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AUDIOLOGY TODAY

The magazine of, by, and for audiologists

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Cover photo courtesy of NIDCD.

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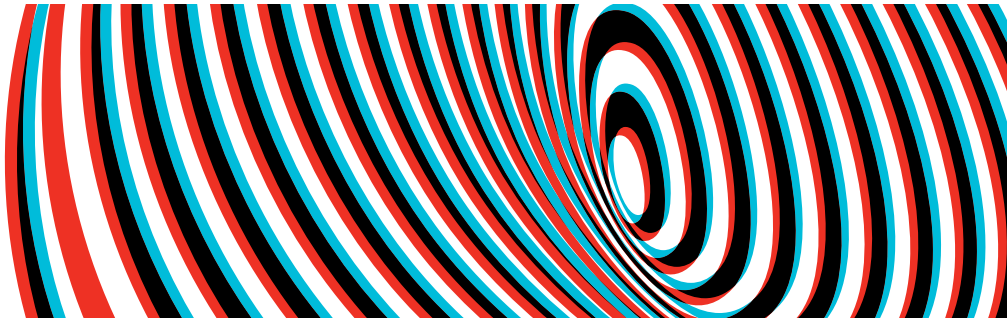

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EDITORIAL MISSION

The American Academy of Audiology publishes *Audiology Today* (*AT*) as a means of communicating information among its members about all aspects of audiology and related topics.

AT provides comprehensive reporting on topics relevant to audiology, including clinical activities and hearing research, current events, news items, professional issues, individual-institutional-organizational announcements, and other areas within the scope of practice of audiology.

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The Importance of Why

At our first meeting in July,

I presented each board member and senior staff member with a copy of the book *Start with Why* by Simon Sinek. The author poses a fundamental question to organizations: *Why* do you do what you do? He then asks how you communicate the message of *why* you believe what you believe and what do you do to support your belief.

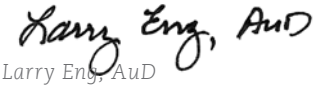
First, I believe that the *why* the Academy exists is because it addresses the need for an organization uniquely sensitive to the professional issues and concerns of all audiologists.

Each one of us came to this profession with a desire to help individuals with hearing and balance problems, possibly from our first exposure to a friend or family member with hearing loss, or from having a hearing loss yourself. That is the why of how you came into this field.

Second, how as members of this organization do we hope to accomplish our goal of promoting quality hearing and balance care? In the fall, the American Board of Audiology will publish the first practice analysis of the profession of audiology. This document will validate the profession through a study of the practices of audiologists who have at least three years post-graduate experience. It will help us to understand how what we do and what products and services to create to provide the best in hearing and balance care.

When we are inspired by the *why* we do what we do, we can then begin to inspire others around us, our colleagues, our policy makers, and our patients. During National Audiology Awareness Month in October, how will you inspire others to seek the professional help of an audiologist to maintain good hearing health, to recognize the need for treatment when a hearing loss is detected, or to access rehabilitation services when indicated? Your Academy's Public Relations Committee, with funding from HyperSound through a gift to the American Academy of Audiology Foundation, developed a new public awareness poster in recognition of National Audiology Awareness Month. The poster is intended to be used in your office, clinic, or community centers to bring audiology awareness to those around you. The poster is included with this issue of your magazine and is available for download on www.audiology.org.

Finally, the question of what we do to support our belief. Your Academy, through the volunteer leadership and government relations staff, continues to advocate for the profession of audiology on Capitol Hill. Academy committees are also working on issues of education, public awareness, and research to provide you with an enriched professional home.



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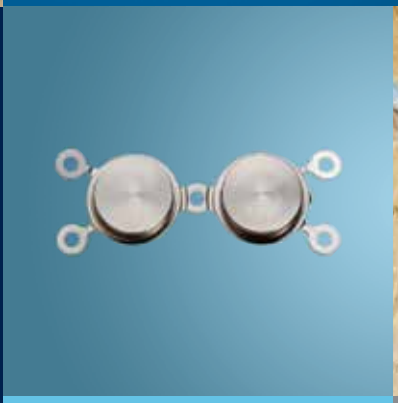

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Licensure Should Define the Audiology Profession, as It Does Other Doctoring Professions

To: Dr. David Fabry, Editor, *Audiology Today*, and Ms. Torryn P. Brazell, managing director, American Board of Audiology

The article "Licensure Should Define the Audiology Profession, as It Does Other Doctoring Professions" by Ms. Brazell in the May/June 2015 (pages 70-71) issue of *Audiology Today*, raised concerns among those of us who believe that professional autonomy is a guiding principle for audiology.

The purpose of this letter is to offer a rebuttal to some issues raised by Ms. Brazell. She first cites John Coverstone, who suggested that the most widely accepted pathway for credentialing for doctoring professions is (1) academic training, (2) clinical training, (3) professional degree, (4) licensure, (5) specialty training (residency), and (6) specialty certification.

This model appears to be, if not wrong, at least incomplete. The Federation of State Medical Boards (www.fsmb.org/policy/public-resources/state_specific) shows that each state requires at least one year of training post-medical school graduation to be eligible for licensing. Many states require that this post-graduate training be completed in an Accreditation Council for Graduate Medical Education (ACGME) program, adding an additional oversight and verification by the medical professional society, not the state licensing board.

At the present time, our professional training model is unlike those in medicine because we do not have any internship or residency type training following the granting of the AuD degree. Our clinical training takes place within the confines of a three- or four-year AuD program, and there is no requirement for post-graduate training, as there is in medicine.

Dentistry, another doctoring profession, has educational requirements as well as written and clinical exam requirements for licensure; each are under the oversight and jurisdiction of the American Dental Association in a similar manner to how ASHA oversees the Council on Academic Accreditation and Council for Clinical Certification. Some states do not require a clinical examination, but require applicants to complete an accredited post-graduate dental residency program of at least one year in length (PGY-1), also under the aegis of the dental professional society.

Optometry licensing requirements include each candidate passing a three-part set of exams developed, administered, and scored by the National Board of Examiners in Optometry, NBEO (www.optometry.org). The Part III Clinical Skills Examination (www.optometry.org/nccto.cfm) is administered at its National Center of Clinical Testing in Optometry. It should also be noted that optometry, like dentistry and medicine, has accredited residency programs for post-graduate training.

To summarize, licensure in other doctoring professions has a high level of oversight and input provided by the professional organizations for those fields of practice. Licensure in fields such as medicine and dentistry require post-professional-degree training in accredited programs. Optometry also offers post-professional residencies. We have no such programs in audiology at this time.

Another serious concern about having licensure define the profession of audiology is that state licensure boards may not be representative of that profession. For example, in Arizona, the licensing board comprises 12 members, only two of whom are required to be audiologists. Other members include public members, speech-language pathologists, hearing instrument specialists, medical doctors, and state-appointed bureaucrats. This composition is very different from that of licensing boards in medicine, dentistry, and optometry, a majority of whose members actually practice in the profession that they are responsible for licensing. The fact that a state licensing board may have a majority of non-audiologists serving as members would appear to drastically reduce professional autonomy.

The limited collective infrastructure of licensing boards in audiology is another key consideration. Unlike the Federation of State Medical Boards, the National Council of State Boards of Examiners for Speech-Language Pathology and Audiology (NCSB) is not a federation and does not engage in standard setting for the profession of audiology (or speech-language pathology). Furthermore, only about half of the licensing boards in audiology (and/or speech-language pathology) belong to NCSB. This is a serious consideration in that reliance on licensure to define the profession of audiology would mean that the very definition

of audiology would no longer be standards based. The only standards that define the profession of audiology are in fact certification standards.

There are critics of licensure. Bergal (2015, www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2015/1/30/a-license-to-braid-hair-critics-say-state-licensing-rules-have-gone-too-far) writes: "Supporters of occupational licensing laws, which regulate everyone from doctors and dentists to door repair contractors and auctioneers, say that they are necessary to protect consumers and provide oversight. But a growing chorus of critics argues that many state licensing requirements are burdensome and create barriers to competition and job growth." Bernal reviews the history of licensure and the political and professional forces that drive it, along with recent attempts by state governments to drastically reduce or eliminate professional licensing. Whereas licensing may be subject to political and lobbying forces within a state legislature, certification by a professional organization can ensure continuity and credibility for the practitioner.

We believe that both state licensure and certification play a vital role in the provision of audiology services. Licensure ensures basic consumer protection and provides a mechanism by which incompetent and/or unethical practitioners may be removed from practice. Certification provides a different level of consumer protection by ensuring that an individual has met standards endorsed by a national professional society. Certification is a fundamental standard among major health professions in this country.

The remainder of the article by Brazell consists of criticism of the Certificate of Clinical Competence in Audiology (CCC-A) that is offered by the American Speech-Language-Hearing Association. There is no mention made of the American Board of Audiology certification program, except to note that it should be "voluntary" (as is the CCC-A). We found this omission puzzling, in that the principles of ABA certification are laudatory:

We work closely with expert practitioners to create high-level professional standards to further the field of audiology. We encourage audiologists to adhere to—and exceed—these standards to ensure that their patients receive the best care available. We also encourage high levels of ethics and continual learning so that audiologists understand and can implement the latest advances in audiology for the benefit of the patients who rely on them for care. (www.boardofaudiology.org)

We note that these ABA certification principles are consonant with those for the CCC-A.

The CCC is the nation's most widely recognized symbol of competency for audiology professionals. The CCC is recognized in 34 states for the purposes of reciprocity or interim practice and, for that reason, may aid the practitioner who moves or wishes to work in another state. In recognizing the CCC for the purposes of reciprocity or interim practice, states appreciate the scientific validity and high standards of the credential. The requirements for the CCC are equivalent to or higher than any state requirements for initial licensure. Thus, individuals who attain the CCC can be assured that they will meet the requirements for licensure in every state.

We believe that licensing is important for consumer protection, but that it does not and should not define the profession; only professional associations can define—and importantly, routinely and systematically update—the profession's scope of practice and its standards for practice. State licensing boards do not have a majority audiology membership and thus cannot be entrusted to act in the best interests of the profession or for professional autonomy. Our professional associations can and do. Furthermore, state licensing requirements, or even the existence of licensing, is subject to local politics and administrations that may change with each election. In contrast, our professional organizations provide stability, vision, and purpose for our profession. We conclude by agreeing with Brazell and others quoted in the article that certification by any organization should be voluntary; however, we promote the principle that it is certification by professional organizations, dedicated to practice at the highest level, that define audiology.

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Members of the Council,

Thank you for engaging us in a discussion that will allow us to further clarify the difference between certification and licensure. We grant that different professions have different paths for qualification for professional practice. As so often happens

in discussions about the Certificate of Clinical Competence, obtained while a student is matriculating for their entry-level professional degree, the arguments offered are a distraction from the real issue at hand. Do we look to a membership organization to offer an entry-level certificate as a universal standard for the profession, or do we develop example standards to guide state licensure boards?

State licensure boards have mechanisms for recognizing students and post-degree clinicians meeting supervised practice requirements. The purpose of licensure boards goes beyond the assertion that "licensure ensures basic consumer protection…." State licensure boards are also responsible for protecting consumers by ensuring that individuals entering the profession are competent to practice. Audiologists and other professionals argue rightly that they are in the best position to provide post-degree training and continuing education for the profession. However, when it comes to consumer protection, states must step up to strike a balance between advocacy for the profession and the establishment of a monopoly. In a related matter, the U.S. Supreme Court recently affirmed that "when a controlling number of the decision makers on a state licensing board are active participants in the occupation the board regulates, the board can invoke state-action immunity only if it is subject to active supervision by the state." (February 25, 2015) The court ruled that a strong public influence is preferred to members of the profession setting their own standards. Your argument that "the very definition of audiology would no longer be standards based" gives little credit to the dedicated audiologists and public members who serve on licensure boards across the country.

Concern that state license boards "…may be subject to political and lobbying forces within a state legislature" is a good point, and an argument for practicing audiologists and state and national membership professional organizations to provide continuous input to and participation within their state licensure boards so that contemporary practice and standards are balanced with consumer protection. It does not follow then, that a credential tied to a professional membership organization, dominated by a separate profession, with substantial conflicts of interest within the audiology profession, is a better choice.

The Members of the Council expressed that they were "puzzled" by the omission of any discussion of the ABA Board Certified in Audiology credential in the *Audiology Today* article. ABA certification is a voluntary credential for audiologists wanting to document a higher standard of education and practice that may be represented by state licensure. The ABA chooses to use straightforward language to describe what the credential is, and what it represents. It is not tied to membership in an organization, and is not represented as a requirement for licensure, student supervision, or other professional activities. It simply is a credential that documents the higher standards that certificate holders adhere to. There was no need to include a discussion of ABA Board Certification in an article about licensure.

It is interesting that the Council's letter notes that the "…ABA certification principles are consonant with those for the CCC-A." The ABA Board Certification standards are equal to or higher than all state standards for entry into the profession, and have higher continuing education requirements for practitioners than the CCC-A.

Professional input to licensing boards is vital to ensure consumer protection in order to provide guidelines by which standards of care can be upheld by practitioners and understood by consumers. We agree that this input should continue and that we should work to strengthen and coordinate state requirements in the United States. We find that efforts to weaken the importance of licensure by promoting a members-only entry-level certificate counterproductive. In fact, the promotion of a certificate such as CCC-A does little to promote standard of care, and merely serves to assure the public that the holder was trained by an institution accredited by an affiliate of the same organization issuing the credential.

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Ways to Incorporate Hearing Conservation and Preservation in Your Audiology Practice

By Luke Hinzmann

There is only one kind of hearing loss that is 100 percent preventable. While you will never prevent them all, if you could help someone and stop hearing loss before it started, would you? All audiologists should answer a resounding YES! Preventative health care has been found to be helpful for nearly everyone in nearly every situation (World Research Foundation, 2015). Not only can you provide this service to your patients, you can increase your practice's revenue simultaneously. With some basic ideas and processes to consider, both goals can be accomplished almost immediately.

Forms of Hearing Conservation

Hearing conservation and preservation is first and foremost education and awareness. The

National Institute on Deafness and Other Communication Disorders (NIDCD) estimates that approximately 15 percent of Americans (26 million people) between the ages of 20 and 69 have high-frequency hearing loss due to exposure to noise at work or during leisure activities (2015). This means that people either are unaware of the possible damage that noise can cause or they know about it and do nothing to prevent it.

Our patients are harming their hearing by being exposed to unsafe noise levels, too often without hearing protective devices. The education can be done in several ways. You may educate large groups of people or just the person in front of you. You may promote awareness through marketing materials to mass quantities or simple informational materials inside your office. The bottom line is you need to be educating your patients about basic hearing conservation and what is safe. The Academy's scope of practice states that "prevention of hearing loss" is part of the audiologist's job (2004).

Another form of hearing conservation is to actually monitor hearing thresholds on a continuous basis. Most of your patients will probably not need this type of monitoring. This would be best applied to high-risk individuals who tend to be around a lot of noise on a regular basis. This may include someone exposed frequently to high noise levels in a recreational form. In this case, you would have to motivate and encourage your patient to have audiograms done on a schedule. Most typically, this would involve people who work in high-level noise areas. The best way to get them into this program is from the employer side. If the employer supports the program, or even requires it, then many workers will likely participate.

The most important form of hearing conservation is to provide useful solutions. While you can educate and even monitor someone's hearing all you like, if you don't have a way to actually solve the issue, then things will never change. Education may teach someone to avoid or alter those high-level noise environments, but for many people, it is either unavoidable or not worth it to give up their hobbies. For most cases, you could encourage the use of hearing-protection devices. These may include a pair of disposable ear plugs, nicer custom ear plugs, earmuffs (that can vary from cheap to expensive and electronic), or premium custom digital noise plugs. Without some type of hearing protection, the noise-induced hearing loss will not show signs of decrease. Just about anything custom is where the audiologist comes in.

While most consumers are likely to purchase muffs or disposable plugs outside of an audiology office, only a handful of people know how to take the ear impressions needed to create custom plugs. Not only this, but very few consumers would know how or where to buy custom plugs without the help of their audiologist. In either case, that patient needs a service from the audiologist.

Hearing Conservation in Your Practice

One way to incorporate hearing conservation into your practice is to market that service directly to consumers. Just as you market hearing services and hearing solutions, your practice can do the same for hearing conservation services and solutions. Depending on your individual practice and target market, this may or may not be worth it. When you consider the amount of profit in this area, it is often not the main area to market. In most cases, it should be marketed to a new patient or already existing patient, but someone who is already in your office. This can be as simple as informational posters in strategically placed areas to get your patient to simply think about noise and its effect on their ears. If patients partake in noisy hobbies or work in noisy environments, they are much more likely to mention this at some point during the appointment. If they have thought about and mentioned it, they are likely someone who would benefit from a solution that you have.

Another way is to market hearing conservation programs to businesses that employ at-risk workers. A hearing conservation program that involves both an educational component and monitoring of hearing thresholds can be very lucrative. The more employees who are in the program, the more revenue it can generate for the audiology practice. Most of these contracts are done on a regular basis, often annually. While this can be very lucrative, the operating costs are often high. Usually several (or many) contracts are needed for the revenues to outweigh the operating costs. Most clinical audiologists will not be doing this; however, it should be considered, as it can produce huge opportunities for growth and revenue, depending on the specifics.

Often a highly cost-effective option is to speak at a seminar or a setting where the audiologist can inform a large group of people at one time about hearing conservation. The audiologist should be cautious—if the main goal is to sell lots of custom ear plugs, most people listening can tell they are being sold. But, if the audiologist can present the information well, and educate the group while offering both services and products, the result is often a good one. This technique is often done for hearing services and solutions, but can easily

be adjusted for hearing conservation and preservation as well. The most difficult part is likely finding a proper setting and a group of highly motivated people willing to listen.

One of the best and simplest ways to incorporate hearing conservation is to inform your already-existing patients, especially the ones who already have noise-induced hearing loss, of the services and products you have available to them. Many patients do not know what you can do to help them reduce any further hearing damage. Again, this goes back to education, because educated patients are the best kind. Most patients who are highly motivated, unfortunately, are the ones who already have noise-induced hearing loss. It is these patients, along with the high-risk patients you identified during the case history intake, who should get a free pair of disposable ear plugs. This challenges the patient to be more proactive and gives you an opportunity to offer even better products. These better products are any custom hearing protection devices that require an audiologist's services. These can be custom noise plugs that are sold around $100 to $200 a pair or custom digital noise plugs with volume-controlled amplification that sell upward of $2,000. The profit margins of ear plugs are not that of hearing aids, but they can be significant to supplement. By simply mentioning the available solutions (to every single identified high-risk patient), you are likely to help more people, thus increase revenue.

There are many different ways to incorporate hearing conservation into your practice, only some of the possibilities were mentioned. Not only is our obligation as audiologists to help and preserve hearing, but it will often directly affect the practice's revenue generated. In a world where online shopping becomes more of the norm, even in health care, and especially in audiology and with hearing aids, this is just one more way that you can stand out and provide more value to your patients.

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Illustration by Johanna van der Sterre.

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CALENDAR

September 10–12
Meeting
California Academy of Audiology Annual Conference
San Jose, CA
www.caaud.org/conference.asp

September 11–12
Meeting
Practice Management Specialty Meeting
Baltimore, MD
www.audiology.org/practice-management-specialty-meeting

September 16–18
Meeting
National Center for Rehabilitative Auditory Research, Hearing Loss as a Public Health Concern
Portland, OR
www.ncrar.research.va.gov/conference/2015NCRARConference.asp

September 23–25
Meeting
Pennsylvania Academy of Audiology Convention
Harrisburg, PA
www.paaudiology.org

October 15–16
Meeting
Maryland Academy of Audiology Convention
Linthicum Heights, MD
www.maaudiology.org

October 28
eAudiology Web Seminar
Utilizing a Magnetic Bone-Conduction Hearing Implant in Children
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AUDITORY TRAINING IN THE "REAL WORLD"

BY KARA VASIL AND KRIS ENGLISH

The future of audiology lies in the hands of today's students; practices adopted during education and training are often continued throughout one's career.

One of the most exciting breakthroughs in audiology has been our evolving understanding of neuroplasticity—the brain's ability to reorganize in response to new experiences, even in later years (Kraus, 2014). When a learner purposefully attends to a repeated stimulus, neural synapses strengthen and begin to fire more synchronously and efficiently. At some point, the new neural processes are "hard-wired," i.e., learned.

According to this concept, repeated auditory stimulation can cause neural synapses within the central auditory nervous system to fire more synchronously as well; in fact, neuroplasticity is the underlying principle of auditory training. It has been shown that despite a long-term hearing loss, auditory training can improve performance for tasks in background noise, auditory memory, and processing speed, and can reduce listening effort at both perceptual and neural levels (Anderson et al, 2013; Anderson and Kraus, 2013; Song et al, 2012; Sweetow and Sabes, 2006). At this time, several auditory training programs are available for clinical and at-home use. Consistent with neuroplasticity principles, these programs actively engage listeners in the learning process, taking into account their listening strategies and cognitive abilities.

Research on brain plasticity and cognitive function continues to inform our understanding of the auditory system and our role in audiological rehabilitation, and because it is within our scope of practice, it is assumed that AuD students acquire this information in coursework. However, it is not known whether students apply auditory training skills in clinic. The purpose of the following study was to identify a potential gap between knowledge and skills—specifically, knowledge about auditory training acquired in AuD coursework, and the development of relevant skills in clinical placements. This study was approved by the Institutional Review Board at the University of Akron.

Methods

Participants were recruited from a mailing list of Student Academy of Audiology members, identified as graduate students of audiology, who were sent an e-mail invitation to participate. E-mails were blind-copied so that no recipient would be aware of other recruits. Respondents (N=379) included 353 female students and 26

male students. The survey consisted of 15 multiple-choice questions and one open-ended question. Questions could be left unanswered. A survey could be submitted without answering every question. A participant's consent was indicated by clicking an "Agree" button on the first slide of the survey.

