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THE OHIO STATE
UNIVERSITY

Grand Rounds: Medical Considerations and Health Literacy, presented in partnership with The Ohio State University

Gail Whitelaw, PhD

Christina Roup, PhD
Morgan Leatherman, BA
Christina Martin-Smith, MGS

Liam Smyth, BA
Aubrey Stoll, BS
Aryn Robinson, BS



Gail Whitelaw, PhD

Gail M. Whitelaw, Ph.D., is a clinical associate professor in the AuD program and the director of the Speech-Language-Hearing Clinic at The Ohio State University in Columbus, OH. Her areas of clinical interest are tinnitus, auditory perception in children and adults, educational audiology, and working with people with HD (hearing deficits-- those with functional auditory complaints). She has consulted to many school districts throughout the county. Dr. Whitelaw has also worked with children and their families in developing educational plans and goals for children with auditory processing disorders.



Morgan Leatherman, BA

Morgan Leatherman is a current fourth-year Doctor of Audiology student at The Ohio State University and is completing her externship at the Lexington VA Healthcare System in Lexington, Kentucky. She received a Bachelor of Arts degree in Speech and Hearing Science with minors in Disability Studies and Human Development and Family Science from The Ohio State University in 2021. She completed a Leadership Education in Neurodevelopmental and related Disabilities (LEND) traineeship from The Ohio State University Nisonger Center in 2024. She enjoys working with individuals across the lifespan and is passionate about accessible audiologic care. She has a wide range of clinical interests including amplification, audiologic rehabilitation, implantable devices, vestibular diagnostics, tinnitus, and auditory processing disorders.

Christina Martin-Smith, MGS



Christina Martin-Smith, MGS is a third-year student with a passion in vestibular evaluation, tinnitus management, and helping older adults better communicate with their loved ones. Her interests include the impact of Covid-19 on hearing and tinnitus and the interdisciplinary aspects of audiology. Outside of academics, she is the mother of an adorable 15- month-old who enjoys testing her mother's hearing through chatting up a storm!



Liam Smyth, BA

Liam Smyth, BA, is a 3rd year doctor of audiology student at the Ohio State University. He graduated from Ohio State in 2022 with a BA in Speech and Hearing Science and a minor in Public Policy. His interests include cervicogenic tinnitus, auditory scene analysis, and advocacy.



Aryn Robinson, BS

Aryn Robinson is a second-year student in Ohio State's Doctorate of Audiology Program. She is an active member of her program, department, and university. Miss Robinson entered clinic at the beginning of May of this year. She is the Education and Outreach Chair of OSU's Student Academy of Audiology and the department's delegate for the university's Council of Graduate Students. Her favorite activity with the department are the community hearing screenings.

Disclosures

- **Presenter Disclosure:** Financial: Gail Whitelaw is an employee of the Ohio State University. Non-financial: Gail Whitelaw sits on the Board of Directors, Accreditation Commission for Audiology Education (ACAE), Honors and Awards Committee, and American Academy of Audiology. Financial: Christina Roup is an employee of the Ohio State University. Non-financial: Christina Roup is an Editor for the American Journal of Audiology and Chair, Education Committee, American Academy of Audiology Financial: Morgan Leatherman has no relevant financial relationships to disclose. Non-financial: Morgan Leatherman has no relevant non-financial relationships to disclose. Financial: Christina Martin-Smith has no relevant financial relationships to disclose. Non-financial: Christina Martin-Smith has no relevant non-financial relationships to disclose. Financial: Liam Smyth has no relevant financial relationships to disclose. Non-financial: Liam Smyth has no relevant non-financial relationships to disclose. Financial: Aubrey Stoll has no relevant financial relationships to disclose. Non-financial: Aubrey Stoll has no relevant non-financial relationships to disclose. Financial: Aryn Robinson has no relevant financial relationships to disclose. Non-financial: Aryn Robinson has no relevant non-financial relationships to disclose. AudiologyOnline has made a donation to the audiology program at The Ohio State University Student Academy of Audiology for this presentation.
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Learning Outcomes

After this course, participants will be able to:

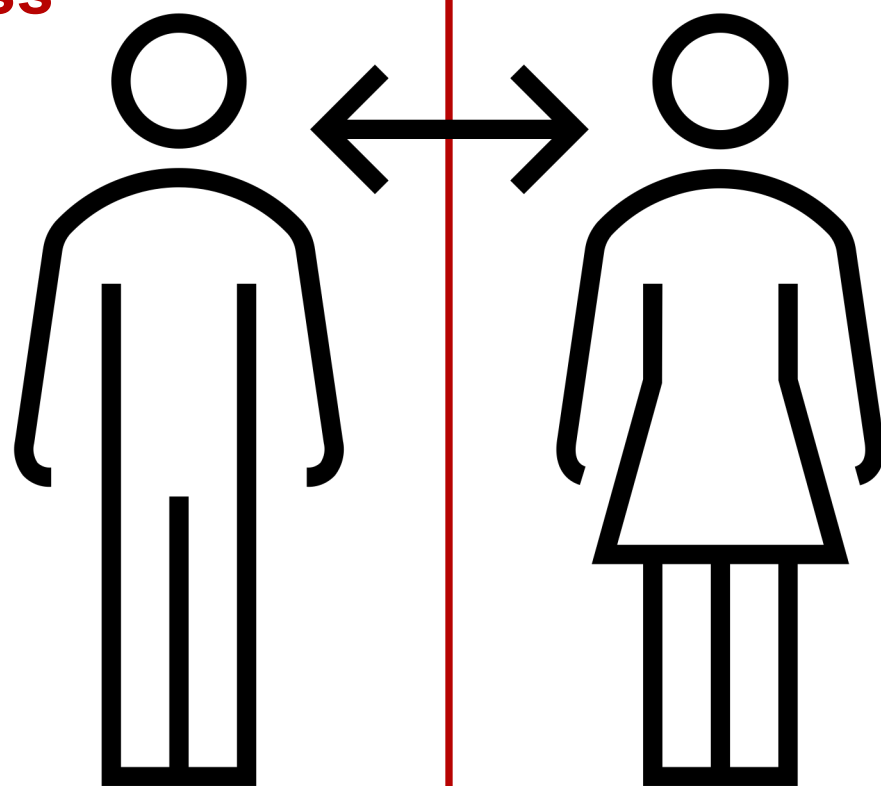
- Describe the critical role of audiology in supporting differential diagnosis based on hearing and balance care provided.
- Discuss considerations in addressing the person as a whole and their hearing/balance/communication needs.
- Describe considerations of health literacy in patient care.

The Co-occurrence of Speech Disorders and Hearing Loss within Communication Partners

Aubrey Stoll, B.S.

Background

Hearing Loss

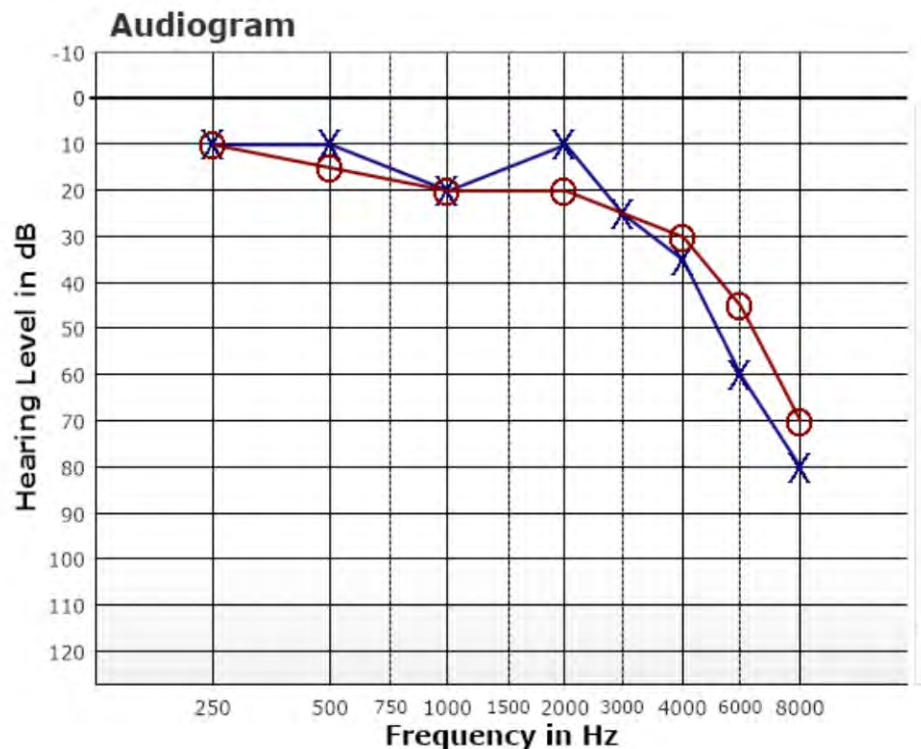


Speech Disorder

Background

- Successful communication requires the participation of both talkers and listeners.
- Communication disorders harm one's ability to communicate. They are shown to negatively impact an individual's psychosocial, emotional, and cognitive well-being and close communication partners. 2,6,7,12,15,22, 23,26
- The complexity of communication disorders is further compounded when they co-occur in conversational partners, necessitating a nuanced and specialized approach to communication management. 3, 10, 24, 28, 29
- Evidence suggests this unfavorable dyad occurs at a high rate, especially in older adults. 6, 10, 15, 26, 27

Case: Mr. R Case History



- 67-year-old male
- Reports progressive hearing difficulties
- Struggles to hear his wife and to hear in noisy situations
- Reported that his hearing difficulties have caused a strain on their communication and relationship
- Difficulties have been causing him to withdraw socially

Is there more to the story... ?

Case: Mr. R Case History

Pt wife (Mrs. R) accompanies him to the appointment, and she helps to provide case history.

