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Grand Rounds - Unique Patient Presentations, in partnership with The Ohio State University

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Jaelyn Jaquay, BS
Liam Smyth, BA
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THE OHIO STATE UNIVERSITY

Disclosures

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- Providers should always evaluate the limitations of diagnostic and screening tools, considering their potential for false results as well as any ethical implications.
- It is the responsibility of course participants to critically evaluate the evidence from multiple sources to guide professional practice.

Learning Outcomes

After this course, participants will be able to:

- Identify the role of audiology in complex medical cases.
- Discuss cultural considerations in patient care.
- List unique aspects of assessment and treatment needed for complex cases.

The Balancing Act in a Unilateral Hearing Aid Fitting

Emma Canino, B.A.

THE OHIO STATE UNIVERSITY

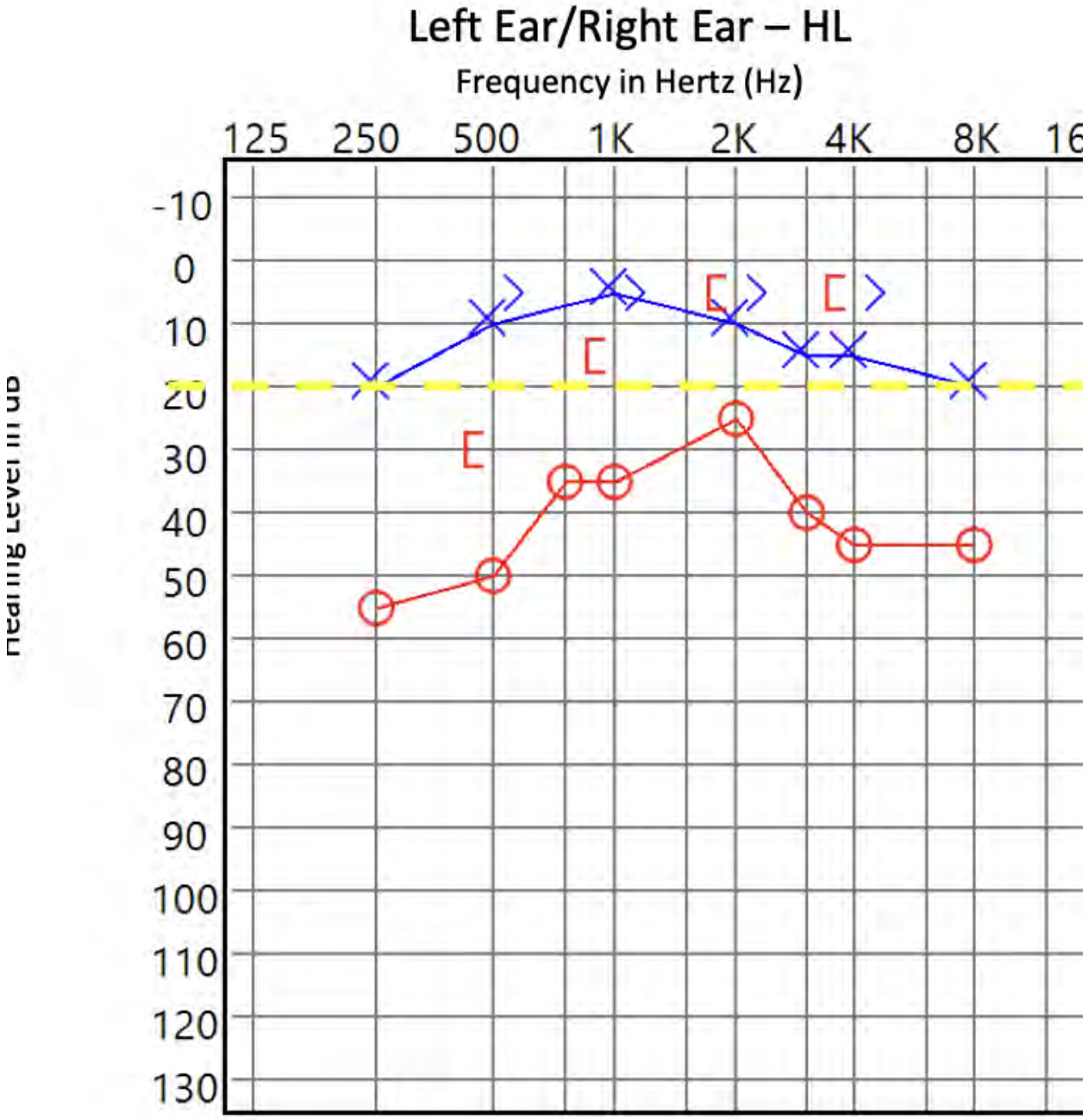
Case History

- 54-year-old man with a unilateral CHL in the RE
- Since childhood, likely due to ear infections/PE tubes
- Medically cleared for HAs with no recommendation of surgery
- Significant delay in pursuing non-surgical options
- Long-term difficulty hearing in group situations and background noise
- Puts LE towards a speaker or his phone

Hearing Evaluation

2024 Audiogram

- Selected: Advanced level RIC with an embedded receiver and custom acrylic earmold (small vent)



HAF

- Goals: hear better in noisy situations, continue to enjoy musical environments, and not needing to turn head to his LE (better ear)
- Acclimatization level 3 → level 1
  - REM deferred
  - Programmed until patient perceived balance between ears
- Patient reports: level 3 was too loud, but level 1 was comfortable/balanced between the ears
- Counseling on adaptation and our ability to continually make adjustments as needed

Follow up

- First HAC: acclimated to HA, wanted more gain at 1-week post HAF
  - REM completed
- Patient reported:
  - Balanced between the two ears
  - Happy with the sound quality after adjustments
  - Summary: Successful - no additional changes needed

A Qualitative Study of Shared Decision Making in Rehabilitative Audiology
(Laplante-Lévesque, Hickson, & Worrall, 2010)

Two themes: my story and trust

- "My Story" Takeaway: participants wanted their experiences and preferences to be heard by their clinician; not in favor of a prescriptive approach
- "Trust" Takeaway: participants want to know the clinician has their best interest at heart and aren't influenced by compensation

Consideration of Auditory Acclimatization in the Prescriptive Fitting of Hearing aids
(Mueller & Powers, 2001)

- Duration of auditory deprivation in pt
- Meet prescriptive targets, but need to make sure they will wear the HAs
- Meet patient where they are at
- Pt centered care (deferring real-ear to after patient has had time to acclimate)

Key Points

- Evidence-based practices includes merging research evidence, patient's preferences/goals, and clinician's expertise
- Shared-decision making, acclimatization, and balancing patient comfort/audibility
- Delayed access to improved hearing - don't assume benefit/lack of benefit
- Broadening education about non-surgical options

Thank you!

Emma Canino, B.A.

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THE OHIO STATE UNIVERSITY

Beyond Diagnosis: Cultural Humility and Language Barriers in a Child with Cochlear Hypoplasia

Dana Hamed, B.A

Third-Year Audiology Student at

The Ohio State University

THE OHIO STATE UNIVERSITY

Inner Ear Malformations:

- “Inner ear malformations are recognized by imaging in about 20% of children with congenital sensorineural hearing loss.”
- Cochlear hypoplasia consists of 15-23% of the inner malformations
- What is cochlear hypoplasia?
- Four types of cochlear hypoplasia
  - Type 1 and Type 2
  - Type 3 and Type 4

Treatment/Management Options for Cochlear Hypoplasia:

- Hearing Aids (depending on residual hearing)
- Cochlear Implantation
- Auditory Brainstem Implant (for select cases with severe cochlear nerve deficiency)
- Speech-Language Therapy and Auditory Rehabilitation

Communication Approaches

- Total Communication
- American Sign Language (ASL)
- Cued Speech
- Auditory-Oral / Listening and Spoken Language

Case of Potential Cochlear Hypoplasia:

Name: Patient A

Age: 4 years old

- Case History: Patient A was diagnosed with bilateral profound SNHL in June 2023 in their home country.
- Had an MRI in the United States in April of 2024, which showed possible bilateral cochlear hypoplasia and decreased cochlear turns. Patient A has present cochlear nerves, intact vestibular system.