Results

Familiarity

Results showed that the majority of students (82.9 percent or 300 participants) were familiar with auditory training, mostly indicating that they had learned the concepts in coursework associated with central auditory processing disorders and audiological rehabilitation. The most familiar auditory training program was Listening and Communication Enhancement (LACE) (Sweetow and Sabes, 2006)(N=245; 82.7 percent). Other familiar programs included Earobics (www.earobics.com), Fast ForWord (www.scilearn.com/products/fast-forword), and hearing aid company proprietary programs (see FIGURE 1).

On-Campus Use

The survey indicated that 88.1 percent or 259 of the respondents had at least one semester of on-campus clinical experience at their university in-house clinics. The majority of respondents (70.3 percent or 185 students) stated that they did not use auditory training procedures on either children or adults in this clinic setting. The students who did complete on-campus auditory training procedures with patients stated that they rarely did so (see FIGURE 2). Common programs used in this setting were LACE, Earobics, and proprietary programs.

Off-Campus Use

Seventy-one percent, or 207 of the respondents, reported having clinic experience in an off-campus setting, such as a hospital, clinic, or school district. Out of these students, 75.8 percent, or 157 students, reported never using auditory training in this setting. The few who did provide auditory training stated that they used it "somewhat often" or "rarely," and were most familiar with the use of LACE or proprietary programs.

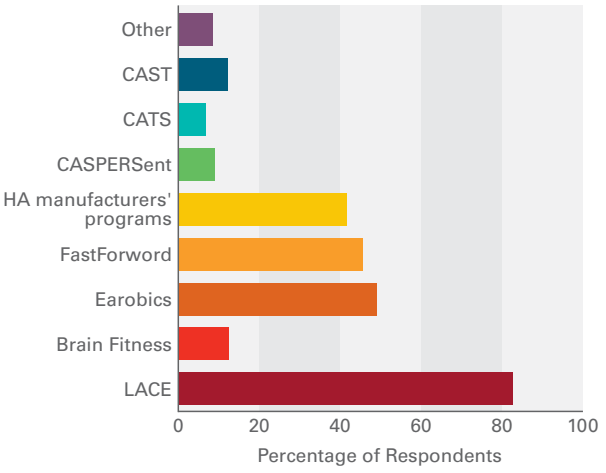

FIGURE 1. Which of the following auditory training procedures are you familiar with?

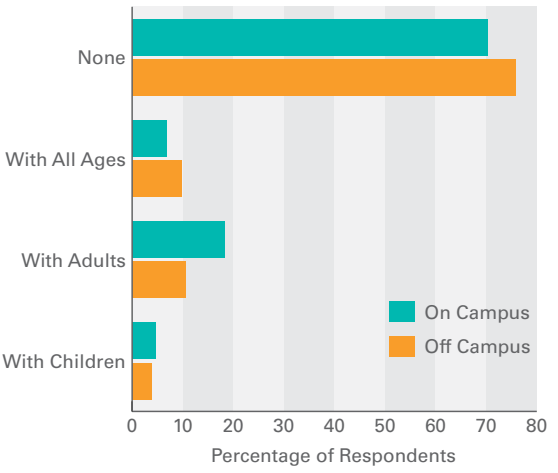

FIGURE 2. Auditory training experience in clinic on and off campus.

FIGURE 2 compares on- and off-campus experiences with auditory training. Of the students who indicated experience with auditory training, FIGURE 3 reports on the degree to which training was provided.

Perceived Importance and Use

When asked about perceived importance of auditory training procedures, most survey respondents stated that they felt these programs were "somewhat important" (FIGURE 4). Students reported that possible reasons for its lack of use were a lack of reimbursement, time, and information about its benefits.

Discussion

Available evidence indicates that auditory training programs benefit patients in adverse listening situations, and improve their perception of hearing aids, communication confidence, and degree of listening effort (Kraus, 2014; Palmer and Sweetow, 2005; Sweetow and Sabes, 2006; Sweetow, 2015) However, the majority of our respondents are unfamiliar with the clinical use of such programs. In coursework, students are reminded that audiological

Despite a long-term hearing loss, auditory training can improve performance for tasks in background noise, auditory memory, and processing speed, and can reduce listening effort, at both perceptual and neural levels.

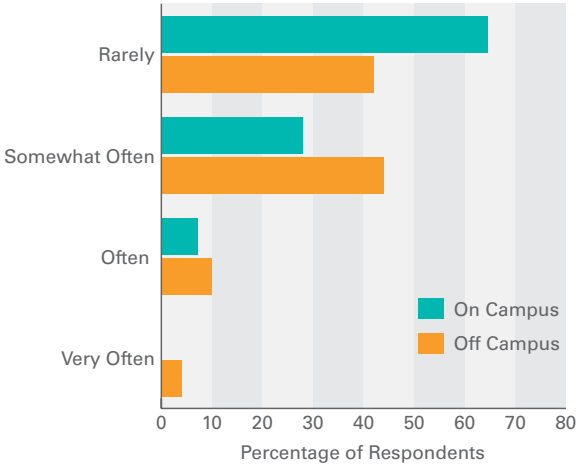

FIGURE 3. How often have you provided auditory training support?

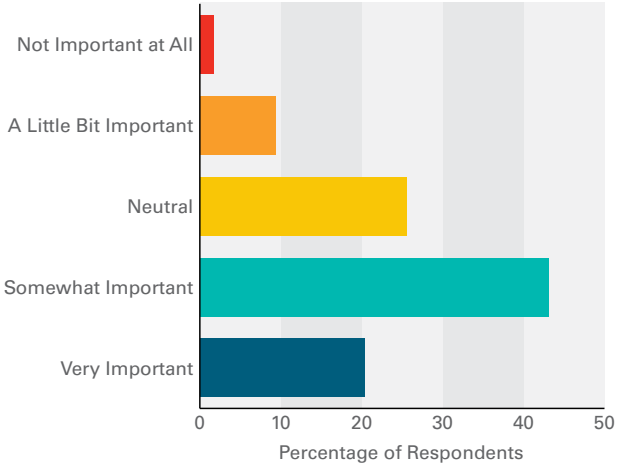

FIGURE 4. Perceived importance and use of auditory training procedures.

rehabilitation plays a crucial role in improving a patient's communication, especially after a long period of auditory deprivation. If this is true, then one must ask the question: why aren't these programs being used in the clinic, especially when the clinic and the classroom often share the same building or same faculty members? If students today are shown that a hearing aid is the sole answer to a patient's communication needs, they will not develop the skills (and commitment) to provide comprehensive rehabilitation.

Of course, auditory training programs may not be a perfect fit for everyone. Clinicians are still unconvinced by auditory training data; the majority of published auditory training studies do not meet rigorous evidence-based criteria, and improvements on untrained tasks can vary (Sweetow, 2015). Additional research is needed to verify the long-term benefits of each training program, but the current evidence for improving listening abilities is compelling and worth exploring.

One helpful and underused tool for choosing aural rehabilitation methods may be the decision aid, such as one used by the University of Memphis (2013). This paper-and-pencil format allows patients to examine various options and decide which ones they'd like to know more about. Hearing aids are one option, but so are hearing management groups, hearing skills training, assistive listening devices, and the option to forgo any treatment at all. This aid facilitates a patient-centered treatment plan, and allows the clinician to expand on all possible options before a decision is reached.

Currently, LACE is affordable to many patients, at a cost of $79 for the Web-based program or $99 for software (Neurotone, 2015). Other, more generalized brain training programs, such as Lumosity, are available for a monthly fee of $15 or less, and are popular and widely accepted (Kaiser, 2013). Many brain and auditory training programs offer a free trial of their software, and are designed to be play-based in the form of puzzles, videos, or games. Compared to a hearing aid, this cost is negligible and its potential is high.

Auditory training may not be necessary for all patients, but it should be considered for those who could benefit from it. Sweetow (2015) points out that other rehabilitation processes, such as physical or occupational therapy, are "commonplace and well accepted." Instead of being discussed as an afterthought, auditory training should be included in a comprehensive conversation about the importance of aural rehabilitation. At subsequent appointments, the audiologist can query the patient about their changes in their listening abilities, or employ a questionnaire such as the Client-Oriented Scale of Improvement (COSI) (Dillon et al, 1997) to assess improvement over time. The COSI, along with many other self-assessments, is subjective and likely to reflect changes in confidence and perception of communication strengths and weaknesses.

If motivation is an issue, Zhang, Miller, and Campbell (2014) suggest an open dialogue with patients about their needs and expectations. Tye-Murray and colleagues (2012) show that compliance is "notoriously low" for patients who were recommended auditory training programs. A group of 93 participants completed a six-week training program involving a single talker or six talkers; regardless of the number of talkers, the majority of patients perceived benefit in speech understanding. However, one milestone is unmistakable—the perceived enjoyment was not correlated with perceived benefit. Older adults had a perspective of increased self-efficacy and enjoyment compared to the younger adults. When asking for feedback about the training program, approximately 20 percent stated that a weakness was its overall tediousness and monotony.

Highly motivated individuals will do well with a home-based program, since they are typically completed at a

Auditory training may not be necessary for all patients, but it should be considered for those who could benefit from it.

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listener's own pace and will track progress. Other hearing aid users might benefit more from a group session or one-on-one appointment with the hearing professional for more guidance. Read My Quips (www.sensesynergy.com), an auditory training program developed by Tye-Murray and colleagues, can be used on a mobile device, and its speech stimuli will soon become available in the voice of the patient's frequent communication partner (Sweetow, 2015). Musical stimuli are also being used in the rehabilitation process, and have been shown to result in better speech processing and understanding in background noise (Kraus, 2014).

Unfortunately, reimbursement is currently an issue, and many patients would have to pay out-of-pocket for such services. If the importance of auditory training is truly emphasized to patients and not only presented as a last-minute option, it is probable that these programs would pique a patient's interest and provide extra motivation to improve their communication skills.

Conclusion

Compelling evidence suggests that the combination of auditory training programs with hearing aid use can result in better outcomes compared to the use of hearing aids alone. It is surprising, then, that the majority of our survey respondents have had little or no clinical experience of such programs. We must ask the question: why aren't auditory training programs being used in clinic, and how can we encourage acceptance? Certainly, more research needs to be completed on the generalization of training results, proper use, and most appropriate outcome measures.

The future of audiology lies in the hands of today's students; practices adopted during education and training are often continued throughout one's career. If students are not given the opportunity to apply theory to practice, and discover for themselves the efficacy and value of auditory training and other rehabilitation methods, they will unknowingly contribute to less-than-optimal patient outcomes and a compromised professional standing in health care. To all involved in student clinical training—please take notice!

Kara Vasil is a fourth-year AuD student at the University of Akron/NOAC and is completing her externship at Heuser Hearing Institute in Louisville, KY. Kris English, PhD, is a professor and interim school director at the University of Akron.

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QUALITY IMPROVEMENT FOR REAL-EAR VERIFICATION USING A DEFINED MODEL FOR IMPROVEMENT

BY SARA E. KADER, ANNE ECKERT, AND VIRGINIA TOTH

USING THE SIX SIGMA METHODOLOGY FOR PROCESS IMPROVEMENT AND PROBLEM REDUCTION, EXPLORE IMPROVEMENTS OF AUDIOLOGY CLINICAL PRACTICE IN ASSESSING WHETHER REAL-EAR VERIFICATION METHODS WERE CONSISTENTLY AND ACCURATELY COMPLETED.

Quality improvement (QI) is a principle of improving business practice by introducing new practice standards and monitoring the impact of these changes. This process is applied across many industries. In health care, quality improvement initiatives lead to better patient outcomes, better system performance, and better professional development (Batalden and Davidoff, 2013). While it seems logical to suggest that QI initiatives would be beneficial in all areas of health care, the literature is lacking in reports of audiology performance projects. It is unclear whether this lack of publications is because systematic approaches to promoting improvements in audiology practice are not implemented or whether they have not been published.

All audiological practices are likely to examine current practices to determine what improvements are needed; however, it is possible that these practices hesitate to apply systematic approaches to achieve improvements. Perhaps the primary reason for the limited published data on this approach is that audiologists are not applying specific methodologies to achieve change due to concerns about time constraints or limited personnel. *The purpose of this article is to explore the clinical feasibility of using a specific QI methodology to improve clinical practice in audiology.*

The two most popular quality improvement methodologies in health care are the Plan-Do-Check-Act (PDCA) method and the Six Sigma Define-Measure-Analyze-Improve-Control (DMAIC) method. The concept of the PDCA Cycle was originally developed by Walter Shewhart, the pioneering statistician who developed statistical process control in the Bell Laboratories in the United States during the 1930s. This process is often referred to as *the Shewhart Cycle* and was promoted very effectively from the 1950s by the famous quality management authority, W. Edwards Deming, and is consequently known by many as the *Deming Wheel*.

There are four steps to the PDCA method.

1. Plan to improve operations first by finding out what things are problematic (that is identify the problems faced), then come up with ideas for solving these problems.

2. Do implement changes to solve the problems on a small or experimental scale first. This minimizes disruption to routine activity while testing whether the changes will work or not.

3. Check whether the small scale or experimental changes are achieving the desired result. Also, continuously "Check" nominated key activities (regardless of any experimentation going on) to ensure that you

know what the quality of the output is at all times and to identify any new problems when they arise.

4. Act to implement changes on a larger scale if the experiment is successful. This means making the changes a routine part of your activity. Also act to involve other persons (other departments, suppliers, or customers) affected by the changes and whose cooperation is needed to implement the change on a larger scale, or those who may simply benefit from what has been learned (these individuals may have already been included in the Do or trial stage).

In 1986, Deming amended his description of PDCA to Plan-Do-Study-Act (PDSA). By replacing the "Check" with "Study," the emphasis shifted from the simple act of checking data to instead reflecting on the meaning of that data to better understand the product or process being improved. There is an emphasis on analysis of the results of one's experiment and then adjustments are applied to further improve the process.

A newer method, Six Sigma, is a statistically based method that was developed by Motorola Inc. in 1986 to reduce variation in the electronic manufacturing process. Six Sigma includes two general processes: (1) Improve existing processes that are wasting resources and (2) Design new products in a way that promotes Six Sigma quality for those products.

The Define-Measure-Analyze-Improve-Control (DMAIC) model of Six Sigma is used for process improvement. DMAIC is a structured methodology used to improve processes by using data to make decisions. This process is a step-by-step guide to achieve business results using a data-based improvement methodology (FIGURE 1).

During the first step, Define, a team is formed to identify the problem and create a focused charter project. In the course of the "Measure" and "Analyze" steps, baseline performance is assessed and reviewed so that potential root causes for the problem are identified. Possible solutions are then generated and implemented to "Improve" the process. Finally, during the "Control" step, the process is reviewed and a plan for future monitoring is implemented to ensure that achieved gains are maintained.

Certainly, one can argue that these processes are similar. Both require identification of the problem (during Define or Plan) and outlines steps to improve the process. With the PDCA method, changes are initially implemented on a smaller scale before initiating large scale modifications. The DMAIC method adds the important element of control; thereby, ensuring progress is maintained via future monitoring progress.

For one audiology practice, the DMAIC methodology was chosen as the tool for assessing quality improvement for real-ear verification. The five-step process DMAIC was applied in assessing whether real-ear verification methods were consistently and accurately completed.

Define

Both the American Academy of Audiology (Academy) and American-Speech-Language-Hearing Association (ASHA) clearly delineate real-ear verification measures as a critical component of the best practice guidelines in the fitting of hearing aids. The Academy states that "prescribed gain (output) from a validated prescriptive method should be verified using a probe-microphone approach that is referenced to ear canal SPL (Valente et al, 2006)." In 2012, Abrams et al demonstrated that patients with hearing aid fittings based on verified prescription had mean scores on the Abbreviated Profile of Hearing Aid Benefit (APHAB) subscales that were higher than those of patients fit based on manufacturer initial fitting.

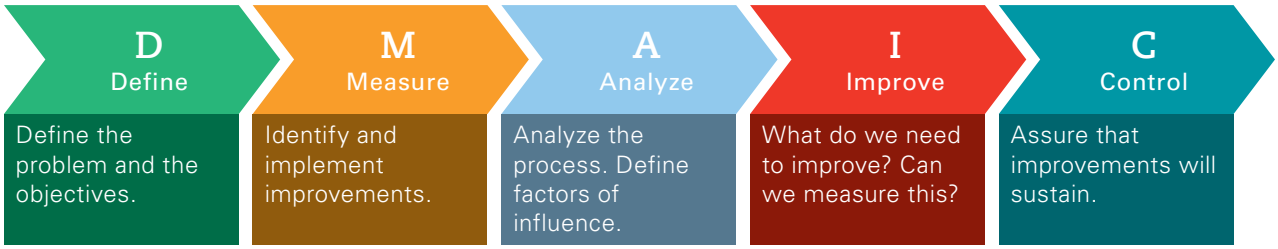

FIGURE 1. The DMAIC model of Six Sigma is used for process improvement.

Furthermore, significantly more subjects in that study preferred the prescriptive gain fitting to the initial fit approach. Thus, patients reported improved ability to understand speech in various listening situations and less hearing disability or activity limitation demonstrated that adults who were fit using the desired sensation level (DSL) 5.0a prescriptive formula had positive outcomes on the client-oriented scale of improvement (COSI), another outcome measure demonstrating improvement in hearing in situations identified by the patient as challenging (Polenko et al, 2010).

In a 2005 review article, Gus Mueller examined the question of whether the current trend of many audiologists failing to use prescriptive methods could be because there is a lack of supporting evidence. He found that while there are a limited number of studies and the statistical power of those studies is low, "there is evidence to support that for average inputs, gain approximating that recommended by the [prescription formula] is most preferred by adult hearing aid wearers (Mueller, 2005)."

In spite of this evidence, using prescriptive methods and real-ear verification methods has not become routine in clinical practice. The *Hearing Journal* has conducted several surveys regarding the use of real-ear probe-microphone measures (TABLE 1). Even the most recent survey by Mueller and Picou (2010) indicated that routine use of these measures has not become commonplace.

In compliance with the practice's goal of using best practices in clinical work, the question of whether this audiology practice was routinely utilizing probe-microphone measures was posed. To answer this question, a baseline analysis was completed that led to three additional questions:

1. Is regular use defined as "more than half the time" by the *Hearing Journal* studies, best practice or should a more stringent goal be defined?
2. How often were verification measures completed on ear rather than in the test box?
3. Were targets (DSL child, DSL adult, or NAL-NL1) approximated?

This project was initiated in February 2012. The audiology practice included five full-time audiologists and one part-time audiologist. The purpose of the initiative was to improve compliance with the best practice of including real-ear measures for every hearing aid fitting and to improve the quality of real-ear verification procedures.

Measure

At initiation of the QI project, a retrospective review of hearing aid fittings was completed for the previous four months. A total of 46 patients were fit with hearing aids during this baseline period, with the number of fittings ranging from 1 to 14 depending on the audiologist. Three aspects of verification were assessed: (1) compliance with completing verification procedures, (2) whether verification was completed on ear or in the test box, and (3) the accuracy with which hearing aids were effectively programmed to prescriptive targets.

Compliance with the completion of real-ear aided response measurements was at 89 percent with 95 percent of those tests completed on the patient's ear and five percent completed in the test box using average real-ear canal differences. When compared to the data presented in TABLE 1, these findings indicated that while above the industry average, there was still room for improvement in the verification procedures.

In calculating the number of fittings for which targets were approximated, it was noted that approximating targets was not always appropriate for all patients. For instance, some patients were unable to tolerate prescribed fittings due to recruitment. In these cases, probe-microphone testing was still considered to be acceptable if documentation was provided as to why approximating targets was not completed. Of the 34

TABLE 1. U.S. Audiologists and Hearing Instrument Specialists (HISs) Routinely Using Probe-Microphone Measures (more than half the time)

Year	1995	1999*	2003	2005	2010
Combined audiologists and HISs	39%	42%	37%	34%	40%

*Limited to practices owning or having access to the equipment.

Source: Mueller HG, Picou EM. (2010) Survey examines popularity of real-ear probe microphone measures. *Hear J* 63(5):27–32.

TABLE 2. Baseline Data

# Fittings	# Speech Mapping Completed	% Completed	On Ear	Test Box	Speech Mapping Approximated Targets (#)	Speech Mapping Approximated Targets (%)
46	41	89%	39	3	32	78%

TABLE 3. Clinical Competency Assessment

Skill/Age Level: This procedure does not change with different age populations.	Competent	Not Competent	Comments
Attends AudioScan in-service or previous experience with Verifit.			
Chooses appropriate test mode.			
Chooses appropriate test.			
Correctly demonstrates calibration of coupler microphone.			
Correctly demonstrates calibration of real-ear reference microphones.			
Correctly demonstrates calibration of transducer.			
Correctly sets up patient for RECD measures.			
Correctly performs RECDs.			
Correctly completes electroacoustic analysis of a hearing aid.			
Correctly completes speech mapping on ear.			
Correctly completes speech mapping in test box.			
Describes other functions available.			

TABLE 4. Second Chart Review

# Fittings	# Speech Mapping Completed	% Completed	On Ear	Test Box	Speech Mapping Approximated Targets (#)	Speech Mapping Approximated Targets (%)
42	36	86%	35	4	34	94%

TABLE 5. Final Chart Review

# Fittings	# Speech Mapping Completed	% Completed	On Ear	Test Box	Speech Mapping Approximated Targets (#)	Speech Mapping Approximated Targets (%)
63	60	95%	59	0	54	90%

hearing aids fit during this four-month period, 70 percent of the fittings either met this criterion or approximated targets (TABLE 2).

