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Grand Rounds: Audiology Clinical Experiences in Guatemala, in partnership with the University of South Dakota

Jennifer Phelan, AuD

Karen Toole, AuD
Cara Donovan, AuD
Rachel Appleton, AuD
Kaitlyn Burkamper, AuD

Katie Druyvestein, BS
Andrea Galindo, BS
Meghan Kalhoefer, BS

Presenters

- Jennifer Phelan AuD PASC
- Rachel Appleton AuD
- Cara Donnovan AuD
- Karen Toole AuD
- Kaitlyn Burkamper – Northwestern student
- Katie Druyvestein – USD student
- Andrea Galindo – Lamar student
- Meghan Kalhoefer – LSU student

Disclosures

- **Presenter Disclosure**: Financial: Jennifer Phelan is employed by the University of South Dakota. Non-financial: Jennifer Phelan has no relevant non-financial relationships to disclose. Financial: Karen Toole is employed by Oticon. Non-financial: Karen Toole has no relevant non-financial relationships to disclose. Financial: Cara Donovan is employed at Sounds of Life Hearing Center. Non-financial: Cara Donovan has no relevant non-financial disclosures. Financial: Rachel Appleton is co-owner of Pacific Hearing Services. Non-financial: Rachel Appleton has no relevant non-financial disclosures. Katie Druyvestein has no relevant financial or non-financial disclosures. Andrea Galindo has no relevant financial or non-financial disclosures. Meghan Kalhoefer has no relevant financial or non-financial disclosures. Kaitlyn Burkamper has no relevant financial or non-financial disclosures.
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- As healthcare is rapidly evolving, new findings may change the validity of the information presented in this course. Providers should always consult the latest research and guidelines from professional associations.
- The interventions discussed in this course may be limited in generalizability, requiring practitioners to consider specific individual and population factors.
- The course may not cover all possible risk factors, diagnostic methods, or treatment options, and complex cases may require additional considerations.
- Healthcare providers should apply cultural competence and sensitivity to ensure effective and respectful care based on their patients' diverse needs.
- 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:

- Explain how to set up a humanitarian trip to meet the needs of patients while providing evidence-based practice.
- Discuss how to evaluate and address unique patient needs in a remote audiology clinic.
- Describe culturally-competent, adaptive communication strategies by reflecting on patient interactions in a multilingual and/or resource-limited environment.

Photos of staff and patients were taken during the trip to Nuevo Progreso, Guatemala and are used with permission of the individuals in the pictures.

