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NEUROAUDIOLOGY NEWSELTTER

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Farewell to an Audiology Legend: Jack Katz

Author: Cydney Fox, AuD

On July 11, 2025, we lost one of the true great men of Audiology: Jack Katz PH.D. Jack was 91 years old.

When you met Jack Katz for the first time, what you noticed were his eyes. They twinkled and emanated warmth and laughter. The second thing you noticed was his smile. It was welcoming and warm, and there was no doubt in your mind that he was happy to meet you or see you again. That was the magic of Jack Katz, Ph.D.

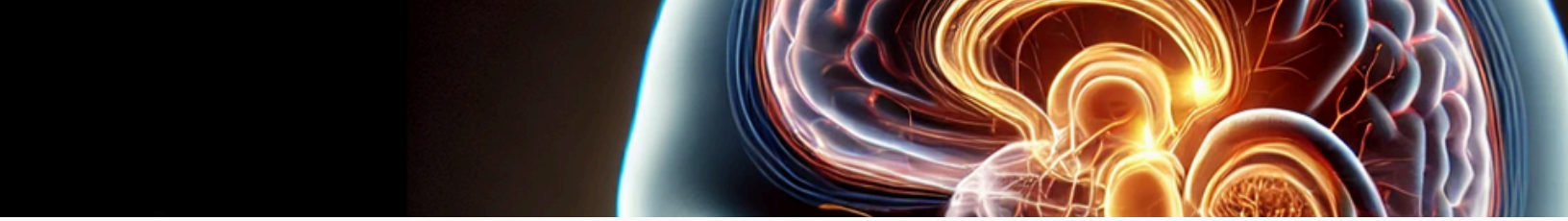
Jack's incredible career has been recounted in his obituary; in the tribute by Marshall Chasin, Au.D.; and by the summary by the American Academy of Audiology. He was known as the father of the Buffalo Model of CAPD. He was the editor in chief of seven editions of the Handbook of Clinical Audiology. He was a researcher, an author, a presenter but also a clinician. One of his most important creations was the development, in 1962, of the Staggered Spondaic Words test (SSW).

Audiology Trivia

1. **What is the percentage of adults 65 and over that experience falls every year?**
a) 25%, b) 13%, c) 40%, d) 50%

2. **True or False. Multi-focal eye glasses improve balance and mobility.**

3. **Three vestibular brainstem nuclei contribute to nystagmic eye movement, two of them are nuclei III and IV, what is the third?**
a) V, b) VI, c) VII, d) VIII



Farewell to an Audiology Legend: Jack Katz

After retiring from the University of Buffalo in 2002 he and his wife, Irma, moved back to Kansas City where the children and grandchildren lived. When he learned there were no services in the Greater Kansas City area for those with APD. He opened a solo practice specializing in evaluation and therapy for children and adults with this disorder. In 2011, he began an international group of audiologists, speech-language pathologists and other professionals who served those with APD. It was called the International Guild of Auditory Processing Specialists (IGAPS). Its purpose was not only to encourage communications among those who worked with individual having APD but to encourage an accepting, supportive group of professionals who welcome diversity of thought rather than one of hostility.

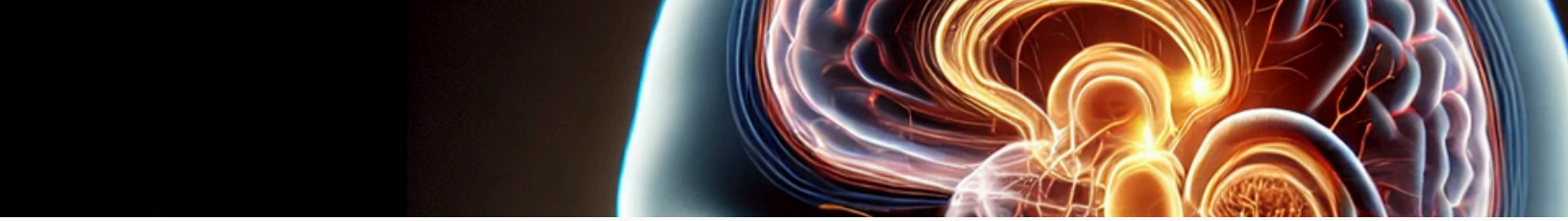
To those of us who knew and loved Jack, this was his purpose and mission. To bring together professionals who could better serve those individuals who have APD/CAPD. We will miss his joy, his enthusiasm, his wisdom and the love that he expressed toward each one of us. May our memories be a blessing.