They share Mrs. R has been managing a number of health conditions, including a diagnosis of **Multiple Sclerosis and Trigeminal Neuropathy.**

Speech changes (dysarthria) are among her primary symptoms.

Dysarthria

- A group of motor speech disorders of neurologic origins that cause a disturbance in neuromuscular control affecting **respiration, phonation, resonance, articulation, and prosody**

Associated neurologic diseases	Estimated prevalence of Dysarthria (%)	Average Age Onset
Stroke	~ 25% and 70% in the acute phase, with 42% of patients showing persistent symptoms at 3 months post-stroke ²	Risk of stroke increases with age
Traumatic brain injury (TBI)	~ 1/3 rd of all individuals who sustain a severe TBI will present with dysarthria ²²	Individuals 75 years and older had the highest numbers and rates of TBI-related hospitalizations and deaths
Parkinson's disease	~ 50- 90% of people with Parkinson disease ²⁶	Prevalence increases with increasing age
Multiple sclerosis	~ 50% of patients with multiple sclerosis experience dysarthria ¹⁴	Avg. age of onset between ages of 20 and 40
Neuromuscular Disease	~ 26%–62% of individuals with neuromuscular disease experience dysarthria through the course of their disease ¹¹	Symptoms most commonly develop between the ages of 55 and 75

Background

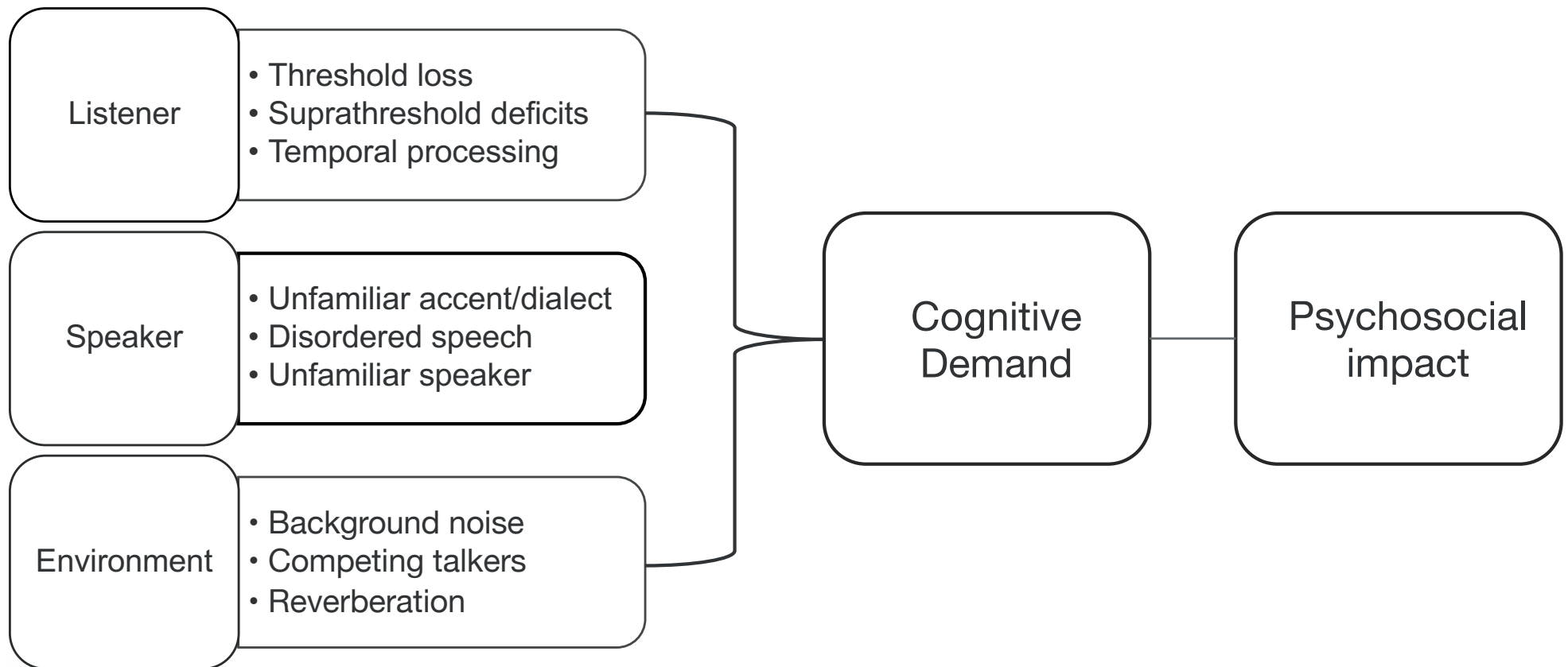
Dysarthria

- Decreased articulatory precision
- Reduced loudness
- Dysfluency
- Mono-pitch/mono-loudness
- Reduced vowel space

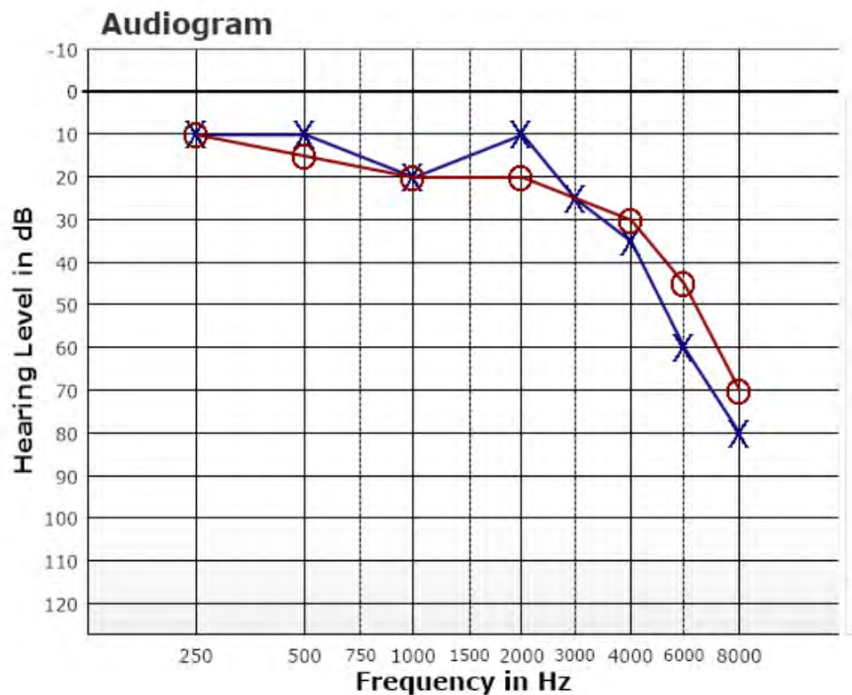
SNHL Hearing loss

- Decreased audibility
- Decreased dynamic range
- Decreased frequency resolution
- Decreased temporal resolution

Acoustic Challenge



Case: Results

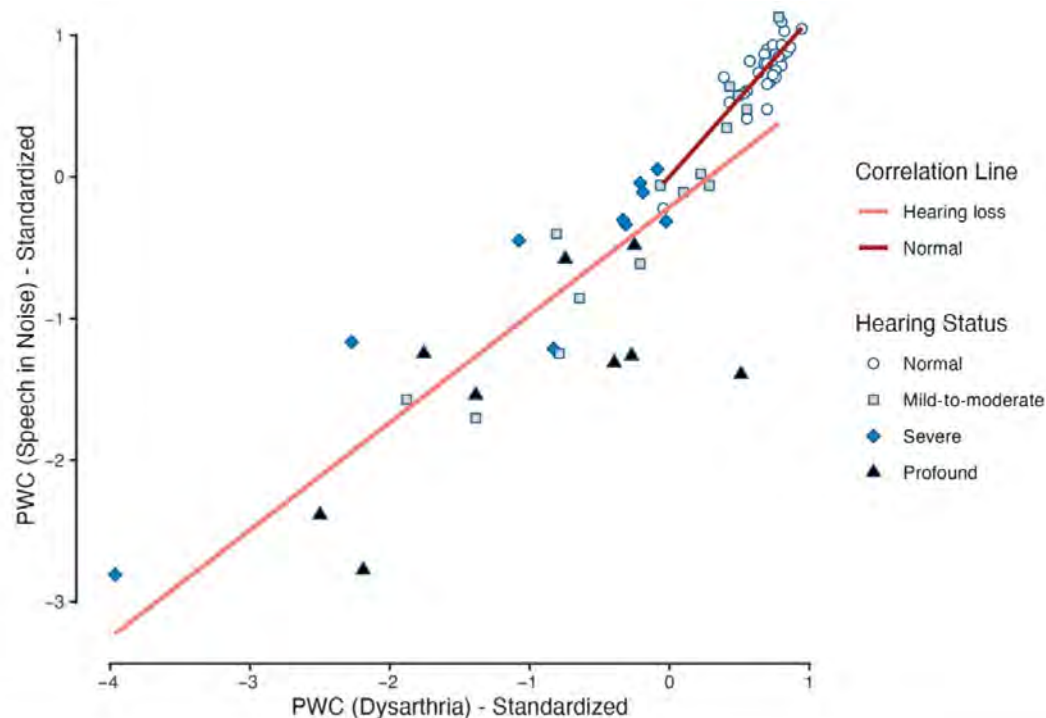


- Word Recognition scores of 100% was obtained at 60dBHL in the left and 96% was obtained at 55dBHL in the right ear.
- RSPIN +8 dB SNR: 100% HP sentences 53% LP sentences
- RSPIN +4 dB SNR: 100% HP sentences 31% LP sentences

Case: Follow up

- Fitting: Binaural Oticon Intent 1 mRITE R HAs
- Real ear measurements revealed the hearing aids were meeting NAL-NL2 target for 250-4000Hz for soft, conversational, and loud speech in both ears.
- First Follow Up:
 - Improvements in understanding most speech in background noise
 - Improvement in listening to books on CD
 - He also reported improved perception of environmental sounds, such as birds chirping
 - Continued difficulty hearing and understanding his wife