Support for Services

Use of ABR in humanitarian outreach

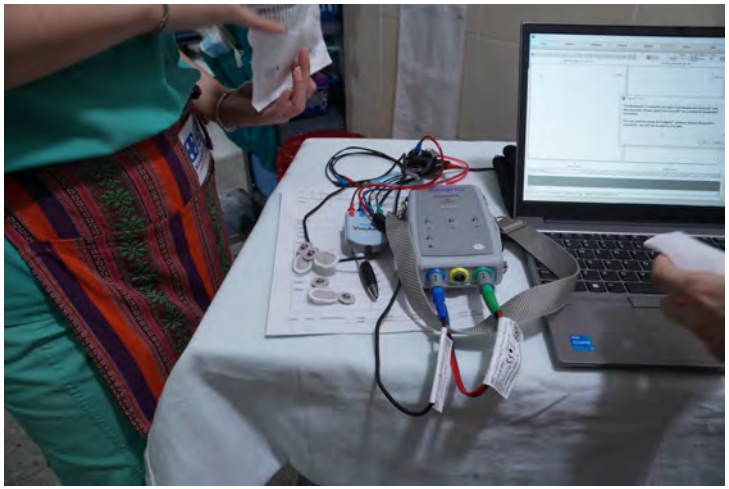
Jennifer Phelan AuD PASC

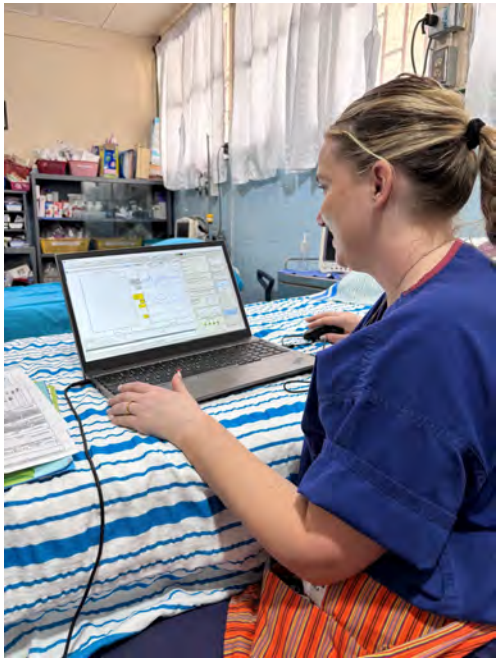
HOSPITAL DE LA FAMILIA FOUNDATION

Student Initiative

Pediatric Protocol

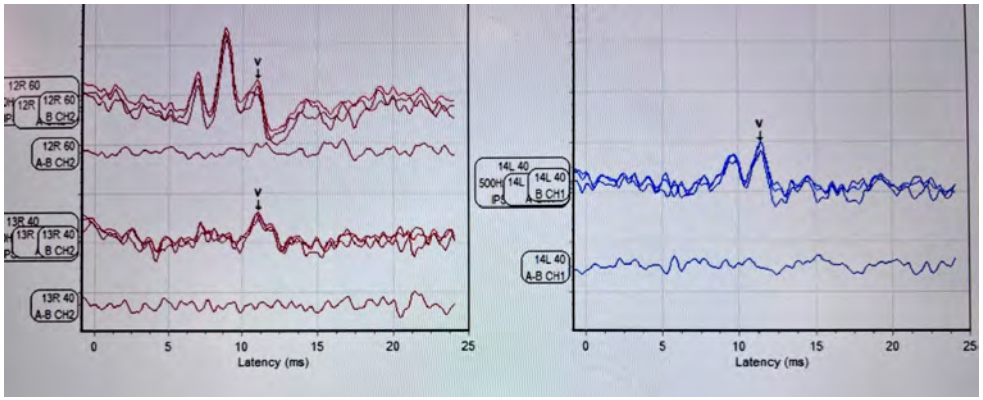
ABR

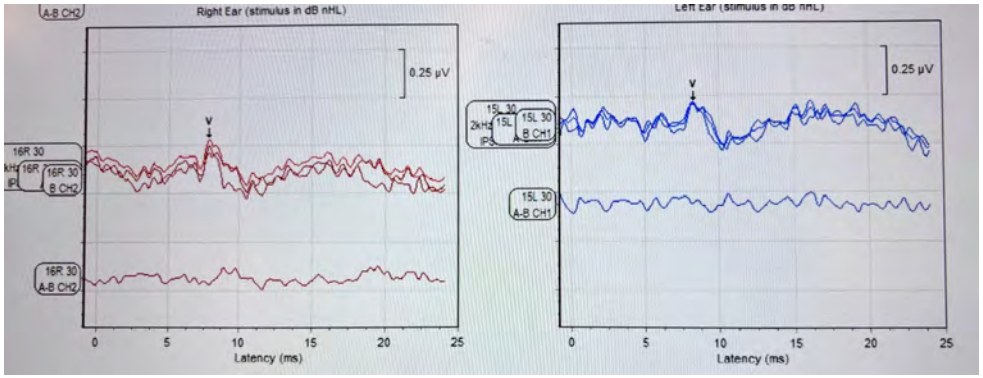




Sedated ABRs in the OR

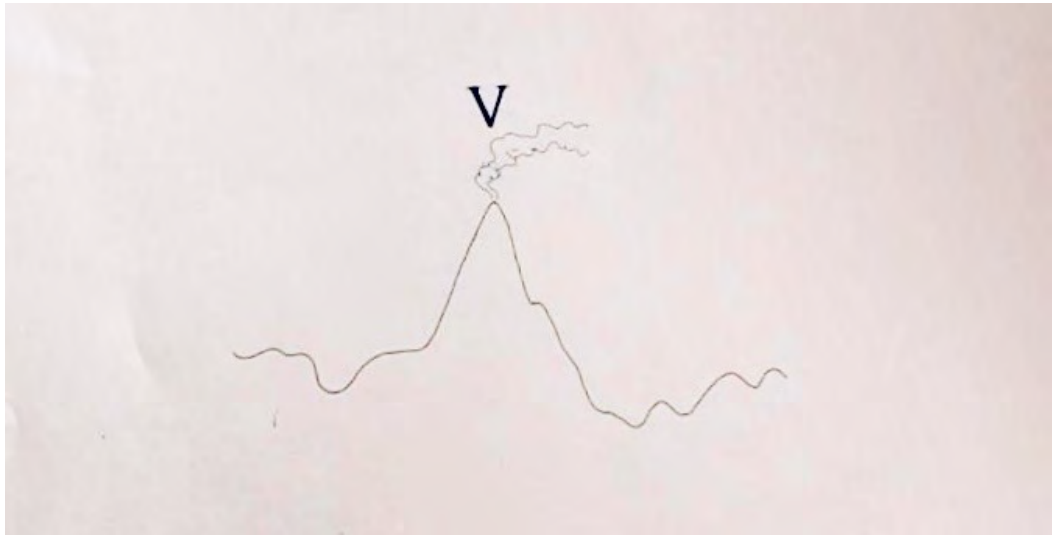
Waveforms


12R 60
12R 60 A-B CH2
12R 60 A-B CH2
13R 40
13R 40 A-B CH2
13R 40 A-B CH2
14L 40
14L 40 A-B CH1
14L 40 A-B CH1
V
0 5 10 15 20 25
Latency (ms)


Right Ear (stimulus in dB nHL)
0.25 µV
16R 30
16R 30 A-B CH2
16R 30 A-B CH2
15L 30
15L 30 A-B CH1
15L 30 A-B CH1
V
0 5 10 15 20 25
Latency (ms)

Family Support

Questions?



Ms. Bubbles

Katie Druyvestein, B.A.

Audiology Student – University of South Dakota

Ms. Bubbles

- 6-years old
- Parents report no speech or language
- Communicates via contact gestures
- Fully occluded cerumen bilaterally, removed manually and with earigator
- Normal tymps, referred on OAE's
- Patient's younger brothers accompanied the appointment, 3 years old and an 18-month-old
  - Family travelled ~4 hours by bus

Audiometric Testing

- Referred on OAEs, type As tymps bilaterally
- Booth testing: Condition play audiometry
- Reliability: Poor
- Did not startle at high intensity levels
  - Could not condition tonal or vibrotactile tasks
- Referred for a sedated ABR the next morning

- ...But what about her little brothers?

Hearing loss within families

- No history of family hearing loss reported by parents
- 3-year-old brother
  - Referred on OAEs, type B tymps bilaterally
- 18-month-old brother
  - CNT OAEs, type C tymps bilaterally

- Would this trigger a referral in our home clinics?

One child turned into family testing

- Scheduled 3 sedated ABRs the next morning, HdlF housed the family overnight.
- When compared to normative data:
  - Both brothers had normal hearing, and were referred to ENT for middle ear pathology
  - Ms. Bubbles had no response to stimulus at the limit of the (Vivosonic)
- Gave the family resources to learn about Guatemalan sign language and nearby services for help

Final Thoughts

Katie Druyvestein, B.A.