Analyze

Best practice standards in audiology indicate that using real-ear verification should be an integral part of the hearing aid fitting process. A goal of 100 percent compliance may be unrealistic, as circumstances (e.g., patient refusal or patient demise) can arise that prohibit completion of the fitting. Nonetheless, excluding unusual circumstances, the quality improvement team agreed that probe-microphone measures should be completed on each patient.

For adult patients, a goal of 95 percent compliance was defined. Analysis of baseline data indicated a secondary goal in improving the quality of the fittings. Even with patients for whom probe-microphone measures were completed, review of the measures indicated that the hearing aids had not been set to approximate targets. For this reason, a goal of 95 percent was defined for approximating targets or documenting why targets were not approximated.

Root cause analysis of baseline measures that did not meet the stated goals led to several questions.

1. Did the audiologists know that on ear probe-microphone measures were consistent with best practice standards?

2. Did the audiologists understand why on ear probe-microphone measures were critical?

3. Did the audiologists have sufficient comfort with the probe-microphone equipment to efficiently complete the measures?

4. Was there enough time scheduled to complete the measures?

5. Did the audiologists understand the criteria for acceptable probe-microphone measures?

   Note: Acceptable measures have been defined within our practice as matching prescriptive targets (within 5 dB) for a 65 dB SPL speech stimulus.

6. Was there significant variation between audiologists in compliance and in quality?

Improve

After review of this analysis, the team determined that an educational workshop might be indicated to ensure that audiologists were knowledgeable about best practice using probe-microphone measures and the practice-defined criteria for acceptable measures, understood why these measures were so important, and were comfortable with the procedure for completing the measures. An educational in-service, which focused on these areas and included a clinical competency assessment, was planned and executed. The clinical competency assessment included one-to-one observation of each audiologist completing calibration, measurement of real-ear canal differences, ear probe-microphone measures, and test-box measures (TABLE 3).

Although this initiative did not directly address the time issue raised in question 4, it was suggested that time might be a lesser factor with greater competence in the procedure. The team opted to postpone the concern of audiologist variations and wait to see if variation persisted following education.

A second chart review following this educational initiative included fittings that were completed from March to July of 2012. Analysis (TABLE 4) revealed improvement in compliance with completing the procedure, but neither the goal of completing speech mapping for 95 percent of fittings nor the goal of approximating targets for 95 percent of fittings was achieved.

Therefore, each audiologist was presented with the data from their hearing aid fittings. During individual meetings, the QI team leader met with each audiologist to address areas of concern and to target specific strategies that might improve both compliance and quality.

The final chart review for this study was completed for fittings from August through December 2012 (TABLE 5). During this period, the goal of 95 percent compliance with completing speech mapping was met. All fittings were verified using probe-microphone measurements and targets were approximated for 90 percent of fittings.

Further review of the charts of the three patients for whom probe-microphone measures were not completed revealed that one patient passed away during the trial period and two patients did not return during their trial period to allow these measures to be performed. It should also be noted that one of these two patients did return several months after the fitting and probe-microphone measures were completed at that time.

Some professionals advocate for completing the probe-microphone measures at the initial fitting session, which would have addressed this lapse in compliance. Other professionals opt to use the manufacturer's prescribed settings during the initial visit and complete real-ear verification at the follow-up. Although research supports the use of real-ear measurements

as the standard of practice, there is no consensus as to when these measures should be completed.

Within our clinic, some audiologists feel that fitting a patient to target at the first evaluation will allow him or her to begin to adjust to appropriate levels of amplification. Conversely, other audiologists feel that using a manufacturer's prescribed settings (which typically provide lower gain than prescription formula) at the initial fitting with verification to prescriptive targets two weeks later, allows patients time to comfortably acclimate to amplification. Additionally, these audiologists prefer to have more time during the initial fitting session to ensure the patient is comfortable with basic use and maintenance of their hearing aids.

Relatedly, one of the initial concerns in this initiative was whether audiologists would have sufficient time to perform the procedures. Team input following the project indicated no further concerns regarding time constraints. Several audiologists commented that through using the measures, they have found that their fitting process seems more efficient (FIGURE 2).

Control

For a quality improvement initiative to be successful, a standardized process plan, a monitoring plan, and a response plan need to be established. For this project, the following have been implemented.

- A standardized process for completing probe-microphone measures for each hearing aid fitting has been updated in the procedures manual.
- A monitoring plan has been delineated that will include twice yearly chart reviews of a randomly selected patient for each audiologist on staff.
- For audiologists who have not completed real-ear measures in accordance with the defined procedure, chart reviews will be completed for all hearing aid fittings until compliance improves.

Conclusion

This QI project using a defined model of improvement demonstrates both value and need. First, pre-existing documentation was used, which avoided the need for collecting data at a later date. Second, a quality improvement team was developed using existing resources to effectively and efficiently identify processes requiring improvement. Finally, staff education, hands-on training, and individual feedback were all used to improve compliance with best practices of verification and the quality of our hearing aid fittings.

For this quality improvement initiative, completion and quality of real-ear measurement were targeted as areas for improvement. This technique was efficient, effective in measurable change in clinical practice, and demonstrated improved quality of care by providing care that is consistent with recommended standards of practice. The success of this initiative suggests, on a macro level, that this trial also serves as a proof-of-concept study to demonstrate that QI is an effective strategy for making clinical improvements in the field of audiology.

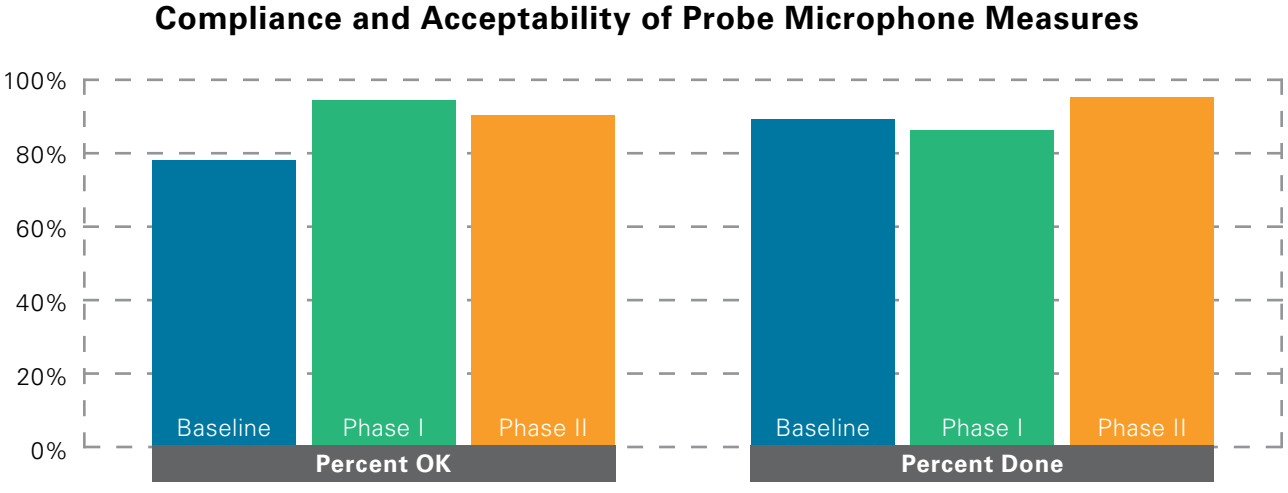

FIGURE 2. Several audiologists commented that through using the measures, they have found that their fitting process seems more efficient.

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The Importance of Marketing in the New World of Audiology

BY DON NIELSEN

An influx of change and competition in hearing health care necessitates thoughtful marketing strategies for both private and nonprofit audiology professionals.

Gary Jacobson asked Jim Jerger (Jacobson and Jerger, 2014): "Do you see any serious threats to the future of audiology?" Dr. Jerger replied: "There has been a serious threat to the profession of audiology from the day the American Speech-Language-Hearing Association (ASHA) decided it was not unethical to dispense hearing aids. Ken Johnson, longtime executive secretary of ASHA, warned us about it more than 40 years ago. The danger is that we will just replace old-fashioned hearing aid dealers with newly minted hearing aid dealers." Beginning in the 1970s, audiologists took ASHA's decision to heart and began wrestling the hearing aid market away from the dealers. Audiologists had a broader knowledge of acoustics, hearing, and patient care, and by the 1990s had made significant inroads into the hearing aid market. This success created a dependency on hearing aid sales to produce needed revenue and profits, and the profession of audiology was forever changed. Today, audiology clinics face a new threat: the reduction and possible loss of this source of revenue on which they have become so dependent. Let us examine what is necessary to survive and prosper.

Audiology Today

To prosper today, a successful audiology clinic must offer more than great audiology, superior patient care, and remarkable products. Clinicians must become business people, thinking strategically about their brand in order to market themselves. With the entry of big-box stores and manufacturer-run or -sponsored dispensaries, there is increasing competition that is expert in business practices and has vast resources. These competitors offer attractive pricing through mass volume purchases and low margin strategies. By selling through dispensers they have hired, they are able to avoid sharing profits with independent audiology clinics. To counter the threat, audiologists must adopt and implement new business strategies to remain competitive.

Health Care Today

These changes in competition are occurring throughout the health-care industry. A survey of 2,339 U.S. residents by Strategy& (Estupianan, et al 2014) paints a clear picture of a population displeased with its overall health-care experience and with rising expectations for transparency, value, and customer service. There is a growing willingness to seek health care from less traditional sources including big-box stores and the Internet, with 40 percent of respondents indicating they would trust a large retailer for health services. Transparent markets and an increasing range of choices for patients means that marketing and branding are no longer optional for audiologists and their clinics.

Competition will continue to increase. Walgreens has partnered with Sonova to sell hearing aids. Wal-Mart, Rite Aid, and CVS are all trying to increase their health

services to provide basic care outside of a physician's office. Even some grocers are adding in-store mini health clinics. With the greying of America and an increasing need to diagnose and treat hearing loss, mega pharmacies and others will continue to grasp this opportunity to provide hearing health care, even at a financial loss, to attract this valuable demographic.

Many audiologists dream of opening their own clinic, practicing audiology, and working for themselves while amassing enough personal wealth to eventually sell their practice and retire comfortably at an early age. This dream will not come true for approximately half of today's audiology practitioners who do not have marketing plans. Nowadays, running a successful audiology clinic requires the constant investment of large amounts of time and other resources into branding and marketing: business practices in which few audiologists are trained. Today's innovative and successful audiology clinics work with business resource providers and hire professionals to advance their marketing and branding.

With the greying of America and an increasing need to diagnose and treat hearing loss, mega pharmacies and others will continue to grasp this opportunity to provide hearing health care, even at a financial loss, to attract this valuable demographic.

Marketing Works

Auspiciously, studies show that marketing works to increase clinic revenue. Phonak's 2013 Survey of Dispensing Practices published in *Hearing Review* (Phonak Marketing, 2013) demonstrates the importance of creating, funding, and executing a marketing plan in dispensing practices. The survey of 268 practices showed that in the lowest quintile of gross revenue, only 22 percent had marketing plans compared to 78 percent in the largest quintile. The larger the gross revenue the more likely the practice was to have a marketing calendar and a marketing budget, which they funded with a higher percentage of their gross revenue. Audiology clinics not planning and allocating resources to marketing are rapidly falling behind the competition.

Marketing is an investment that will make your clinic known, valued, and trusted in the community. Marketing planning will help you define your unique niche and reach the patients you want with a message that motivates them to action. A well thought out value proposition will help you break through marketplace chaos and get the patients' attention. Effective marketing will make potential patients and referral sources understand why you stand out from the competition. Well-executed branding will convince patients and referral sources that you will deliver on your promises. Once, courting the friends and families of current patients was enough of a marketing strategy to increase patient flow to the clinic. Now, additional strategies are needed. As with any investment, marketing takes time to generate sustainable positive returns. Marketing is a profession unto itself, and successful audiology clinics often turn to marketing professionals for help.

More than Family and Friends

Looking beyond internal patients and their families and friends, the most lucrative external marketplace is that of other professionals such as physicians who care for your market niche of patients. Abrams and Kihm (2015) report in MarkeTrak IX: "the primary care physician (PCP) influences a sizable proportion of the market. The vast majority of consumers think of hearing aids as medical devices, and many consider a positive recommendation from their physician to be a key motivator." Audiology clinics must educate potential physician referral sources about hearing loss and related conditions as well as the value of quality audiological services. Audiologists must strive to become trusted advisors to physicians and an integral part of their team by educating and empowering them with timely, cost-efficient, highly effective hearing health care for their patients. Until primary care and

other physicians understand when to screen for hearing loss, the benefits of early detection, and the negative consequences of undiagnosed hearing loss, the profession of audiology will sadly continue to treat only 20–30 percent of those who need hearing aids.

Marketing the Profession

Marketing and branding of the audiology profession is also necessary. Providing the definition of an audiologist on a clinic poster or on your website is not enough. The profession of audiology must differentiate itself from all competition in the minds of professional referral sources and patients by systematically educating physicians and other professionals about the benefits provided by a doctor of audiology. A nationwide strategy by the audiology profession to accomplish this goal would be appropriate and timely.

Creative Destruction

The growing competition is disruptive, but there are changes in audiology that promise to counter that. Chief among them is moving beyond the audiogram (Fabry, 2015). The pure tone audiogram is a crude and inefficient diagnostic tool or basis on which to fit hearing aids because patients with normal audiograms can still have hearing problems. In addition, two patients with identical audiograms can hear differently and require different hearing aid fittings. Kujawa and Liberman (2009) have demonstrated that "noise-induced damage to the ear has progressive consequences that are considerably more widespread than are revealed by conventional threshold testing." The audiogram is not a test that makes it clear to patients they will benefit from a hearing aid. The diagnosis of hearing loss and fitting of hearing aids is moving beyond audiograms to more sophisticated objective measures like otoacoustic emissions and brainstem correlates of speech-in-noise perception (Anderson et al, 2011) and neural degradation with age. Only audiologists perform these new procedures, allowing audiology clinics to clearly differentiate themselves from hearing aid dispensers and warehouse testing facilities.

Marketing Is Everybody's Business

Marketing is not just the responsibility of the clinic director or office manager. Successful marketing and branding requires a team effort. To this point, and to the earlier point that audiologists depend on hearing aid sales to meet required revenue targets, the profession of audiology should require marketing as one of the core areas of study for an AuD. Audiology clinics must know

that they can hire new AuD clinicians who understand basic marketing, can work with marketing professionals, and will eagerly participate as a clinic team member in marketing implementation.

Fortunately, there is a growing body of knowledge and services to educate students and assist in developing clinic marketing strategies appropriate for today's new world of audiology. *Marketing in an Audiology Practice*, edited by Brian Taylor, has just been published by Plural Publishing (Taylor, 2015). This practical "how-to" book demonstrates how marketing and branding are necessary to the long-term sustainability of an audiology practice. Business resource services are available to independent audiology clinics from several providers. Working with Fuel Medical, university and hospital audiology practices can get customized free or low-cost professional marketing and business development services which result in strong differentiation from local competition. Audiologists nationwide need to step up to their competitive challenges by using these and other resources to initiate, grow, and professionalize their marketing and branding efforts.

Revenue Diversification

Audiologists' reliance on hearing aid revenues has drawbacks, but the profession has broadened its body of knowledge and can now focus on emphasizing other areas in order to diversify its revenue sources. Because of rapid changes in health care, new emphases in audiology will also require sophisticated new marketing and branding to succeed. However, until audiologists successfully diversify their revenue streams, the profession must remain sustainable by surviving the current threat to hearing aid revenues through sophisticated marketing.

Conclusion

The response to a rapid increase in competition from large, well-funded, business-skilled competitors has so far been slow and ineffective. The fast-paced changes in hearing health care and increased competition from many new participants are raising the importance of well-reasoned marketing strategies for audiology clinics, both private and nonprofit, to a critical level that cannot be ignored. Audiologists will never win a price-based competition, but they are not just "newly minted hearing aid dealers," either. Audiologists' strengths center on their ability to provide superior patient care drawing from an extensive depth of knowledge and years of advanced training. The key to unlocking this strength in the marketplace is differentiation of audiology clinics, and the profession of audiology, through the development and implementation of proven marketing and branding strategies to educate and inform patients and referral sources. Marketing does not work its magic overnight. The time to start is now.

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AMERICAN ACADEMY OF AUDIOLOGY

A STREAMLINED APPROACH TO ASSESSING PATIENTS WITH PERIPHERAL VESTIBULAR DISORDERS

BY MAGGIE BOORAZANES, WENDY CRUMLEY-WELSH, AND BRIANNA YOUNG

ICS impulse video head impulse testing.

RESEARCH-BASED UPDATES TO ASSESSMENT PROTOCOLS CAN INCREASE WORKFLOW EFFICIENCY, WHICH CAN LEAD TO A FASTER DIAGNOSIS.

Approximately 2.4 million Americans suffer from dizziness and it takes an average of three to five years for a person with a vestibular disorder to receive a diagnosis (Vestibular Disorders Association). There are several reasons for the long diagnosis time. It is difficult to diagnose a vestibular disorder as dizziness is a common symptom for many illnesses. In addition, getting access to appropriate testing is challenging for patients achieving the services they need. Many clinics have limited time slots for vestibular assessment, which causes months-long wait lists due to the amount of time needed for testing and schedule availability. If audiologists and physicians modified their testing protocol to streamline the assessment process, they could assess and treat more patients in less time.

This article provides an in-depth review of new advancements in balance assessment technologies that are helping practitioners reduce the time it takes to test patients with peripheral vestibular disorders, highlighting benign paroxysmal positional vertigo (BPPV), Ménière's disease, and vestibular neuritis. It will inform audiologists about the benefits of implementing video head impulse testing (vHIT) into their clinical practice and suggest ways to adapt to the new technologies available today.

Status of Vestibular Testing Today

Assessment of a patient with a balance disorder can be challenging to perform and diagnose. Some of the symptoms commonly associated with vestibular disorder can mimic those of non-vestibular etiology, such as migraine, stroke, or head injury. Therefore, in addition to the physical examination often performed by the referring physician, obtaining a thorough case history is essential to achieving a vestibular diagnosis. It is important to determine the patient's past medical history, onset of symptoms, temporal course, the type of dizziness, and any auditory-related concerns, especially since symptoms can vary.

The case history, in particular, is vital in distinguishing between true vestibular symptoms from the possibility of another etiology. An audiologist who is experienced with vestibular testing can often have a general working diagnosis throughout testing based on the patient's reported case history. However, when patient-reported symptoms are confounding, or unclear, this can prolong the examination process. For example, many peripheral vestibular disorders share the symptoms of vertigo (spinning sensation) that can worsen with head movement. However, a thorough case history can help to distinguish one from the other, and therefore guide the clinician in key findings within the test results.

While a thorough case history is important, it is also important to perform efficient, yet comprehensive testing with each patient. Many audiologists and other professionals who work with dizzy patients perform a 60–90 minute videonystagmography (VNG) evaluation, which includes oculomotor examination, positional testing, and caloric irrigation. Some audiologists also add other

measures into this examination, such as video head impulse testing (vHIT) and vestibular-evoked myogenic potentials (VEMP).

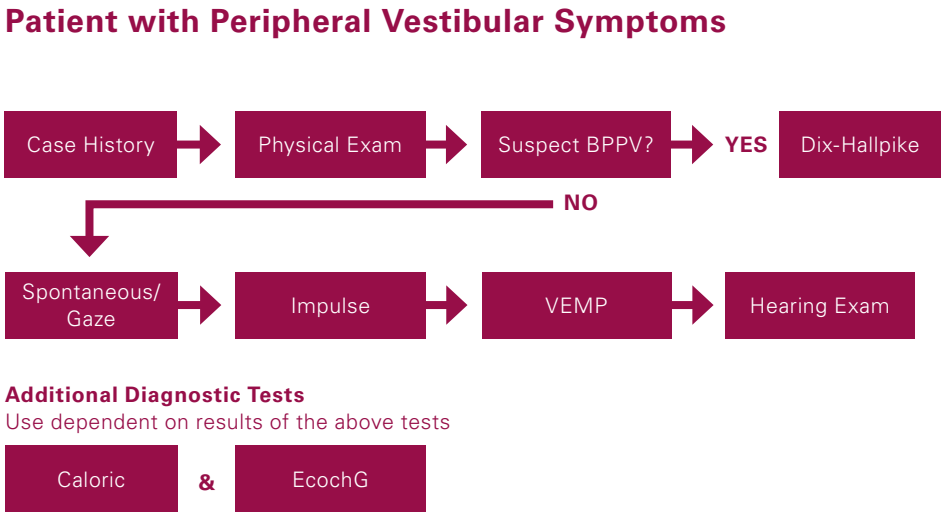
"The availability of vHIT and VEMP as new clinical tests has greatly enhanced the assessment of dizzy patients," says Kamran Barin, PhD, and assistant professor emeritus in the Department of Otolaryngology–Head and Neck Surgery and Department of Speech and Hearing Science, at Ohio State University, and educational speaker on balance disorders. "Whereas now and in the past, we may have performed a full VNG on the patient, it is far more efficient to perform vHIT, cervical VEMP (cVEMP), and ocular VEMP (oVEMP) and then decide what parts of the VNG, if any, are needed to reach a diagnosis."

Of the measures listed earlier, the head impulse test (also referred to as video head impulse and vHIT) is among the newer technologies for vestibular testing.

Head impulse is a lesion-specific test that detects a deficiency of the vestibulo-ocular reflex (VOR), and identifies which ear and semicircular canal is affected in cases of peripheral vestibulopathy. In cases where there are concerns for central etiology, vHIT can be used to rule out a peripheral involvement.