- In the spring of 2024, Patient A, who was two years old, received cochlear implantation (out of the state) in the right ear
- Post-implantation follow-up was on 5/2/2024 (moved to Ohio shortly after)
- Patient A, per the patient's parent report, did not wear CI after implantation until Patient A began school. (Fall 2025)
- September 2025: Follow up with an implant center, Initial map with four progressive programs
- **Present:** Patient A has been through 3 mappings with four progressive programs each

What's the next step for Patient A? How is Patient A improving in school and language development?

- Scheduled to get his left cochlear implant in early May.
  - No further mapping of the right CI until activation of the left
- Willingly and consistently wears his right CI at school but is resistant to wearing it at home.
- Ling 6 sounds improved drastically throughout his various mapping programs from September to December of 2025.
- Aided testing was unsuccessful due to Patient A's lack of cooperation in completing the test.
- Current expressive vocabulary repertoire is 50-100 signs
  - Receptive vocabulary is slightly higher

9/29/25

FREQUENCY (HERTZ)

LEGEND	R	L
AIR	O	X
AIR MASKED	Δ	□
BONE	<	>
BONE MASKED	[	]
SOUNDFIELD	~	
AIDED	A/C1	
NO RESPONSE	NR	

HEARING THRESHOLD LEVEL IN dB (ANSI—1969)

C1 NR

OTOSCOPY	TYMPANOMETRY
R L	R L
□ □ NORMAL	□ □ NORMAL
□ □ CERUMEN	□ □ NEG PRESSURE
□ □ P.E. TUBE	□ □ REDUCED MOBILITY
□ □ OTHER	□ □ FLAT
	□ □ HYPERMOBILITY
	□ □ COULD NOT TEST

STIMULUS: PURE TONE (NARROWBAND NOISE) WARBLE OTHER
RESPONSE: STANDARD (PLAY) COR OBSERVATION
RELIABILITY (GOOD) FAIR POOR

HEARING AID DATA
BINAURAL ____ RIGHT ✓ LEFT ____
EARLEVEL ____ ITE ____ CI ✓
MAKE/MODEL Nucleus 8
SERIAL# ____
DISPENSING INFO. ____
Prog. 2 - First mapping

	PTA	SRT	SAT	DISCRIM	MATERIAL
RIGHT					
LEFT					
SOUND FIELD					
AID					

Aided Ling Sounds: (R) C1
/ah/ /oo/ /sh/ NR
/ee/ 70dB /m/ 65dB /s/

11/17/25

FREQUENCY (HERTZ)

LEGEND	R	L
AIR	O	X
AIR MASKED	Δ	□
BONE	<	>
BONE MASKED	[	]
SOUNDFIELD	~	
AIDED	A	
NO RESPONSE	NR	

HEARING THRESHOLD LEVEL IN dB (ANSI—1969)

See below

OTOSCOPY	TYMPANOMETRY
R L	R L
□ □ NORMAL	□ □ NORMAL
□ □ CERUMEN	□ □ NEG PRESSURE
□ □ P.E. TUBE DNT	□ □ REDUCED MOBILITY
□ □ OTHER	□ □ FLAT
	□ □ HYPERMOBILITY
	□ □ COULD NOT TEST

STIMULUS: PURE TONE NARROWBAND NOISE WARBLE (OTHER) — MLV
RESPONSE: STANDARD (PLAY) COR OBSERVATION
RELIABILITY (GOOD) FAIR POOR

HEARING AID DATA
BINAURAL ____ RIGHT ✓ LEFT ____
EARLEVEL ____ ITE ____ CI ✓
MAKE/MODEL Nucleus 8
SERIAL# ____
DISPENSING INFO. [redacted]
New map - prog. 2 (2nd mapping)

	PTA	SRT	SAT	DISCRIM	MATERIAL
RIGHT					
LEFT					
SOUND FIELD					
AID					

Aided Ling Sounds: Program 2
/ah/ 50dB /oo/ 40dB /sh/ 70dB
/ee/ 60dB /m/ 65dB /s/ 70dB

10/13/25

FREQUENCY (HERTZ)

LEGEND	R	L
AIR	O	X
AIR MASKED	Δ	□
BONE	<	>
BONE MASKED	[	]
SOUNDFIELD	~	
AIDED	A/C1	
NO RESPONSE	NR	

HEARING THRESHOLD LEVEL IN dB (ANSI—1969)

C1 C1 C1 NR

OTOSCOPY	TYMPANOMETRY
R L	R L
□ □ NORMAL	□ □ NORMAL
□ □ CERUMEN	□ □ NEG PRESSURE
□ □ P.E. TUBE DNT	□ □ REDUCED MOBILITY
□ □ OTHER	□ □ FLAT
	□ □ HYPERMOBILITY
	□ □ COULD NOT TEST

STIMULUS: PURE TONE NARROWBAND NOISE WARBLE (OTHER) — MLV
RESPONSE: STANDARD (PLAY) COR OBSERVATION
RELIABILITY (GOOD) FAIR POOR

HEARING AID DATA
BINAURAL ____ RIGHT ✓ LEFT ____
EARLEVEL ____ ITE ____ CI ✓
MAKE/MODEL Nucleus 8
SERIAL# ____
DISPENSING INFO. ____
Program 4 First Mapping

	PTA	SRT	SAT	DISCRIM	MATERIAL
RIGHT					
LEFT					
SOUND FIELD					
AID					

Aided Ling Sounds: R (C1)
/ah/ /oo/ NR /sh/
/ee/ /m/ 70 /s/

11/3/25

FREQUENCY (HERTZ)

LEGEND	R	L
AIR	O	X
AIR MASKED	Δ	□
BONE	<	>
BONE MASKED	[	]
SOUNDFIELD	~	
AIDED	A	
NO RESPONSE	NR	

HEARING THRESHOLD LEVEL IN dB (ANSI—1969)

See below

OTOSCOPY	TYMPANOMETRY
R L	R L
□ □ NORMAL	□ □ NORMAL
□ □ CERUMEN	□ □ NEG PRESSURE
□ □ P.E. TUBE	□ □ REDUCED MOBILITY
□ □ OTHER	□ □ FLAT
	□ □ HYPERMOBILITY
	□ □ COULD NOT TEST

STIMULUS: PURE TONE NARROWBAND NOISE WARBLE (OTHER) — MLV
RESPONSE: STANDARD (PLAY) COR OBSERVATION
RELIABILITY (GOOD) FAIR POOR

HEARING AID DATA
BINAURAL ____ RIGHT ✓ LEFT ____
EARLEVEL ____ ITE ____ CI ✓
MAKE/MODEL Nuc 8-
SERIAL# [redacted]
DISPENSING INFO. New map - (2nd mapping)
Prog. 1

	PTA	SRT	SAT	DISCRIM	MATERIAL
RIGHT					
LEFT					
SOUND FIELD					
AID					

Aided Ling Sounds: (R) C1
/ah/ 70 /oo/ 75 /sh/ NR
/ee/ 70 /m/ 65 /s/ NR

11/21/25

LEGEND	R	L
AIR	O	X
AIR MASKED	Δ	□
BONE	<	>
BONE MASKED	[	]
SOUNDFIELD	~	
AIDED	A	
NO RESPONSE	NR	

FREQUENCY (HERTZ)

250 500 (750) 1000 (1500) 2000 (3000) 4000 8000

HEARING THRESHOLD LEVEL IN dB (ANSI—1969)

0 10 20 30 40 50 60 70 80 90 100 110 120

See below

STIMULUS: PURE TONE NARROWBAND NOISE WARBLE OTHER
RESPONSE: STANDARD PLAY COR OBSERVATION
RELIABILITY: GOOD FAIR POOR

MLV

OTOSCOPY	TYMPANOMETRY
R L	R L
□ □ NORMAL	□ □ NORMAL
□ □ CERUMEN	□ □ NEG PRESSURE
□ □ P.E. TUBE	□ □ REDUCED MOBILITY
□ □ OTHER	□ □ FLAT
	□ □ HYPERMOBILITY
	□ □ COULD NOT TEST

HEARING AID DATA

BINAURAL ____ RIGHT ✓ LEFT ____
EARLEVEL ____ ITE ____ CI ✓
MAKE/MODEL Nuc 8
SERIAL# ____
DISPENSING INFO [redacted]