Bilateral Hearing Loss on 8-year-old

Andrea Galindo, B.S.

Case History

- Mom stated that teacher had noticed that patient was not able to pay attention in class and that he had a very small vocabulary for his age (8 years old) and only had about 10 words.
- Mom knew he was not able to hear that well and knew that she wanted to drive however long it took to be able to see us and for his kid to be treated.

Case History continued

- Mom rode a motorcycle for 1 hour to be able to be seen by us
- Mom believed that the hearing loss was caused by hits to his head
- Mom stated that compared to her other child she knew he could not hear as well so she would comunicate with him with signs and body language

Results

- Otoscopy
  - Clear on both ears
- Tympanometry
  - As bilaterally

Testing and treatment

- Hearing test results showed moderate sloping to moderately severe sensorineural hearing loss
- Both ears were aidable so we decided to fit him with Oticon Ruby 2 PP with earmolds.

Results

- What happened after the fitting?
- What were the parents' reactions?
- What was the kid's reaction?
- How did we proceed?

Final Thoughts

Andrea Galindo, B.S.

Middle Ear Pathology in Pediatric Audiology: Evolving Diagnoses and the Value of Multidisciplinary Care

Cara Donovan, AuD

The Patient

- M.T.
  - 5-year old boy
  - Healthy
  - No reported ear infections or ear surgeries
  - Possible Autism Dx
  - Non-verbal
  - No hearing evaluation prior to today

Family History

- No known family history of hearing loss
- Mom has two sons and a daughter
  - The two boys are non-verbal and are getting evaluated for autism
  - The girl is typically developing with normal hearing
- M.T.'s brother
  - Diagnosed with a mild high frequency hearing loss in both ears via ABR.