Dr. Barin also states that although the VNG has served, and will continue to serve, professionals for over a century, the test has its limitations in that it does not fully assess the entire vestibular system. Many of these limitations are centered on caloric irrigation. Caloric irrigation is used to assess semicircular canal function, and clearly define any unilateral or bilateral weakness; however, calorics assess only the lateral semicircular canals. Time can also be a factor as caloric irrigation can take up to 30 minutes of testing to assess two semicircular canals; whereas vHIT takes around 12–15 minutes to assess all six semi-circular canals. vHIT also has the advantage of being easily performed on patients who have middle ear disorders, and those who cannot tolerate caloric irrigation such as young children, elderly patients, or patients with severe hearing loss. Properly performed vHIT assesses the vestibular frequency range consistent with movements comparable to looking both ways before crossing the street (approximately 4000 Hz to 5000 Hz). In contrast, caloric irrigation tests at lower frequencies (approximately 0.025 Hz), which are not used in day-to-day life. However, much like performing a comprehensive auditory assessment, no vestibular sub-test on its own is perfect. Dr. Barin confirms, "Together, vHIT and VEMPS provide a full assessment of the entire peripheral vestibular structures."

Another challenge facing an increasing number of professionals is the need to reduce test time and increase patient flow through the clinic. More facilities are using benchmarking, and in order to meet patient



WORKFLOW 1. Recommended workflow for peripheral vestibular disorder assessment.

WORKFLOW 2. Recommended suspected BPPV management workflow.

External monitor displaying the eye video and real-time slow phase velocity.

care goals, test time must be reduced. It is possible to provide more efficient patient care by making clinical decisions for testing based on the patient's case history. This has been reflected through many disciplines, including new recommendations being made by the American Academy of Otolaryngology–Head and Neck Surgery (AAO). In the AAO Guidelines, the panel made strong recommendations that clinicians should diagnose posterior semicircular canal BPPV when vertigo associated with nystagmus is provoked by the Dix-Hallpike maneuver. The panel made further recommendations against radiographic imaging, vestibular testing, or both in patients diagnosed with BPPV, unless the diagnosis is uncertain or there are additional symptoms or signs unrelated to BPPV that warrant testing (WORKFLOW 1).

By integrating this information and providing a slimmed-down workflow, clinicians can fit more patients into their schedule by not spending as much time obtaining a diagnosis, and therefore, providing more access to patients. The remainder of this article will focus on integrating the above streamlined workflow into your clinical practice. Segments are divided to present with key case history information for each disorder, the recommended workflow, other tests to consider, and when further testing might be necessary.

Benign Paroxysmal Positional Vertigo

Benign paroxysmal positional vertigo (BPPV) is the most common cause of vertigo. Further broken down into canalithiasis and cupulolithiasis, as well as location by semicircular canal, it is well known that canalithiasis of the posterior canal is the most common diagnosis. Patients with BPPV experience brief of vertigo caused by rapid changes of head position. Unique to BPPV, these episodes are typically less than one minute, but episodes can last up to two minutes, and are typically brought on by head repositioning, such as bending the head up or down and rolling over in bed. These are usually described in the case history, which can also include complaints of mild postural instability between attacks. WORKFLOW 2 outlines the current recommended workflow.

If the Dix-Hallpike is unremarkable, then further investigation is warranted to work toward a diagnosis.

Lightweight goggles.

Vestibular Neuritis

Vestibular neuritis is an acute vestibulopathy caused by inflammation of the inner ear or vestibular nerves. This inflammation disrupts the transmission of the information from the ear to the brain. The vestibulopathy can be either viral or degenerative, and can affect the superior or inferior branch of the vestibular nerve.

Patients with vestibular neuritis will often present with prolonged severe rotational vertigo, head movement

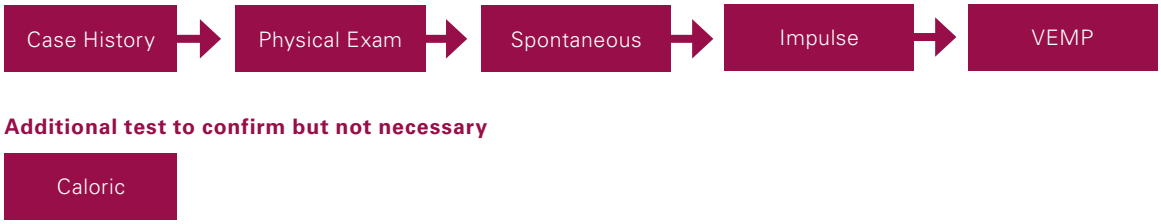
that worsens vertigo, postural imbalance to the side of lesion, nausea, and spontaneous/torsional nystagmus beating towards the good ear. They key difference within the patient's case history is duration of the vertigo, as patients with vestibular neuritis commonly report a sudden onset of symptoms for one to three days that presents after a recent cold or upper respiratory infection (URI) (Jacobson, 2008). By comparison, vertigo associated with BPPV lasts less than two minutes, whereas vertigo associated with Ménière's disease lasts 20 minutes to several hours. Refer to WORKFLOW 3 for the current recommended workflow.

vHIT is particularly useful in working with neuritis patients because of the equipment's capability to assess all six semicircular canals, allowing the audiologist to isolate which canal is compromised. If the impulse identifies catch-up saccades, and cVEMP or oVEMP is abnormal, then the evaluation is complete. The presence of catch-up saccades in the lateral or anterior canals, with abnormal oVEMP indicate superior vestibular neuritis. Refer to FIGURE1 for an example of catch-up saccades in superior vestibular neuritis. Catch-up saccades in the posterior canals and abnormal cVEMP indicate inferior vestibular neuritis. Refer to FIGURE 2. It may be desired to perform calorics to confirm the diagnosis, but not necessary. If the vHIT is normal, then further testing is warranted to confirm another diagnosis. FIGURE 3 provides a clear summary of test findings to differentiate vestibular neuritis versus a healthy patient versus a patient with unilateral vestibular loss.

Ménière's Disease

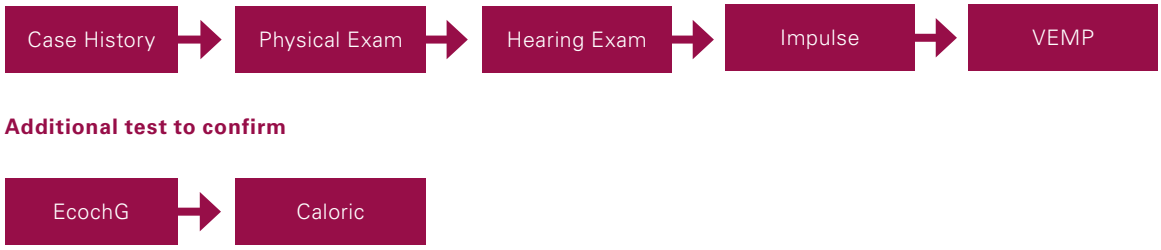
Also referred to as endolymphatic hydrops, Ménière's disease describes a set of symptoms including vertigo, hearing loss, tinnitus, and a sensation of fullness in the affected ear(s). Refer to FIGURE 4 for anatomical representation of where Ménière's disease affects the vestibular system. Episodes typically last from 20 minutes up to four hours. Hearing loss is often intermittent, occurring mainly at the time of the vertigo attacks. Patients may also report hyperacusis and distortion of sound. Usually, the hearing loss involves mainly the lower frequencies, but over time can cover the entire frequency range. After months or years of the disease, hearing loss often becomes permanent, and can vary in degree and configuration. Tinnitus and fullness of the ear with changes in hearing may come and go, occur during or just before the attacks, or be constant.

Patients with Ménière's exhibit varying results. High gain above 1.2 has been reported in the literature



WORKFLOW 3. Recommended suspected vestibular neuritis workflow.*

*VEMP is not FDA-approved in the United States.



WORKFLOW 4. Recommended workflow for suspected Ménière's disease.

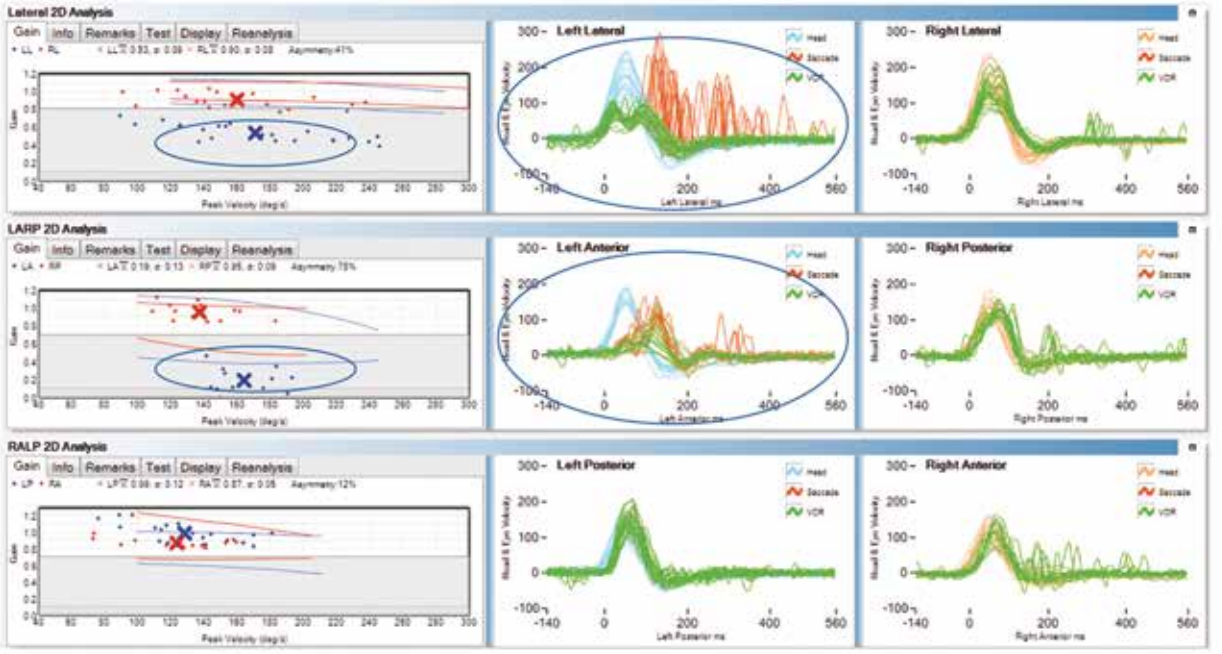


FIGURE 1. Superior vestibular neuritis (affects lateral and anterior canal).

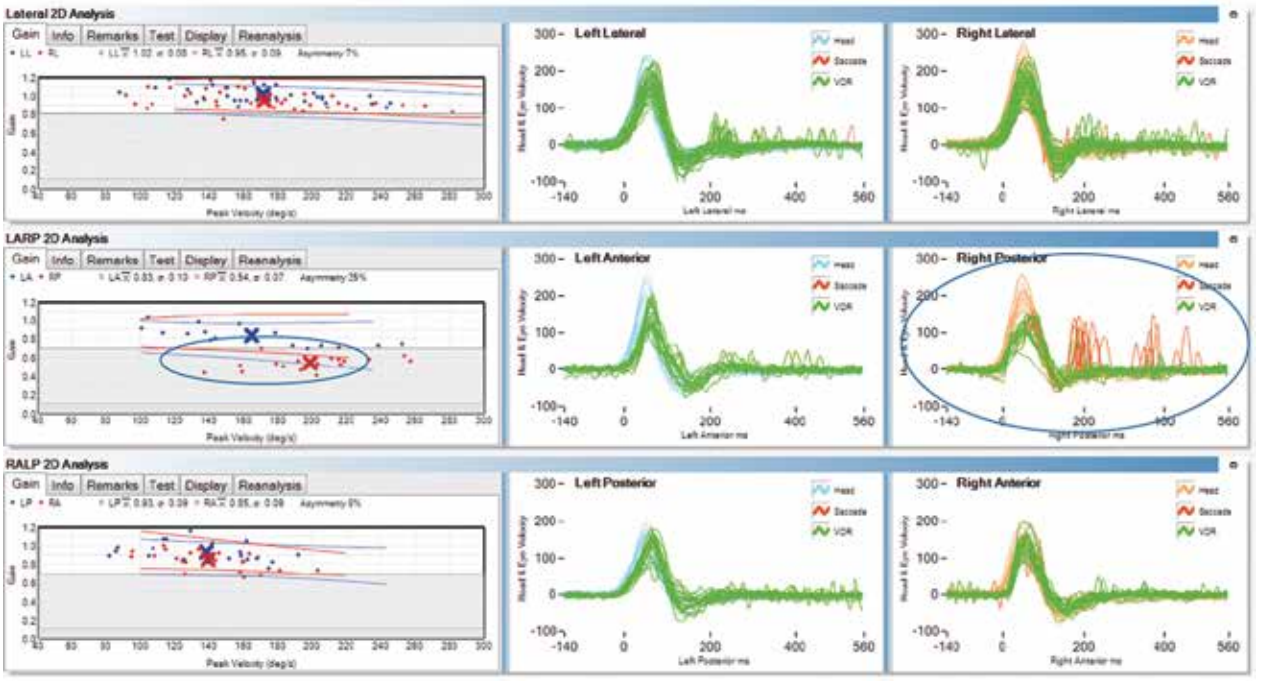


FIGURE 2. Inferior neuritis (affects posterior canal).

(Manzari, 2011). Of note, high gain on vHIT testing can also be contributed to goggle slippage or user error, so it is important to rule out any extraneous factors when interpreting results. In addition to high gain results from vHIT testing, you may also see a reduced amplitude in cVEMP findings for the affected ear. If the vHIT results are normal, then further investigation is warranted to work toward a diagnosis. Refer to WORKFLOW 4 for current recommended workflow. A new publication in 2015 by McGarvie et al has described a hypothesis based on past

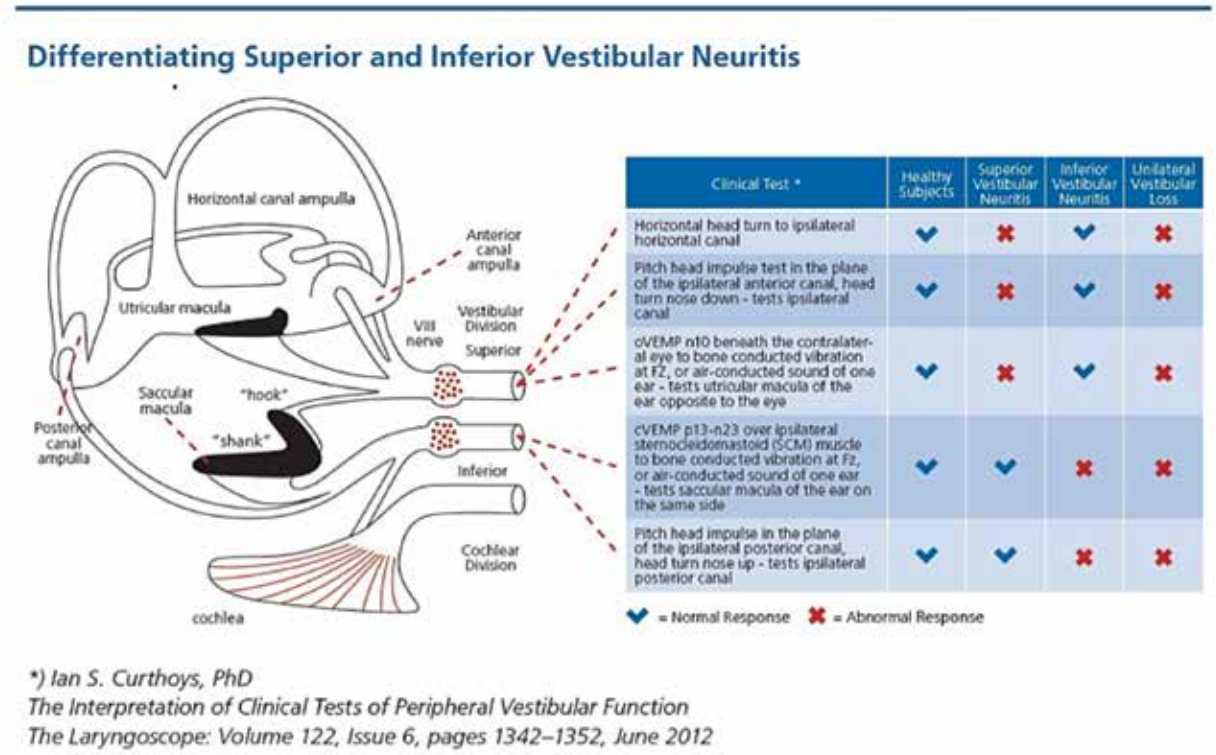


FIGURE 3. Differentiating vestibular neuritis.

FIGURE 4. Back-up fluid in the sac and inner ear leads to swelling and pressure. Distorted information travels from the inner ear to the brain.

animal and human research which describes how the anatomical changes due to Ménière's affects the vHIT and caloric results. This further explains why differences in test results may occur for these two tests due to the increase in endolymphatic fluid in the semi-circular canal (McGarvie, 2015).

Conclusion

In an era of increased testing capabilities, decreased time allowed for testing, and a growing need to streamline efficient patient care, audiologists and physicians can save time when assessing patients with vestibular symptoms by reconsidering current work flow practices. Allowing for research-based updates to assessment protocols based on the patient's case history can increase efficiency and decrease the time a dizzy patient has waited to be evaluated, as often they have been waiting years for a diagnosis. While comprehensive testing is necessary to obtain an accurate diagnosis, it is equally important not to put a distressed patient through superfluous testing.

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OPTIMIZED CUSTOM-MADE EARMOLDS

Part of a System to Deliver Amplification and Reduce Tinnitus

BY ERICH BAYER

The custom-made earmold is the most individual element in every kind of hearing rehabilitation and the last link in improving a patient's ability to function.

The author has experienced "tinnitus" as ringing in his ears since the mid-1980s. He had just finished the first part of his program to become a hearing aid acoustician in Germany when it started. Hearing aid acousticians are trained in the techniques for fitting hearing aids and listening devices. They have a higher level of education than what are traditionally called "licensed hearing aid dispensers." In the 1980s, customers with complaints about tinnitus were primarily sent to university hospitals. After diagnosis, they were sent for technical treatment to the hearing aid acoustician of their choice. The hearing acoustician would then reduce the effects of the tinnitus through the use of a masker (Vernon, 1997) or a single hearing aid. In Germany, binaural fitting of hearing aids was standard as early as 1988; so use of a monaural fitted hearing aid was a special technique sometimes applied to those with tinnitus.

The key question for the use of tinnitus instruments was, "What is the best fitting and how to measure it?" At that time, no one could accurately determine the answer. As a result, German practitioners used technology whose settings, wearing protocol, and follow-up were often unpredictable. However, in the absence of significant hearing loss, one thing was always essential: an open fitting!

In the late 1990s, tinnitus retraining therapy, as proposed by Jastreboff and Hazell (1998), came into use. Through their work and later studies, we understand that tinnitus aurium is an annoying, sometimes tormenting, auditory sensation perceived by those afflicted. It is not a real acoustic signal, however, and therefore it was often called a phantom sound. The commonly-suspected cause of tinnitus and this phantom sound is a pathologic activation of hair cells in the inner ear. However, results based on animal models indicated that it is not an activation of the hair cells, but rather a suppression of hair-cell activity that may induce a tinnitus while the neuronal activation, which is perceived as a phantom sound, has its origin in the central auditory system (Langner et al, 2010).

Today in Germany, the technical part of tinnitus treatment called decreased sound tolerance and hyperacusis belong to the core competencies of the hearing

aid acoustician. Other similar disorders such as somatosounds, misophonia (selective sound sensitivity syndrome), and phonophobia (ligyrophobia or sonophobia) are different things and are treated at special units.

The current treatment for tinnitus, because people with tinnitus often have a deficit in hearing as well, is to amplify normal sounds with hearing aids. Unfortunately, in a quiet environment, conventional hearing devices are of little use. They amplify only noise actually present around the user. So, for people with tinnitus and normal hearing, wearable sound generators that look like hearing aids are required. They produce an audible sound that is quieter and more pleasing than the tinnitus itself. It is the exception—rather than the rule—to mask the tinnitus directly with sound as often the technical sound is louder than the tinnitus. People with a hearing impairment and tinnitus need hearing instruments which also feature carefully selected broadband relief sounds (i.e. white, pink, or red noise), modulated, ocean-themed relief sounds, or fractal sounds.

The open completely-in-the-canal (CIC) shell earmold is available in many different designs; normally with a small diameter and long length vent.

For over 25 years, it has been known that bringing sound into the auditory canal of tinnitus patients is best done through use of an open type of mold. There is no fixed formal definition for the term open, as it depends on so many variables such as:

- Diameter and movement of the ear canal
- Residual acoustic volume of the auditory canal
- Volume of acoustic conveyance in the auditory canal
- Impedance of the middle ear

Of course, we all know that a chain is only as strong as its weakest link, so who is to say which of these links is more or less important in achieving success?

Specifications for Custom-Made Earmolds and Hearing Protection Systems

The best hearing system or hearing protection system is the one that is used. Poor speech discrimination and tinnitus are not always problems at the cochlear level. In some cases, it is necessary to send acoustic signals to the central auditory system. No matter the site of the lesion, an inappropriate earmold will often result in non-use of a perfectly fitted technical system. It becomes necessary to consider the requirements for each and every kind of earmold. Specifically when using a device to mask tinnitus, each of the following factors should be considered:

- Comfortable fit
- Hypoallergenic material
- Adequate venting from outside to inside
- Minimal feeling of a foreign body in the ear
- Minimal weight/pressure
- Cosmetically and aesthetically pleasing
- No noise during mastication
- Minimal occlusion effect
- Ease of cleaning
- Affordability
- Broad-bandwith capability
- Patient's tolerance for sound (hyperacusis)

FIGURE 1A. CIC systems with two parallel short vents.