Clinical Tools



Speech in Noise Testing:

- Study by Yoho and colleagues (2023) found that performance on speech in noise testing can be predictive of performance on disordered speech intelligibility
- Can be used for baseline testing to predict outcomes for patients
- As a tool to evaluate benefit of rehabilitation (pre/post fitting)
- Counseling tool with patients to set healthy communication strategies and realistic expectations

Clinical Tools

I. Appropriately fit amplification

- I. Utilizing real ear measurements and tactful acoustic coupling to match patient needs

II. Assistive technology

- I. Remote microphone
- II. Alerting devices

III. Patient-centered audiologic rehabilitation + counseling

- I. Auditory training with the speech of close communication partners
 - a. Tye-Murray et al., 2016: A subset of the cLEAR training program
 - b. Lansford et al., 2018: The benefit of listener-targeted perceptual learning paradigms as a clinical intervention tool
- II. Importance of environment, timing of conversations, and topic identification

IV. Interdisciplinary Care Team

Takeaways

1

Biopsychosocial Care Model

2

CPS Involvement in Care

3

Speech in Noise Testing

4

Auditory Training + Appropriate Amplification

5

Interdisciplinary Care Team

Conclusion

- Communication is a dynamic exchange that requires the shared involvement from both speakers and listeners.
- Gaining insight into the perspectives and experiences of patients, and the intricate communication dyads they form, is pivotal for enhancing care. All themes underscore the necessity for patient-centered hearing health care that adheres to a biopsychosocial model.

End of a Journey

Long-Term Facial Weakness After a Vestibular Schwannoma Surgery

Christina Martin-Smith, B.S., MGS

Agenda

Introduction

- Meet the case

Surgical Approach

- Middle Cranial Fossa

Facial Paralysis

- What are the risks?

Meet Ms. Jane Doe: 2013-2014

May 2013

Reported symptoms:

- Decreased hearing
- Aural fullness
- Tinnitus in the left ear

Diagnosis and referral:

- Audio: normal sloping to moderate SNHL in left ear, normal hearing in left ear
- ENT: Vestibular schwannoma on the left side

Aug. & Nov. 2013

August:

- Middle Cranial fossa surgery with successful removal of the tumor
- No information regarding post-op facial functioning

November:

- Left Audio: Flat profound SNHL
- Rx: BAHA or CROS

2014

January:

- Fit with CROS
- Ms. Doe commented feeling balanced
- No further information for the year

Meet Ms. Jane Doe: 2015-2018

2015

March:

- Tried Osseo-integrated BAHA

May:

- Fit with size #4 down to size #3 magnet for comfort

October:

- Reported no physical discomfort from the device
- Taught how to clean and maintain the device

April 2016

Single Appointment:

- Ms. Doe is doing well

Sept. 2018

5- year follow-up:

- CT scan revealed no persistent or recurrent tumor!

Throughout these appointments, there was no indication of improved facial paralysis.

October 2023

10 years later

Last Follow-up:

- Denied Otorrhea, talgia, and substantial vertigo

CT scan:

- Dr. and Ms. Doe decided against because of the clear 5-year scan

BAHA:

- Stopped wearing the device
 - Pinches and falls out when gardening
- Discussed hearing rehab and new transcutaneous devices

Left Side

Facial Functioning:

- Grade II-III out of VI
 - House-Brackmann Scale (HB)
- No Residual Hearing
- Reported tinnitus and aural fullness

House-Brackman Scale:

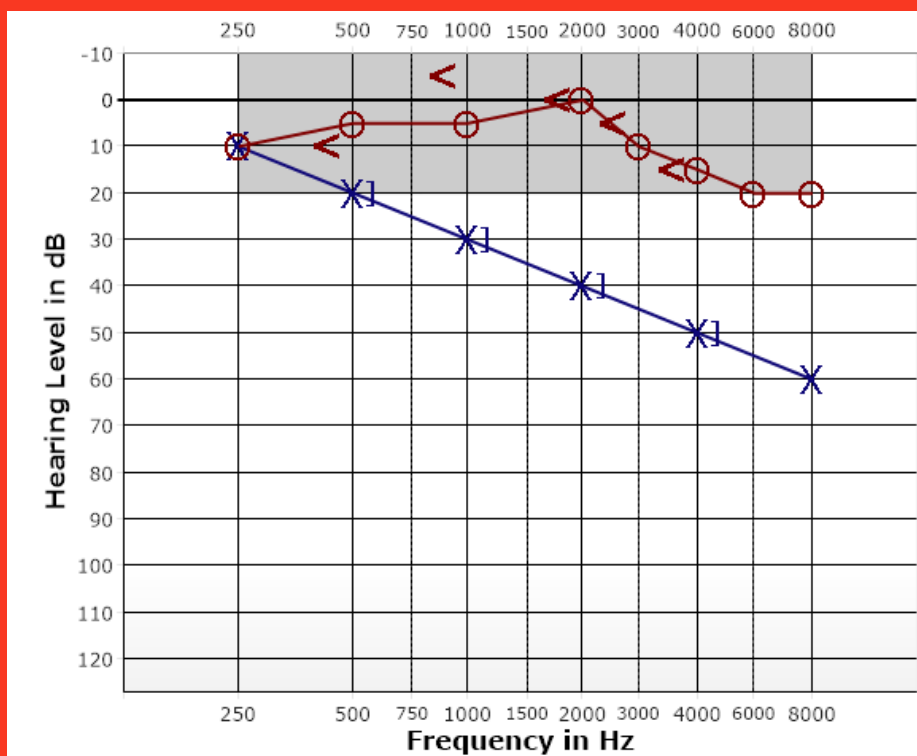
- Mild to moderate functioning
- Can close eyes
- Unable to fully lift mouth or eyebrow

Right Side

Facial Functioning:

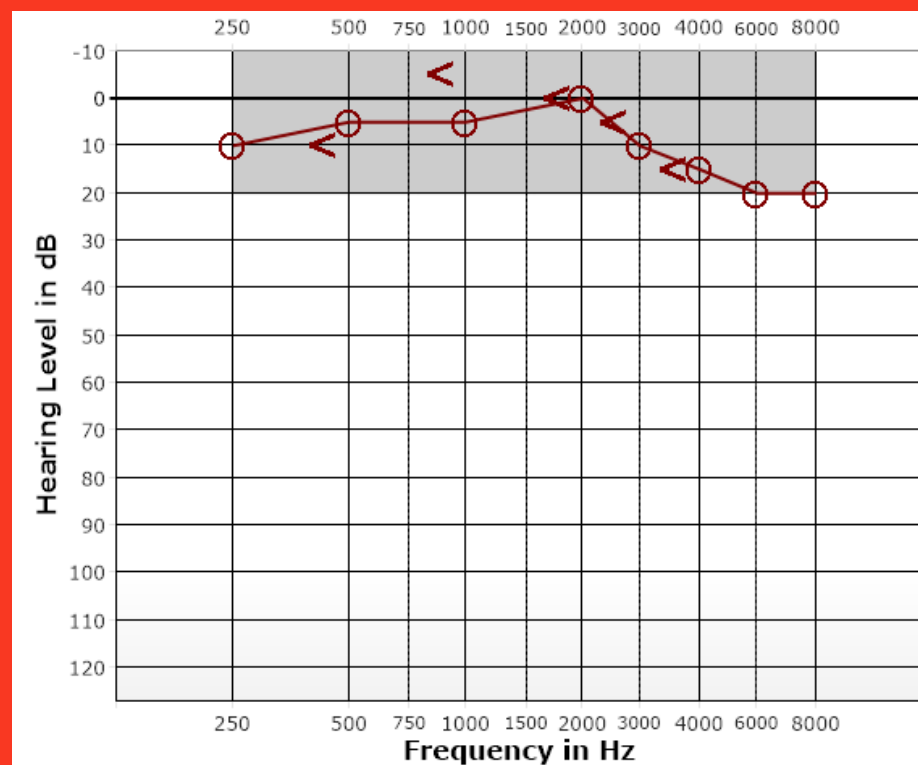
- Normal
- PTA: 3dB
- SRT: 10dB
- WRS: 100% @ 50dB

Audiograms



May 2013

Estimated Audiogram



October 2023

Present Audiogram

Why this case study?

- Permanent facial weakness/paralysis as a result of the surgical approach

Four Main Options for managing VS:

- Radiology
- Observations
- Microsurgery
- Combination of all of them

Deciding factors of treatment involves:

- Vestibular Schwannomas effect on auditory nerve
- Patient's symptoms, health, and approval

Microsurgical Approach

Surgical considerations

- Type: Size and location of the tumor
- ABR and ECoG to assess hearing preservation outcomes
- VNG for vestibular system evaluation

Retrosigmoid (RS)

- Posterior fossa craniotomy approach
- Considerations: hearing preservation with appropriate residual hearing

Translabrynthine (TL)

- No hope of hearing preservation by the tumor size cutting off blood supply
- Maintaining facial nerve identification is easier

Middle Cranial Fossa (MCF)

- Described by Parry in 1904 was used for removing infections in the temporal bone, trigeminal neuralgia, and otosclerosis.
- Popularized by House in 1961 to remove vestibular schwannoma.
- Approx. 3% result in permanent facial nerve injury, where 97% have an HB grade of I or II (1)

Considerations

- Under age 65
- Healthy to endure intracranial surgery
- Evidence of Brainstem Evoked Responses to measure during surgery
- $\leq 1.5\text{cm}$ (size of an Apple Jack)
- Tumor doesn't reach the brainstem
- “socially useful hearing” (1)