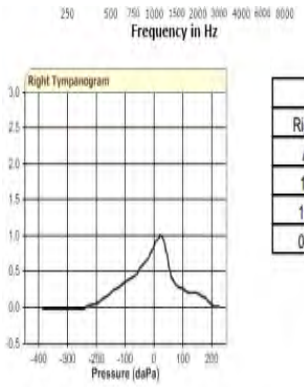
Audiologic Findings

Otoscopy/Cerumen Removal

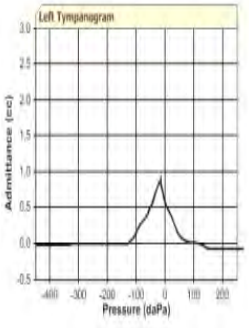
- Occluded cerumen

Tympanometry

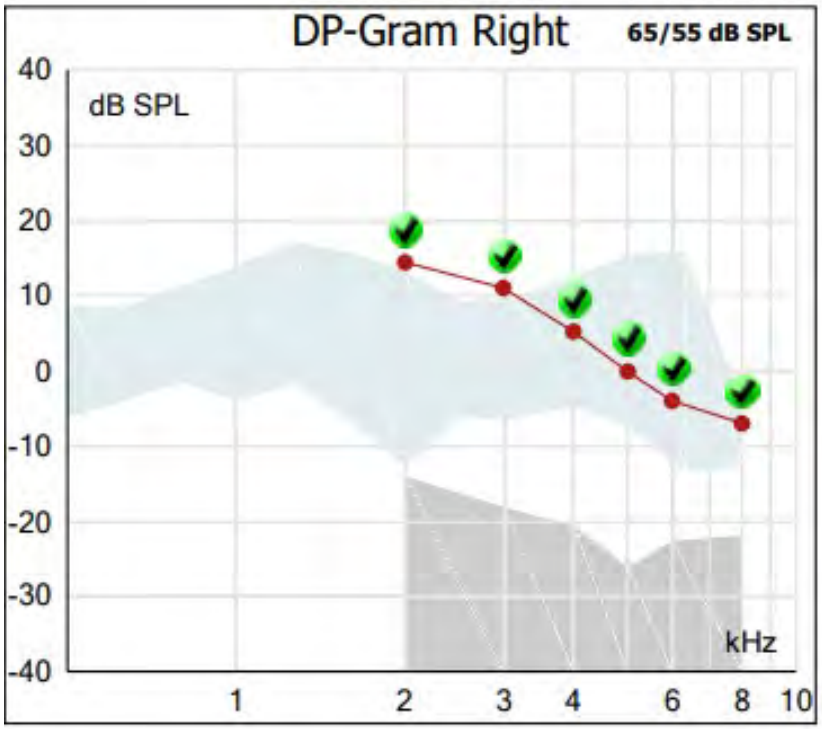
- Within normal limits, bilaterally

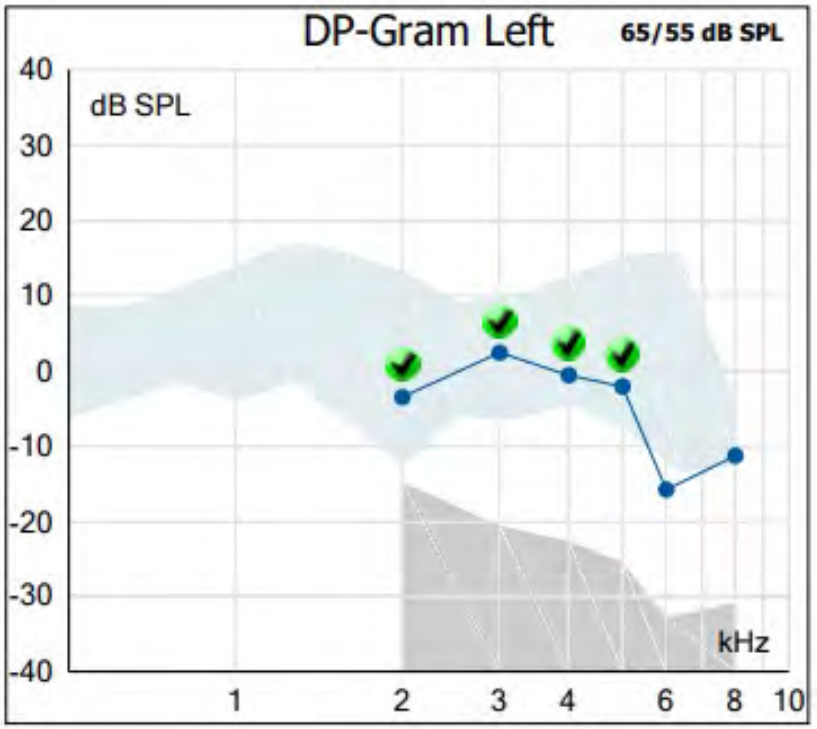


TYMPANOMETRY (226 Hz)		
Right		Left
A	Type	A
15	Pressure (daPa)	-10
1.0	Admittance (cc)	0.8
0.6	ECV (cc)	0.6



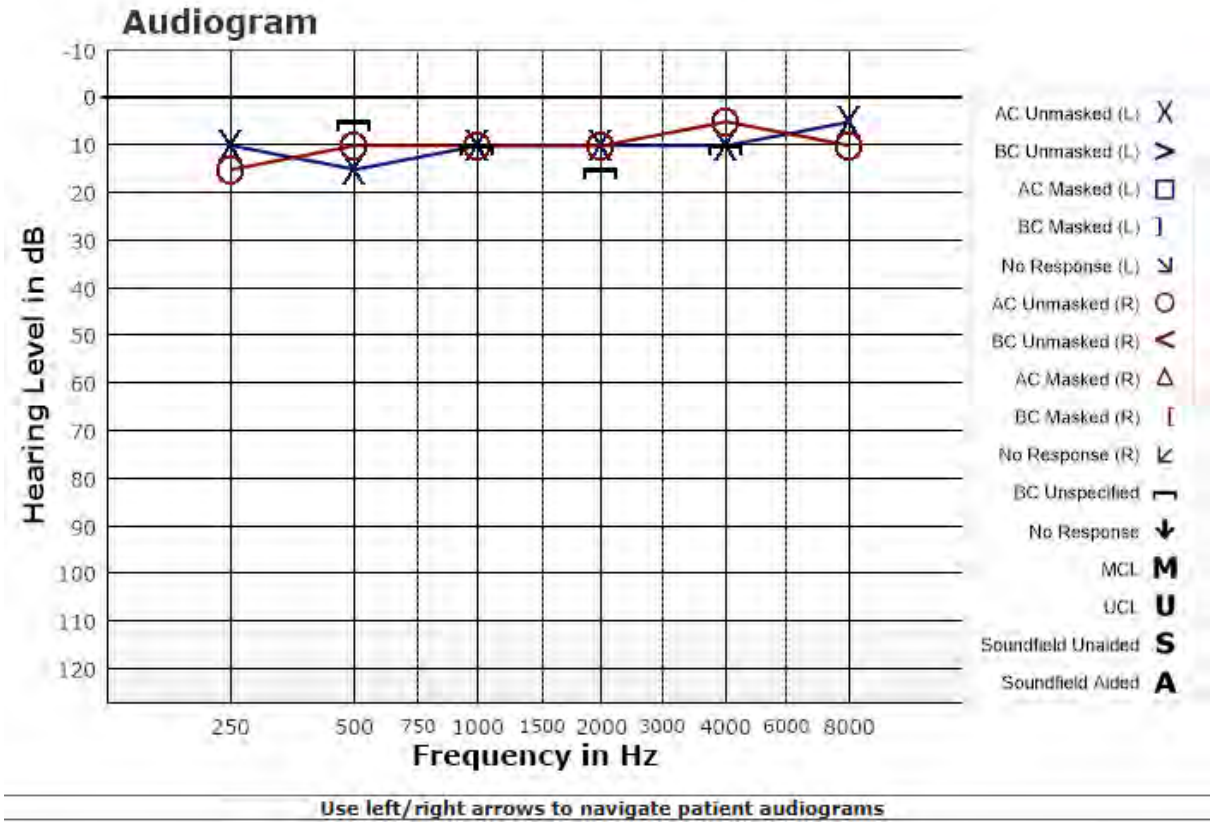
Distortion Product Otoacoustic Emissions





Audiometric Findings

- Hearing within normal limits in both ears.



Take Aways

- Always consider family history when completing screenings.
- Consider the child and their special needs while ensuring accurate findings.
- Remember the sensitivity and limitations of DPOAEs.
- Even in remote areas of the world we can still complete best practices.
- In these cases, providing the family definitive answers is extremely important.

Final Thoughts

Cara Donovan, AuD

Guatemala Case Presentation

Kaitlyn Burkamper, BA

Extern at Ann & Robert H. Lurie Children's Hospital of Chicago

Northwestern University

”Nick”

- 7-year-old male
- History of chronic ear infections
- No parental concern for hearing or speech and language development
- No family history of hearing loss
- Most recent ear infection was one week ago

Initial Testing

- Tympanomery WNL AU
- Essentially present DPOAEs in both ears
- Could not condition to tonal stimuli
  - No response at the output limits of the audiometer
- Present and robust ipsilateral reflexes

ABR Testing

- Natural sleep ABR vs Sedated ABR
- Social considerations
- Patient comfort and considerations
- WNL for each ear

Why is Nick's Case Important?

- Exhausting your tool-box prior to ABR testing
- Natural sleep vs. Sedated ABR
- Rule out what you can while you can
- Zoom out

Final Thoughts

Kaitlyn Burkamper, BA

Soft band implementation on A surgical ear

Meghan Kalhoefer, B.S.