FIGURE 1B. CIC system with two parallel short vents.

One requirement not listed above is individual life pattern recognition. This term refers to the patient's ability to hear and habituate to pattern regularities, repetitions, and similarities while wearing the device. This results in auditory pattern recognition and enhances communication. Because this is a relatively new consideration, its parameters are not yet accurately defined.

Effects of a Micro/Short Vent

When working with patients who have tinnitus, the first fit is usually a "no go" (Bayer, 2007). Therefore, audiologists should understand the acoustic differences between a "normal" length vent (19mm) and a "short" vent (1mm to 7mm). A general review can be found in most hearing aid manufacturer's fitting software documentation (Oticon, 2015). Per Dietirch, 2007, the effect of venting depends not only on the diameter but on the entire acoustic dimension. The acoustic mass is the key. To simplify: the vent is defined as a cylinder ($V=r^2 \pi \times h$). The reality is that this fitting software documentation is often incomplete or inadequate for different earmolds or dome tips used with contemporary behind-the-ear or receiver-in-the-canal (RIC) hearing devices.

Current Custom-Made Earmold Designs for Open Fitting

Tinnitus patients are often provided with stock dome tips, which are typically the most efficient solution for the audiologist. Custom earmolds offer superior customization and personalization to meet the acoustic, cosmetic, and performance characteristics of each individual patient. The auditory canal is not static while talking, eating, or swallowing. Ready-made units are designed to contact the basal areas of the auditory canal. Thus, these pre-sized items are moving with the motion of the jaw and the auditory canal. That means there is not a constant sound source going to the ear membrane and patients often complain about irritations such as itching and tingling in the auditory canal because of the jiggling domes.

Many patients want an "invisible" hearing device. Because of this, most people are looking for invisible mini-systems. This leads to the question of which design of a custom-made open earmold is optimal for a tinnitus patient?

"Open" CIC Shell

The open CIC shell earmold is available in many different designs, normally with a small diameter and long length vent. To change such a CIC shell into a more open one, the long vent can be divided into two parts, with different diameters, as illustrated in FIGURES 1A AND 1B. The first reports using this approach were presented by the author in 2003 and discussed in 2008 (Bayer, 2008). The author is not aware of any additional literature about the effects of a divided long vent (with space between) in earmolds and in-the-ear (ITE) shells. The technique functions in an excellent way when properly designed and with adequate canal size. Although CIC and custom hearing aid fittings are extremely popular because of their small size, size constraints prevent optimal vent design for patients with normal hearing and tinnitus. This often results in-the-canal (ITC) systems not being worn all day by people with tinnitus because of the uncomfortable occlusion effect and the sense of a foreign body in the ear. Therefore, we believe an ITC fitting is not the best choice for tinnitus patients because of design limitations that prevent their use as a truly open earmold.

Helix Design

The Helix design started to be used in Germany in the late 1990s. The idea for an open fitting was excellent, but in practice this design often created bigger problems than it solved. The mold, with the aid inside, was positioned in the cymba conchae so the auditory canal was really open. But the cartilage tissue in the concha is very sensitive and when the mold was not properly inserted, it would often result in irritation at the lower part of the crus anthelicis. The first Helix aids looked similar to ring-type molds used for BTE systems. However, because the system was different for the tinnitus

FIGURE 2. Different designs of Helix aids.

user, the resulting issue became the ideal placement position for the hearing aid receiver. There are at least two possibilities:

The receiver location is molded into the earmold at the factory and in conventional ITE position.

Another receiver location is adjacent to the cymba conchae. In this design, sound travels via the crus helicis through a hollow tube to the auditory canal. Repairing such a mold is easier than with the previous solution similar to a conventional ITE. Removing earwax out of the long, hollow, acoustic canal is challenging. Further, because of the variable length, the technical data received from the patient is often totally different from the data sheets received from the factory. In addition, sometimes the material bridge across the crus helicis creates discomfort in the canal. As a result, we modify the sound channel to the auditory canal. The sound is lead through a channel following the anti-helix, going behind the antitragus ending in the auditory canal.

Foils

In the 1990s, custom-made foil molds were introduced to the market through computer-aided design (CAD) and/or computer aided manufacturing (CAM) technology printed with rapid prototyping. Users were very pleased because of the invisibility of the mold (CIC size and deeper position) as well as reduced weight due to a thinner wall. However, in a manner similar to conventional molds, there is a large area of contact between the mold walls and the auditory canal. This results in the pronounced sensation of a foreign body in the ear, which is less than desirable for most patients. The comfort of this type of mold can be improved by using special perforations in the wall of the device. Discomfort can only be reliably relieved if the largest perforation in the shell wall, regardless of the material used to make the mold (titan, polyurethane, silicone or acrylic), is located in the basal area of the auditory canal (Bayer, 2008). The reason for this is that the temporo-mandibular joint is rubbing against the cartilaginous ear canal, almost always in an anterior or anterior-inferior direction. This is uncomfortable and causes auditory sensations in the ear as the dynamics of mandibular joint movements are transferred via the mandibular condyle to the auditory canal (Voogdt, 2005).

Concha-Line and Cymba-Line

In October 2000, two special designs, open earmolds for BTE hearing aids CI components and BTE tinnitus systems, were registered as patent applications. They provide another option for people with hearing loss and tinnitus. One advantage of these molds is that there is no material contact in the basal area of the auditory canal.

FIGURE 3. Foil mold for receiver-in-canal system.

FIGURE 4A. Concha-Line P with long strut for tube systems (Kurz, 2007).

FIGURE 4B. Micro-RIC with short strut (Bayer, 2009).

FIGURE 5. Cymba-Line earmold with a conic slotted metal grommet sleeve and a narrower or wider track tube.

This markedly reduces the sensation of a foreign body in the ear. Because of the anchoring, stabilization, and support required for the mold in the concha area, the earmold is more visible. Furthermore, sleeping with this design is uncomfortable. Kurz (2007) altered the two open designs to a more closed one. This provided more options for using power hearing aids for people with significant hearing loss and tinnitus with nearly open molds. These became the Concha-Line P(ower) and Cymba-Line P(ower) earmolds with a normal or a short hook. As illustrated in FIGURE 4A–4B, their chief characteristic is a "strut" that runs from the upper part of the auditory canal (incisura anterior) through the cavum conchae to the antitragus (short strut) or along the anti-helix to the cymba concha (long strut).

Concha-Line or Cymba-Line Earmolds for Slim Tube Systems

For many of the initial slim-tube systems, glue was used to connect the aid to the earmold, which required a drill for modification, repair, or replacement. Consequently, at each repair or modification, the borehole was made larger and larger, creating challenges for fixation of the tube. The development of a conical slotted metal grommet sleeve integrated into the earmold provided a way to secure the tube while permitting a quick and smooth change of the slim tube for adjustment and cleaning (Bayer, 2013). This also helped in fitting choices related to use of a narrower or a wider track tube along the side of the head (see FIGURE 5). A major additional benefit of this tube attachment is the possibility to easily compare different devices from different companies (FIGURE 6).

FIGURE 6. Concha-Line/Cymba-Line earmold with an integrated conic slotted metal sleeve and replacement instrument.

Custom Hybrid Earmolds: Design of the Future?

Custom hybrid earmolds represent the latest developments in custom earmold technology. Hybrid molds are a device/system made from an impression based on a scan of the ear canal and a standard industrial product. Crucial to the function of such molds is the coupling of both elements by a ball and socket joint. FIGURES 7–8 illustrates the concept. The individual parts of these high-tech earmolds are created through CAD/CAM technology (printed with rapid prototyping).

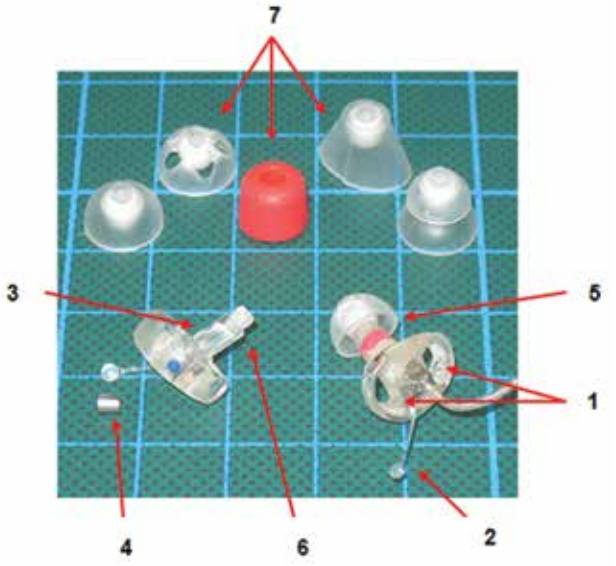

FIGURE 7. High-end hybrid earmold (slimtub-/RIC-system) for people with tinnitus or a mild/moderately high-frequency hearing loss.

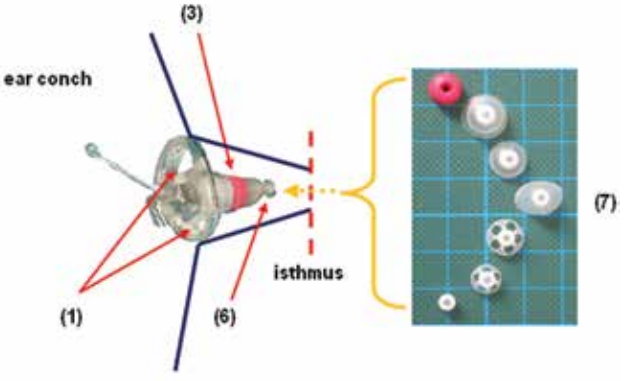

FIGURE 8. Hybrid-mold for RIC systems.

Based on the previous discussion and the long history of hearing mold development, the idea for an optimized tinnitus earmold would consist of the following:

1. A concha-sided perforation (open=one or two holes) custom-made part with the following elements (see FIGURES 7–8):
2. In a position similar to an CIC-system with an extraction filament
3. Connected middle axially directed to the auditory canal longitudinal body, pointing toward the eardrum
4. A slotted and conically shaped metal grommet sleeve
5. An internal thread; therefore, various slim tube systems (different hearing aid companies and different types) may be compared by the patient or for receiving a (mini-) RICs that does not contact the skin of the tissue of the auditory canal
6. A ball joint
7. Coupled hearing aid replacement click-dome (open, semi-closed, closed) made of soft silicon or polyurethane foam

Because of the various etiologies of tinnitus, a blanket statement about useful treatment to help people to reduce their unwanted noise is impossible. Further, as we all well know, tinnitus is often not a single symptom: more than 70 percent of the members of the German Deutsche Tinnitus League are not only affected by tinnitus; they also have mild-to-moderate hearing loss (Albert and Goebel, 2015). Often a proper hearing aid fitting is enough to reduce a tinnitus problem. Even the best-fitted sound generator tinnitus instrument will be unsuccessful without an optimized custom-made earmold. That is the weakest link in the sound chain because only with this element do we have correct physical conditions ; the mixture of direct and amplified sound always fails in favor of the latter. Working with ready-made earmolds is similar to buying a sports car with wheels made of wood (Voogdt, 2005).

The custom-made earmold is the most individual element in every kind of hearing rehabilitation and it is the last link in the chain to improving a patient's ability to function. Unfortunately, there seems to be limited information about this subject in the common literature for audiologists, hearing aid acousticians, and others involved in patient care. Hopefully this article detailed some useful information towards that purpose and also provided a glimpse into the German hearing aid market.

Erich Bayer is the head of the quality management and branch manager of Hoergeraete Seifert in München, Germany.

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WELCOME BACK to an ongoing series that challenges the audiologist to identify a diagnosis for a case study based on a listing and explanation of the nonaudiology and audiology test battery. It is important to recognize that a hearing loss or a vestibular issue may be a manifestation of a systemic illness. Being part of the diagnostic and treatment "team" is a crucial role of the audiologist. Securing the definitive diagnosis is rewarding for the audiologist and enhances patient hearing and balance health care and, often, quality of life.

—Hillary Snapp, AuD
Investigator-in-Chief

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Positional Vertigo

As Simple as It Gets?

By Michael Hojnacki and Gina Watkins

Case History

A 54-year-old female was referred for vestibular evaluation with a chief complaint of positional provoked spells of vertigo for the past two years. Provoking positions were simple in nature including prolonged head turns to the right, shaving under her right arm, and rotation of head upward and rightward. Provoked vertigo was also accompanied by associated confusion, altered speech, word-finding difficulty, nausea, weakness, imbalance, and intermittent unresponsiveness. She stated that avoiding these head positions was the only way to prevent inducing symptoms. She reported that symptoms persisted as long as she maintained the provoking positions and quickly resolved when her head assumed a neutral position. Lying down or rolling over in bed was not bothersome. She denied changes in hearing, tinnitus, aural fullness, vomiting, headache, imbalance, syncope, or incontinence. She denied antecedent illness or injury prior to onset of symptoms.

Medical History

The patient reported smoking for more than 35 years and medical history was positive for depression and hypertension. She denied any history of otologic disease. The patient's mother and two daughters had a positive history of migraines. A neurology work up and evaluation at initial time of onset showed a normal electroencephalogram (EEG) study, normal magnetic resonance imaging (MRI) of the brain, and reported a "positive right Hallpike maneuver." The Epley maneuver was performed by the neurologist for presumed benign paroxysmal positional vertigo (BPPV). Approximately one year later, the patient was seen for a vestibular rehabilitation evaluation stating symptoms were unchanged. At the time of therapy evaluation, gait and balance reactions were normal and Dix-Hallpike maneuvers were negative for subjective or objective findings. The report noted, "During a Roll Test, the patient reported severe dizziness and showed signs of anxiety accompanied by oblique nystagmus lasting 15 seconds. Initial nystagmus appeared more vertical and did not have a clear horizontal or

torsional component." The Roll Test is performed with the patient lying supine and head elevated 30 degrees, and head briskly rotated to the right from center and then to the left from center (Roberts and Gans, 2008).

According to the report, several canalith repositioning maneuvers were attempted without improvement in symptoms. The patient was discharged from therapy and referred back to her primary care physician for further medical management. A magnetic resonance angiogram (MRA) of the neck found "the left vertebral artery is the dominant of two vertebral arteries." A MRI of the spine showed "minimal uncovertebral degenerative change and posterior endplate osteophytes (bone spurs)" at cervical vertebrae five and six. The patient was ultimately re-evaluated by her original neurologist who again reported a positive right Hallpike maneuver and referred her for audiological and vestibular evaluation.

Audiometric and Vestibular Evaluation

Cursory otoscopy revealed clear ear canals and intact tympanic membranes, bilaterally. Audiometric evaluation demonstrated normal hearing thresholds and excellent word recognition in quiet, bilaterally. Dizziness Handicap Inventory yielded a total score of 58, classifying this patient's perceived limitations and restrictions as "severe" (Jacobson and Newman, 1990). The modified clinical test of sensory integration and balance (mCTSIB) (Wrisely and Whitney, 2004) indicated normal ability to maintain upright stance under a variety of changing sensory input conditions.

Videonystagmography testing demonstrated normal oculomotor function. There was no evidence of spontaneous, post headshake or static positional nystagmus. Vertebral artery screening test (Humphriss et al, 2003) was performed to evaluate for compression of the vertebral artery secondary to MRI findings. Screening results were negative for vascular compression. Right and left Dix-Hallpike maneuvers were negative for subjective symptoms or observable nystagmus. Roll Test was negative to the left, while testing to the right provoked robust vertical down-beat nystagmus (DBN).

After approximately 15 seconds, DBN fatigued and right-beat horizontal nystagmus developed that then changed to left-beat horizontal nystagmus within the single, sustained head position over a 60-second recording period. The patient subsequently reported immediate onset of concurrent vertigo, dizziness, and nausea. The patient became panicked while sustaining this position and later reported that she had hallucinated, meaning she was unaware of her environment.

Nystagmus and subjective symptoms abruptly resolved when the patient's head was moved out of the provoking position. The patient was emotionally distressed following provocation of her symptoms and required a return visit to the clinic to complete vestibular evaluation. At the follow-up evaluation, bithermal caloric responses were unremarkable, demonstrating a two percent asymmetry. Testing of lateral head positions again resulted in robust DBN in the head-right position, although no subsequent horizontal nystagmus was observed. Symptoms and nystagmus completely resolved as soon as the patient assumed a neutral head position.

Consider the Facts

- Patient reported transient symptoms of position-provoked dizziness, vertigo, presyncope and hallucination, easily reproducible and avoidable
- Objective measures of peripheral vestibular function were unremarkable (normal calorics, negative Hallpike); normal audiometric testing
- Normal balance reaction/function on mCTSIB
- DBN and direction-changing nystagmus with subjective symptoms in head-right positions
- Documented cervical osteophytes (bone spurs) and anatomic anomaly of the vertebral arteries

Differential Diagnosis

- Atypical/anterior canal BPPV
- Migrainous vertigo
- Vertebrobasilar insufficiency
- Chiari malformation

Discussion

Given the patient's evaluation, primarily the constellation of symptoms provoked and observed DBN, she was presumed to have Vertebrobasilar Insufficiency (VBI). The presence of DBN was the initial indicator that a central nervous system (CNS) influence was at play. Positionally provoked DBN, as well as in primary gaze, is regarded as a strong indicator of CNS involvement (Furman and Cass 2003; Bertholon et al, 2002). VBI is the transient reduced or cessation of blood flow through the vertebral and/or basilar artery secondary to arterial stenosis or compression. Bertholon et al, (2002) summarized the mechanism of VBI in which lateral head turns induce greater compression in the contralateral

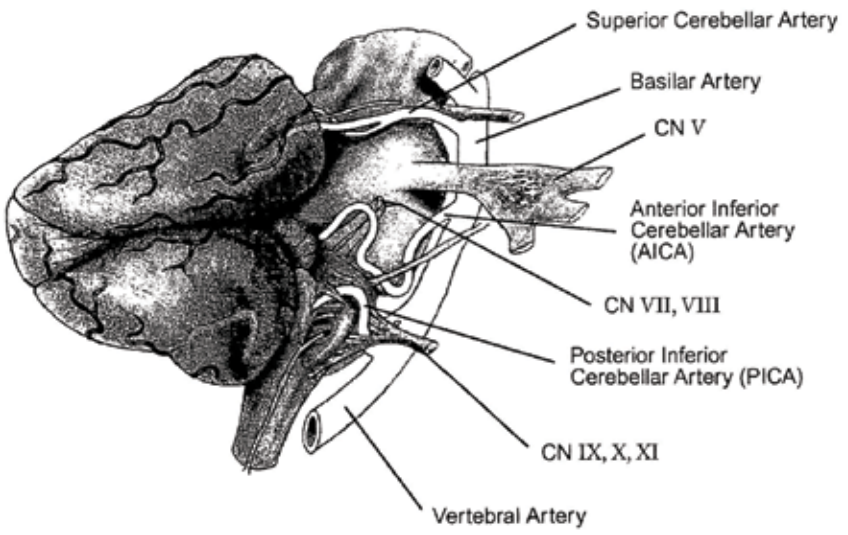

FIGURE 1. Illustration showing the vertebral artery giving rise to the three major arteries supplying the posterior fossa: posterior inferior cerebellar artery, anterior inferior cerebellar artery, superior cerebellar artery.

Adapted from Furman J and Cass S. (2003) Vertebrobasilar Insufficiency. In: *Vestibular Disorders, A Case-Study Approach.* New York: Oxford University Press Inc., 142.

vertebral artery. In normal subjects, the ipsilateral vertebral artery compensates for transient reduction of blood flow of the afflicted vertebral artery. However, some individuals have anatomical anomalies where one vertebral artery is "dominant" (Bertholon et al, 2002). Compression or occlusion to the dominant artery could potentially lead to reduced cerebral blood flow as the malformed side cannot carry the burden of increased blood flow rate/pressure (Bertholon et al, 2002).

The vertebrobasilar artery system is responsible for oxygenating major areas of the brainstem and cerebellum (FIGURE 1).

When blood flow is reduced or ceased, the following symptoms can arise: vertigo, visual hallucinations,

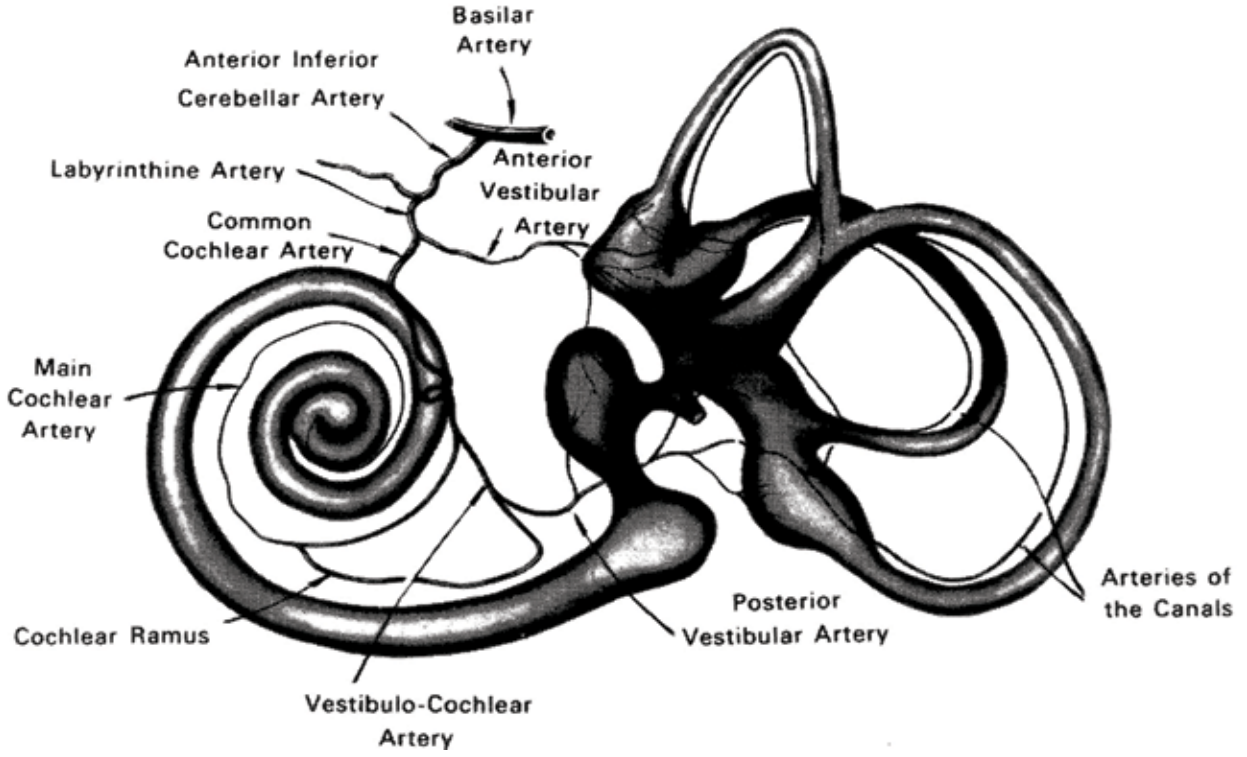

FIGURE 2. Illustration demonstrating the arterial supply to the inner ear arising from the anterior inferior cerebellar artery.