Auditory Considerations for Migraine Patients: A Focus on Auditory Processing

Author: Katherine (Katie) McLaren, B.S.-Doctor of Audiology Student, U of A

As vestibular migraine is a prevalent and considerably underdiagnosed condition (Villar-Martinez & Goadsby, 2024), a key component of this case history involves asking about a personal or family history of migraine or other primary headaches, as well as accompanying migraine features such as aura. However, when reviewing the literature, I came to realize that these are questions that I should extend to audiologic evaluations as well.

Migraine attacks have commonly been associated with sensory disturbances, such as photophobia and phonophobia and a proposed migraine sub-type, the cochlear migraine (Lai & Liu, 2018), manifests with auditory symptoms (hearing loss and/or tinnitus) during attacks. Beyond these transient symptoms, patients with migraine are also at an increased risk of tinnitus, sensorineural hearing loss and sudden sensorineural hearing loss (Hwang et al., 2018). Findings by Wang et al. (2023) corroborate increased pure-tone average and prevalence of tinnitus, but also reveal greater subjective hearing loss in migraineurs, indicating central auditory dysfunction. Neuroimaging studies further demonstrate abnormal resting connectivity across varying domains of sensory processing: visual, auditory, gustatory, somatosensory, multisensory and motor cortical regions, even in the interictal phase (between migraine attacks) (Meylakh & Henderson, 2022). Due to the presence of this altered sensory processing framework, baseline differences in auditory processing function should be considered in migraineurs.



Auditory Considerations for Migraine Patients: A Focus on Auditory Processing

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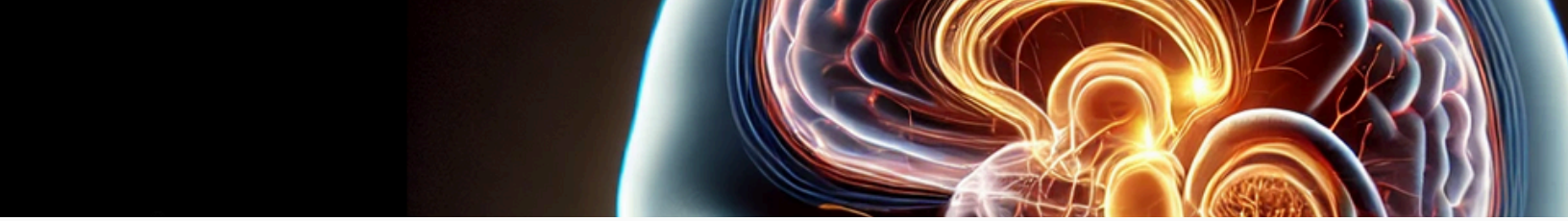
When compared to participants without migraine, some studies have outlined that migraineurs exhibit significantly poorer performance on tests of central auditory processing. Alhawy et al. (2025) recently found that migraineurs demonstrated significantly poorer performance than controls across all employed tests of central auditory function: the Arabic Speech in Noise Test, Duration Pattern Test, Arabic Dichotic Digit Test, and Auditory Fusion Test Revised. These differences remained significant regardless of whether participants were experiencing an active episode and whether they typically experience aura. However, central auditory performance was decreased with increased severity of migraine, associated disability and disease duration. Participants with migraine also exhibited significantly increased P300 latencies in an odd-ball paradigm, which was exacerbated in those assessed during active migraine attacks, but P300 latency was not correlated with behavioral test scores. These findings suggest that while migraine patients may also experience altered cognitive function, this likely does not account for their auditory processing dysfunction. Tawfik et al. (2021) similarly reported poorer performance among migraineurs on the Duration Pattern Test, Arabic Dichotic Digit Test (version II), and Arabic Speech Intelligibility in Noise Test, also noting worse performance on the Gaps in Noise (GIN) Test. All migraine and vestibular migraine patients exhibited abnormal GIN Test results, and no performance differences were present between these sub-groups. No correlation was found between frequency of attacks in either study group and central auditory performance. These studies are preceded by Agessi et al. (2014), which reported impaired Gaps in Noise and Duration Pattern Test results in migraineurs with and without aura, but no significant differences in Dichotic Digit Test performance.