Case History

- 71-year-old female
- Perceives a change in hearing
  - Reports better hearing in her left ear
- Denied otalgia, tinnitus, and noise exposure
- Reports a surgery on right ear 20 years ago
  - Unsure which surgical procedure was done as we did not have access to her medical chart

Otoscopy:

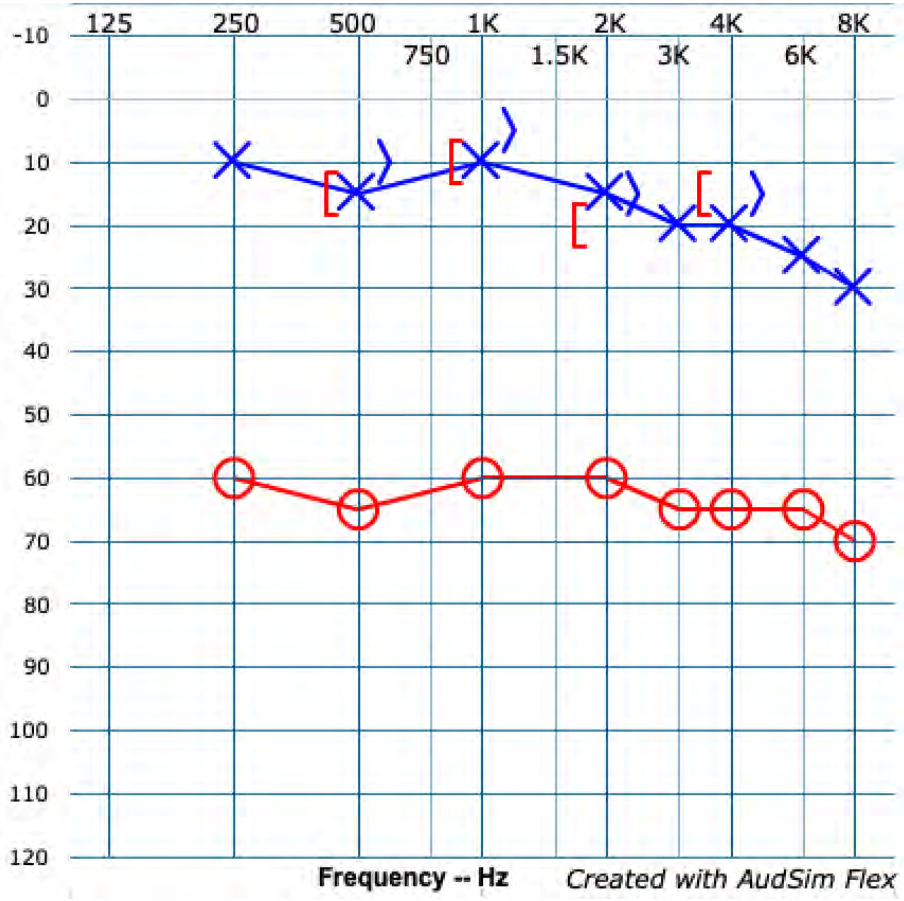
- As: Unremarkable
- Ad: Surgical ear

Tympanometry:

- As: Type A
- Ad: Type B with normal ECV

Pure Tone Audiometry:

- As: Normal sloping to mild SNHL
- Ad: Flat moderately severe CHL



Speech Audiometry:

- DNT

Fit with a soft band Oticon Ponto

- The device bypasses the damage and stimulates both cochlea via bone conduction.
- We were unable to program the Oticon Ponto to the exact hearing loss, so we fit her with a device which was already programmed for a maximum conductive loss.

Image by the University of South Dakota

Results

- We instructed the patient how to use the volume control and let her decide which volume setting was most comfortable.
- Instructed the patient on the importance of proper placement of the device.
  - The sound processor sits behind the ear but should not touch the ear.
- Counseled on how to properly put on the soft band, change the batteries, change the volume level, how to avoid moisture, etc.

Final Thoughts

Meghan Kalhoefer, B.S.