Adapted from Furman J, Cass S (2003) Vertebrobasilar Insufficiency. In: *Vestibular Disorders, A Case-Study Approach.* New York: Oxford University Press Inc., 239.

drop attacks, weakness, visceral sensations, visual field deficits, headaches, hearing loss, tinnitus, dysarthria, and confusion (Furman and Cass, 2003). The vertebrobasilar artery system specifically carries blood to the vestibular nuclei, vestibulocerebellum, and the entire peripheral labyrinth (FIGURE 2).

Given the central and peripheral vestibular sites this system supplies, ischemic changes can lead to episodic vestibular and auditory symptoms (Furman and Cass, 2003). Further, as seen in the described patient, the nystagmus that results may reflect changes to peripheral, central, or a combination of systems.

DBN is most commonly observed in primary gaze and known to occur with Chiari malformation, lesions in the posterior fossa, and cerebellar infarcts/degeneration and pharmacologic influence (Rosengart et al, 1993; Roberts and Gans, 2008; Bertholon et al, 2002). Most often, the observed DBN is persistent, not transient or position induced. In the presented patient, DBN was not observed in the spontaneous nystagmus test, oculomotor evaluation was normal, and prior imaging ruled out significant cerebellar infarcts, central lesions, or abnormalities. As such, Chiari malformation (abnormally located/descended cerebellar tonsils through the foramen magnum) and other cerebellar infarcts were excluded as a cause of DBN for our patient.

The patient's observed DBN was repeatedly position induced and accompanied by numerous subjective symptoms. Position-induced DBN is less common and has been reported to occur in various CNS disorders, such as multisystem atrophy, various types of cerebellar degeneration, multiple sclerosis, hydrocephalus, VBI, and migraine (Berthonlon et al, 2002; Roberts and Gans, 2008; Roberts et al, 2006). Despite familial history of migraine, migraine-associated vertigo was not suspected in this patient. None of the patient's family reported history of vertigo with or without migraine. Further, the patient had no personal history of migraine or migrainous symptoms other than vertiginous episodes. Lastly, neurological work-up did not support migraine-induced vertigo.

Positional DBN does not entirely rule out peripheral vestibular involvement as in the case of anterior canal BPPV, specifically canalithiasis (Al Saif and Johnson 2012; Bertholon et al, 2002). Anterior canalithiasis BPPV is far less common than posterior canalithiasis and horizontal canalithiasis BPPV, but is caused by the same mechanism of free-floating otoconial debris in the semicircular canal (Roberts and Gans, 2008). As such, anterior canal BPPV-induced DBN is delayed in onset, fatigues, and its response is habituated over time (Al Saif and Johnson, 2012; Bertholon et al, 2002). Either the Dix Hallpike maneuver or deep head hanging position (FIGURE 3) has been shown to provoke anterior canal BPPV (Al Saif and Johnson, 2012; Bertholon et al, 2002).

In the described patient's case, Dix-Hallpike maneuvers during vestibular evaluation were negative for nystagmus and symptoms. In addition, provoked DBN and collection of symptoms was in head-right lateral positions, onset was immediate and persisted the entire time the provoking position was held. Deep head hanging position was not performed on this patient, as she was intolerant to the test procedure. Proper

FIGURE 3. Image demonstrating the deep head hanging position used to assess for anterior canal BPPV.

Adapted from Al Saif A, Johnson EG. (2012) Physical therapy management of a patient with anterior canalithiasis using the deep head hanging maneuver. *J Nov Physiother* 2:117.

and safe positioning was doubtful and omitted from exam. Given the persistent DBN and direction-changing nystagmus, the constellation of symptoms neither of which fatigued after roughly 60 seconds of sustained right lateral head turn, AC BPPV was not suspected.

Ultimately, VBI was suspected for several factors:

1. Constellation of symptoms does not support peripheral or central vestibular dysfunction alone
2. Induced DBN nystagmus was transient with specific head maneuvers
3. Previous imaging studies documented cervical osteophytes and anatomic anomaly of the vertebral arteries

In our patient's case, the left vertebral artery was described as the dominant of the two. The combination of vertebral artery anatomical anomaly and cervical osteophytes likely contributed to the mechanism of VBI. The observation that rightward positions provoked symptoms aligns with the patient's left vertebral artery domination. When the left vertebral artery is compressed and/or impinged by cervical osteophytes, adequate posterior circulation cannot be achieved in the dominant artery (Olszewski et al, 2006, Kuether, 1997). In our patient, it is presumed that with head turns the right cervical osteophytes compressed or impinged her left vertebral artery limiting adequate blood flow to the posterior fossa.

Our patient shared various similarities to a case published by Rosengart et al, (1993) where a patient had induced symptoms of tinnitus, dizziness, and presyncope with leftward head rotations. Medical work-up revealed hypoplastic right vertebral artery and covertebral osteophytes from cervical vertebrae five and six. In Rosengart's case, successful ostephyectomy and cervical fusion eliminated the condition and the patient's symptoms. Potential treatment options for our patient included cervical fusion, removal of osteophytes, or lifestyle management through limitation of provoking symptoms. As Rosengart et al, (1993) reported, surgical removal of cervical osteophytes resolved their patient's VBI as the mechanism was altered.

Final Thoughts

Review of this case shows the true complexity of evaluation, differential diagnosis, and treatment of positional vertigo. The presented patient had "simple" positions which provoked short duration and transient symptoms of vertigo (among many others). Previous diagnostic maneuvers had provoked subjective symptoms and observable nystagmus, yet she ultimately was suffering from something less benign than BPPV. Careful symptomatology, observation of induced symptoms, and review of known medical history were fundamental in arriving at the correct conclusion. It was the specific knowledge and understanding of the anatomy and physiology of the peripheral and central vestibular system, as well as the contributing vascular supply, that helped to facilitate proper diagnosis and management for this patient.

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Gina Watkins, MA, is the Balance Center clinical coordinator for Spectrum Health in Grand Rapids, MI.

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I-C-D LIGHT

Shining a Light on ICD-10

By Josie Helmbrecht and Shirin Jivani

Remember the movie *Groundhog Day,* where Bill Murray's character lived the same day over and over? We are going to use this idea to discuss the differences between diagnostic coding on September 30, 2015, and October 1, 2015. A little Hollywood fiction will help illustrate, because when have you ever experienced the same clinic day twice?

Wait, what is happening? ICD-10, which will offer updated terminology, greater specificity, flexibility, and ability to analyze disease patterns for public-health applications. All providers covered by the Health Insurance Portability and Accountability Act (HIPAA) will be required to transition to ICD-10 on October 1, 2015. Do not be overwhelmed by the changes in coding. As established by the World Health Organization (WHO), ICD-10 is already being used in other countries such as United Kingdom (1995), France (1997), Australia (1998), Germany (2000), and Canada (2001). The transition from ICD-9 to ICD-10 is long overdue. ICD-9 is over 35 years old, and terminology is inconsistent with current medical practice. ICD-9 provides limited data about medical conditions, and limits the number of new codes that can be generated to match advancements in the medical field.

The codes most commonly used in audiology practice are found in Chapter 8 of the ICD-10 manual, *Diseases of the Ear and Mastoid Process*. Typically, audiology codes start with the letter H. The character after the decimal point specifies the type of hearing loss, and the final character specifies laterality (1-right, 2-left, and 3-bilateral). Most ICD-10 audiology codes are three to seven digits. As found in the ICD-9 coding system, there is no code for normal hearing acuity.

The following changes in coding should be noted:

- Conductive hearing-loss codes are not defined by their physical location (tympanic membrane, middle ear, etc.).
- Unilateral hearing loss codes require hearing to be "unrestricted" in the other ear.
- Tinnitus is no longer defined as subjective or objective.
- There is no distinction between sensory and neural hearing loss: it is sensorineural hearing loss.

General Equivalency Maps (GEMs) have been created as a useful tool for comparing and translating large ICD-9 databases to ICD-10 data during the transition process. Web sites such as www.icd10data.com allow you to enter an ICD-9 code and search for the comparable ICD-10 code. This is referred to as "forward code mapping." It is very important to keep in mind there is not a one-to-one mapping from ICD-9 to ICD-10, as ICD-9 does not code the same level of detail for cause and location. Therefore, it is advised to use the individual codes found in Chapter 8 for precise coding. Remember, the process for selecting the appropriate code in the new ICD-10 system is not different. It simply provides a specific description of the diagnosis. When a diagnosis cannot be made, a code related to the services rendered can be selected.

We have provided some clinical cases to help illustrate the differences between the diagnostic codes in ICD-9 and ICD-10.

Case #1

The first case is simple and includes additional tools available with ICD-10 that were not available with ICD-9.

Meet the Patient

A three-year-old female who failed her hearing screening at her recent well-child check. Diagnostic testing revealed hearing sensitivity is within normal limits, with normal middle-ear mobility, bilaterally, and present otoacoustic emissions.

Neither ICD-9 or ICD-10 code provides an option for normal hearing. In the absence of a clinical diagnosis, the signs, symptoms, or reason for visit should be coded. In this case, on September 30, 2015, V72.11 encounter for hearing examination following failed hearing screening would be the appropriate ICD-9 code.

On October 1, 2015, Z01.110 encounter for hearing examination following failed hearing screening would be the appropriate ICD-10 code. In the rare case there is not a code to appropriately indicate the signs, symptoms, or reason for the visit, Z01.10, a hearing/vestibular examination without abnormal findings can be used. It is best to use the most specific code.

Take-Home Message

Z codes are supplemental codes and represent reasons for a procedure. It can be used to describe reasons for referral in the absence of definitive diagnostic test results or associated signs and symptoms.

Case #2

Meet the Patient

A 76-year-old male with a gradual decrease in hearing and increased difficulty having a conversation, especially in groups and when there is background noise. Diagnostic evaluation showed mild to moderately severe sensorineural hearing loss, bilaterally.

On September 30, 2015, 389.18, sensorineural hearing loss bilateral would be the appropriate ICD-9 code.

On October 1, 2015, H90.3 would be the appropriate ICD-10 code.

Case #3

Meet the Patient

A 47-year-old female with a two-week onset of sudden hearing loss and tinnitus in the right ear. There is no report of any vertigo. Diagnostic evaluation showed severe-to-profound, right-sided sensorineural hearing loss, and normal hearing for the left ear.

On September 30, 2015, the diagnosis would be coded 389.15, sensorineural hearing loss unilateral; 388.2, hearing loss, sudden onset; and 388.31, tinnitus. Coding the same patient on October 1, 2015, will be different. Let's use www.icd10data.com to help illustrate.

ICD-9 389.15 converts approximately to

- 2015 ICD-10 H90.41, sensorineural hearing loss, unilateral, right ear, with unrestricted hearing on the contralateral side, or
- 2015 ICD-10-CM H90.42, sensorineural hearing loss, unilateral, left ear, with unrestricted hearing on the contralateral side

ICD-9 388.2 converts approximately to

- 2015 ICD-10 H91.23, sudden idiopathic hearing loss, bilateral

ICD-9 388.31 converts approximately to

- 2015 ICD-10 H93.19, tinnitus, unspecified ear

On October 1, 2015, this patient's primary diagnosis would be H90.41, sensorineural hearing loss, unilateral, right ear, with unrestricted hearing on the contralateral side, and a secondary diagnosis code would be H93.11, tinnitus, right ear. Per ICD-10 instructions, H90.41, sensorineural hearing loss, unilateral, right ear, with unrestricted hearing on the contralateral side, and H91.21, sudden idiopathic hearing loss, right ear, are mutually exclusive and cannot be coded together. There are directions in ICD-10 that indicate which codes can never be reported together on a claim. When reporting codes in the H90- family, you also cannot report codes in the H91- family. This is a type one exclusion.

In this case, the GEM is helpful, but does not provide all the details. As previously noted, there are not one-to-one conversions for many codes. There are other resources available, including the *ICD-10 Codes Utilized by Audiologists* document available on the Academy's Web site, as well as ICD-10 coding manuals. These resources will help you code appropriately.

Take-Home Messages

- ICD-10 codes provide more detail.
- Use caution when using GEMs.
- Multiple resources will be necessary for a successful transition from ICD-9 to the ICD-10 coding system.
- Pay attention to the directions that might accompany a code, as there may be exclusions in ICD-10 that were not defined in ICD-9. Failure to note these exclusions could result in the claim being denied.

Case #4

Meet the Patient

A 35-year-old female with progressive decline in hearing for the left ear for several years. She denied any tinnitus, dizziness, or otalgia. Diagnostic evaluation revealed left-sided conductive hearing loss, with Carhart's

notch at 2 kHz. On September 30, 2015, the diagnosis would be coded 389.08 for conductive hearing loss.

ICD-9 389.08 converts approximately to

- 2015 ICD-10-CM H90.12, conductive hearing loss, unilateral, left ear, with unrestricted hearing on the contralateral side

Case #5

Meet the Patient

An 88-year-old male with an onset of dizziness laying down on his left side. The dizziness feels like the room is starting to spin, but goes away quickly when he lays flat on his back. The Dix-Hallpike maneuver was positive for the left side.

On September 30, 2015, this diagnosis would be coded ICD-9-CM 386.11, benign paroxysmal positional vertigo (BPPV). ICD-10, however, includes laterality of this diagnosis.

Therefore, this code will be H81.12 specifying left-side BPPV.

Update

In July 2015, the Centers for Medicare and Medicaid Services (CMS) announced in a joint statement with the American Medical Association (AMA) that there would be a one-year grace period following the October 1, 2015, transition to ICD-10. During this grace period, Medicare claims will not be denied based solely on inaccuracy or lack of specificity in claims reported with ICD-10 codes. Note, this DOES NOT mean delayed implementation of ICD-10. Providers will not be denied payment in the first year of transition to ICD-10 as a result of unintentional coding errors inherent in the process of transitioning to the new system, as long as the incorrect claim is in the same general family as the correct ICD-10 code.

Case #6

Meet the Patient

A 10-year-old male with history of a mild bilateral sensorineural hearing loss. He is currently under the care of an ENT for acute otitis media in the left ear, who has ordered an audiogram and tympanometry. Diagnostic testing reveals the hearing to be unchanged in the right ear, however, he now presents a mixed-hearing loss in the left ear. On September 30, 2015, the diagnosis coding would be 389.20 mixed hearing loss, unspecified and 389.10 sensorineural hearing loss, unspecified. On October 1, 2015, the most appropriate ICD-10 codes to use would be H90.8 mixed conductive and sensorineural hearing loss, unspecified and H90.5 unspecified sensorineural hearing loss.

Although ICD-10 presents options for laterality for a unilateral hearing loss of various types with normal hearing in the opposite ear, there is currently no provision for describing laterality when a bilateral hearing loss of differing types occurs. The best choice at this time is to use the combination of unspecified codes, as this most accurately describes the test results from the list of available ICD-10 codes.

Resources

The American Academy of Audiology has a Web page dedicated to ICD-10, where you can find getting-started guides, timelines to implementation, code lists for audiologists, GEMs, and CMS information on ICD-10. The Academy Web site is a comprehensive resource and a great place to get more information. Learn more at www.audiology.org/practice_management/coding/international-classification-diseases-10th-edition.

Every audiologist should have an ICD-10-CM manual for information on medical diagnosis coding. These resources are available from the Centers for Disease Control and Prevention (CDC), the AMA, as well as coding resource companies.

The free, interactive PDF is available on the CDC Web site: www.cdc.gov/nchs/icd/icd10cm.htm.

AMA Press Online
Phone Orders: 800-621-8335
E-mail: amacatalog@ama-assn.org

Decision Health
Phone Orders: 877-652-9093
E-mail: csales@customcodingbooks.com

Ingenix (formerly St. Anthony, Medicode)
Phone Orders: 800-INGENIX
E-mail: info@ingenix.com

ICD-10 is a big change for everyone in health care. Ultimately, this will benefit patients and provide detailed coding for insurance. Our challenge is to survive the learning curve, which is surmountable with use of available resources, preparation and planning. Happy coding!

Josie Helmbrecht, AuD, is owner of Spirit River Audiology in Cambridge, MN, and an audiologist in professional services at Unitron in Plymouth, MN. She is also a member of the Academy's Coding and Reimbursement Committee.

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The authors would like to acknowledge Annette Burton, AuD, past chair of the Coding and Reimbursement Committee, for her extensive contributions to and review of this article.

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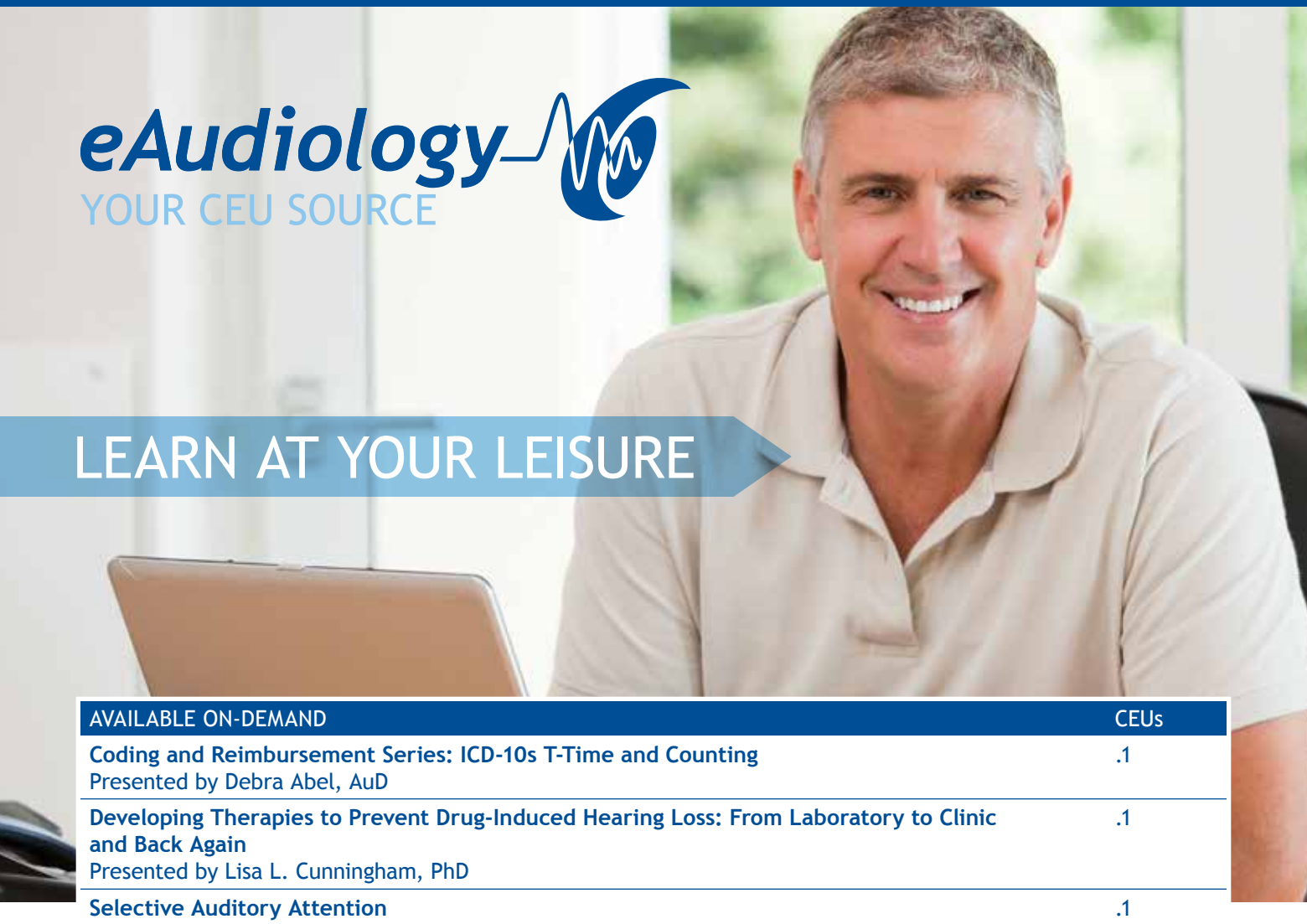

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Successful Aging: Linking Hearing and Memory to Social, Psychological, and Health Factors Presented by M. Kathleen Pichora-Fuller, PhD	.15
Technology Behind the Hearing Aids Grand Rounds—Round 1 Presented by Laurel A. Christensen, PhD; Jason A. Galster, PhD; and Francis K. Kuk, PhD	.2
Technology Behind the Hearing Aids Grand Rounds—Round 2 Presented by Michael Nilsson, PhD; Thomas A. Powers, PhD; and Don Schum, PhD	.2
Preventing "Premature Aging" of Young Ears from Noise Presented by Brian J. Fligor, ScD *ABA Certificants: Tier 1*	.3
Improving Patient Care Through Innovation in Workplace Management Lecture: The Impact of Patient Experience Data Collection on Patient Satisfaction in an Evolving Reimbursement Climate Presented by Francis Fullam, MA; Briana J. Jegier, PhD, CLC; and Keri Kwarta, AuD *ABA Certificants: Tier 1*	.3

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LIVE WEB SEMINAR

Wednesday, October 28, 2015, at 1:00-2:00 PM ET

Utilizing a Magnetic Bone-Conduction Hearing Implant in Children (.1 CEUs)
Presented by Lisa Christensen, AuD

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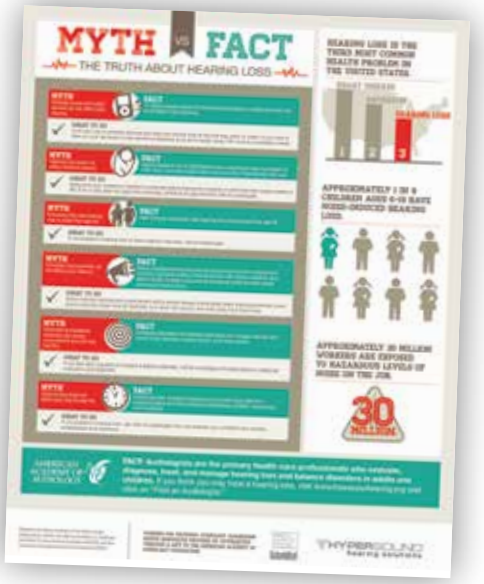


Each October, the Academy celebrates National Audiology Awareness Month by creating consumer-friendly resources for members to use in their practice settings; these tools increase awareness about hearing loss and the value of audiology care. Thanks to a generous gift from HyperSound Hearing Solutions, the Foundation has underwritten the production of the 2015 Myths vs. Facts about Hearing Loss poster. Because of HyperSound's generosity, a complimentary copy of the poster is included with this issue of *Audiology Today*, and additional copies will be available throughout the year.