Ms. Doe's Case

- 63 years old at surgery
- Everything else is assumed to correlate

Intra- and Post- operative Monitor

Intra-operative

- Electromyogram for facial nerve connected to a speaker to alert if surgeon encounters it
- Once at the VS, inspect the area for anatomical location and any connections
- If there is a risk to facial nerve, abandon or temper hearing preservation to maintain facial nerve integrity

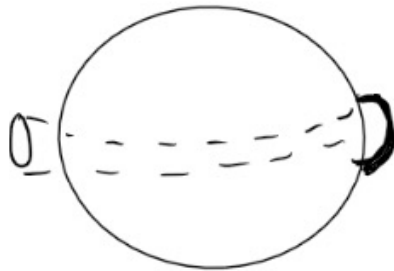
Post-operative

- ICU monitoring
- May experience vertigo and prescribed diazepam for extreme vomiting
- Follow-ups begin several weeks out
- Yearly follow-ups are 1-, 5-, and 10-year mark

Facial Nerve types

You, et al. (2013), 116 participants (p. 290)

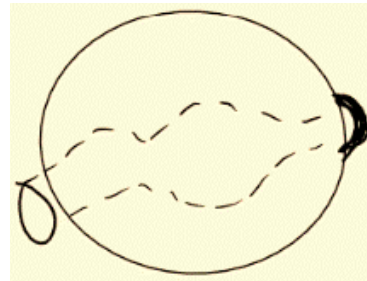
Normal



3.4%

Small VS grew away from the brain

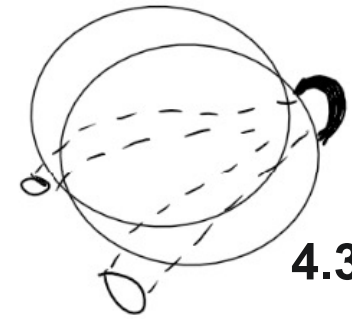
Membranoid



18.1%

Visually yellow color with larger tumors

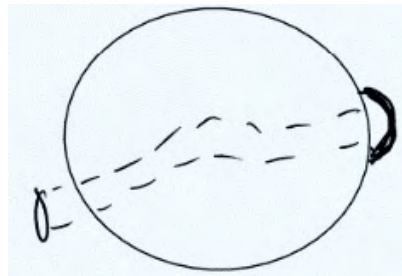
Diffused



4.3%

Uneven growth of the tumor or occurrence affects the facial nerve

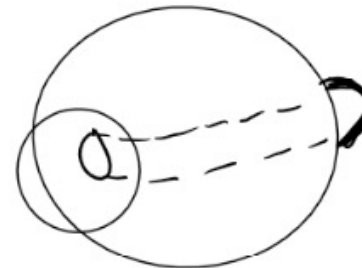
Flat



72.4%

Visually silvery white color nerve and separate from the IAC

Penetrating



1.4%

Multiple tumors intertwine the facial nerve

House-Brackmann Scale

Developed in the 1980s by the Facial Nerve Disorder Committee of the American Academy of Otolaryngology - Head and Neck Surgery

Measure:

- 8 different points from forehead to mouth and function of movement

Categorize:

- 6 Grades – normal to total paralysis

Ms. Doe: Grade II-III

- Less noticeable facial paralysis until she attempted to smile
- Reported using gel at night to keep eyes closed

Grade	Description	Characters
I	Normal	Normal facial function in all areas
II	Mild Dysfunction	Gross: slight weakness noticeable on close inspection; may have very slight synkinesis At rest: normal symmetry and tone Motion: Forehead: moderate to good function Eye: complete closure with minimum effort Mouth: slight asymmetry
III	Moderate Dysfunction	Gross: obvious but not disfiguring different between two sides; noticeable but not severe synkinesis, contracture, and/or hemifacial spasm At Rest: normal symmetry and tone Motion: Forehead: slight to moderate movement Eye: complete closure with effort Mouth: slightly weak with maximum effort
IV	Moderately Severe Dysfunction	Gross: obvious weakens and/or disfiguring asymmetry At Rest: normal symmetry and tone Motion: Forehead: none Eye: incomplete closure Mouth: asymmetric
V	Total Paralysis	No movement

Risk of Facial Paralysis

- Risk of Facial Paralysis has no correlation to one microsurgery.
- Facial Paralysis and VS size correlation:
 - Kahn et al. (2022) found a positive correlation between facial nerve paralysis and VS size.
 - Performed a retrospective review of 420 VS surgical removals.
 - 3.4% were MCF, 62.6% were RS, 32.1% were TL approach, initial and last follow-up had 86% good HB score (Grade I-II).
 - Sampath et al. (1997) found a noticeable increase, however they only used the RS and TL approaches.
 - 60.8% with a 2.5 cm or small VS had a normal facial nerve function.
 - Of 611 patients, 62.1% had normal facial function at the initial post-op that rose to 89.7% at the year follow-up.

Risk of Facial Paralysis

- Facial Paralysis and VS size correlation continued:
 - Olshan et al. (2014) did not find a correlation between facial nerve paralysis and VS size.
 - Caveat of 67 participants had microsurgery whereas only 9 had facial nerve weakness.
 - Initial post-op, 6 had HB VI, 2 HB V, and 1 HB I-II. At the one-year follow-up, 7 had improvements to HB III
 - Sobieski et al. (2021) also found a noticeable increase, however, they only considered ≥ 3.0 cm
- Limitations of lack of comparability among the articles regarding MCF inclusion, retrospective medical files approach, categorizing facial nerve grading, and data analysis.
- Though missing from the case reports, two assumptions can be made about Ms. Doe:
 - She had a Grade II or III HB score for a decade
 - Her facial paralysis recovered from a worse HB score

End of VS journey only
means the end of follow-up

Credits:

Dr. Ren and Dr. Macielack for allowing me to observe and Ms. Whiteman for acquiring the case information for me

A Cochlear Implant Please

Aryn Robinson, BS

Outline

- Background
- Grand Round Case
- Conclusions

Sudden Sensorineural Hearing Loss (SSNHL)

- Definition: a sudden hearing impairment of more than 30 dB across three contiguous frequencies in < 3 days¹
- Incidence: 27 cases per 100,000 people a year in the United States²
 - Typically unilateral
- Cause: 90% of cases are idiopathic²

Outcomes in SSNHL

- 1) Spontaneous recovery
- 2) Recovery after the initial round of steroids
- 3) Recovery after a second round of steroids
- 4) Permanent SSNHL

Treating SSNHL

- Conventional Treatment – systemic corticosteroid
 - Treatment must be administered as soon as possible
- Rescue – transtympanic corticosteroid injection
 - Advantages^{3,4}
 - Avoidance of systemic steroids side effects
 - Target only the affected ear
 - Better tolerated by hypertensive and diabetic patients
 - Easy to perform
 - Disadvantages^{3,4}
 - Pain, infection, TM perforation, and vertigo

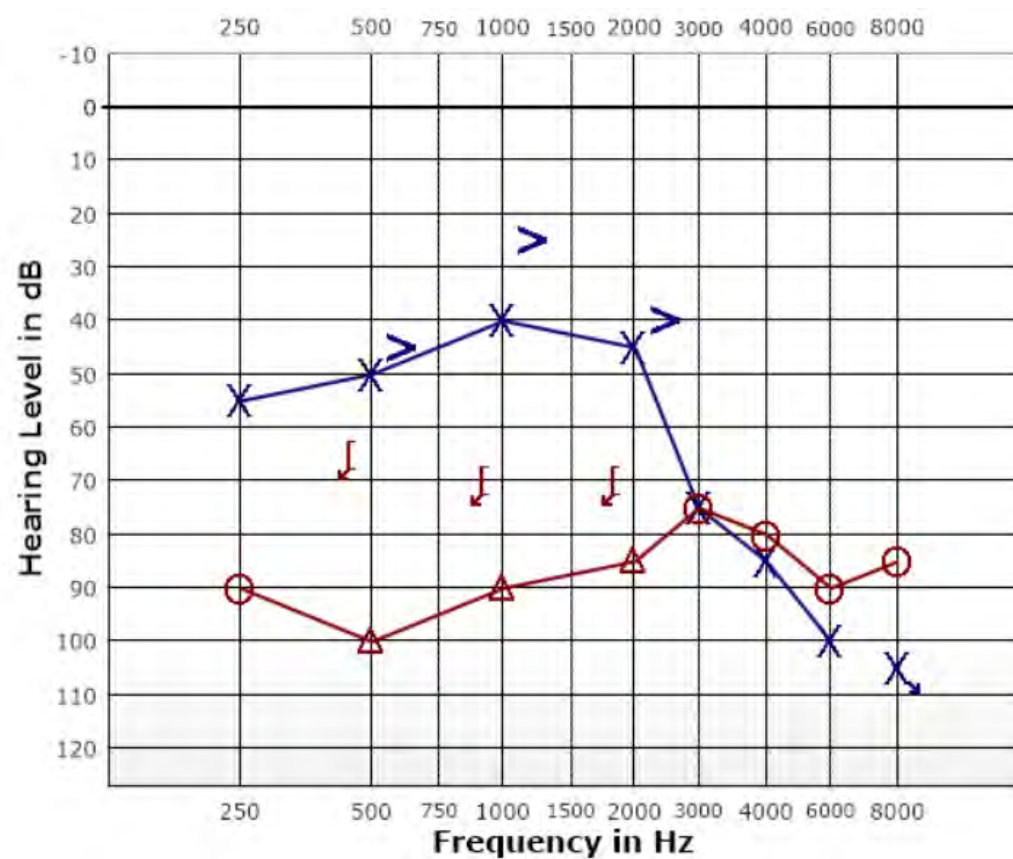
SSNHL and Cochlear Implants (CI)

- In cases of unilateral SSNHL, CIs improve word recognition and decrease tinnitus perception^{6,7,8,9,10}
- Case of sudden bilateral profound SNHL that did not respond to oral steroids¹¹
 - Speech Awareness Threshold of 30 dB, no measurable Word Recognition
 - 1-year post-CI: warble tone thresholds in the moderate category, 60% open-set spondee recognition