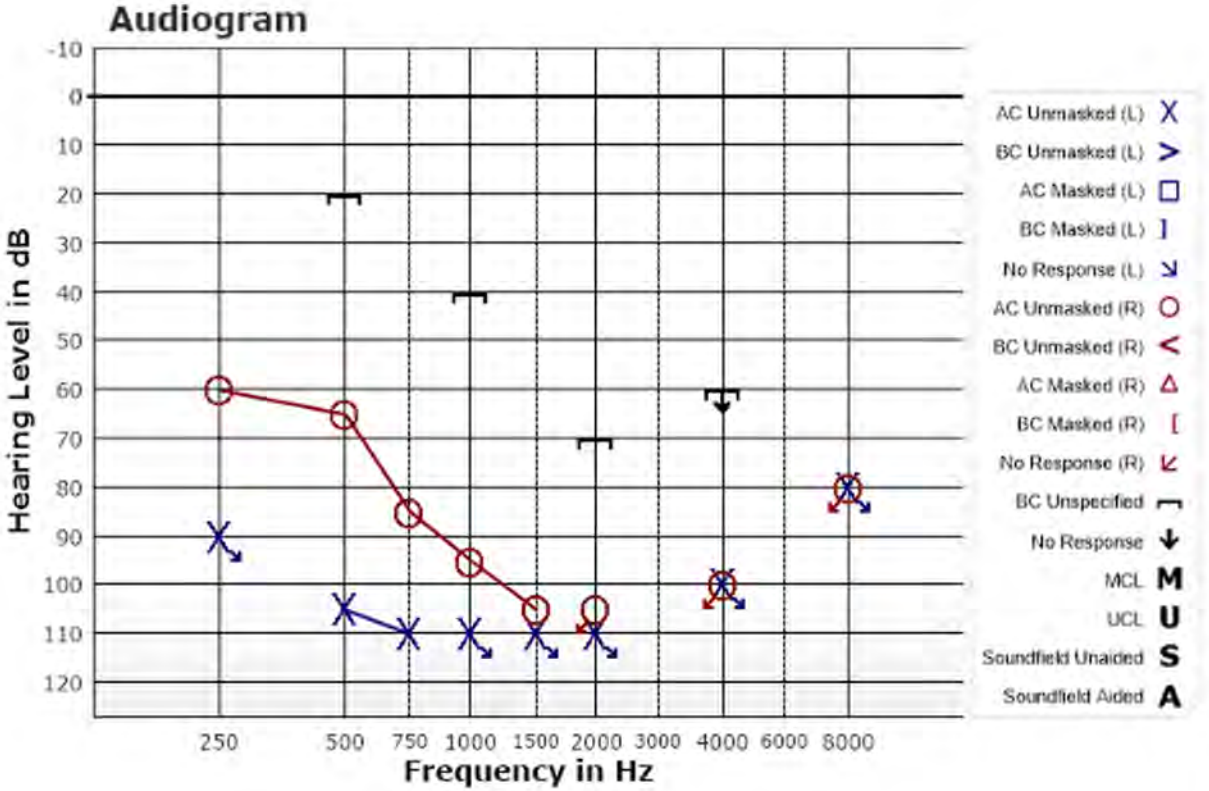
Thinking Outside the Box

Rachel Appleton, Au.D

Case Study

- 57 year old male
- Referred from ENT
- Denied tinnitus and vertigo
- History of ear infections
- Normal otoscopy
- Type A tympanograms
- Unreliable responses during masking

- **Conductive or sensorineural?**



Weber Test

- **Purpose**: To detect unilateral conductive involvement
- **History**: Began as a tuning fork test prior to use of the electric bone oscillator

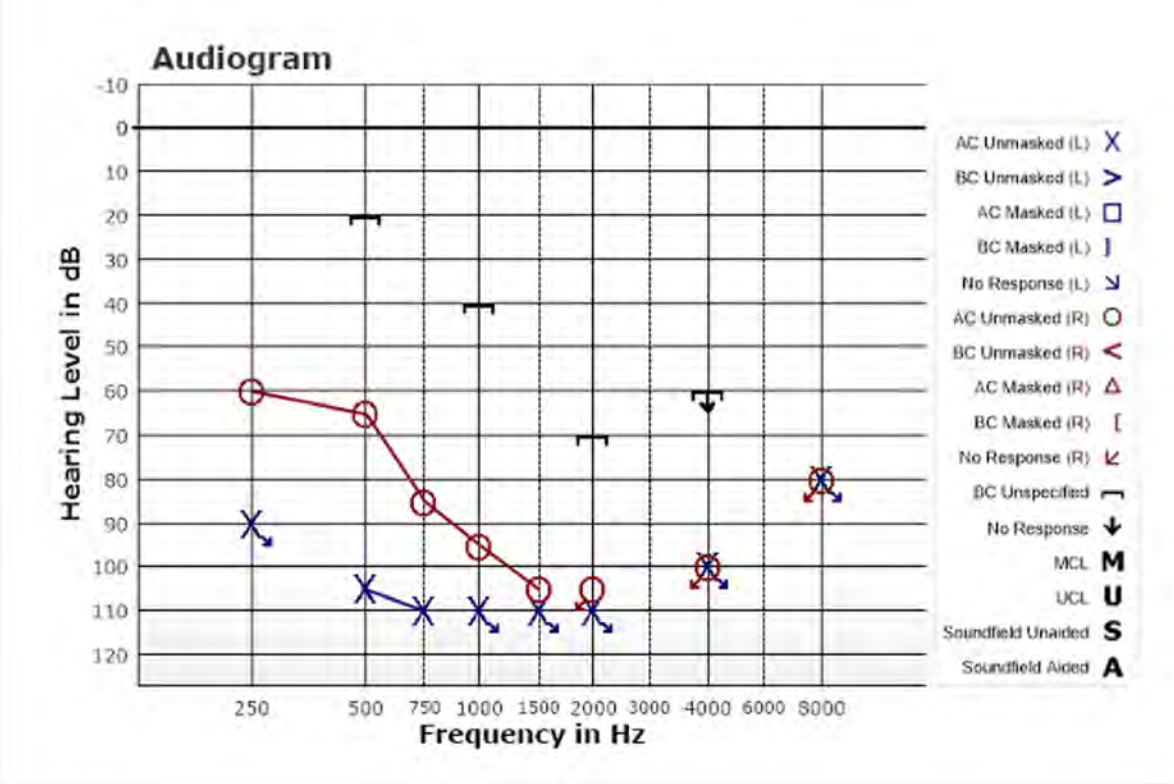
Weber Test

- **Steps**:
  - Present low frequency suprathreshold tone via bone conduction to forehead
  - Ask patient which ear had louder tone

- **Interpretation**:
  - **Positive Weber**: Tone louder in ear with poorer air-conduction thresholds; indicates a unilateral conductive component
  - **Negative Weber**: Tone louder in ear with better air-conduction thresholds or heard equally; indicates no conductive component

Use of Weber Test in Guatemala

- **Positive Weber**: Tone is louder in the left ear
- **Negative Weber**: Tone is louder in the right ear (or the same in both ears)



Pt. heard tone in right ear! Negative Weber / Sensorineural

Next steps

- Reinstructed patient
- Repeated testing using 2 audiologists and conditioning
- Final audiogram was sensorineural

Use of Weber test in a typical clinic

- Use to confirm audiometric findings when things don't match up or make sense
- Quick bedside test
- Difficult to test patients

- **Reminde**r: Screening test only! Does not replace other tests, use in addition to other evaluations

Final Thoughts

Rachel Appleton, Au.D

Emphasizing differential diagnosis and multidisciplinary care in a pediatric case.