Extending this research to children aged 8-12 years, Agessi et al (2017) noted that no differences in GIN Test scores were found between those with or without migraine, but that children with migraine scored significantly lower on the Duration Pattern Test, Synthetic Sentence Identification Test, and the Nonverbal Dichotic Test. These results suggest that age may interact with GIN Test results in the migraine population. Contrastingly, one study of adult migraine participants reported no central auditory deficits. Yeral et al. (2024) found that patients with migraine performed similarly to controls on the Duration Pattern Test and Frequency Pattern Test, regardless of presence of aura. The authors note that male migraineurs performed significantly better than female migraineurs, and that younger migraineurs outperformed older ones, but these demographic factors alone do not appear to explain this study's differing outcomes.

In sum, future research is required to further define the relationship between central auditory dysfunction and migraine disease course. Nevertheless, all reviewed studies have reported similar central auditory performance across migraine sub-groups, such as in vestibular migraine (Tawfik et al., 2021) and with/without aura (Alhawy et al., 2025, Agessi et al., 2014, Yeral et al., 2024). In accordance with the overall findings, it is important to consider that migraine patients of any age may experience central auditory dysfunction at higher rates (Alhawy et al., 2025, Agessi et al., 2017), which may be affected by disease duration and migraine severity (Alhawy et al., 2025).



NeruoAudiology/CAPD Corner

TOPIC: DIAGNOSING CENTRAL AUDITORY PROCESSING DISORDER
AUTHOR: BILL KEITH, PHD

Given the lack of universal agreement on the definition and assessment of central auditory processing disorder (CAPD), publishing a statement of principles and criteria for diagnosing CAPD may seem presumptuous or even foolhardy. But every day clinical audiologists have to diagnose or rule out CAPD in patients presenting with hearing difficulties. Their decisions have to be based on some sort of criteria. In their classic paper showing the inconsistency of published CAPD diagnostic criteria, Wilson and Arnott (2013) called for clinicians and researchers to always specify their diagnostic criteria. This wise advice is relevant for both clinical case reports and research publications. A statement of diagnostic criteria should of course be preceded by the definition of CAPD adopted.

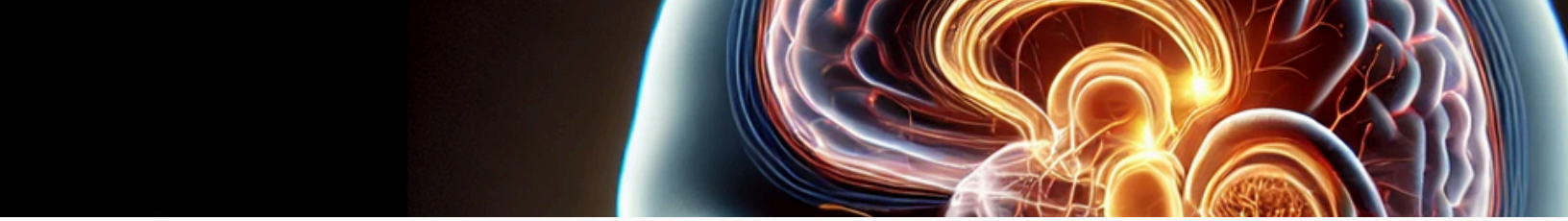
This statement of principles and criteria for diagnosing CAPD, developed by a group of clinical audiologists for their own use, is one clinic's guideline on how to diagnose CAPD. Experienced CAPD audiologists will have their own criteria but perhaps this guideline may be helpful to students or audiologists with limited experience in auditory processing assessment. Hopefully it will also encourage more clinics to specify and share their diagnostic principles and criteria.

SoundSkills Statement of Principles and Criteria for Diagnosis of Central Auditory Processing Disorder

Nelumdeniya, C., Ma, L., Willis, C., Keith, W., Leung, J., Butler, I., Poludore, W., Pullar, K. (July 2025).

1. Central auditory processing disorder (CAPD) is a generic term for hearing anomalies that result from atypical processing of auditory information in the brain.
Although the terms APD, (C)APD and CAPD are used synonymously, CAPD is more precise. In the context of auditory processing the term "central" auditory processing disorder is generally considered to refer to auditory processing deficits occurring in the auditory nervous system from the cochlear nucleus of the brainstem to the cortex. The term "peripheral" typically refers to the auditory system from the pinna to and including the auditory nerve.

2. Audiologists are the only professionals qualified to diagnose CAPD.
Audiologists responsible for diagnosing and treating CAPD should have training and experience in CAPD or be supervised by an audiologist with relevant expertise.