"The Foundation is excited to work with the Academy on this important consumer-oriented project each year…and this fall, we are equally excited to work with our colleagues at HyperSound, as they look for ways to make a difference through philanthropy," stated Angela Shoup, Foundation chair. "The Academy's Public Relations Committee seeks avenues to spread the message about hearing loss prevention, and the support from our friends at HyperSound will allow them—and us—to increase our reach."

Brian Taylor, AuD, HyperSound's senior director, Clinician Affairs, collaborated with Foundation leadership to secure support for the poster project. "HyperSound knows that audiologists are uniquely qualified to provide diagnoses and treatment for hearing loss and other related conditions, so we are thrilled to have the opportunity to work with the Foundation and Academy to promote National Audiology Awareness Month," he said recently. "Increasing understanding about the causes of and treatment for hearing loss and awareness about hearing and balance disorders is a great public service, and HyperSound is proud of this philanthropic partnership."

For more information about the Myths vs. Facts about Hearing Loss poster and/or to obtain additional copies for use in your community or workplace, contact Angela Chandler at achandler@audiology.org.

Foundation Welcomes New Trustees

On October 1, 2015, four new trustees join the Foundation Board of Trustees for three-year terms: Tiina Huckabay, Eileen Rall, Georgine Ray, and David Zapala. Also new to the board is Academy Past President Erin Miller, who began a one-year term on July 1 as

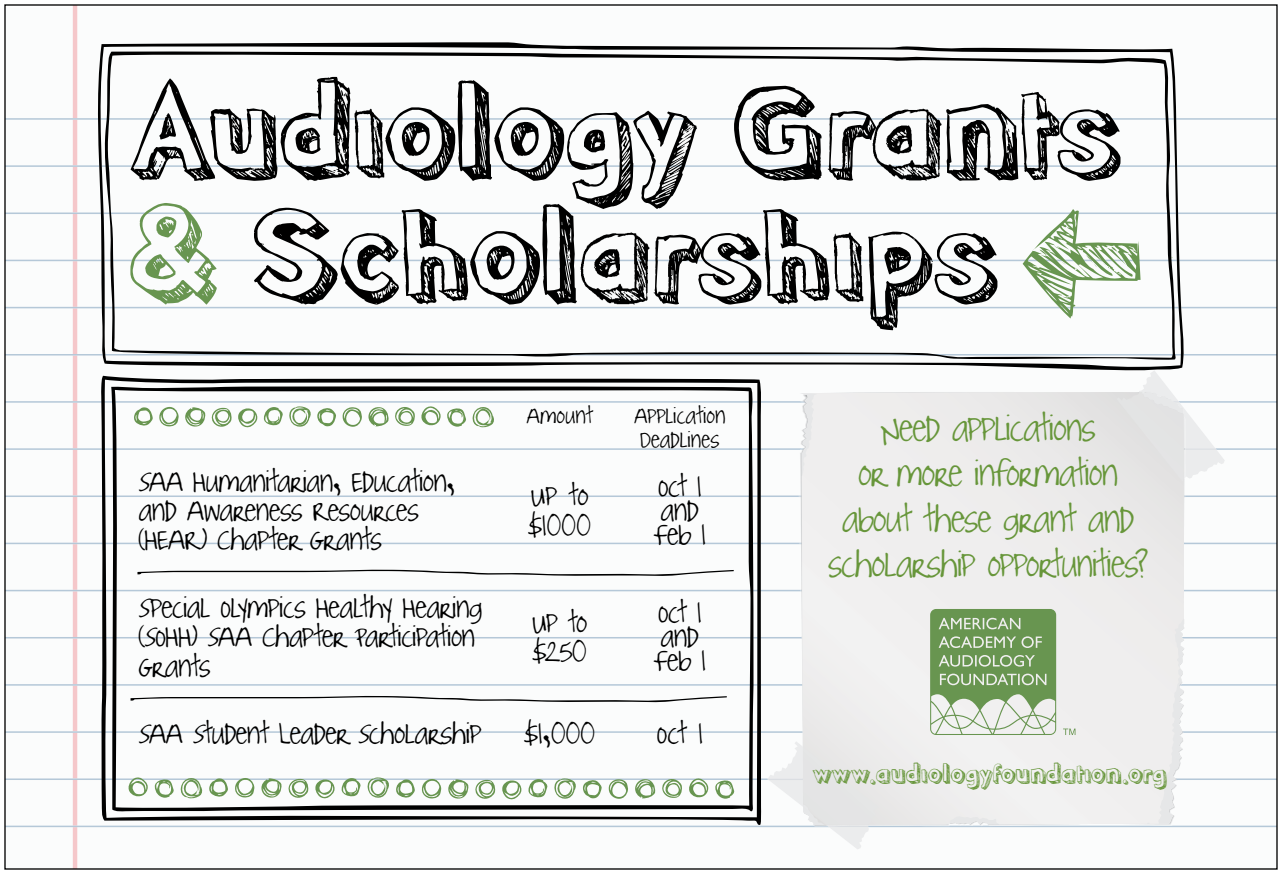
ex-officio trustee and liaison from the American Academy of Audiology Board of Directors.

This group joins current trustees Bopanna Ballachanda, Kimberly Barry, Patrick Feeney, Pamela Fiebig, Alison Grimes, and Elizabeth Thompson, who will continue their work advancing philanthropy in the audiology community. In addition, current board members Therese Walden, Jason Galster, and Brenna Carroll will replace outgoing officers, Angela Shoup, Francis Kuk, and Mike Mallahan, as chair, secretary/treasurer, and development chair, respectively.

The Foundation will miss the remarkable leadership of Shoup, Kuk, and Mallahan, as well as the invaluable contributions of board members Bettie Borton, Karen Glay, and Eugene McHugh (whose terms were completed in 2015). The Foundation also thanks Sarah Kate Fisher for her energetic service as the Foundation's Student Academy of Audiology representative.

As Shoup passed the torch to the new officers at the August meeting, Walden expressed her thanks and appreciation for the group's efforts over the last few years: "Under the leadership of Angela, Francis, and Mike, and the support of Board Trustees Karen, Gene, and Bettie, the Foundation has continued to thrive and grow. Their dedication has enriched the Foundation and those who are impacted by its reach in the field. On behalf of our profession, I thank them for their service, commitment and their passion to the profession of audiology."

Visit the Foundation Web site (www.audiologyfoundation.org/about_us) for more information about the new Foundation Trustees who hail from across the nation and from a variety of work settings. If you are interested in becoming a future trustee, please contact Kathleen Devlin Culver at 703-226-1049.



Celebrating a Successful Year of Accomplishments

By Kristen Schultz

Each winter, a new group of passionate students is elected to the Student Academy of Audiology (SAA) Board of Directors. Armed with fresh ideas and goals, each board member serves as the chair of a committee of student volunteers who are just as committed to furthering the SAA's mission. Each committee focuses on a different aspect of audiology to develop activities and events to build the SAA. Whether it is strengthening long-standing programs or developing new ones, the tireless work of these students provides the backbone of SAA. With the help of these dedicated students, SAA has accomplished much in just one year!

SAA Chapter Relations Committee

The Chapter Relations Committee successfully completed the first ever Chapter Charter Renewal process with each SAA local chapter. This process included reviewing chapter bylaws, updating contact information, and verifying national membership in an effort to maintain local chapter contact with national SAA. They also completed a "Program Ideas Bank," where chapters can find activity ideas provided for, and by, local SAA chapters. The ideas bank can be found at http://saa.audiology.org/program-ideas-bank.

To strengthen connections among local chapters, the committee launched tri-annual regional conference calls and auto-subscription of all SAA members to the Student Community, an online collaboration forum for students to discuss interesting topics and share ideas. Additionally, they continued the SAA Chapter Challenge program, where local chapters compete with one another to earn points for activities performed across the core areas of advocacy, fundraising, education, and humanitarian efforts.

SAA Programs Subcommittee for AudiologyNOW!® 2015

The SAA Programs Subcommittee worked tirelessly to plan a variety of student-focused events at AudiologyNOW! (AN!) 2015 in San Antonio, TX. To do this, eight committee members participated in monthly conference calls and worked closely with the AudiologyNOW! Programs Committee to provide a voice for students in the overall conference planning process. They also conducted the Student Interest Survey and Student Experience Survey to aid in planning and assessing the student experience at AN! 2015.

To promote student attendance at AN! 2015, the Programs Subcommittee collaborated with the SAA Board of Directors and Academy staff to publicize different events through social media. This hard work resulted in many educational and entertaining events that were enjoyed by undergraduate and graduate student attendees alike!

SAA Conference Committee

The SAA Conference Committee successfully put together the third annual SAA Conference in conjunction with AudiologyNOW! 2015, which consisted of six speakers and over 120 attendees. This was the largest conference to date, with record attendance! Challenging talks on a variety of topics, including cochlear implants, auditory processing disorder, and adult diagnostics with electrophysiology, forced students to critically think to solve cases.

The conference included more networking opportunities than ever, with chances to speak with the American Academy of Audiology Board of Directors and other leaders in the field. In addition, they included a new portion of the conference called the New Audiologists' Panel. This event featured five panelists from different backgrounds who addressed various issues facing recent graduates, from job searching to salary negotiations.

The SAA Conference Committee is looking forward to an even

New Members of the Student Academy of Audiology

Gabriela Aguilar
Stefanie Allan
Ellen Balkey
Diane Cheek
Grant Gambrall
Roxanna Massoodnia
Emily Rooney
Brittany Thrall
Valerie Tiscareno
Mary Urlacher
Viktoriya Zakharenko

more successful conference at AudiologyNOW! 2016 and hopes to see you there.

SAA Humanitarian Committee

This year, the Humanitarian Committee continued strengthening SAA's relationship with Special Olympics (SO) Healthy Hearing by recruiting members to volunteer at the 2015 SO World Summer Games in Los Angeles, CA.

To aid local SAA chapters in their own humanitarian efforts, the committee made progress in the creation of a resource of humanitarian trips. Additionally, they worked to promote various philanthropic efforts in which SAA members may participate locally.

SAA Media Committee

Throughout the year, the Media Committee has been committed to keeping the audiology community up to date on current events and the initiatives of students and local SAA chapters across the country. The SAA Facebook and Twitter accounts provided followers with the most current news in audiology and reached a record number of followers.

Four editions of *SAAy Anything*, the SAA electronic newsletter, were successfully distributed to SAA members. The Chapter News portion of *SAAy Anything* promoted connections between chapters by providing local chapter updates and highlights, while the "So You Want to be a _____ Audiologist?" article series highlighted various audiology niches, including auditory processing disorder, rehabilitative audiology, and military audiology.

Additionally, the Media Committee collaborated with the Board of Directors to publish an SAA Spotlight article in each issue of *Audiology Today*. The topics for these articles ranged from the SAA Conference in San Antonio to the importance of student advocacy.

2014–2015 SAA Board of Directors (back row) Nikki Jordan, Sarah Crow (vice president), Laura Chenier (president), Sarah Kate Fisher (treasurer), Kevin Seitz, (front row) Susan Von Dollen, Lyndsey Spencer (secretary), Jenna Pellicori, Nicholas Reed, Amy Safran.

SAA Education Committee

The SAA Education Committee has worked hard this year to develop resources and provide information that is relevant to students and their interests. To this end, the committee has written a number of articles in *SAAy Anything*, along with a piece in *Audiology Today*. Additionally, an informative PowerPoint was featured to raise awareness of audiology as a career path for students. Topics of these articles ranged from international audiology to preparing for the Praxis exam. We are also proud to have worked with the Accreditation Commission for Audiology Education (ACAE) to provide students with information about accreditation.

SAA Undergraduate Committee

The SAA Undergraduate Committee successfully integrated the first ever SAA undergraduate local chapter at Florida State University. The establishment of an undergraduate chapter is an accomplishment in itself, but the chapter is also extremely active at the local level and participated in several nationally recognized SAA activities.

Conclusion

Clearly, the SAA Board and their committees' student volunteers have been busy in the past year! Students are juggling classes, clinical rotations, externship searches, and research projects, in addition to outside commitments, and we are grateful for their commitment and stewardship of SAA's mission.

These accomplishments represent the leadership and drive needed to get things done not only within SAA, but also the field of audiology. We are confident that the 2015–2016 Board of Directors will be equally successful in continuing to advance and advocate for the audiology profession! I am sure we are all looking forward to what the upcoming term will bring!

Kristen Schultz is a member of the SAA Media Committee. She is a second-year student at Northwestern University and will be completing her externship at SUNY Downstate Medical Center in Brooklyn, NY.

The author would like to thank the SAA Board of Directors for their contributions to this article.

Certification Requirements Ensure Greater Knowledge Base and Can Elevate Your Career

By Torryn P. Brazell

Today, advances in all aspects of audiology, from technology and scientific discoveries to patient care and even business practices, are having a profound effect on the profession and making it even more important for audiologists to stay abreast of changes in the field. Maintaining certification from the American Board of Audiology® (ABA) can help audiologists continue to learn, grow, and evolve with the profession.

The ABA recently had the opportunity to visit with former ABA Board of Governors member Dr. Barbara Kurman, who was one of the original cohort of audiologists who earned ABA Board Certified in Audiology® certification in 1999.

In addition to maintaining her certification for 16 years, Dr. Kurman has been generous with her time, supporting the practice of audiology at the local, state, and national levels. She did not take a traditional path in audiology. Rather, after teaching and working as an audiologist in New York City, she is now a vice president of sales for e3 Northeastern Technologies Group, which helps other audiologists understand and implement state-of-the-art equipment for patient evaluation and care.

Dr. Kurman feels strongly that ABA certification has been and continues to be beneficial to her career.

"One of the reasons I pursued and have maintained my ABA certification is because I come across all manner of customers, including seasoned audiologists, hospital administrators, professors from universities, and people who are new to audiology," Dr. Kurman said. "In order for me to stay on top of my game, I need to maintain my professional knowledge."

"As an audiologist and now a sales and support professional of audiological and balance assessment equipment, I must provide the best

services and support to anyone I interact with," Dr. Kurman continued. "I've always tried to be the best that I could in my field, and ABA certification helps me to be the best."

Dr. Kurman explained that she sees ABA certification as the highest standard in audiology, because it is voluntary and it requires 60 hours of education to acquire the hours needed for recertification. She was also very interested in the fact that the ABA requires a commitment to ethical behavior.

"What intrigued me the most was that ABA requires an ethics component for certification, and I see that as particularly important from the commercial side of the equation," Dr. Kurman explained. "I not only can say that I maintain a knowledge of what is ethically appropriate in my profession, but I have a certification to show that I have maintained my dedication to understanding ethics in audiology."

"I feel the ethics requirements is very important because there will always be issues that you confront where you don't necessarily know what is the right way or the best way to do it," she continued. "Maintaining awareness through education of those types of issues is beneficial on many levels, including that you realize that you aren't alone—everyone at one point or another faces these kinds of questions. To be ABA certified, you have to be able to operate within the code of ethics and operate legally. I think that would make anyone a better audiologist."

Dr. Kurman has become a mentor and trusted advisor to many colleagues, and she feels that ABA certification—along with her commitment to the field—is foundational to that role.

"I like to think that I'm successful at what I do because people call me for advice, or they will send me results of tests and ask for my input," she shared. "In the course of doing my job in the sales of audiometric and balance assessment equipment, I am asked what equipment should be utilized in a particular situation. The balance of customer needs, professional integrity, and ethical behavior creates a confluence of the benefits of my work as an audiologist in the commercial arena with the ethical and professional knowledge fostered by ABA certification."

"In addition, the ABA requires more hours than other certifying bodies to earn recertification, and these are not 'easy' credits," she continued. "I have to commit myself to learning in different environments and in different topical areas, because of the Tier 1 component."

For those who are considering certification, Dr. Kurman said, "ABA certification is the highest certificate that one can achieve in our profession, and it says something about your commitment to your profession."

Kurman, and the ABA, believe that it also shows your commitment to your colleagues in the sense that you are committed professionally, educationally, and ethically to be the very best audiologist you can be.

Dr. Barbara Kurman

To learn more about ABA certification, including Board Certification in Audiology, Pediatric Audiology Specialty Certification, or Cochlear Implant Specialty Certification, visit www.boardofaudiology.org.

Torryn P. Brazell, MS, CAE, is the managing director of the American Board of Audiology®. She is a credentialing practitioner with extensive experience in association management, including the development and implementation of professional certification and assessment-based certificate programs: initial concept, practice analyses, subject matter expert facilitation, program delivery, item writing, and recertification.

$$$ What Is Professional Autonomy Worth to an Audiologist? $$$

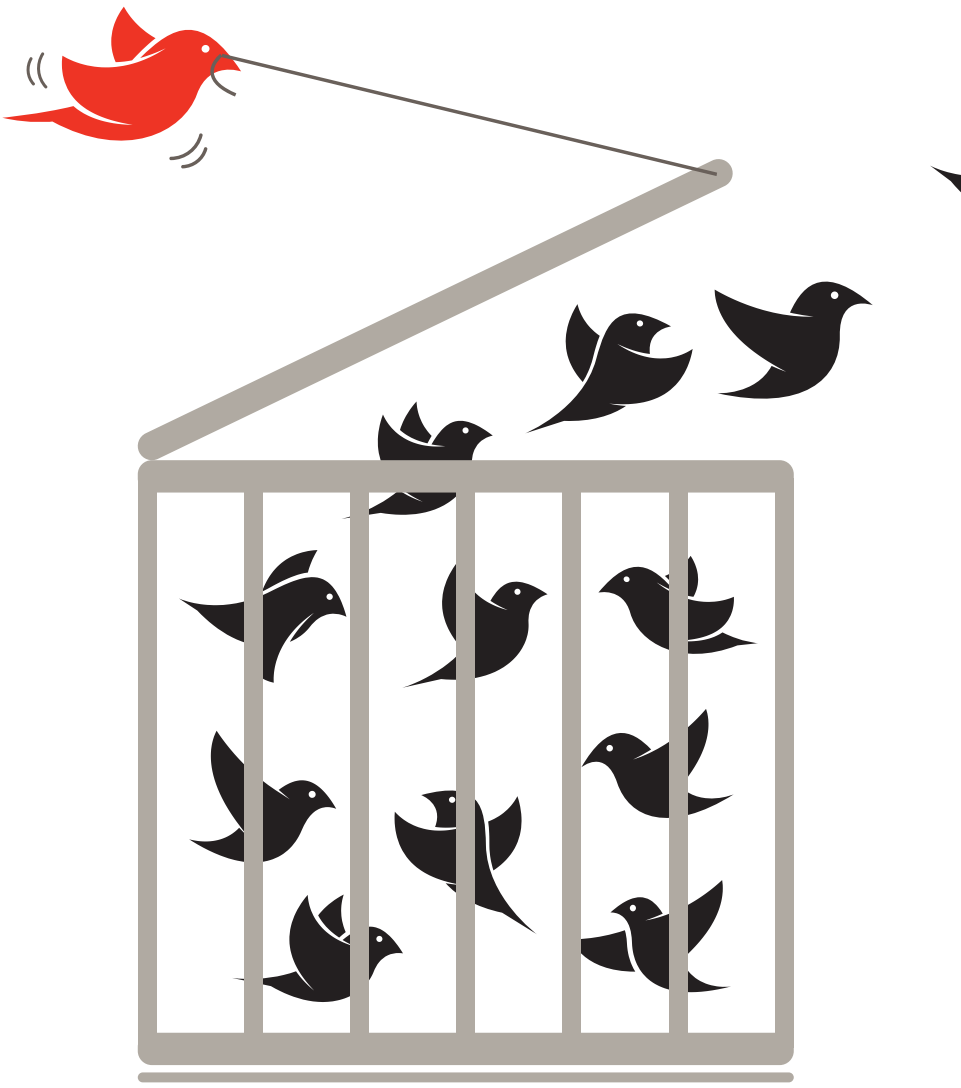
By Jeff Browne

The adoption of the doctor of audiology (AuD) degree was met with widespread enthusiasm as a means to improve education and training and, thus, raise the stature of audiology. Audiologists who obtained the degree were able to put the title *doctor* in front of their names. In the intervening years since its adoption, recipients of the AuD degree haven't reaped much else.