	PTA	SRT	SAT	DISCRIM	MATERIAL
RIGHT					
LEFT					
SOUND FIELD			40		
AID					

Aided Ling Sounds: 2nd mapping Prog. 3

/ah/ 45 dB /oo/ 45 dB /sh/ 65 dB
/ee/ 45 dB /m/ 60 dB /s/ 65 dB

12/1/25

LEGEND	R	L
AIR	O	X
AIR MASKED	Δ	□
BONE	<	>
BONE MASKED	[	]
SOUNDFIELD	~	
AIDED	A	
NO RESPONSE	NR	

FREQUENCY (HERTZ)

250 500 (750) 1000 (1500) 2000 (3000) 4000 8000

HEARING THRESHOLD LEVEL IN dB (ANSI—1969)

0 10 20 30 40 50 60 70 80 90 100 110 120

See below

STIMULUS: PURE TONE NARROWBAND NOISE WARBLE OTHER
RESPONSE: STANDARD PLAY COR OBSERVATION
RELIABILITY: GOOD FAIR POOR

MLV

OTOSCOPY	TYMPANOMETRY
R L	R L
□ □ NORMAL	□ □ NORMAL
□ □ CERUMEN	□ □ NEG PRESSURE
□ □ P.E. TUBE	□ □ REDUCED MOBILITY
□ □ OTHER	□ □ FLAT
	□ □ HYPERMOBILITY
	□ □ COULD NOT TEST

HEARING AID DATA

BINAURAL ____ RIGHT ✓ LEFT ____
EARLEVEL ____ ITE ____ CI ✓
MAKE/MODEL Cochlear Nuc. 8
SERIAL# ____
DISPENSING INFO [redacted]

3rd mapping P1

	PTA	SRT	SAT	DISCRIM	MATERIAL
RIGHT					
LEFT					
SOUND FIELD					
AID					

Aided Ling Sounds: Ⓡ CI

/ah/ 40dB /oo/ 50dB /sl
/ee/ /m/ /s/

12/8/25

LEGEND	R	L
AIR	O	X
AIR MASKED	Δ	□
BONE	<	>
BONE MASKED	[	]
SOUNDFIELD	~	
AIDED	A	
NO RESPONSE	NR	

FREQUENCY (HERTZ)

250 500 (750) 1000 (1500) 2000 (3000) 4000 8000

HEARING THRESHOLD LEVEL IN dB (ANSI—1969)

0 10 20 30 40 50 60 70 80 90 100 110 120

See below for aided Ling Sounds

STIMULUS: PURE TONE NARROWBAND NOISE WARBLE OTHER
RESPONSE: STANDARD PLAY COR OBSERVATION
RELIABILITY: GOOD FAIR POOR

MLV

OTOSCOPY	TYMPANOMETRY
R L	R L
□ □ NORMAL	□ □ NORMAL
□ □ CERUMEN	□ □ NEG PRESSURE
□ □ P.E. TUBE	□ □ REDUCED MOBILITY
□ □ OTHER	□ □ FLAT
	□ □ HYPERMOBILITY
	□ □ COULD NOT TEST

HEARING AID DATA

BINAURAL ____ RIGHT ✓ LEFT ____
EARLEVEL ____ ITE ____ CI ✓
MAKE/MODEL Nuc 8
SERIAL# ____
DISPENSING INFO [redacted]

12/30/25

	PTA	SRT	SAT	DISCRIM	MATERIAL
RIGHT					
LEFT					
SOUND FIELD					
AID					

Aided Ling Sounds: Ⓡ CI

/ah/ 40dB /oo/ 45dB /sh/ 45dB
/ee/ 45dB /m/ 40dB /s/ 50dB

12/18/25

LEGEND	R	L
AIR	O	X
AIR MASKED	Δ	□
BONE	<	>
BONE MASKED	[	]
SOUNDFIELD	~	
AIDED	A	
NO RESPONSE	NR	

FREQUENCY (HERTZ)

250 500 (750) 1000 (1500) 2000 (3000) 4000 8000

HEARING THRESHOLD LEVEL IN dB (ANSI—1969)

0 10 20 30 40 50 60 70 80 90 100 110 120

STIMULUS: PURE TONE NARROWBAND NOISE WARBLE OTHER
RESPONSE: STANDARD PLAY COR OBSERVATION
RELIABILITY: GOOD FAIR POOR

MLV

OTOSCOPY	TYMPANOMETRY
R L	R L
□ □ NORMAL	□ □ NORMAL
□ □ CERUMEN	□ □ NEG PRESSURE
□ □ P.E. TUBE	□ □ REDUCED MOBILITY
□ □ OTHER	□ □ FLAT
	□ □ HYPERMOBILITY
	□ □ COULD NOT TEST

HEARING AID DATA

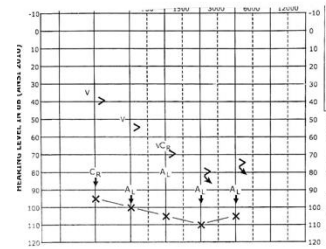
BINAURAL ____ RIGHT ✓ LEFT ✓
EARLEVEL ____ ITE ____ CI ____
MAKE/MODEL NUC 8
SERIAL# ____
DISPENSING INFO [redacted]

3rd mapping - prog. 3

	PTA	SRT	SAT	DISCRIM	MATERIAL
RIGHT					
LEFT					
SOUND FIELD					
AID					

Aided Ling Sounds: Ⓑ CI

/ah/ 30dB /oo/ 40dB /sh/ 45dB
/ee/ 30dB /m/ 40dB /s/ 60dB

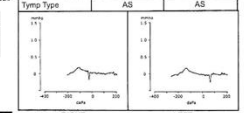


AUDIOMETER: GSI AudioStar Pro
TRANSDUCER: Inserts Soundfield
RELIABILITY: Good
TEST TYPE: CPA

NOTE: AN '✓' ATTACHED TO THE ABOVE SYMBOLS INDICATES 'NO RESPONSE'

IMMITTANCE MEASUREMENTS

Probe tone: 226 Hz	RIGHT	LEFT
Otoscopy		
Volume	0.47	0.58
Static Admittance	0.21	0.19
Width	92	61
Peak pressure	-109	-138
Tymp Type	AS	AS



RIGHT LEFT

PURE TONE FREQUENCIES (Hz) * masked value

	9K	10K	11.2K	12.5K	14K	16K	18K	20K
RIGHT								
LEFT								

PURE TONE AVERAGES (PTA)

RIGHT	LEFT Air 105	SOUNDFIELD

SPEECH AUDIOMETRY RESULTS * masked value

STIM	SAT	SRT	MCL	UCL	WRS%	#ITEMS	HL	MATERIAL	MLV REC
R									
L									
SF									
IONE R									
IONE L									

SRT/SAT MATERIAL: RELIABILITY:

ACOUSTIC REFLEX TESTING

Tone In	Probe In	500 Hz	1000 Hz	2000 Hz	4000 Hz
R	R	DNT	DNT	DNT	DNT
L	R	DNT	DNT	DNT	DNT
L	L	DNT	DNT	DNT	DNT
R	L	DNT	DNT	DNT	DNT

Abs- Absent CNT- Could Not Test UdB- Undefined level
Acoustic reflexes not tested above 100 dB HL

OTOACOUSTICS EMISSIONS

RIGHT	LEFT

Yes- Present Abn- Present, but Abnormal No- Absent

Notes
COMMENT: Aided CI right not visible on audiogram. No response at 90dB HL at 500, 2,000 & 4,000 Hz.

[redacted] was seen for a Cochlear Implant Consult for his left ear and a Cochlear Implant Check for his right ear. Please see additional note for full details and recommendations.

Digitally signed by [redacted]
2026-01-05 9:26 AM

Counseling the Patient's Family:

- The patient's parent is currently finding difficulty accepting that their child will require ASL and needs to go through a total communication model.
- The parent does not speak English and uses an interpreter to communicate
- How does one build rapport when there is a language barrier?
- Multiple situations in which misunderstanding has occurred, reiterated that due to Patient A's parent, due to Patient A's cochlear anomaly, Patient A being oral language only is not possible, per the surgeon and audiological team reports.
- What is missing? How does one address emotions, feelings, misunderstandings, and cultural beliefs/stigma?

How do we, as a profession, expand and provide the best patient-care we can?

- Providing culturally sensitive communication
- Identifying cross-cultural barriers and acquiring cultural competency to mitigate various patient cases.
- Using certified professional interpreters (not family members)
  - Clear Language
  - Concise Language
  - Avoid heavy audiology jargon
- Teach-Back Counseling
- Patient-Centered Care
  - Self-awareness
  - Ethnocentrism

Why is this important to audiologists and healthcare providers?