Initial Visit - History

- 60s, male
- Reported hearing loss for many years
- 2013 - Sudden bilateral threshold shift
 - Resulted in poor speech discrimination in all listening environments
- Previous transtympanic steroid injection
 - Improved hearing thresholds, but still poor speech discrimination
- Fit with Starkey RIC with a closed dome in the left ear

Initial Visit - Results



	Right	Left
PTA	91 dB	45 dB
SRT	80 dB	40 dB
WRS	CNT	8% @ 75 dB

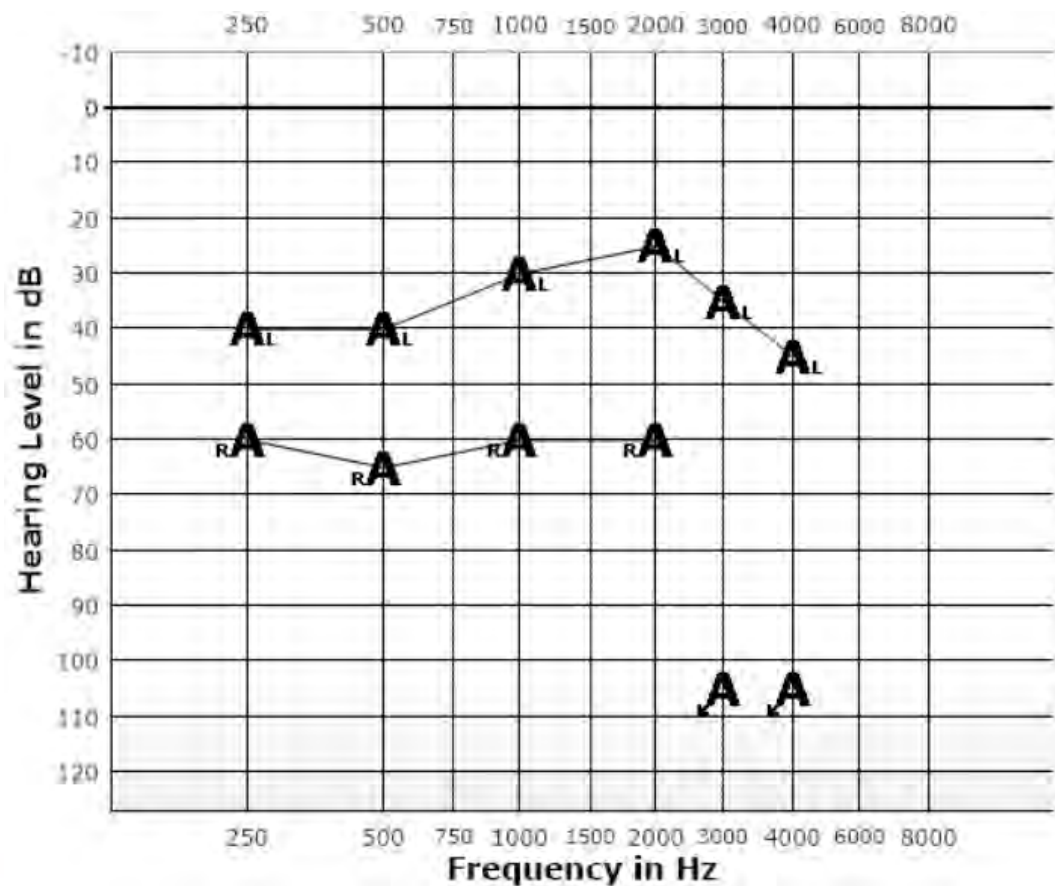
Initial Visit - Recommendations

- Bilateral amplification
 - Fit with Phonak Naida UP III

Visit 2 - History

- Consistent bilateral daily wear
- Still struggling

Visit 2 - Results



Sentence Test: AzBio

Binaural	5%
R	1%
L	3%

Visit 2 - Recommendations

- Get a cochlear implant in the right ear

Interim

Right Ear

- Manufacturer: Advanced Bionics
- Processor: NAIDA CI M90
- Magnet Strength: 4

- Date of implantation: 6/14/2019
 - V1 failure
- Date of reimplantation: 4/21/23

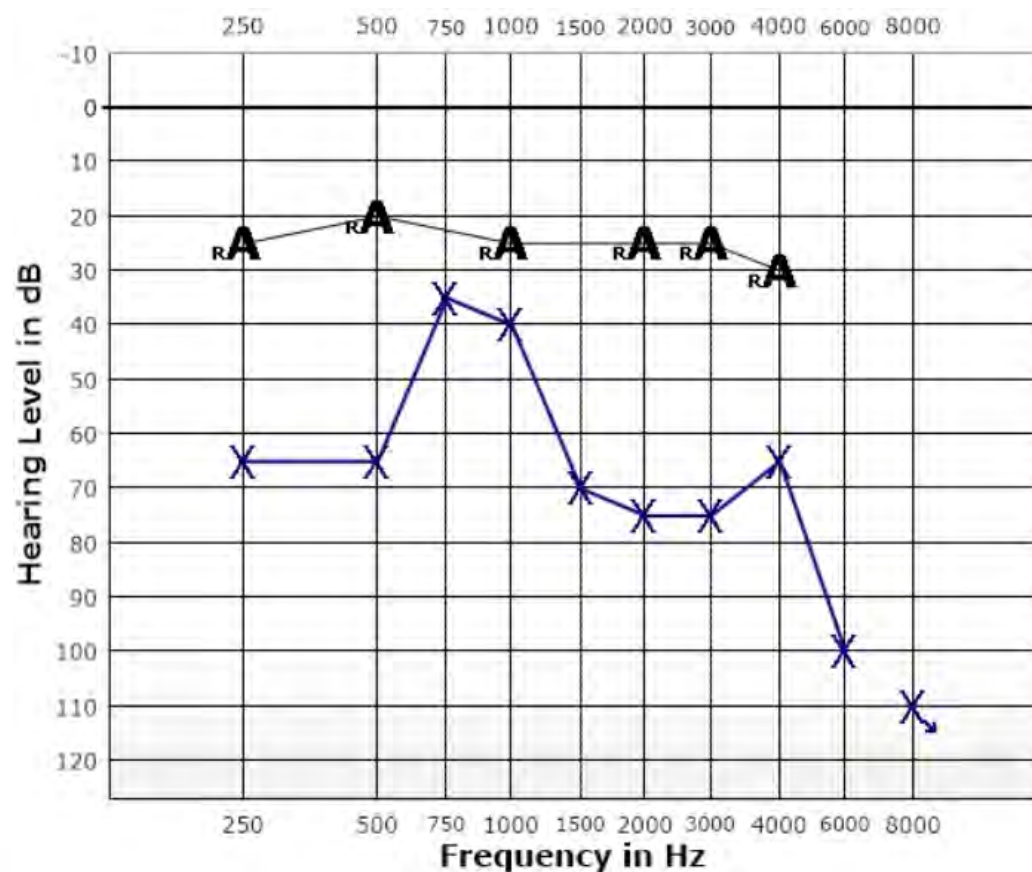
Left Ear

- Phonak NAIDA Link

Visit 3 - History

- Patient reported:
 - Sound from CI was rough and raspy
 - Sound from HA was low and weak
- Very little CI listening practice with speech
 - Recommended – listening practice apps, audio books, or podcasts with familiar content
 - Usually listens to music for practice

Visit 3 - Results



	Left
PTA	60 dB

Sentence Test: AzBio (quiet)	
Binaural	24%
Right	14%
Left	DNT

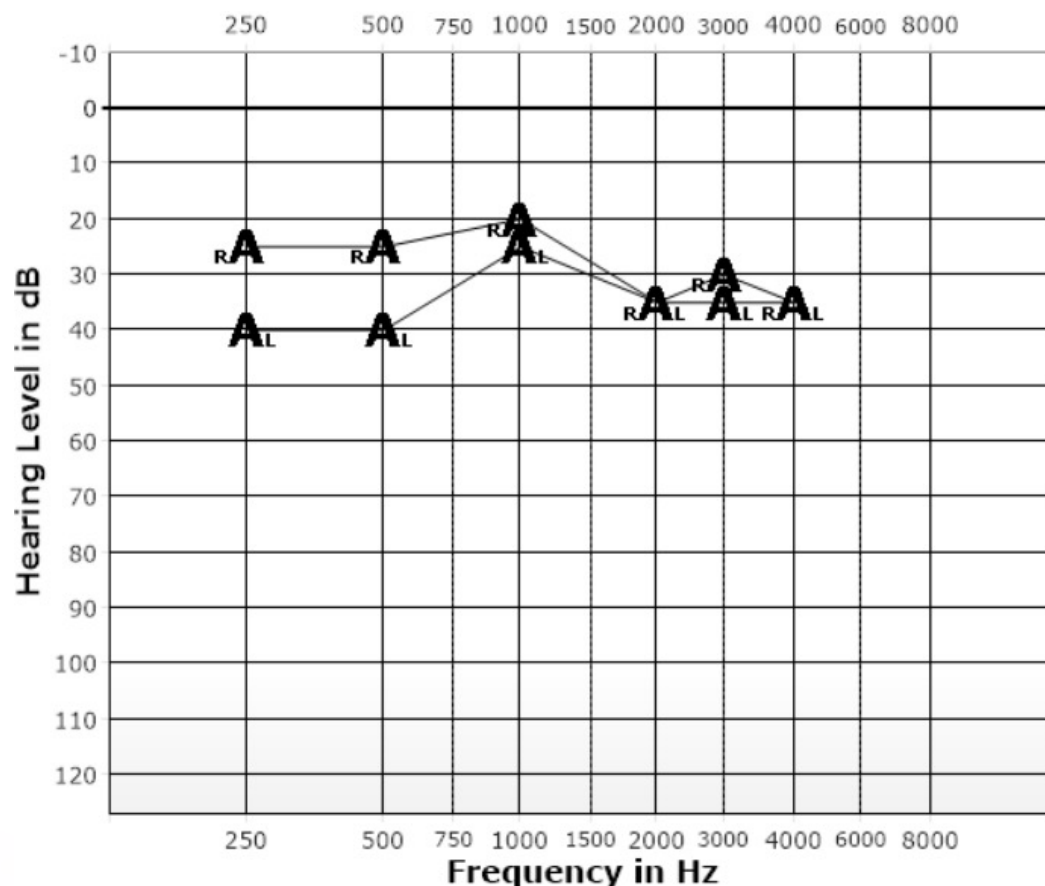
Visit 3 - Recommendations

- Reviewed hearing aid maintenance
- Daily speech listening with CI only
 - App examples: Hearoes, Word Success, CoPilot
- Get a cochlear implant in the left ear

