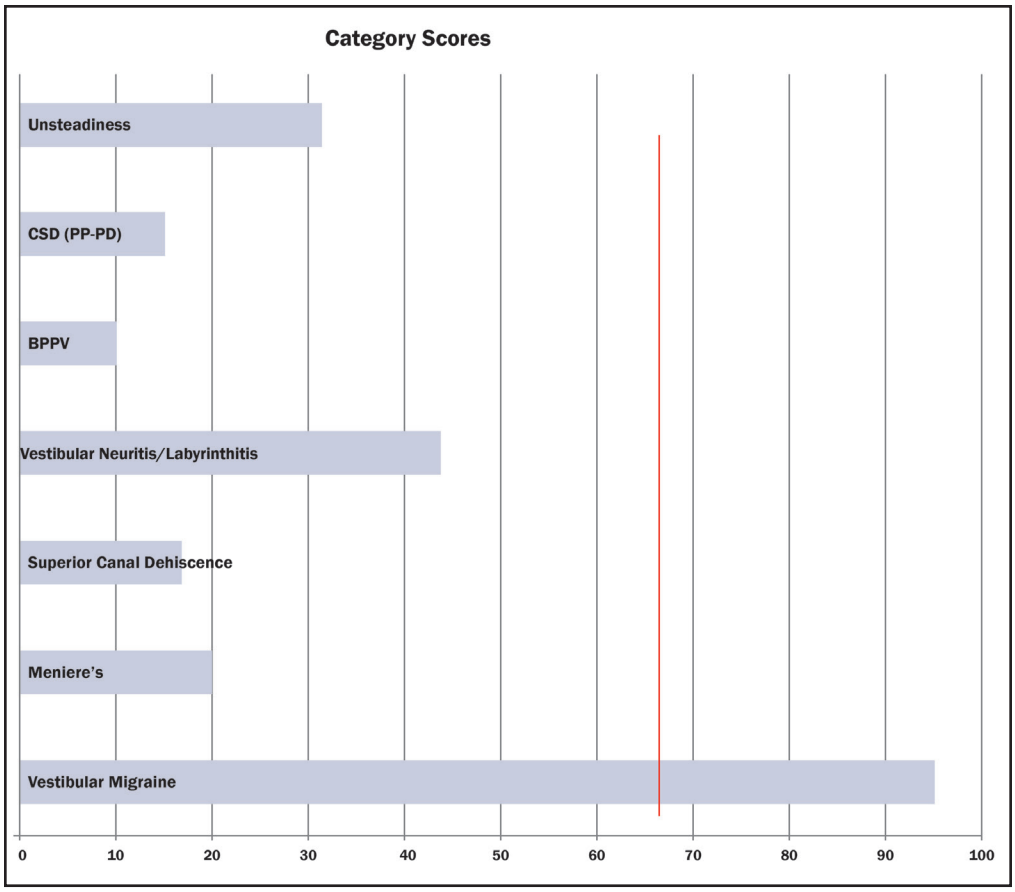


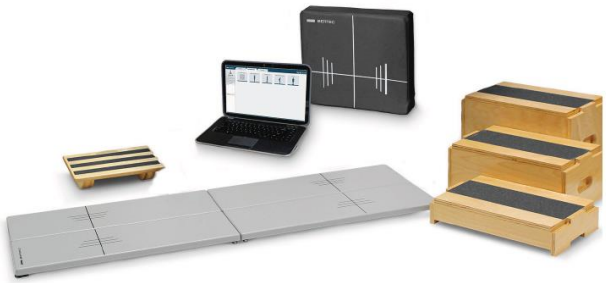
Figure 1: Table that is generated by the Dizziness Symptom Profile (DSP) whose history is suggestive of vestibular migraine.

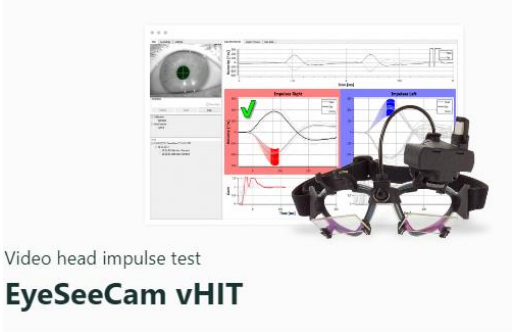
The DSP offers providers seeing patients with dizziness a fast and accurate mechanism by which to narrow down their differential diagnosis to begin treatment. We are continuing to collect data in an effort to enhance the questionnaires effectiveness in identifying disorders and investigate its test-retest reliability.