Thank You!

Dana Hamed, B.A.

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THE OHIO STATE UNIVERSITY

Muenke Syndrome and the Audiologic Paradox: When OAEs Don’t Tell the Full Story

Jaelyn Jaquay, B.S.

OSU Audiology Doctoral Student

THE OHIO STATE UNIVERSITY

What is Muenke syndrome?

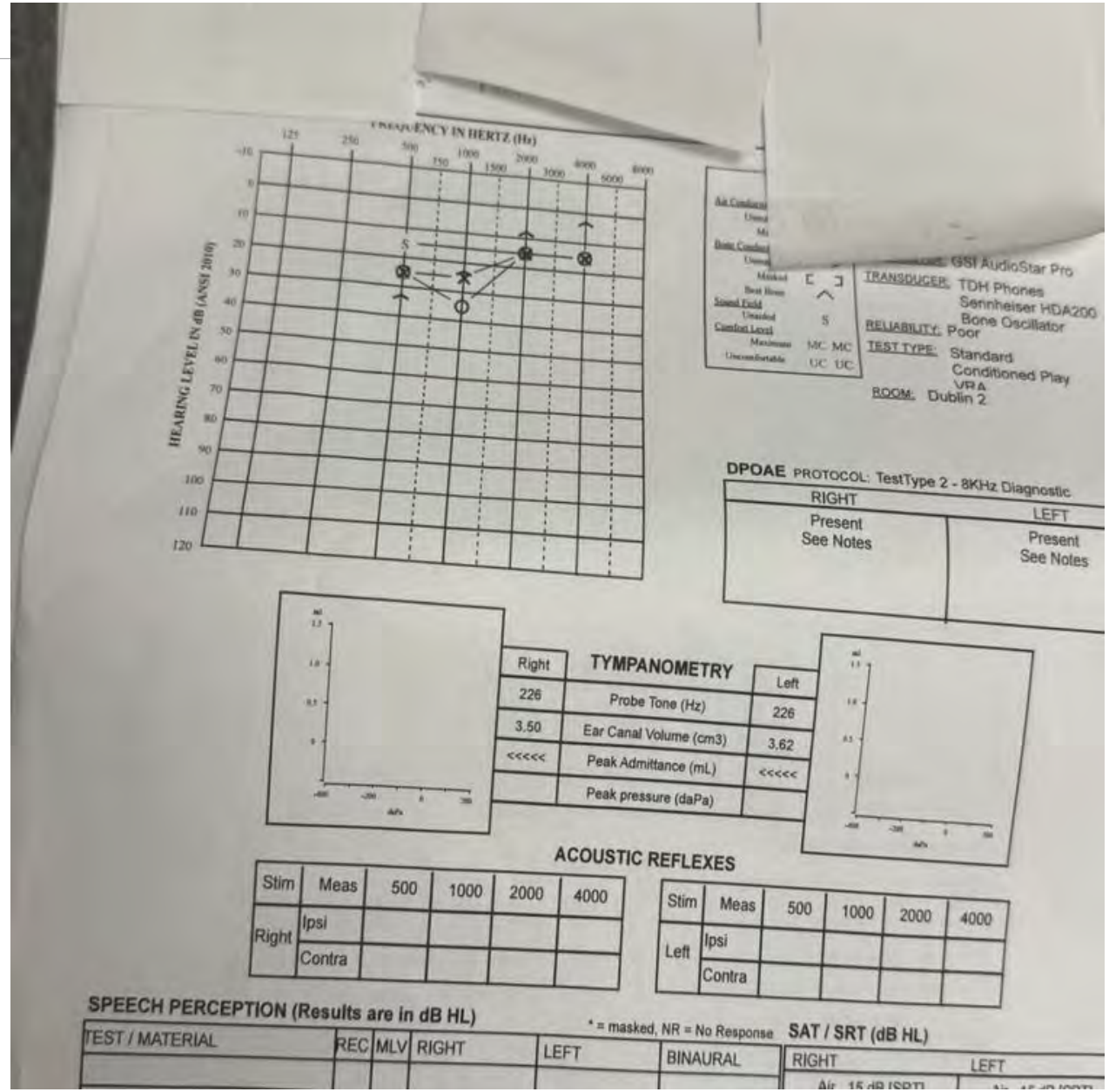
- Muenke syndrome is an autosomal dominant condition most commonly associated with coronal synostosis, craniosynostosis, and macrocephaly, with an estimated prevalence of 1 in 30,000 live births. In addition to craniofacial differences, individuals with Muenke syndrome frequently present with hearing loss, typically a mild sensorineural hearing loss in the mid to low frequencies, as well as other developmental delays and other intellectual disabilities.
- Muenke syndrome—caused by a single defining c.749 C>G mutation in the FGFR3 gene, resulting in a proline to arginine amino acid substitution at codon 250 is the most common syndromic cause of craniosynostosis

Why is this important audiologically?

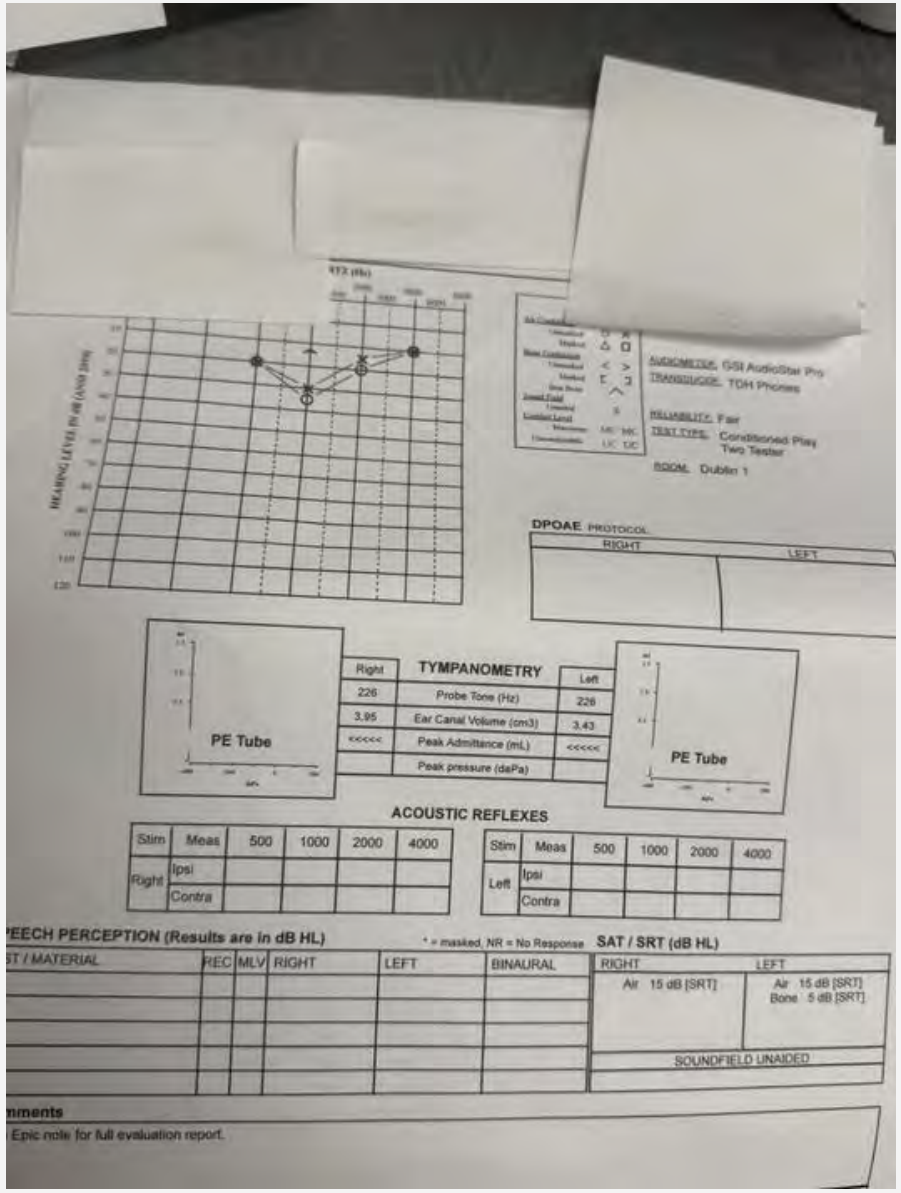
- Muenke syndrome frequently is associated with a mild sensorineural hearing loss in the low to mid frequencies.
- This presentation can be misleading since these children often appear behaviorally untestable since they have normal otoacoustic emissions across most frequencies (except 2000 Hz) but behavioral auditory reveals a mild low-
- to mid-frequency hearing loss, and due to behavioral and intellectual concerns, this can seem like unreliable testing.
- However, sedated ABRs often reveal a mild low to mid-frequency hearing loss showing that since OAEs don’t test that low they are not reliable.