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3. An audiologist's diagnosis of CAPD is a clinical opinion based on presenting symptoms, case history, parent and teacher questionnaires, other available assessments and supporting information, hearing assessment, clinical observation, and specific tests of central auditory processing.

Whereas some developmental disorders are diagnosed largely on the basis of symptoms, tests of auditory processing add more rigour to diagnosis of CAPD. Scores on tests of auditory processing provide guidance but are not absolute determinants of diagnosis. The following norm-referenced criteria provide useful guidance. (Note that norms may be expressed in various formats such as standard deviations, standard scores, percentiles.)

- Performance below published norm-referenced cutoff levels for at least one ear on at least two different behavioural central auditory tests, or
- Performance reliably below published norm-referenced cutoff levels on only one test accompanied by significant functional difficulty in auditory behaviours reliant on the process assessed, or
- Performance markedly and reliably below published norm-referenced cut-off levels on only one test.

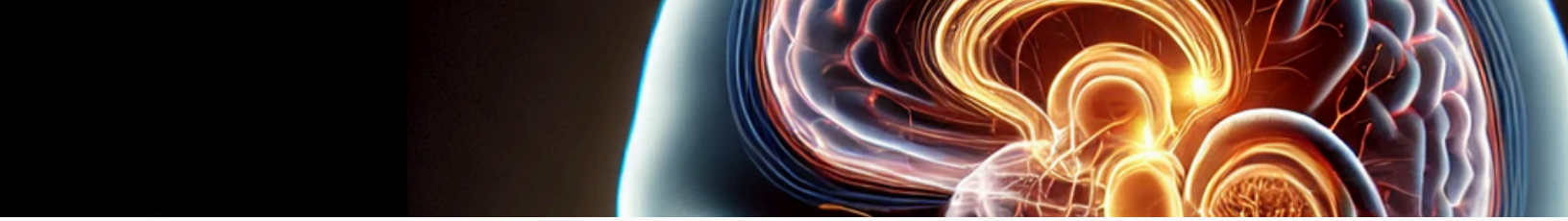
Patient behaviour should be observed during testing. Factors that could adversely affect results such as inattention, tiredness, difficulty with comprehension, or poor reliability, should be taken into account. Severity of failed results (some tests identify borderline cases or suggest degree of severity) should be taken into account. If multiple tests are failed the possibility of an over-riding comorbidity (e.g., global developmental delay) should be considered.

4. The diagnostic label of central auditory processing disorder (CAPD) should be applied judiciously.

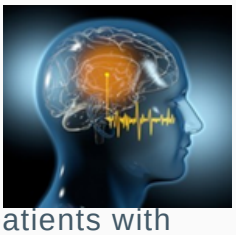
A disorder label implies a lifelong disability. Other terms such as "weaknesses", "difficulties" or "deficits" in auditory processing may be more appropriate in some cases particularly when treatment may be expected to mitigate the disability. Identifying weaknesses can be accompanied by identification of any auditory skill strengths. Terms specific to a particular deficit such as spatial perception disorder, amblyaudia, dichotic dysaudia will also be appropriate in some circumstances. A statement that results meet criteria for a diagnosis of CAPD may be necessary for authorities that do not recognise alternative terminologies.

5. Other possible hearing disorders must be identified or excluded.

Diagnostic audiological assessment is essential to identify or rule out peripheral hearing loss and any other possible auditory abnormalities including auditory neuropathy spectrum disorder and retrocochlear pathology.



NeruoAudiology/CAPD Corner



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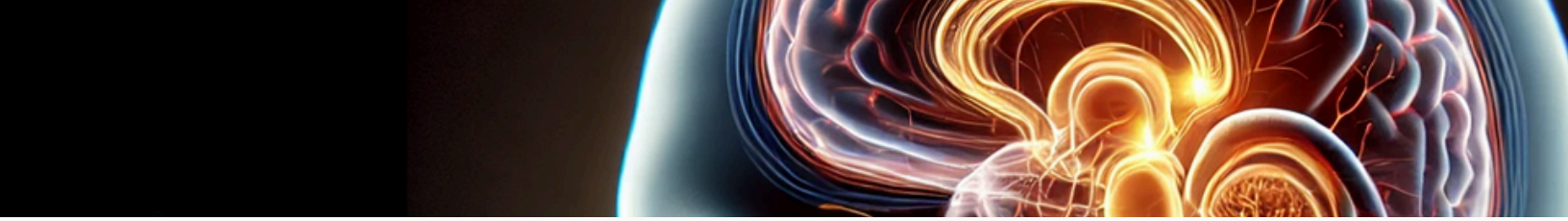
6. Be alert for signs of central nervous system (CNS) disorders.
Clinics that receive referrals for central auditory processing assessments will encounter patients with CNS pathologies giving rise to auditory symptoms. Audiologists must be alert for any signs warranting medical referral.