Most Recent Visit - History

- Reported improved perception of hearing
- Considering a cochlear implant for the left ear

Most Recent Visit - Results



CNC	Words	Phonemes
Binaural	14%	33%

Sentence Test: AzBio (quiet)	
Binaural	31%
Right	22%
Left	10%

Most Recent Visit - Recommendations

- Continue cochlear implant only practice
- Get a cochlear implant in the left ear

Key Takeaways/What I Learned

- Success takes effort
- “Experienced Patients” need refreshers sometimes
- Do not forget about your resources
- Above all - be patient

Somatic Tinnitus

Liam Smyth

Somatic Tinnitus

- Tinnitus that is evoked or modulated by inputs from the somatosensory or motor systems (Oostendorp, et al 2016a).
- Estimated to occur in about 65% of all tinnitus cases (Sanchez, 2011).

Causes of Somatic Tinnitus

Muscle tension

TMJ/jaw problems

Dental disorders

Head injuries

Cervical spine issues

Chronic stress

Cervicogenic Tinnitus

- Thought to be caused by a neural connection between the dorsal cochlear nucleus and the somatosensory systems of the head and cervical regions (Oostendorp, et al, 2016a, Michiels, et al, 2015).
- Cervical spine testing, such as manual rotations, can aid in diagnosis. This kind of testing should be carried out by a physical therapist Michiels, et al (2014).

Patient Case Report

74-year-old male

Tinnitus Handicap Inventory: 38

Reported steadily worsening bouts of tinnitus since Spring 2023

On a scale of 1-10 points, he described his tinnitus as being about 8 points in intensity.

He described the sound like the compressor on a refrigerator.

Patient Case Report

- Patient reported that neck movements aggravate his tinnitus.
- Currently in physical therapy, working on his posture to alleviate stiffness in his neck.
 - Has flare up about an hour after therapy sessions.
- He also reported that falling asleep and tilting his head down increases his tinnitus perception.



Image: Continued (licensed from Getty Images)

Patient Case Report

- Diagnosed in 2021 with a degenerating cervical disc disease, with symptoms including bulging in the lumbar region and mild stenosis of C3-C6.
- Seen by an otologist in 2023; MRI and CT scans revealed no craniofacial abnormalities.

SPINE CONDITIONS

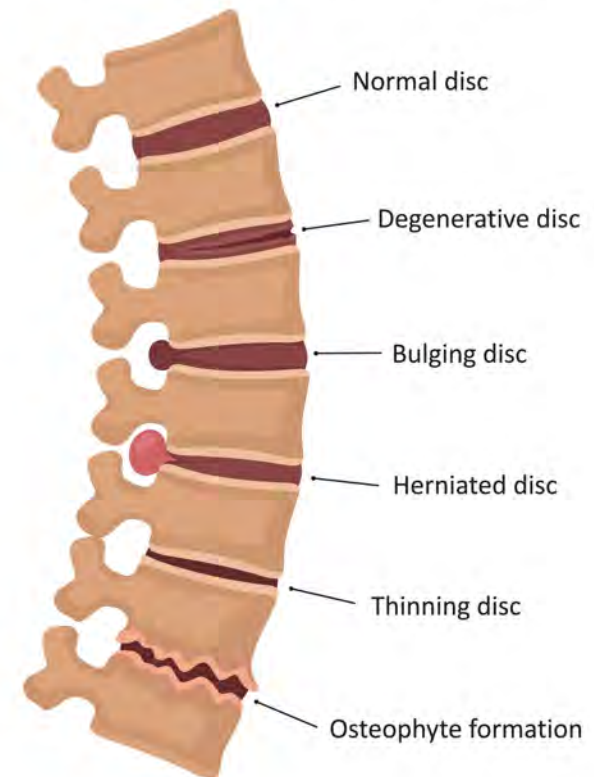
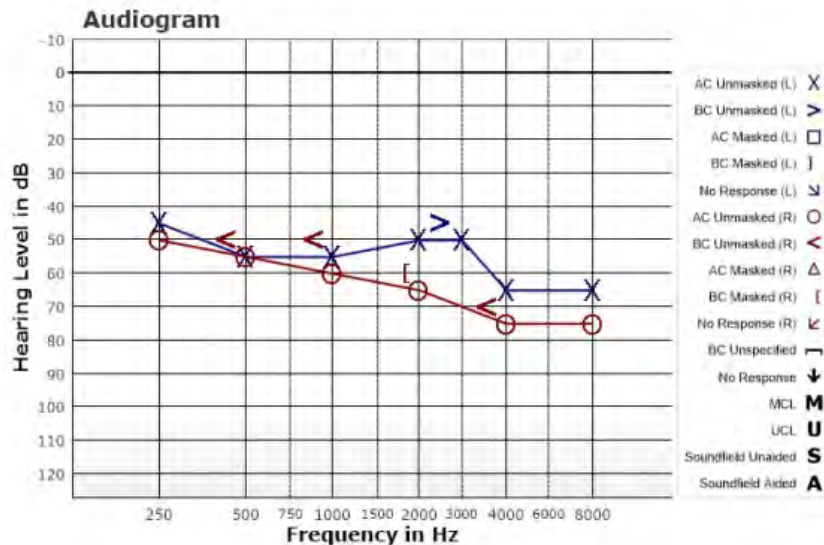


Image: Continued (licensed from Getty Images)

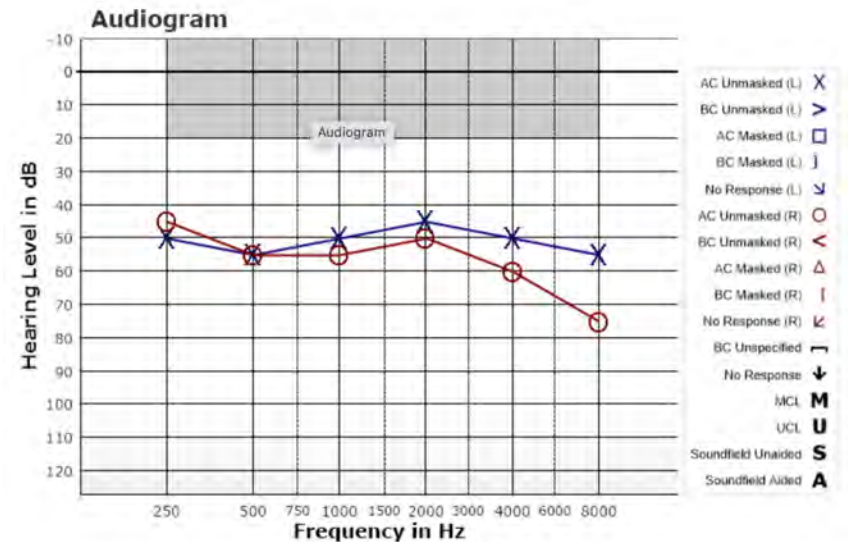
Diagnostics

- Case History
- Questionnaires
- Audiogram (see next slide)
- Speech Audiometry
- Tinnitus Pitch Mapping
 - The patient's tinnitus was pitch matched to 1500 Hz at 63 dB HL (~10 dB SL).

Patient Audiograms



Naples, FL: January 2022



OSU: October 2023

Prior Tinnitus Management

- Has worn Phonak hearing aids for fifteen years for bilateral hearing loss.
- Recently was fit with new Signia RIC hearing aids with Notch Therapy at roughly the same time as his tinnitus began.
- Hearing aids were generally well fit, albeit slightly below NAL-NL2 targets.

Physical Therapy

- Oostendorp, et al (2016a): developed a tinnitus management technique that “focuses on static and dynamic posture, preferences of movements, and selective somatosensory mechanical stimulation of joints of the spine, pelvis and extremities by the therapist repeatedly performing very gentle, low velocity passive movements.”
- Michiels, et al (2016) preliminarily showed that multimodal cervical physical therapy significantly decreased tinnitus questionnaire scores over a therapy period of 6 weeks.
- Their 2017 follow-up study further expanded on this research, investigating prognostic indicators that can predict a positive outcome after multi-modal cervical physical therapy treatment in patients with CST.
- **Patient reported that his tinnitus was aggravated by physical therapy.**

Tinnitus Management

- Hearing aids can help patients manage their tinnitus through the use of masking techniques and sound therapies.
- Cognitive behavioral therapies include relaxation, exposure techniques, and mindfulness-based training. These are accomplished through weekly sessions, either in person or online.
- Lenire is a neuromodulation device employing bimodal stimulation of the trigeminal nerve via headphones and a tongue stimulator.

Patient Counseling

- Patient was counseled on the OSU Speech-Language-Hearing clinic's hearing aid demo program.
- He was counseled on the benefits of Lenire.
- Patient was provided with information for an at-home CBT option while awaiting in-person CBT through OSU.

Aftermath

- After a period of further research and reflection, the patient opted against pursuing further tinnitus management with hearing aids, instead moving forward with Lenire.
- The patient was fit with Lenire 12/07/2023.
- The patient reported his perception of his tinnitus had been significantly reduced at a 2/27/2024 follow-up.