Patient A

- Patient A's initial test age: 5
- OAES; Left absent 2-3K Hz, present 4-8k Hz and right absent 2k Hz and present 3-8k Hz
- Mild sensorineural hearing loss
- 500 through 1,000 Hz bilaterally
- Note poor reliability
- Test type: VRA, CPA, and conventional



Clinical Case 1



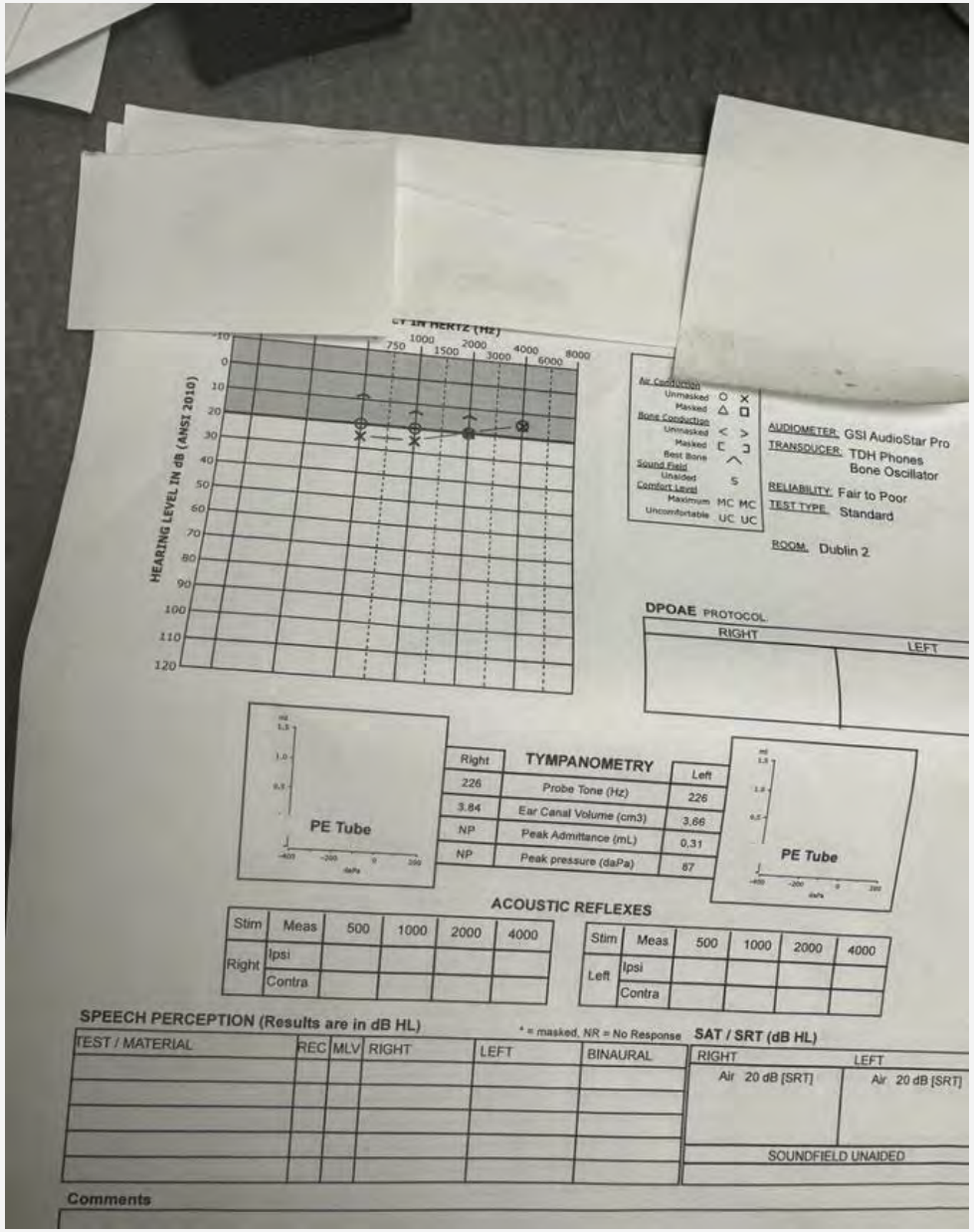
Patient A

- Age: 6 years old (August) Very similar to initial test Reliability: Fair
- Test Type: CPA two-tester PE tubes OAEs not tested

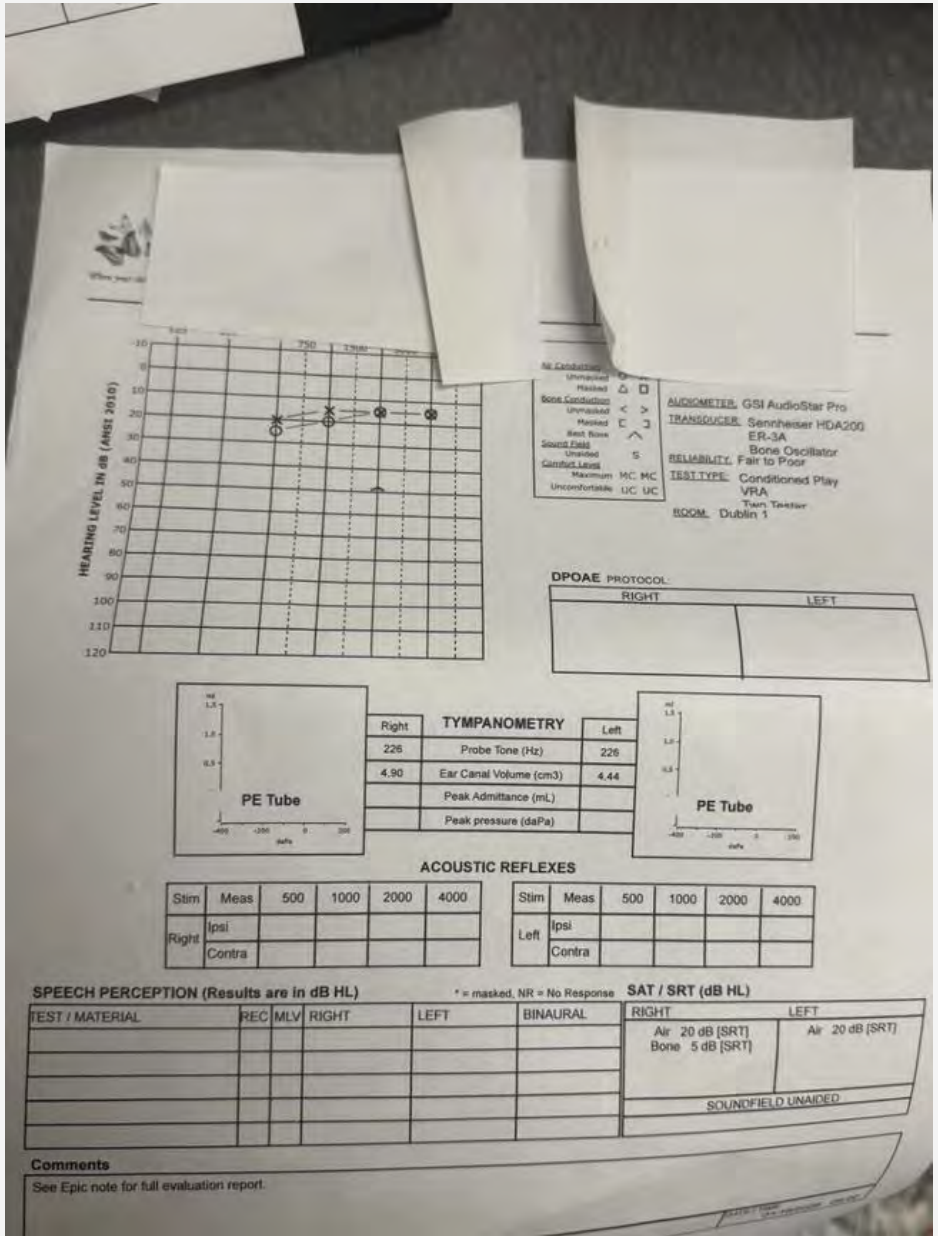
Clinical Case 1

Patient A

- Age: 6 years old (October)
  Mild to essentially normal
  Reliability: Fair to poor Test type: standard
- PE tubes OAEs not tested



Clinical Case 1



Patient A

- Age: 6 years old (January) Mild to essentially normal- almost exactly the same as October
- Reliability: Fair to poor
- Test type: VRA, CPA and two tester
- PE tubes OAEs not tested

Patient A: ABR

Age: 6 years old (March)

Reason for test: Inconclusive behavioral testing

- Results: Mild Sensorineural hearing loss 500-2000 Hz rising to normal hearing 3000-4000 Hz right ear and mild sensorineural hearing loss 500-4000 Hz left ear. Absolute and inter wave latencies were within normal limits bilaterally.