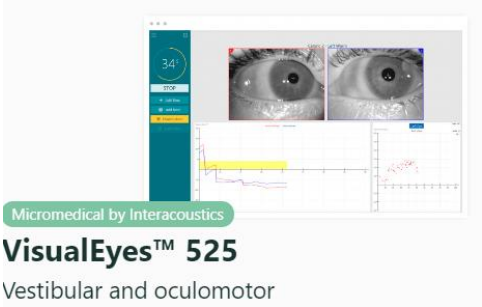
This study has been published in the journal *Ear and Hearing* last year. The article is entitled "Development and Preliminary Findings of the Dizziness Symptom Profile". Providers who have an interest in obtaining the DSP may contact me at devin.mccaslin@mayo.edu.

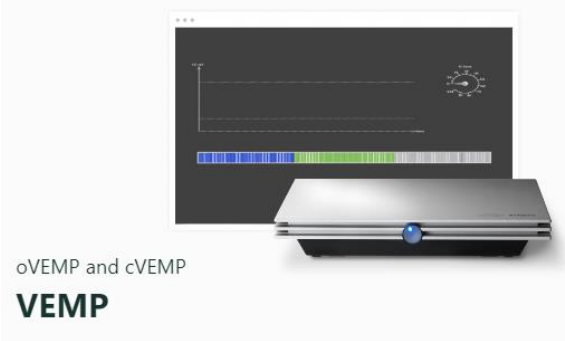
Midwest Special Instruments is proud to represent the leading manufacturers of Balance instrumentation like Bertec, Interacoustics and Micromedical.

Here are some of their offerings.









For more information contact Matt Williams at matt@midwestsi.com or 952-230-6353.

Student Spotlight

Martha Westman

3rd year Au.D. Student, University of Minnesota

You are entering your third year at the University of Minnesota Au.D. program; what have you found to be most valuable in your education so far?
As a graduate student, it's easy to feel guilty doing anything for yourself when there are always ten things you "should" be working on at any given time. I learn and work so much more efficiently when I take care of myself with sleep and exercise, so I now make those things a priority.

I also learned the importance of putting myself out there and networking, especially as an introvert to whom those things haven't always come naturally. Audiology is a small world filled with wonderful people and I love hearing about everyone's unique experiences and career paths. You also never know what opportunities might come your way via a personal connection.

You are a talented singer, what is your favorite type of music to listen to and what type of music do you sing?
I mainly sing classical music, which is what I studied before switching over to the world of speech and hearing in undergrad. As for listening, the Spotify algorithms are probably very confused. My recently-played songs run the gamut from ancient chants (Hildegard von Bingen), to indie rock (Modest Mouse), to electronic (ODESZA), to hip-hop (Kendrick Lamar). I'm also not ashamed to admit I listen to some pop music—for example, Ariana Grande has an incredible set of pipes!

You are the 2019-2020 President of your chapter's Student Academy of Audiology, what is one goal that you have for SAA this coming year?
I want to get incoming students involved right away and help them feel comfortable participating. It can be overwhelming being a new graduate student in a new place, and extracurricular activities understandably take a backseat to the rigorous coursework. I want to encourage everyone to participate in things like volunteering and conferences, especially with the AAA Conference in New Orleans this year! Conferences are a great way for students to learn about hot topics in audiology research, meet other students and professionals, and explore a fun city. Plus, you might catch a controversial talk and it's always fun to watch experts argue.

You had a very interesting Capstone project, could you tell us a bit about that?
I've had an amazing summer with the National Center for Rehabilitative Auditory Research in Portland, OR. My project is on ototoxicity in people with cystic fibrosis (CF). Many patients with CF experience frequent life-threatening infections and are treated with ototoxic medications such as gentamicin. This treatment often causes sensorineural hearing loss.
I'm looking at acoustic reflex growth in patients with CF who still have normal hearing thresholds. My hypothesis is that there is subtle damage to the auditory system occurring even before hearing thresholds are affected, and this will be seen in changes in the acoustic reflex.

Welcome New Members

Fellows
Karen Brennhofer, PhD
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It's as Easy as 1, 2.4, 3

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I grew up in a household where we purchased a second-hand personal computer in the late 1980s. I started dispensing hearing aids right when the industry was transitioning from analog hearing aids with potentiometers to programmable analog and digital hearing aids.

Even as I write this, I am cognizant that these statements are strangely reminiscent of my parents' own "when I was your age I had to walk to school" perspectives. Nevertheless, compared to 15 years from when I first began dispensing hearing aids, hearing aids available to patients today are of far greater complexity.

In our graduate programs, we learned how to identify hearing deficits and how to appropriately fit, verify, and validate hearing instruments. While informational counseling has always been a part of the process, I sense that many of us are feeling intimidated and/or frustrated by our new 'responsibility' to educate patients on the functions and capabilities of their own cell phones. I hope to provide you with a few insider tips to help reduce this aspect of your patient interactions to something more akin to "easy as one, two, three."