Takeaways

- Tinnitus is complicated.
- This case underscores the importance of good interdisciplinary care.
- Sometimes our role in a patient's case is unusual.

Health Literacy: It's Role in Hearing Healthcare

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Presentation Outline



Case
Introduction

Health Literacy

Considerations

Take Aways

Case Introduction

- 35-year-old Venezuelan female
- Diagnosed with a bilateral hearing loss 5 years ago in Venezuela.
- Has worn binaural behind-the-ear hearing aids with custom earmolds since then and reported that she loved them.
- She recently immigrated to the United States and her hearing aids stopped working.

Case Cont.

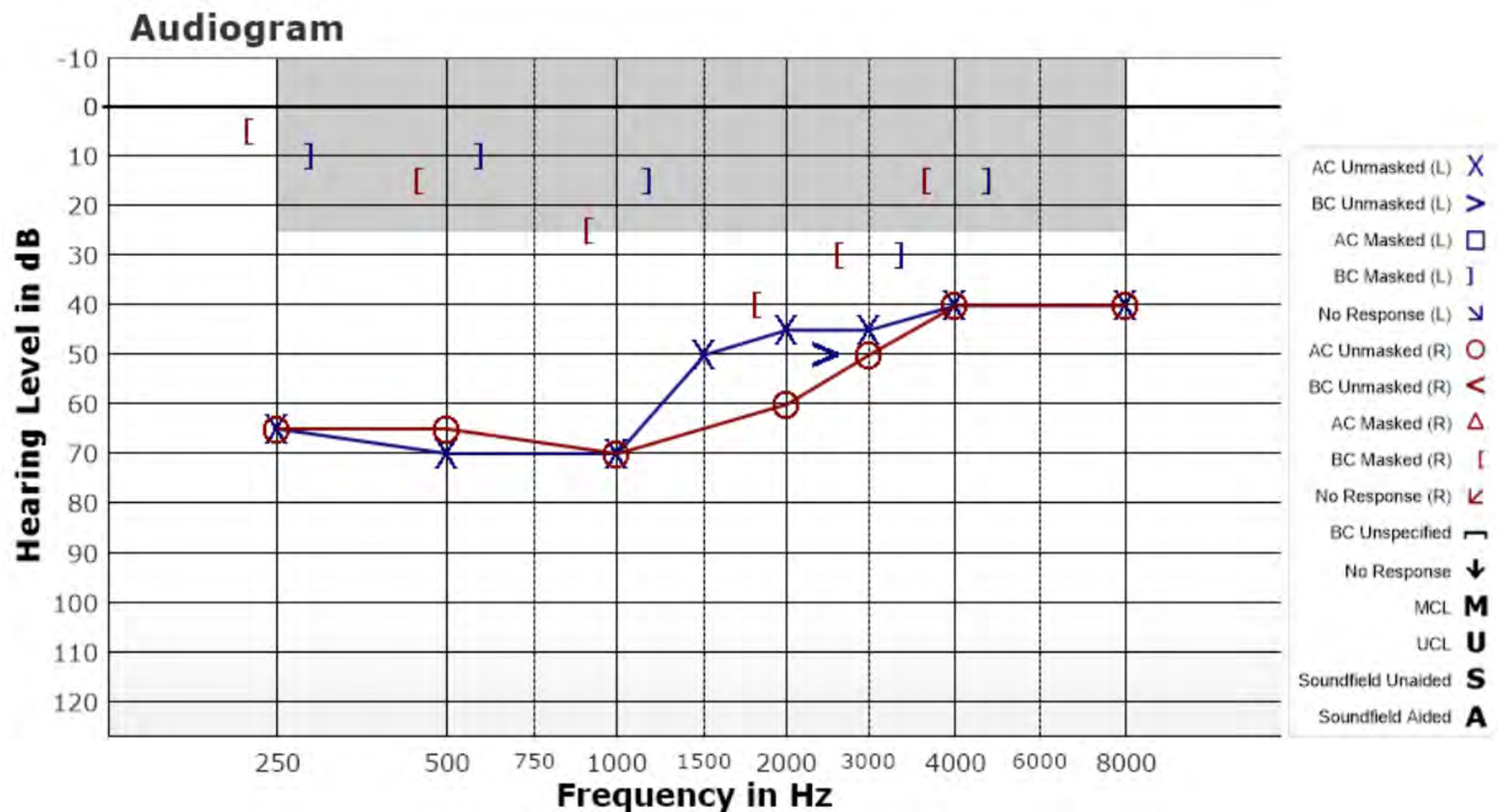
- She reported she emailed the manufacturer of her original hearing aids to help her determine how to obtain hearing aids specific to her location in the United States.
- That led her to the OSU Speech-Language-Hearing Clinic.
- Her first language is Spanish.
 - The majority of her appointments were conducted through a Spanish Interpreter using Boost Lingo video interpreting services.

Audiologic Evaluation

- Patient arrived wearing slim tube BTE hearing aids with power domes that she purchased online ~2 months ago.
- She reported the hearing aids
 - Did not fit well
 - Hurt her ears
 - Caused headaches
 - Would often feedback
 - Impacted her ability to communicate at work

Audiologic Results

- Tympanometry:
 - Type A bilaterally; indicative of normal tympanic membrane mobility, middle ear pressure, and ear canal volume
- Ipsilateral Acoustic Reflex Testing:
 - Absent 500-2000Hz bilaterally
- DPOAE Screening
 - Absent 2000-5000Hz bilaterally
- Pure Tone Testing:
 - Symmetric moderately-severe rising to mild mixed hearing loss 250-8000Hz bilaterally
- Speech Audiometry:
 - Not conducted as the patient's primary language was Spanish



Counseling and Outcomes

- Mixed hearing loss was described to the patient.
- It was recommended she consult an ENT for a medical evaluation and possible medical intervention.
- She expressed understanding of this recommendation but declined.
 - She stated she may re-consider within the next 1 - 2 years.
- She has since been fit binaurally with entry-level RIC hearing aids with custom earmolds using best practices at the OSU-SLH Clinic.
 - She has reported subjective benefit from these hearing aids.

Happy Ending . . . Right?

- But it left us thinking:
 - Why did this patient purchase over-the-counter hearing aids when she has a history of consistent prescription hearing aid use?
- Reflecting on the case and reviewing the literature on possible barriers to pursuing prescriptive amplification, health literacy surfaced as an important area of focus.

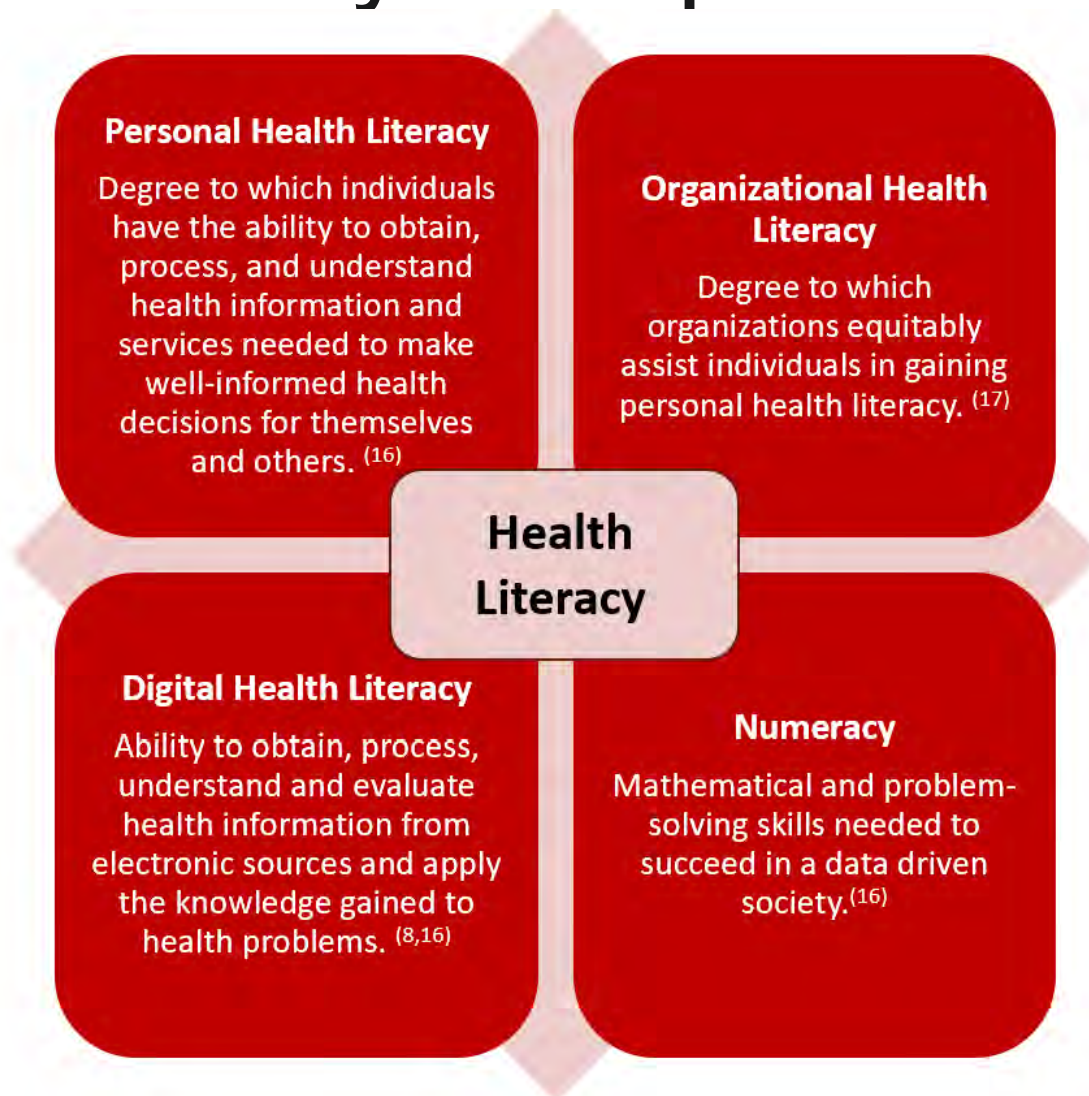
What makes this case interesting?