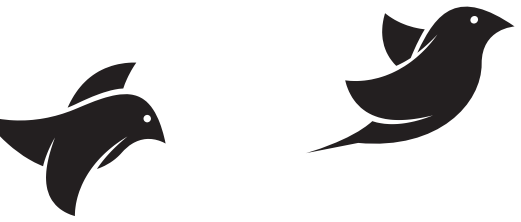
Audiologists are realizing that being able to call yourself *doctor* doesn't automatically confer professional esteem or financial advantages. They are also beginning to realize that the AuD, by itself, doesn't give them more professional security. Other health-care professionals are rapidly starting to encroach on audiology's scope of practice because the standards for provision of many audiological services are easy to meet due to the concurrent requirement of physician oversight.

We know that there is a cost associated with having to practice with physician oversight. For example, nurse anesthetists in the states that have opted out of the requirement for physician oversight (in order to expand affordable health care for residents) make approximately $10,000 to $12,500 more annually than their counterparts in states that require direct physician oversight. (Bureau of Labor Statistics, 2014). Nurse anesthetists in opt-out states make more in part because they don't have to share fees for unnecessary physician oversight.

Audiologists can make the same argument that unnecessary oversight is wasteful and they can reap the same rewards of extra income when they are recognized as *the* hearing care provider. The requirement of a physician referral for Medicare reimbursement is an



example of unnecessary added cost. Vestibular and cerumen management are the kind of professional services that are in the audiology scope of practice, but aren't compensated because audiologists are not classified as providers. Provider status is achieved only when state and federal governments acknowledge health-care professionals as full practice providers. To do that, audiologists have to follow the footsteps of other health-care professionals who are successfully fighting for professional autonomy.



Audiologists Need to Walk the Walk

The first line of defense that physicians use when fighting attempts to give other health-care professionals autonomy within the scope of their practice is that others lack the professional training and experience of physicians in the same field. As the public member of the Accreditation Commission for Audiology Education (ACAE), I stress the importance of audiology schools maintaining the education and training standards that are comparable to similar classes and externships at medical schools. ACAE accreditation standards are designed to meet that level of comparability so that state legislators and federal regulators considering autonomy for audiologists will be assured that the quality of hearing care provided is equivalent.

It's a Marathon

The experience of other health-care professionals is that it takes a long time to get state and federal agencies to change the top-down model of physician-directed health care. When the effort to alter the model is successful, it is a benefit to patients as well as providers.

In 2001, Iowa was the first state to opt out of physician oversight for nurse anesthetists. Now, 16 states have opted out of the requirement due to a methodical campaign by the American Association of Nurse Anesthetists, showing that the quality of care is maintained, scope of care is improved, and health-care costs are saved. Federal regulators have followed suit, particularly in Veteran Administration hospitals, to recognize nurse anesthetists as providers.

Professional Autonomy Is Earned the Hard Way

The Affordable Care Act (ACA) should make it easier for other health-care professionals to make their case for independence from physician oversight. Legislators are looking for ways to cut burgeoning health-care costs and extend coverage without a loss in the quality of health care provided. But physician groups and inertia ("We've always done it this way") will make it challenging for any health-care profession seeking professional autonomy.

It will take years and involve multiple fights before state legislators and federal regulators begin to make progress. Now is the time to embark on this effort while in a climate where all of health care is being examined and alternatives entertained.

Audiologists Have to Hang Together

One of the clearest lessons I've learned working with health-care professionals seeking autonomy is the need to pursue a common goal. A fractured profession will not succeed, while a unified profession will. Other health-care professionals have figured out how to deal with competing associations. The American Association of Nurse Practitioners (AANP), for example, was created in 2012 by two competing organizations merging together for the good of the profession.

Audiologists Have to Actively Participate

Opponents of audiology autonomy don't have to do anything to win because inertia is on their side. Audiologists who don't get involved in the fight for autonomy are effectively against it for the same reason. Getting involved means contributing to the Political Action Committee, staying up on state legislation and federal regulatory initiatives, and whether you are alumni or students, working to get your school of audiology to adopt the ACAE.

It will be a long fight. It is the right fight, both for patients and audiologists.

Jeff Browne is the public member of ACAE and president of RWB Communications.

Reference

Bureau of Labor Statistics. (2014) Occupational employment and wages, May. www.bls.gov (accessed July 2015).

Institute of Medicine Considers Accessible and Affordable Hearing Health Care

By Marilyn Richmond

A distinguished panel of experts at the Institute of Medicine (IOM) heard testimony from a standing-room-only gathering at the Washington, DC, headquarters of the IOM on June 30, presenting all points of view about accessible and affordable hearing health care. That hearing loss touches the lives of so many in this country made the day's presentations all the more compelling.

Researchers from universities across the country presented data about various contributors to hearing loss, such as genetics, cardiovascular disease, noise exposure, smoking, and weight. They spoke to the effects of hearing loss that include increased dementia, reduced physical ability, falls, decrease in brain function, depression, and social isolation. Much is known about hearing loss, but there is so much more to be learned. A recurring theme among presenters and panelists was the need for more outcomes data to show the benefits of treating hearing loss.

Consumer self-awareness and understanding of hearing impairment are the critical components in deciding to seek help. Other key factors include cost and affordability, and access to services and technologies. Consumers do not yet have enough information about hearing loss and its consequences with which to make informed decisions. They often do not seek help at all. Or, they delay a visit to the primary care physician or audiologist because of embarrassment about hearing loss,

or the perception that a hearing aid is a sign of aging. This shows a need to find better ways to educate consumers about hearing loss.

Another significant issue is the lack of meaningful screening for hearing loss by primary care physicians. Primary care physicians screen for diabetes and lung cancer, but often do not screen patients for hearing loss. Many of these physicians do not understand hearing loss or its long term effects, and, as a result, they do not give the proper attention to evaluating and referring patients for care. All presenters and panelists agreed that primary care physicians need to be better trained about hearing loss and incentivized to screen for it, just as they now screen for other chronic conditions.

All presenters agreed on the need to develop prevention screening measures for hearing loss. The challenge, however, is the development of better evidence-based outcomes data to show that treatment for hearing loss works. The U.S. Preventive Services Task Force has made this point in the past. The Center for Medicare and Medicaid Services (CMS) representative suggested working with the private Medicare Advantage plans, where hearing-care services could be added without the constraints of the traditional Medicare system. She also recommended working with the Center for Medicare and Medicaid Innovation (CMMI), which has the flexibility to develop and test new models of health-care delivery. Representatives from the Veterans Administration, Kaiser, and Optum, spoke to their unique models of care in delivering and measuring hearing health-care services.

There was a spirited debate among industry representatives and IOM panelists about the value of FDA regulation of hearing aids, the current medical waiver requirement, and whether consumers should have unfettered access to personal sound amplification products.

The most powerful presentation of the day was delivered on behalf of the profession of audiology. Addressing the needs of adults with hearing loss includes an understanding of the impact of the loss on a person's life, and an evaluation of the ear and brain mechanisms that underlie the hearing deficits. Treatment programs must address both hearing loss and the consequences of the loss. Consumer access to affordable hearing care is important, but successful outcomes require more than access to, and the fitting of, an amplification device. As with other areas of health care, treatments for hearing loss will continue to evolve to include, for example, pharmacological and genetic processes, hair cell regeneration, and emerging technologies. Knowledge of existing and emerging options, and access to these options, will be just as important to a person with hearing loss in the future, as access to amplification is today.

IOM panel members nodded in agreement as the audiologist concluded, "Consumer access to hearing health-care professionals and the provision of outcome-improving services remain critical and important components of both the evaluation and treatment process."

The Institute of Medicine will continue its hearings on affordable and accessible hearing health care in September 2015.

Marilyn Richmond is the senior director of advocacy and government affairs for the American Academy of Audiology.

New Members of the American Academy of Audiology

Casey Adkins, AuD
Kelly Cormier, AuD
Kathryn Crane, AuD
John Davis, AuD
Christopher Engelkes, AuD
Leisa Ensworth, MA
Grant Ewer, MA
Ashley Gordon, AuD
Kathryn Jackson, AuD
Christina McQueeney, AuD
Hannah Meeker, AuD
Randi Murphy, AuD
Erica Pennesi, AuD
Veronique Rozon-Gauthier, MS
Lindsay Smith, AuD
Layla Sweeney, MS
Kaitlyn Tidwell, AuD
Jessica Vaughn, AuD
Alicia Wooten, AuD
Caitlin Yesis, AuD

Celebrate National Audiology Awareness Month this October!

By Randi Davis and Diana Callesano

The American Academy of Audiology Public Relations Committee promotes audiologists as the primary hearing health-care professionals, introduces upcoming generations to audiology as a career option, and networks with local events to encourage the public to see an audiologist for a hearing evaluation.

October is National Audiology Awareness Month, which is your month to celebrate your profession. This year, we created a new campaign, stating the common myths and facts about hearing loss for your consumer audience. Hearing loss is the third most common health concern that affects people of all ages. It impacts people of all demographics since it is sometimes caused by everyday activities.

The American Academy of Audiology encourages each and every audiologist to display the poster, enclosed with this issue, and spread audiology and hearing loss awareness in your community. Share your uses of the poster and other resources available on the Academy's Web site with your pictures and experiences on the Academy's Facebook or Twitter page.

More Resources

The Academy's public awareness resources are literally at your fingertips on the Web site www.audiology.org. To get started, select the "Get Involved" tab from the top-level navigation and proceed to the public awareness section. There are so many resources! Let's highlight a few.

- Fact Sheets
- Just for Kids and Young Adults
- Letters to the Editor
- Posters
- PowerPoint Presentations
- Press Releases
- Radio PSAs
- Web Tools

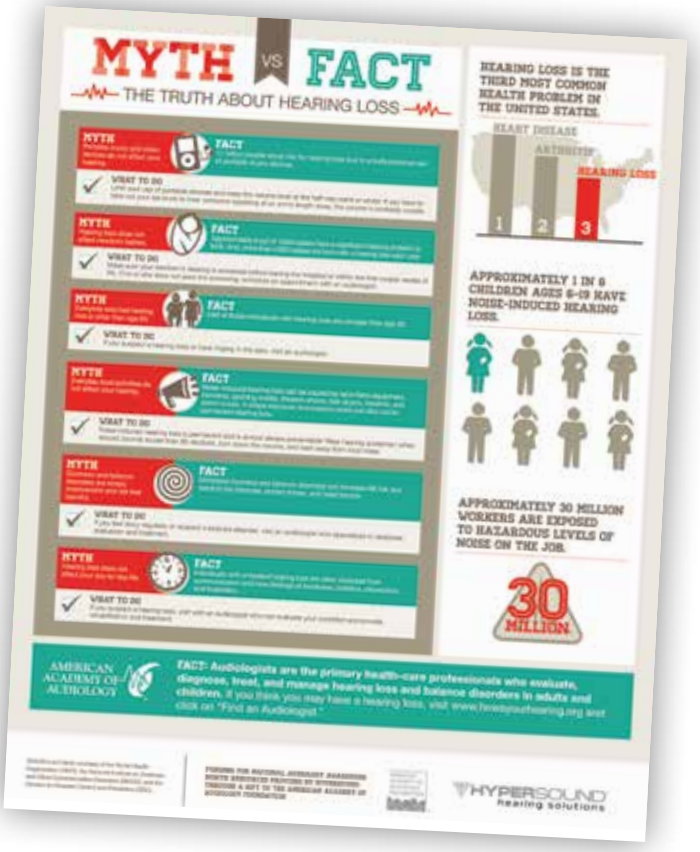
Take some time this October to use these free resources to promote your practice and the profession. They are available at no charge, thanks to support from the Academy's Foundation and HyperSound Hearing Solutions.

Student Recruitment

Each year, our committee seeks out a high school science fair held near the host city of AudiologyNOW! Members are encouraged to judge the science fair and select one or two winning projects relative to audiology. The winners are invited to present their research on-site, receive a monetary prize from the Foundation, and then spend the day with exhibitors to learn more about the industry.

Want to raise awareness about the profession to our future generations? Reach out your local high school and talk about audiology at the next career day and take the poster with you to help educate your audience.

Randi Davis, AuD, is a private practice audiologist in Nashville, TN. Diana Callesano, AuD, is an audiologist with The Hearing and Tinnitus Center in Woodbury, NY. The authors are members of the Academy's Public Awareness Committee.



Participate in the Academy's Delegation to Greece

The American Academy of Audiology continues to expand its global presence supporting audiology practitioners around the world. In the past two years, the Academy has lead delegations of our members to Cuba and India to exchange information about the practice of audiology in our respective countries. As the immediate past president of the American Academy of Audiology, I am honored to have been selected to lead our third audiology delegation, this time to Greece. I invite you to join me, and other members of the Academy, to participate in this important international exchange.

The delegation will convene in Greece in October 2015. The purpose of the delegation is to experience the profession of audiology from a different view and to share our experiences with our colleagues in Greece. The Academy's goals for the trip are to:

- Meet with professionals providing audiology/hearing and balance services to gain their perspective and learn about their challenges.
- Specifically address how they are working with other healthcare professionals to address the co-morbidity of hearing loss and other health issues including cardiovascular conditions, diabetes, and cognitive decline.
- Gain an understanding of their delivery model for early intervention services, as well as hearing, amplification, tinnitus, and balance services, and share our perspective regarding the changing delivery model in the United States.
- Discuss the education model for audiology in their country, and determine if there our opportunities to share information regarding both didactic and clinical training.

These goals will expand as we continue our preliminary discussions with our colleagues in Greece and determine who will be joining us on the delegation. I know that many of our members have much to contribute to these discussions and would gain both personally and professionally from the experience.

Each delegate will be asked to complete a profile identifying their background and areas of interest, to ensure the final schedule of activities reflects the professional goals and specific topics of discussion of the enrolled delegates. Visit www.professionalsabroad.org to enroll and learn more.

The estimated cost per delegation member is $3,595. This cost includes group ground transportation within Greece, meetings, accommodations in double-occupancy rooms, entry fees for cultural visits, the service of a national guide, and most meals. The program convenes on October 25, 2015, in Athens, Greece and ends on October 30, 2015, in Athens, Greece. In most cases, this means a departure from the United States on October 24, 2015, with a return on October 30, 2015.

Travel arrangements will be arranged, at no cost to the Academy, through our cooperation with Professionals Abroad, a division of Academic Travel Abroad. A parallel program of unique cultural activities will be arranged for non-professionals and accompanying guests. If you are interested in bringing a guest to experience the rich culture of Greece, please contact Professionals Abroad for program specifics.

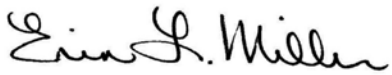
For U.S. citizens, expenses associated with this program may be tax deductible as an ordinary and necessary business expense. You should consult with a tax advisor to determine if the tax deduction is applicable to you.

As the team will be limited and due to the extensive planning and communication involved in coordinating a program of this nature, please respond with your intentions regarding this invitation as soon as possible. Please RSVP to Professionals Abroad at 877-298-9677 by **September 24, 2015**. A $500 deposit is required to reserve your place on the team. In the event that you are unable to accept this invitation, an alternate delegate candidate will be invited. You may also recommend a colleague as your alternate for the program. I look forward to hearing from you regarding your participation.

If you have questions regarding the delegation, contact our program representative at Professionals Abroad (www.professionalsabroad.org) at 877-298-9677.

I am pleased to be involved in this exciting opportunity and hope that you will strongly consider participating in the delegation to Greece.

Sincerely,



Erin L. Miller, AuD
Board Certified in Audiology
Past President
American Academy of Audiology

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The Academy's Loyalty Media Programs offer organizations the opportunity to connect with Academy members and the audiology community.

You can find participants featured here in *Audiology Today* magazine, on our Web site (www.audiology.org), and at Academy events. Consider supporting the companies that support your association.

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For more information about the program, contact Alyssa Blackwell at ablackwell@networkmediapartners.com.

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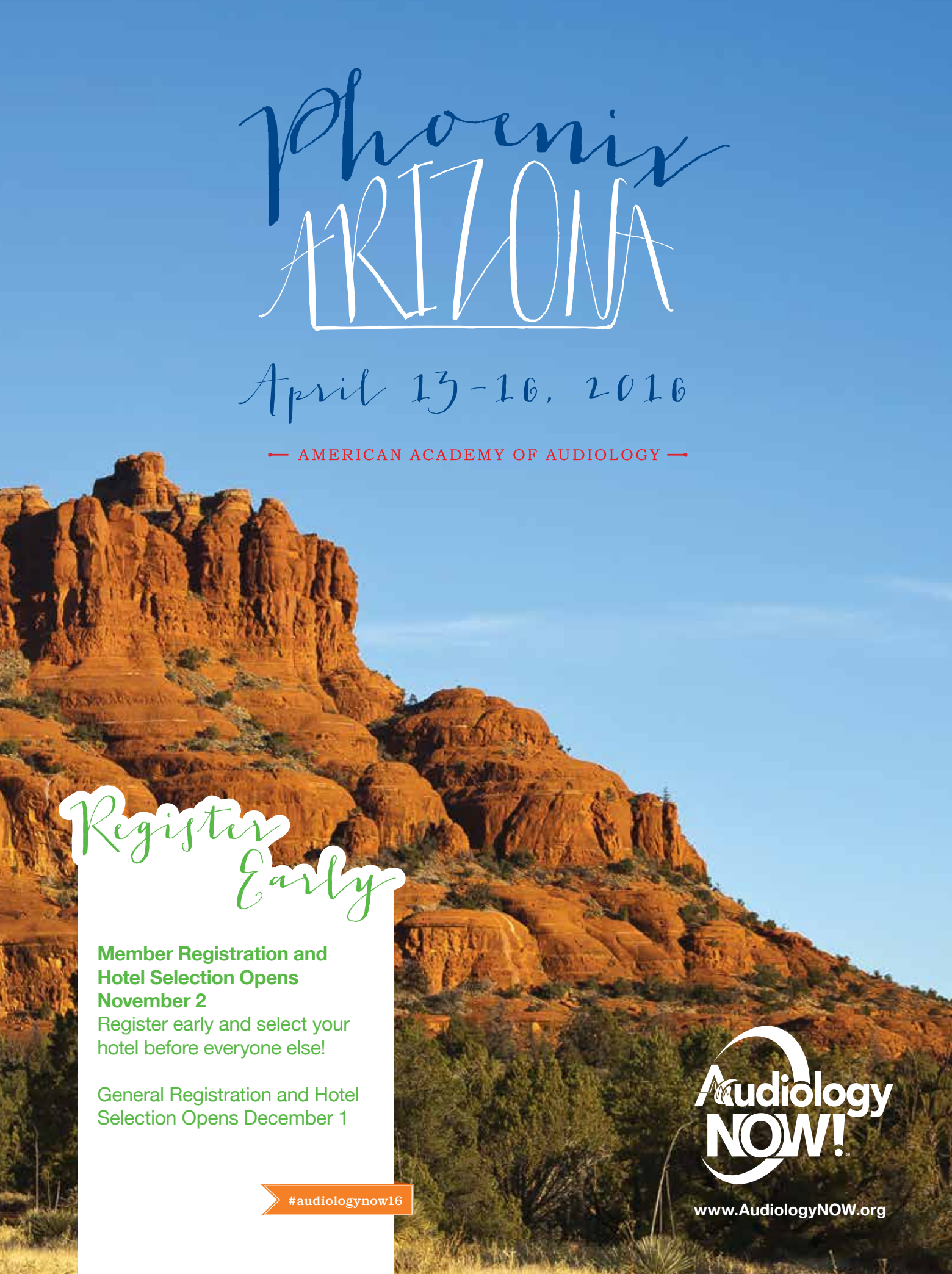
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binax™, featuring e2e wireless™ 3.0, is now available in the complete Insio binax custom hearing aid portfolio.

In a bilateral fitting, ***binax*** processes the audio signals from both hearing aids and delivers an individually optimized audio signal back to each hearing instrument. This process enhances the natural directional hearing that the pinna provides to the front. As a result, wearers of even the tiny, one-microphone IIC can enjoy a whole new level of speech understanding that's adaptive and automatic.

Insio binax' performance has been maximized while its dimensions have been minimized. The new, ergonomic construction allows Insio binax to sit inconspicuously in the ear canal for maximum discretion. **Now Insio binax has more power than ever before – wearers can get up to 65dB in a tiny CIC and IIC.** And Insio has more customizable options which increases the overall fitting rate and patient satisfaction.

With wireless available down to the IIC, Insio binax offers wearers maximum convenience. Together with the new easyTek™ and easyTek App, Insio binax models can be connected to *Bluetooth*®-enabled devices such as mobile phones, MP3 players, TV's, and more. And for the utmost discretion, even the tiniest IICs are now remotely controllable via the touchControl™ App so wearers can use their Apple® or Android™ smartphones to change volume and programs discreetly without any intermediary device.

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