Patient A: Conclusion

- Results of ABR are consistent with behavioral testing previously, but due to reliance on OAEs, she seemed untestable, and in the diagnosis of ABR, many tests were performed, including sedated ABR, all of which were the same confirming normal sensorineural hearing loss bilaterally

Patient B

- Relevant history: congenital CMV
- Audiologic History: Passed Newborn hearing screening, January 2023 normal ABR, February 2024 bilaterally present OAEs, and CPAL clinic 2025 – could not be tested.

Patient B

- Audiologic Evaluation and Recheck January 2026
- Normal Tymps
- OAEs: Present 3k-8k Hz and “could not tolerate at 2k Hz” in the right ear and present 3k-8k Hz and absent 2k Hz in the left ear
- Audiologic testing: Ruled inconclusive due to patient cooperation
- Attempted VRA
- Scheduled sedated ABR

Patient B: ABR

- Recent diagnosis of Muenke syndrome before
- OAEs: Right ear-Present 3k-8k Hz, absent 2k Hz; and Left ear-Present 3k-8k Hz and absent 2k Hz
- Results: Right ear-normal hearing 500 Hz, mild hearing loss 1k Hz-4k Hz with sensorineural at 2K Hz and conductive at all other frequencies; and left ear-normal hearing 500-1k and 4k Hz normal hearing, mild conductive hearing loss at 2000 Hz

Patient B: ABR – Conclusion

- Also see the pattern of 2k Hz sensorineural hearing loss here
- Conductive hearing loss common with Muenke Syndrome due to cleft palate
- A different presentation but also show the absent 2K OAEs and then sensorineural hearing loss at 2K Hz during a sedated ABR
- Monitoring should be done to check on lower frequencies since it can develop as the child ages

Thank You!

Jaelyn Jaquay, B.S.

THE OHIO STATE UNIVERSITY

Dual-Sensory Impairment & Audiology

Liam Smyth, B.A.

THE OHIO STATE UNIVERSITY

Agenda

- Overview of Dual-Sensory Impairment (DSI) and its effects on daily life
- Audiologists' role in working with patients with DSI
- DSI and hearing aids
- Case Report

Dual Sensory Impairment (DSI)

- The impairment of both hearing and vision.
- Present in between 9-21% of the population.[1]
- It has been estimated to affect one in nine adults over the age of 80.[2]
- Little agreement on degrees of severity.

Affects on Daily Life

- Associated with an increase in chronic depression and chronic anxiety.[3]
- It's estimated that about 2/3 of DSI patients have cognitive decline, a number that increases with age.[4,5]
- Patients with DSI have greater risk of difficulty with mobility and activities of daily living (ADLs) than those with a single impairment or no impairment.[6]
- DSI has been associated with increased specialist visits.[7]

Psychosocial Factors

- DSI is associated with poorer psychosocial outcomes8:
  - Life Satisfaction
  - Positive Affect vs. Negative Affect
  - Depressive Symptoms
  - Loneliness, Social Isolation
  - Autonomy
  - Decreased Self-Esteem

Effective Communication Strategies[9,10]

- Wait until you are in the same room to have a conversation.
- Identify yourself when entering a room
- Get the listener's attention before speaking.
- Face the person as you speak.
- Stand or sit 3–6 feet from the listener.
- Don't block your mouth when speaking.
- Speak clearly and directly, in regular tone of voice (don't shout).

Effective Communication Strategies[9,10]

- Talk in a quiet listening environment.
- Eliminate distractions, like the TV, dishes, etc.
- When possible, turn on more lights in the room—or move to a room with good lighting.
- Rephrase your message if it appears that a person is having difficulty understanding you.
- Be specific when describing something.
  - “The wooden table with the food is six feet away on your left.” vs. ”It’s is on your left.”
- Address the listener by their name.

Audiologists’ Role in DSI

Audiologists' Role in DSI

- Audiologists diagnose hearing loss.
- Audiologists can oversee Aural Rehabilitation:
  - Audiologists can fit hearing aids.
  - Audiologists can work with patients on effective communications strategies.
- Audiologists can fit a variety of other assistive devices.

Barriers to Hearing Healthcare Uptake

- Patients with DSI have been found to have a lower uptake of hearing health care.
- Patients with DSI report more dissatisfaction with care quality and more difficulty finding a health care provider.[11]
- 60% of patients forgo help due to
  - The perception their hearing loss is not severe enough.
  - The presence of competing priorities.
  - Concerns about managing hearing aids with poor vision.
- Among patients with DSI who seek hearing healthcare, an estimated 40% are unsure if their audiologist knew of their diagnosis or simply believed the audiologist didn't know.[12]

Hearing Aids

Hearing Aids

- Hearing aids provide amplification and signal processing to aid in audibility.
- Modern hearing aids are highly sophisticated, computerized devices.
- A little more than half of those with hearing loss own hearing aids.
- Of that number, about a third report low use.13

Proper Hearing Aid Maintenance

- At a minimum, most hearing aids will have the following:
- Microphone (all hearing aids have these).
  - These need to be periodically cleaned.
- Wax guard: prevents wax from blocking speakers.
  - These need to be periodically changed.
- Other parts may include domes, tubes, and batteries.

Hearing Aid Maintenance and Low-Vision

- Working with the low-vision clinic can be an excellent way to determine the best methods for maintaining hearing aids.
- Consider the patient's support system.
  - Do they have people who can help you with these things?

Rechargeable VS Batteries

- Rechargeable hearing aids may be easier to use.
- Fewer parts to manipulate eases simplicity of maintenance.
- It is generally recommended that patients struggling with vision, dexterity, etc. be fit with rechargeable hearing aids.

Case Study

Case Study

Use of Assistive Devices by Audiologists for Dual-Sensory Impairment

Liam J. Smyth, B.A.[1] & Abbie K. Huinker, Au.D.[1]

Abstract

Dual-sensory impairment is the common occurrence of vision loss and hearing loss. Audiologists play an important role in treating individuals with dual-sensory impairment with conventional and unconventional methods. This poster reviews a patient with dual-sensory impairment who uses a constellation of assistive listening devices (ALDs) throughout his house to ensure he can be alerted to alarms or people at the doorbell.

Dual Sensory Impairment

Dual-sensory impairment (DSI) is the common occurrence of vision loss and hearing loss. It is present in between 9-21% of the adult population and is estimated to affected 80% of adults over the age of 80.[1,2] Due to the concurrent nature of the two impairments, patients and providers are faced with unique, multi-faceted challenges that affect daily living and quality of life.

Patients with DSI have greater risk of difficulty with mobility and activities of daily living (ADLs) than those with a single impairment or no impairment.[3] Additionally, patients with DSI often have increased risk of falls, increased isolation and loneliness, and lower life satisfaction.[4] DSI has been shown to be correlated with increased risk of cognitive decline.[5,6]

Audiology and Low-Vision

Audiologists play an important role in treating individuals with dual-sensory impairment with conventional and unconventional methods. The most conventional treatment method is fitting hearing aids. However, a major caveat in fitting hearing aids with this population is the vision impairment may cause difficulty using them and therefore reluctance to pursue hearing aids and hearing healthcare more broadly. Audiologists can take steps to ensure that the patient is able to use hearing aids, such as prioritizing rechargeable aids over battery-operated aids.