- The patient has low health literacy due to
 - A limited understanding of the U.S. health system and how to access it as a recent immigrant
 - English not being her primary language
- But . . . she had the skills to
 - Understand that the hearing aids she acquired online were not appropriate
 - Navigate health information on the internet
 - Find a hearing healthcare professional in her community

Health Literacy

- Health literacy is a central focus of Healthy People 2030⁽¹⁷⁾
 - Six Healthy People objectives are related to health literacy:
 - Increase the proportion of adults whose health care provider checked their understanding — HC/HIT-01
 - Decrease the proportion of adults who report poor communication with their health care provider — HC/HIT-02
 - Increase the proportion of adults whose health care providers involved them in decisions as much as they wanted — HC/HIT-03
 - Increase the proportion of people who say their online medical record is easy to understand — HC/HIT-D10
 - Increase the proportion of adults with limited English proficiency who say their providers explain things clearly — HC/HIT-D11
 - Increase the health literacy of the population — HC/HIT-R01

Health Literacy Components



Levels of Health Literacy

 **Functional** Basic reading and writing skills needed to understand health information, the healthcare system, and technologies used. ⁽¹¹⁾

 **Interactive** Higher level communicative and social skills required to extract and discuss health information with others, such as healthcare professionals and family members. ⁽¹¹⁾

 **Critical** Has skills necessary to analyze health information and make informed decisions. ⁽¹¹⁾

Who's at Risk For Low Health Literacy?

- Older adults^(2, 10, 21)
- Individuals facing health disparities^(11, 12)
- Individuals with lower education levels⁽³⁾
- Individuals whose primary language is not the primary language of the society they live in⁽²⁰⁾
- Ethnic minorities⁽²⁰⁾

EVERYONE!^(1,6,15)

Considerations

- Patients with lower health literacy are more likely to present with more severe hearing loss at their first audiologic evaluation. ⁽²⁰⁾
- High literacy and education levels do not automatically equal adequate health literacy.
- Adequate general health literacy does not equal adequate hearing/audiologic health literacy. ⁽⁶⁾
- Patients with low health literacy may overestimate their health knowledge. ⁽¹⁾

Patient Education Materials (PEMs)

- Hearing aid user guides ⁽²⁾
- Cochlear implant brochures ⁽¹⁴⁾
- Information on hearing loss, hearing disorders, and interventions ⁽¹⁸⁾

Patient-Reported Outcome Measures (PROMs):

- International Outcomes Inventory–Hearing Aids (IOI-HA) ^(5, 9)
- International Outcomes Inventory–Alternative Interventions (IOI-AI) ⁽⁵⁾
- Hearing Handicap Inventory for the Elderly– Screening Version (HHIE-S) ⁽⁵⁾
- Abbreviated Profile of Hearing Aid Benefit (APHAB) ⁽⁵⁾
- Nijmegen Cochlear Implant Questionnaire (NCIQ) ⁽⁵⁾
- Amsterdam Inventory for Auditory Disability and Handicap (AIADH) ⁽⁹⁾
- Glasgow Hearing Aid Benefit Profile (GHABP) ⁽⁹⁾
- Measure of Audiologic Rehabilitation Self-Efficacy for Hearing Aids (MARS-HA) ⁽⁹⁾
- Satisfaction with Amplification in Daily Life Scale (SADL) ⁽⁹⁾
- And many more! ^(5,9)

Literacy and Health Literacy

- Literacy levels do not equal health literacy
 - But . . . they can interact
- Patient literacy and readability levels of common audiologic patient materials must be considered during patient counseling
- Average reading grade level in the U.S. is an 8th-grade reading level (14, 18)
 - It is recommended that written materials be written no greater than a 5th – 6th-grade reading level (9, 11) for the whole population to have equal literacy access.
- PEMs and PROMs have been found to have readability levels above the recommended 5th-grade reading level. (2, 9, 14, 15, 18)

Patient Materials

- Patient materials for your practice can be developed with health literacy in mind. ⁽¹³⁾
- Consider:
 - Your audience's needs, interests, and behaviors
 - Focus and limit your objective with evidenced-based content; provide the “need to know” information
 - The content meets the language and cultural needs of the audience
 - Keep literacy levels in mind and write using clear language
 - Using clear, clean typeface and 12-14 point font size
 - Using graphics to complement the content
 - Emphasizing important information with bulleted lists, underlining, and bold

Counseling Considerations

- Share health information in the patient's primary or preferred language. ⁽⁴⁾ Use certified interpreters.
- Use clear and accurate language. ^(13, 15, 17) Avoid technical words, jargon, and acronyms.
- Focus on 2-3 main points you want the patient to remember. ⁽¹³⁾
- Use the "teach-back" method. ⁽¹¹⁾
- Use pictures to complement verbal/written counseling. ⁽¹³⁾

Take Aways

- Health literacy levels are not static.
- Patients with high literacy and education levels may still have low health literacy.
- Frequently used audiologic user guides and informational materials are often written at a higher readability level than the average individual has.
- Clinicians can provide health information that individuals can more easily consume and use for best health practices and shared-decision making.
- Provider awareness of health literacy is essential for patient-centered care.

When is “faking” not faking?

Gail M. Whitelaw, Ph.D.

Case Introduction

- 13-year-old girl who has a complicated medical and hearing health history
- Was initially seen at our clinic a year earlier due to fluctuant hearing loss demonstrated at another facility repeatedly
- No speech in noise testing had been done and the patient and her family wanted more direction for addressing what she reported as communication issues

Case Introduction

- Patient has a history of mental health needs and has requested female providers only since she noted that she had negative interactions with male providers
- Has been diagnosed with complex regional pain syndrome (CRPS), an uncommon form of chronic pain that usually affects an arm or a leg and typically develops after an injury, a surgery, a stroke or a heart attack. The pain is out of proportion to the severity of the initial injury.

Case Introduction

- Patient seen for audio in 2023, had significant speech in noise deficits
 - Medical clearance and trial of low gain hearing aids on a demo basis
 - Patient reported considerable improvement in listening in school, in social and extracurricular activities, and her family notes significant improvement in her hearing and listening skills
 - Were working on obtaining funding for hearing aids and her hearing was being re-evaluated on an ongoing basis

Audiologic Re-evaluation

- Patient's mother contacted me by email on Saturday, 4/20/24 to say that the patient had a significant decrease in hearing in both ears, but patient reported she was "deaf" in her right ear.
- Discussed options, including going to ED while bringing her otologist in on this, but family opted to wait until Tuesday, 4/23/24 for audio and otology exam
- Results revealed profound hearing loss for the right ear and moderate to profound hearing loss for the left ear

Audiologic Re-evaluation

- Results were inconsistent, but her anxiety and presence of tinnitus make this not surprising
- OAEs absent in R ear and present in L ear (consistent with hx)
- Begged to have hearing aids “boosted” and explained nothing would be done until medical assessment occurred and hearing was re-evaluated
- Otologist saw her same day and prescribed oral steroids (patient reported she could not do transtympanic administration)

Follow Up

- Finished course of steroids and was seen at our clinic for followup. Same results but a couple of observations
 - Could walk ahead of her with my back toward her and she could hear conversation easily and clearly
 - Word recog is better than would be anticipated
 - Patient was “in a bad mood” at time of testing
- Was seen by an audiologist at the otologist’s office and had same results as we obtained. Male audiologist who “confronted” patient that she was a “faker”

Follow Up

- ABR performed and was consistent with normal hearing
 - Audiologist reportedly confronted her and insinuated she was “faking” and needed to “stop”
- Frantic phone call from mother, patient is “spiraling” based on audiologist’s feedback, insistent that she has hearing loss, she’s not crazy and she can’t understand people in her environment

Interprofessional Practice

- I reached out to a pediatric psychologist for direction (patient has been seeing a psychologist for pain)
- Based on the patient's reported symptoms, psychologist provided the diagnosis of Functional Neurologic Symptom Disorder (FNSD), a health condition in which a patient experiences symptoms that are associated with a neurologic/sensory "condition" that is not confirmed with clinical findings

Interprofessional Practice

- Functional Neurologic Symptom Disorder (FNSD) symptoms may include abnormal control of movement or alternations in sensory experiences, such as perceived hearing loss
- FNSD can be diagnosed only when there is clear evidence of incompatibility between symptoms and test results
- ICD-10 code: F44. 4

What to Do?

- Validate patient's experience and their symptom review
- Partner with pediatric psychologist (not a transfer of care)
- Support parents in being a "coach" for their child

What Doesn't Help

- Over emphasis on patient's mental health as contributor to symptoms (many patients do not have a comorbid psychiatric diagnosis or stressor)
- Suggesting symptoms are "all in your head"
- Confronting the person as a "faker"

How Does This Relate to Audiology?

- We have been taught and conditioned to see patients are malingerers
- Historically, we might have been referred to psychogenic hearing loss as any hearing loss that cannot be explained by an organic cause (some called conversion disorder)
- There is at least a subgroup of patients who demonstrate hearing loss that cannot be explained by hearing results
- FNSD is a real disorder and requires a partnership with patient, family, psychologist, audiologist

Update

- This patient has been evaluated by behavioral psychologist but there are no community resources to support continued treatment
- Continuing to work with her as her audiologist; she acknowledges her anxiety and believes that her hearing loss is real
- Previous audiologists continue to identify her as a “faker” and this needs to be “called out”
- This information can reframe how to address perceived malingering behavior

Thank you!

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