1. Simplify set up

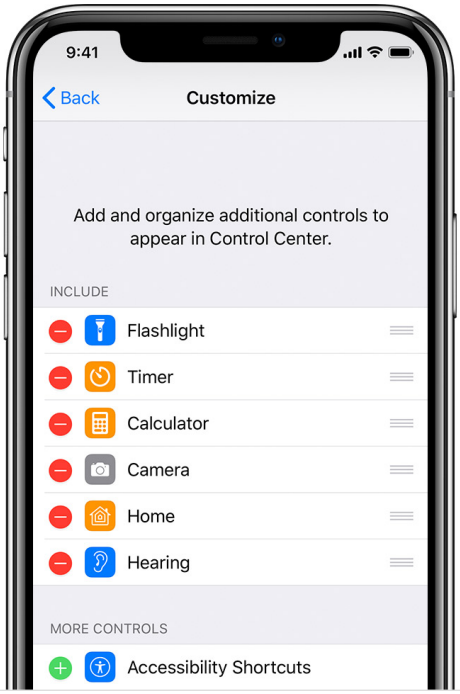
Most hearing aid manufacturers offer a mobile application (app) to control the hearing aid(s). For those patients who are not as tech savvy, we may need to consider simplifying control by utilizing the phone's native controls. For Android users we can simplify an app by creating a widget, which is more of a quick menu for the app. However, it does require the user to go to the Google Play Store, access their account using their username and password, and download to the phone.

I will focus on iPhone users because the iPhone has native control options which bypass loading any app. During the first few weeks of the patient's journey, regardless of the manufacturer, it may be beneficial to use the native controls for "Hearing" in the "Control Center" of the phone in lieu of an app. Using these controls is an easy method to confirm connectivity with the device(s), check battery status, access volume control, switch between manual programs, and use the live listen function (turns the microphone of the iPhone into a remote microphone). The other advantage to using the native controls is you do not have to sit and wait politely while the patient tries to remember their Apple ID and password.

2. Teach them how to fish

Once you have connected the device(s) navigating [steps: Settings>General>Accessibility>MFi Devices>Click on named devices>Pair (1x or 2x)], after about a minute you will see all of the connected hearing aid(s)' remote-control options load. To easily access these controls from the home screen you have a couple of options.

First option, the "triple click". Triple click the home button (iPhone 8 or earlier). If it's an iPhone without a home button (iPhone X or later), triple click the "Side Key" on the right-hand side of the phone. If your patient doesn't have the dexterity to click this



effectively you can slow down the clicking speed required by navigating to Settings>General>Accessibility>Home Button/Side Button. Under "Click Speed" you may select either "slow" or "slowest." The cool feature with these speed alternatives is when you select "slow" or "slowest" it will flash and vibrate to let you visually and tactilely sample the speed you have selected to ascertain if it is the most appropriate choice.

A second choice is swipe access. An option to add the "Hearing" control to your "Control Center" may be a better option. To do this, go to Settings>Control Center>Customize Controls. Scroll down until you locate "Hearing" with a green (+) plus sign next to it. Click on the green (+) plus sign to add "Hearing" to your "Control Center". For iPhone 8 or earlier, swipe your finger from the bottom of the screen up and it will open your Control Center, where the ear-shaped icon for "Hearing" can now

cont.

Easy, *cont.*

be accessed. For iPhone X or later, drag your finger down from the top right side (called the "right ear" in tutorials) of the screen to access the ear-shaped icon for "Hearing" in the Control Center.

This way before you get into all the details of the individual App you can discuss basic access to controls and streaming. When appropriate, I would instruct my patients to download the App once they were home and we would go through those details at the follow up visit.

3. Don't get stuck in the weeds

As we all know, connectivity is imperfect and has its occasional oddities and interferences. Here are some strategies to troubleshoot when patients are reporting connectivity issues in the MFi controls of the iPhone (Settings>General>Accessibility>MFi Devices).

First let's cover access for "Audio Routing". This menu has "Call Audio" (phone calls) and "Media Audio" (everything else) separated out here to have "Always Hearing Devices", "Never Hearing Devices" and then "Automatic" as selectable options.

The "Never Hearing Devices" would only be selected if the patient stated they would of course never want media and/or calls to come through to their device(s). The "Always Hearing Aid Devices" would be selected if the patient wanted the hearing aid(s) to always be prioritized. The "Automatic" (the recommended standard) will assess whether the MFi device(s) are powered on and connected to send audio to the device(s) or if a Bluetooth speaker (such as a vehicle) is connected to stream audio there as an alternative. This is where the iPhone can experience connectivity issues or get delayed in connection.