7. Strive for early identification and intervention.
There are tests and screening tools that are useful, if not always definitive, in assessing aspects of auditory processing in children aged five and six, and even younger (Keith et al, 2019). While a definitive diagnosis is at times possible in children under six, diagnosis can be limited to a “provisional” diagnosis, or a diagnosis of “at risk for CAPD” in cases where CAPD is suspected but there is insufficient information for an immediate definitive diagnosis. Often children presenting at preschool age with confirmed hearing difficulties but no other obvious hearing disorder ultimately turn out to have severe CAPD. Interventions do not have to wait for a confirmed diagnosis at a later age. Early intervention is to be encouraged.

8. Cognitive and language confounds need not prevent assessment and intervention.
Cognitive or language abilities below the normal range may adversely affect behavioural test results. Methods of deriving diagnostic information in such cases are set out in the New Zealand Guidelines on Auditory Processing Disorder (Diagnosis in the presence of comorbidities; Keith et al, 2019). Information on a patient’s cognitive and language abilities can be obtained from expert assessments, non-verbal IQ and language screening tools administered by the audiologist, and information on academic progress and achievement provided by a child’s school. Diagnostic challenges should not prevent intervention for children with complex needs.

9. Comorbidities should not prevent assessment and intervention.
It is commonplace for central auditory processing deficits to be accompanied by one or more comorbidities. In some cases CAPD may be an underlying cause of the comorbidity (e.g., language disorder, dyslexia). In some cases the conditions are considered co-occurring (e.g., ADHD). In some cases, the auditory processing deficits are consequences of an over-riding disorder (e.g., autism spectrum disorder, global developmental delay). Comorbidities should not preclude auditory processing assessment. On the contrary, people with multiple challenges usually need all assistance possible. Assessment methods may need to be customized to the individual.
Characterising auditory deficits as a unique and separate disorder (CAPD) is not recommended when they are secondary to an over-riding condition. Autism spectrum disorder (ASD) for example is described as a singular disorder, not a constellation of discrete disorders. In such cases a diagnosis can be expressed as central auditory processing deficits secondary to a comorbidity. This does not lessen the importance of diagnosing and treating the auditory deficits.
When audiological assessment raises suspicion of any other unidentified developmental disorders or medical conditions it is the responsibility of the audiologist to provide guidance towards referral for appropriate expert assessment.



NeruoAudiology/CAPD Corner

10. In cases of developmental CAPD it is usually inadvisable to attempt to specify sites of lesion within the central auditory nervous system (CANS).
In CAPD there will often be multiple parts of the central auditory nervous system (CANS) involved. Particular auditory abilities may be more dependent on neural circuits than discrete centres in the brain. Dysfunction at any one level of the CANS will likely lead to dysfunction through subsequent ascending levels also. Behavioural tests in particular have limited validity in attributing sites of lesion in developmental CAPD, and neuroanatomical correlation is outside the scope of practice of most audiologists. Clinical diagnosis should focus on auditory skill deficits.

11. Although electrophysiological testing methods have not yet demonstrated adequate predictive efficiency for diagnosis of CAPD they play an important role in detecting or ruling out some other conditions and are valuable tools for auditory processing research.
Differences, for example delayed latencies, can be observed on evoked response tests in groups of individuals with CAPD as compared to groups without CAPD and meaningful research conclusions can be derived. However the degree of overlap in the ranges of results between the two groups precludes diagnosis of individuals. Specifically, adequately robust sensitivity and specificity has not yet been demonstrated with electrophysiological tests for diagnosis of CAPD.