Hearing aids are an important tool, but they are only one tool in an audiologist's proverbial toolbox. With some innovative thinking, audiologists can employ a variety of assistive listening devices (ALDs) to improve the patient's quality of life.

Bellman Alarm Clock

Bellman Portable Receiver

Bellman Door Transmitter

Bellman Smoke Alarm Transmitter

Bellman Carbon Monoxide

Bellman Telephone Transmitter

Patient History

The patient presented has been followed by Audiology at the Iowa City VA Medical Center for significant hearing loss and poor word understanding. Despite being a likely CI candidate, patient declined to pursue. He contacted the clinic in February 2025 requesting information about glasses that provide real-time captioning. At a hearing test in May 2025, patient decided not to pursue glasses with real-time captioning, but reported his most significant concerns were feeling safe at home when his wife is not there. For example, he could not hear the doorbell or the smoke alarm. Discussed assistive devices he could set up in his house.

Veteran reported needing a home alert system with a receiver linked to the following transmitters:
- Doorbell
- Smoke alarm
- Carbon dioxide detector

Patient Outcomes

The following ALDs were ordered:
- Bellman Alarm Clock (with bed shaker) for his bedroom
- Bellman Portable Receiver with additional bed shaker for living room/couch
- Bellman Door Transmitter
- Bellman Smoke Alarm Transmitter
- Bellman Carbon Monoxide Transmitter
- Bellman Telephone Transmitter

Veteran reported during follow-up phone calls in July and August 2025 that he successfully assembled the ALDs and that he found significant benefit from using them. His only concern was that the Bellman bed shaker was not as powerful as he would like. He reported that he attached a previously-issued Silent Call bed shaker to the Bellman alarm clock and that it worked to his satisfaction.

Takeaways

When treating patients with hearing loss and/or dual sensory impairment, it is important for the audiologist to consider specific areas where assistance is needed to improve quality of life.

When treating patients with hearing loss and/or dual sensory impairment, it is importance to consider unconventional methods, like ALDs, that can give the patient significantly more independence and improve quality of life.

References

VA | U.S. Department of Veterans Affairs
Veterans Health Administration
Iowa City VA Health Care System

[1]Department of Audiology & Speech-Pathology
Iowa City VA Medical Center, Iowa City, Iowa
Primary Correspondence: liamsmyth679@gmail.com

Background

- Patient presented has been followed by Audiology at the Iowa City VA Medical Center for significant hearing loss and poor word understanding.
- At a hearing test in May 2025, patient reported his most significant concerns were feeling safe at home when his wife is not there.
- For example, he could not hear the doorbell or the smoke alarm. Discussed assistive devices he could set up in his house.
- Patient wears ITE hearing aids. Patient was previously considered for CI candidacy due to poor word recognition and profound hearing loss but declined to pursue.

Patient Concerns

- Patient reported needing a home alert system with a receiver linked to the following transmitters:
  - Doorbell
  - Smoke alarm
  - Carbon dioxide detector

- An initial attempt to order a set of assistive devices proved unworkable due to supply chain issues.

Devices Ordered

- Bellman Alarm Clock (with bed shaker) for bedroom
- Bellman Portable Receiver with additional bed shaker for living room/couch
- Bellman Door Transmitter
- Bellman Smoke Alarm Transmitter
- Bellman Carbon Monoxide Transmitter
- Bellman Telephone Transmitter

Patient Follow-Up

- Veteran reported during follow-up phone calls in July and August 2025 that he successfully assembled the ALDs and that he found significant benefit from using them.
- His only concern was that the Bellman bed shaker was not as powerful as he would like.
- He reported that he attached a previously-issued Silent Call bed shaker to the Bellman alarm clock and that it worked to his satisfaction.

Takeaways

- When treating patients with hearing loss and/or dual sensory impairment, it is important for the audiologist to consider specific areas where assistance is needed to improve quality of life.

- When treating patients with hearing loss and/or dual sensory impairment, it is importance to consider unconventional methods, like ALDs, that can give the patient significantly more independence and improve quality of life.

Thank You!

Liam Smyth, B.A.

THE OHIO STATE UNIVERSITY

When A Migraine Gets Loud: An Audiologic Puzzle in a Complex Neurologic Case

Madison Pollock, B.A.

THE OHIO STATE UNIVERSITY

Who Is Our Patient?

- 43 year old women
- Scheduled for a Tinnitus Evaluation
- No information known prior to appointment
- Husband attends each appointment with the patient

What Led Up To The Appointment

- Reports an extensive history of hemiplegic migraines, with a severe migraine flare-up in August 2025 that resulted in several hours of paralysis and unconsciousness leading to hospitalization
- A few weeks later, underwent an EEG

During The EEG

- The patient reported severe head pressure and pain
- EEG was discontinued due to the severity of the pressure and pain

After The EEG

- The patient reported quiet tinnitus that progressively increased in loudness to a constant, "wiry/sharp" sound that is predominantly left-sided but intermittently involves the right ear.
- The patient also described a central head sensation and a sense that her ears are "talking to each other."
- At the onset of her tinnitus she experienced imbalance and a sensation of falling with eye or head movement but denies visual spinning, which had since improved.
- She reported reduced hearing in the left ear, noting difficulty hearing certain sounds and in background noise
- Extreme sound intolerance is also endorsed
- These symptoms resulted in suicidal ideation

Other Otological Appointments

- Prior to the initial appointment, the patient saw several ENTs and Audiologist
- During each appointment, the patient reported severe pain in the left ear when a tympanogram was preformed
- Reported completing a course of oral prednisone for the sudden hearing loss

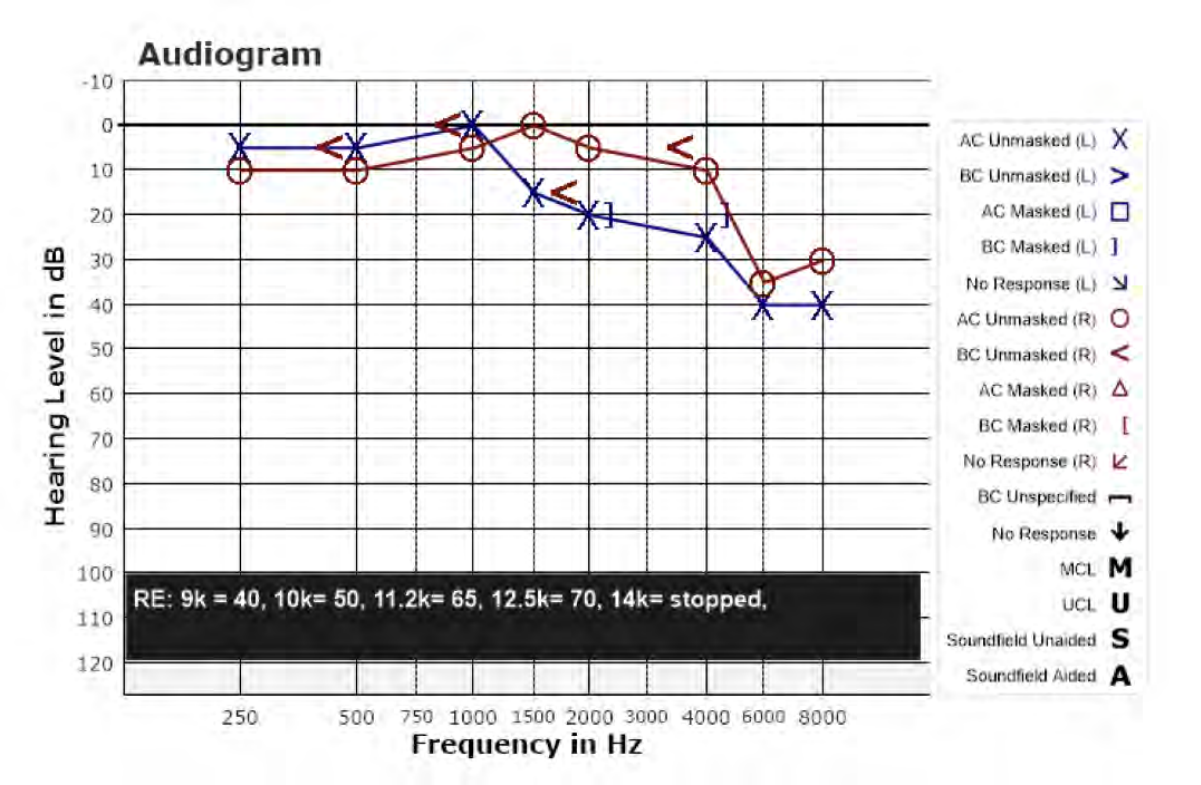
Other Treatments Attempted

- Masking devices
- Earplugs/loops
  - Wearing for several hours a day, but notices a higher sensitivity to sounds if she wears them for too long
- Craniosacral therapy
- Chiropractic treatment
- Cognitive/behavioral approaches including sessions with a tinnitus-focused therapist.