You will also note there is a slide bar to select "Play Ringtones" through the hearing aid(s). This is where you can turn "Play Ringtones" off if bothersome to the patient. Disabling this feature sometimes assists connectivity when the vehicle call/media audio routing is having difficulty connecting to the phone. The car audio should take precedence over the audio routing of a medical device(s) if there is an issue, disabling "Play Ringtones" oddly can mitigate that confusion.

In contrast, if a patient would like to route the audio to their hearing aid(s) instead of the car audio it would be of course best to "Forget" Bluetooth connectivity with the vehicle altogether. However, if a patient wanted some features active, to play devil's advocate, only the GPS to be announced through the speakers of the car; an alternative would be to select "Always Hearing Aids" for only the "Call Audio" in the "Audio Routing" menu.

"Control Nearby Devices" is described in the apple support user guide as "use your iOS device to adjust the settings of hearing aids that are on the same WiFi network and connected to your cloud account." Which you should leave selected by default to accomplish.

"Audio Handoff" is described as "Continue listening to media through your hearing aid when you switch between your iOS devices. For example, if your hearing aid(s) are connected to your iPhone but you start watching a movie on your iPad, the hearing aid automatically switches to the iPad." (https://support.apple.com/en-us/HT201466)

The "Control Nearby Devices" and "Audio Handoff" are features you may want to turn off using the slide bar should the patient be experiencing some difficulty connecting or staying connected with their MFi device(s) in their home with other iOS devices active. The "Control Nearby Devices" feature when turned off will only turn off other iOS devices' ability to control the hearing aid(s), NOT the iPhone's ability to control the device(s).

The "Audio Handoff" will mitigate interference from other iOS devices for control over the streamed signal and ensure that the intentional connected device(s) stay priority.

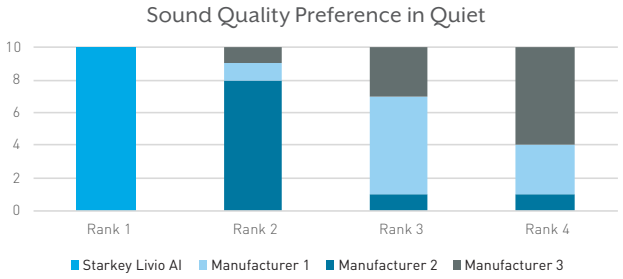
Thankfully, with increased flexibility and complexity of technology there are a variety of options well-suited for individual patient's capabilities and needs. We use acclimation tools with new or less tolerant users with regard for amplification, which assist in easing these patients into optimal gain over time. We can apply this same philosophy to gently acclimate patients into optimal control of their devices as well. Understanding connectivity and developing strategies to assist methodical troubleshooting when issues present can also improve the patient experience. Technology is rapidly advancing and will continue in that direction; it's our responsibility as providers to stay informed of these advancements, as well as to create and share templates to best educate our patients.

Evan Maraghy began working for Starkey in December 2018 as a Field Sales Representative covering Minnesota, North Dakota, and Western Wisconsin. She received her B.S. in Communication Disorders from the University of Massachusetts Amherst. She continued to receive her M.S. in Audiology from Northeastern University of Boston in 2002 and in 2010 earned her Au.D. from A.T. Still University. She holds a Certificate of Clinical Competence through American Speech, Language and Hearing Association. Evan is a member of the American Academy of Audiology and Minnesota Academy of Audiology.

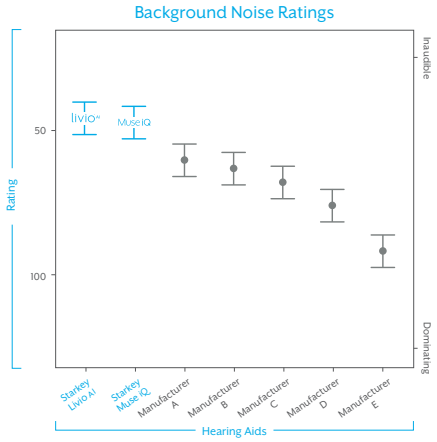
Two Studies. Proven Superior Sound Quality.

Starkey Livio AI is the preferred solution in both quiet and noisy environments

In a blind comparison, 10 of 10 normal hearing expert listeners **ranked Starkey Livio® products first in sound quality**[1] when listening in a quiet environment. Hearing Reality™ technology applies fast-acting noise reduction developed to address the system noise that all hearing aids generate.



A recent independent study gave Livio AI and Muse™ iQ hearing aids the **top rating compared to other manufacturers' premium devices** for reducing background noise in noisy environments.[2]



Contact your local Sales Representative at (800) 328-8602 to learn more about these studies and how Livio AI can fit into your practice.

1 Results from Starkey Hearing Technoloigies internal clinical studies.
2 Delta Senselab. (2018, November). Benchmark evaluation of spatial noise management in hearing aids. FORCE Technology Venlighedsvej 4 2970 Hørsholm, Denmark.