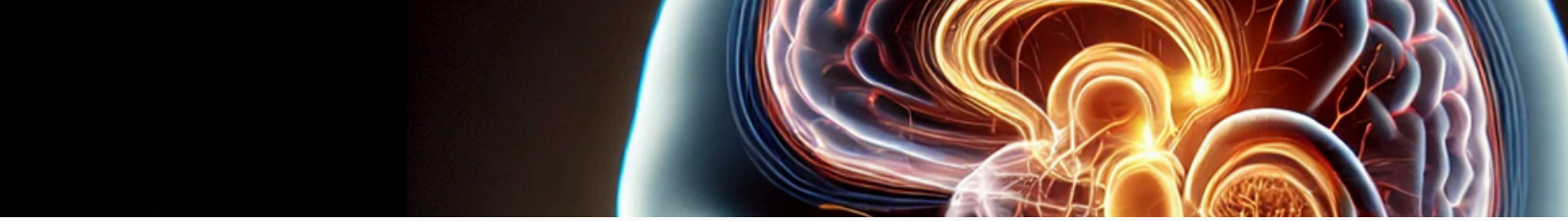
NeruoAudiology/CAPD Corner References

Keith, W. J., Purdy, S. C., Baily, M. R., & Kay, F. M. (2019). New Zealand Guidelines on Auditory Processing Disorder. New Zealand Audiological Society. https://www.audiology.org.nz/

Wilson, W. J., & Arnott, W. (2013). Using different criteria to diagnose (central) auditory processing disorder: how big a difference does it make? Journal of Speech, Language, and Hearing Research, 56(1), 63-70.

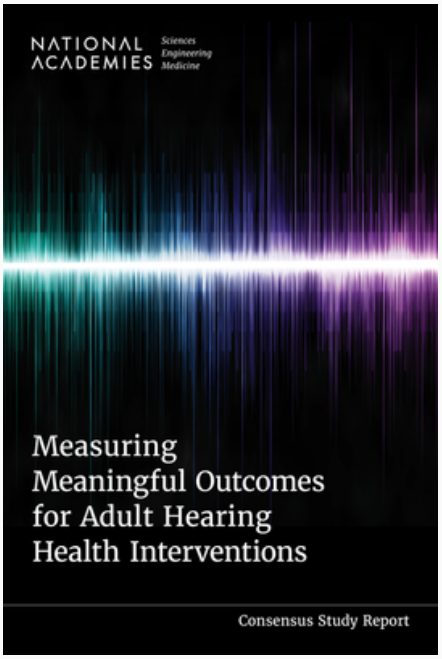
Auditory Impacts of Neuropathology

On September 17-19, 2025, the National Center for Rehabilitative Auditory Research (NCRAR) will be hosting the 12th Biennial Conference virtually. This conference combines clinical research with clinicians to better translate the science into practice. This year's conference will focus on the Auditory Impacts of Neuropathology: From Toxicity and Trauma to Interprofessional Practice. Presenters include **Drs. Frank Musiek, Alyssa Davidson, Christina Roup**, among many other auditory scientists!
Register here: https://ncrarconference2025.eventscribe.net/



Measuring Meaningful Outcomes for Adult Hearing Health Interventions

The National Academies of Sciences, Engineering, and Medicine brought together a panel of specialists to establish a standardized set of outcomes and measures for evaluating how well hearing aids and other treatments address hearing challenges. These committee members included: Theodore Ganiats, Kendall Campbell, Tamala David, Larry Humes, Alan Jette, Colleen Prell, Uchechukwu Megwalu, Catherine Palmer, Carla Perissinotto, Thomas Powers, Nicholas Reed, Sherri Smith, Fan-Gang Zeng, Cameron Gettel, Paule Joseph, among study staff, consultants, and reviewers. Their report,
Measuring Meaningful Outcomes for Adult Hearing Health Interventions, outlines these recommended outcomes and measures and offers guidance on how to encourage their adoption across the hearing health field.



Find the report here:

https://nap.nationalacademies.org/catalog/29104/measuring-meaningful-outcomes-for-adult-hearing-health-interventions

Trivia Answers

1. (A) 25% of adults 65+ experience falls each year.
2. (False) Multi-focal eye glasses do not improve balance and mobility.
3. (B) The third vestibular brainstem nuclei is VI.

Learning Corner

The learning corner will offer citations of articles that may contribute to one's knowledge base for CAPD/NeuroAudiology.

- Duquette-Laplante, F., Belleau-Matte, A., Jemel, B., Jutras, B., & Koravand, A. (2025). The impact of noise on auditory processing in children and adults: A time–frequency analysis perspective. Brain Research, 1856, 149589.
- Bernard, M. W., Koohi, N., & Bamiou, D. E. (2025). Auditory processing disorder: an online survey of hearing healthcare professionals' knowledge and practices. International Journal of Audiology, 64(2), 121-130.
- Sherlock, L. P., Ellis, G. M., & Brungart, D. S. (2025). Functional Consequences of Tinnitus in Military Service Members. American Journal of Audiology, 1-14.