Karen Toole, AuD

National Education & Training Specialist,

Oticon Inc.

Case study: JT

11-year-old male resident of rural Guatemala

- Initial visit to Audiology outreach clinic in May 2024.
- Chief complaints were tinnitus, ear infections and trouble sleeping.
- Traveled 2 hours to see the HDLF team for 1 year follow up.

- Primary visit resulted in hearing aid fitting bilaterally.

Case study: JT

11-year-old male resident of rural Guatemala

- Follow up visit in May of 2025
- Primary reason for visit: hearing aids are broken, however not brought in with them today.
- Secondary: increased pressure and pain.
- Mom wants to obtain new hearing aids.

Audiologic test battery

Equipment brought:

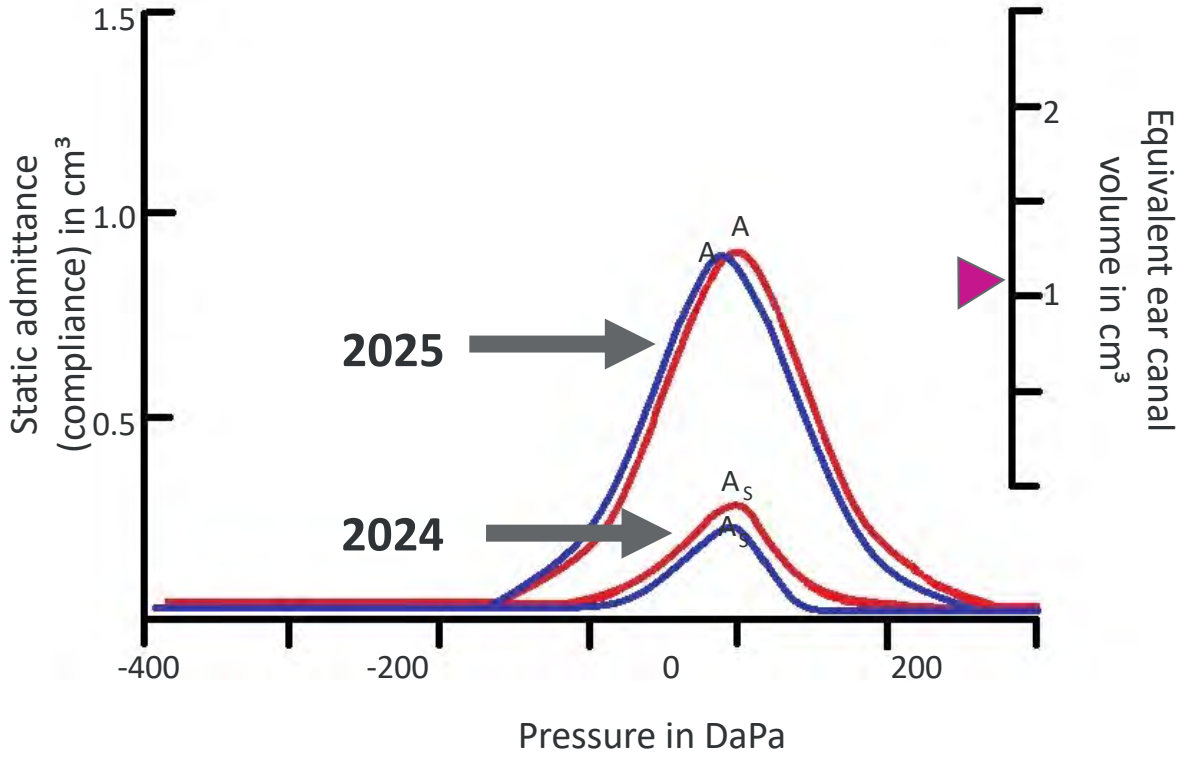
- Otoscopy
- OAE Screener
- Tympanometry and Reflexes
- Pure Tone Air and Bone
  - Kudowave vs Inventis Harp