Medical History Reported

- Long-standing hemiplegic migraines, POTS, and glaucoma treated with daily eye drops.
- Taking clonazepam (Klonopin), escitalopram (Lexapro), and benzodiazepine, which helps sleep and reduces hyperacusis, as well as reducing suicidality.
- Past otologic history includes childhood ear infections and a prior left tympanic membrane rupture.
- Family history is notable for gradual left-sided hearing loss and tinnitus in her mother and other members of her maternal family.

Initial Appointment -
March 2026



WORD RECOGNITION (Presentation: Recorded / Word List: CID W-22)						
	dBHL	%	Mask	dBHL	%	Mask
Right	50	100	20			
Left	50	88	20			

SPEECH AUDIOMETRY (Word List: Spondees)					
	SAT	SRT	Mask	MCL	UCL
Right		10			
Left		5			

Audiogram

- Hearing WNL 250-4000Hz sloping to a mild SNHL at 6000-8000Hz bilaterally, with a 15dB difference in LE from the RE from 1000-4000Hz.
- PTAs at 6dB in the RE and 8dB in the LE.
- SRT of 10dB in the RE and 5dB in the LE
- WRS of 100% in the RE and 88% in the LE when presented at 50dB with 20dB of masking.

Other Testing

- Otoscopy was unremarkable bilaterally.
- Tympanometry was not completed due to past report of severe pain
- Extended high frequency audiometry was completed in the right ear revealing a response at 40dB at 9kHz, 50dB at 10kHz, 65dB at 11.2kHz, 70dB at 12.5kHz.
  - Extended high frequency testing was terminated after 12.5kHz in the RE due to ear pain reported at that frequency and not completed in the LE
- Quick-Speech-In-Noise (QSIN)
  - Revealed an SNR loss of 9.5 on the first list, and 3.5 on the second list, with an average score of 6.5, indicating a mild SNR loss.
- A Tinnitus Handicap Inventory (THI) questionnaire was completed, with a score of 87, which indicates catastrophic tinnitus disturbance.
- Further testing was discontinued due to ear and head pain. The patient was holding the front of her head in her hands during times of pain and reported feeling the pain as a sensation throughout her whole head, but not in her ears.

Initial Recommendations

- Due to significant medical history, it was discussed that prior to definitive recommendations, we would like to obtain prior ENT and neurology records, in which the patient agreed and signed a release of records form.
- A follow up appointment was scheduled for 1 week later, to review past medical records and attempt to obtain additional audiologic testing focused on sound sensitivity and tinnitus.
- Some short-term recommendations were given to implement within the next week
  - Begin OTO cognitive behavioral therapy program.
  - Limiting prolonged earplug use
  - Use CBT/mindfulness strategies for stress reduction
  - Proceeding cautiously with any sound-based interventions (i.e. masking device) to avoid provocation of pain.

Review of Records

- History is notable for maternal development of Duffy antibodies during the patient's gestation.
  - Mother's immune system create antibodies that cross the placenta and attack baby's red blood cells
  - Can result in anemia or jaundice
- The patient was reportedly born cyanotic ("blue baby") and required exchange transfusion at birth. No long-term complications from this neonatal event have been reported.
- The patient reports onset of migraines at age 13, initially associated with menstrual cycles. Over time, these have progressed to frequent hemiplegic migraines

Review of Records

- Neuroimaging history includes:
  - Brain MRI in 2016 demonstrating diffuse cerebral atrophy
  - Repeat brain MRI in 2020 showing brain parenchymal volume loss.
  - Brain MRI in 2023 again demonstrating parenchymal volume loss, with an additional finding of a left lateral ventricular xanthogranuloma.
- Parenchymal volume loss is the loss of active brain tissue
- Left lateral ventricular xanthogranuloma is a rare, benign growth that originates in the choroid plexus in the left lateral ventricle

Review of Records

- Documented medical problem list includes
  - cervicalgia, dysuria, glaucoma, globus sensation, hemiplegic migraine, mild hyperlipidemia, nabothian cyst, neck muscle spasm, nocturia, palpitations, polycystic ovary syndrome (PCOS), postural orthostatic tachycardia syndrome (POTS), pruritus, postnasal drip, postural dizziness, right upper quadrant abdominal pain, throat fullness, urinary frequency, vaginal burning, vaginal discharge, vaginal irritation, vaginal itching, vaginitis, vulvitis, and vulvodynia.

Research

- Emerging evidence suggests that tinnitus, hyperacusis, and speech-in-noise difficulties may reflect central nervous system dysfunction involving both auditory and non-auditory brain regions. Neuroimaging studies demonstrate that brain tissue loss and altered connectivity can affect networks responsible for auditory processing, attention, sensory gating, and emotional regulation, potentially explaining symptoms that appear disproportionate to the degree of peripheral hearing loss

New Case History

- Long history of migraines
  - Hemiplegic features that evolved from menstrual-related headaches in adolescence to hemiplegic migraine symptoms beginning around age 30, several months after the birth of her third child.
  - Migraine triggers include hormonal changes, heat/sunlight, and exertion.
  - Migraine episodes can involve prolonged visual auras including central colorful scintillations and transient peripheral visual field loss, and transient focal weakness/paralysis.
  - She reports multiple neurologic evaluations including EEG and serial brain MRIs dating back to adolescence that were described to her as showing brain volume loss/“brain atrophy” but stable over time.

New Case History

- Past medical history as reported includes POTS, pelvic congestion (with prior recommendation for embolization which she declined due to concerns about implanted material), probable PCOS, and prior gastrointestinal bacterial issues.
- Had an ophthalmology evaluation after a severe visual disturbance that did not identify a definitive ocular cause, however was then diagnosed with glaucoma.
- Describes the tinnitus as her most distressing symptom, contributing to significant emotional distress and interference with sleep.
- She acknowledges ongoing concern that her constellation of symptoms has not been integrated across providers.

Further Testing

- Otoscopy was unremarkable bilaterally.
- A Revised Speech-In-Noise (RSPIN) test was completed at +8 with a high predictability score of 100% and a low predictability score of 66%.
- Uncomfortable loudness levels were reported in the 20–30dB range during testing.
  - This finding may be influenced by anxiety and/or the specific stimulus used as the patient did not demonstrate sound sensitivity during conversational speech at normal volume in the clinic.
- Tinnitus was pitched matched to 6000Hz and loudness matched to 45dB, or 10dB SL.

Recommendations

- Tinnitus, sound intolerance, and speech-in-noise difficulties may have a significant neurologic/systemic contribution rather than a straightforward otologic etiology. Recommendations provided are listed below:
  - Refer to a neuroimmunology specialist for comprehensive evaluation of the brain atrophy, migraine/neurologic history, impact on audiologic symptoms, visual symptoms, and systemic factors (POTS, pelvic congestion, glaucoma) to identify potentially medically modifiable contributors
  - Implement immediate tinnitus/sound-sensitivity management strategies including stress/anxiety reduction, enrollment in the recommended CBT-based app OTO, use of background/enriching sounds (especially for sleep), and avoidance of excessively painful sounds
  - The will generate a report and send the referral, request specialist records back for coordinated care, and plan audiology follow-up after the neuroimmunology evaluation and any subsequent medical management.

Where Are We Now?

- Patient has been referred to Neuroimmunologist
- Will follow-up with audiology after medical clearance for continued tinnitus, sound intolerance, and speech in noise management

Take Aways

- The importance of an in-depth medical record review, when necessary
- Avoiding premature recommendations
- Relying on research / real-time research reviews
- Interprofessional practice
- Viewing the patient as a whole person, and not just their ears

Thank You!

Madison Pollock, B.A.

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Questions?

Thank You!

Gail Whitelaw, PhD

Emma Canino, BA

Dana Hamed, BA

Jaelyn Jaquay, BS

Liam Smyth, BA

Madison Pollock, BA

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