Case study: JT

Tympanography

Middle ear function results for 2024 and 2025

Tympanogram

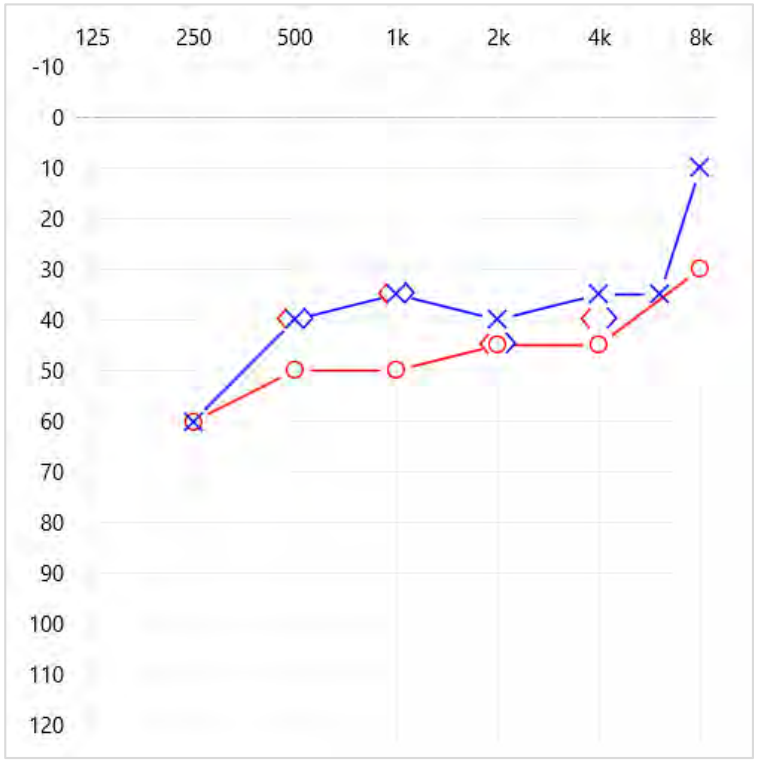


Case study: JT

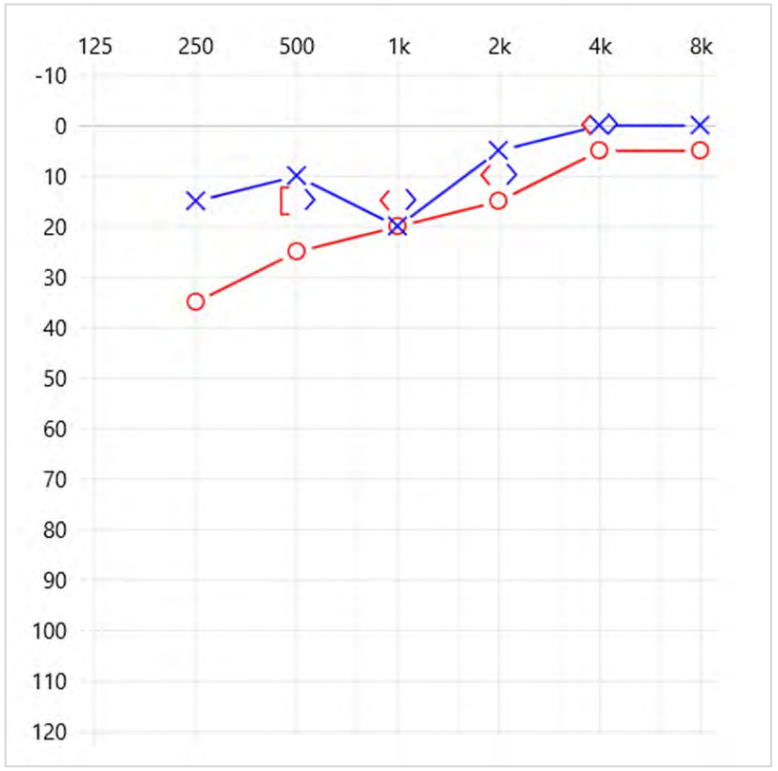
- Otoacoustic Emissions results:
  - JT passed in both ears in both 2024 and 2025.
- OAE Screener used was the Sentiero portable Tympanometer and OAE Screener

Audiometric test results JT

2024 Pure tone results



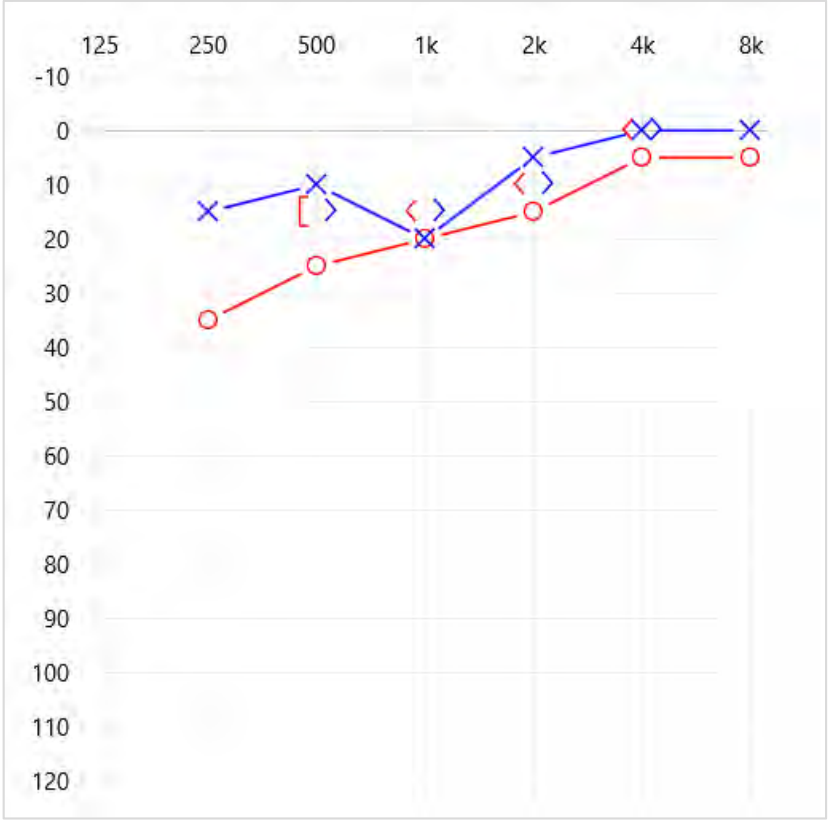
2025 Pure tone results



What could cause such a drastic change in results?

Case study: JT

- Testing was repeated with two audiometers during visit:
  - First with the Kudowave and then repeated with the Inventis Harp.
  - Results for both were identical.
- Discussion with Mom resulted in new info:
  - Jaw Pain/popping
  - Ear Pain
  - He feels the need to relieve pressure constantly



Possible new diagnoses:

The Importance of not assuming a static condition

Temporal Mandibular Joint Disorder (TMJ)

Eustachian Tube Dysfunction (EDT)

Local multidisciplinary team

- Coordinated and comprehensive care

Specialist	Role
Audiologist	Conducts diagnostic testing, monitors hearing, and fits hearing aids or other assistive devices.
Otolaryngologist (ENT)	Evaluates medical causes of hearing loss, orders imaging, manages infections, and performs surgical interventions (e.g., cochlear implants).
Dentist	Monitors oral health, which can be affected by certain syndromes; ensures safe use of hearing aids with head/neck appliances; may assist with mouth-breathing or feeding issues. May assist with treatment with TMJ.

New treatment plan

Why was there a change? What is the new plan?

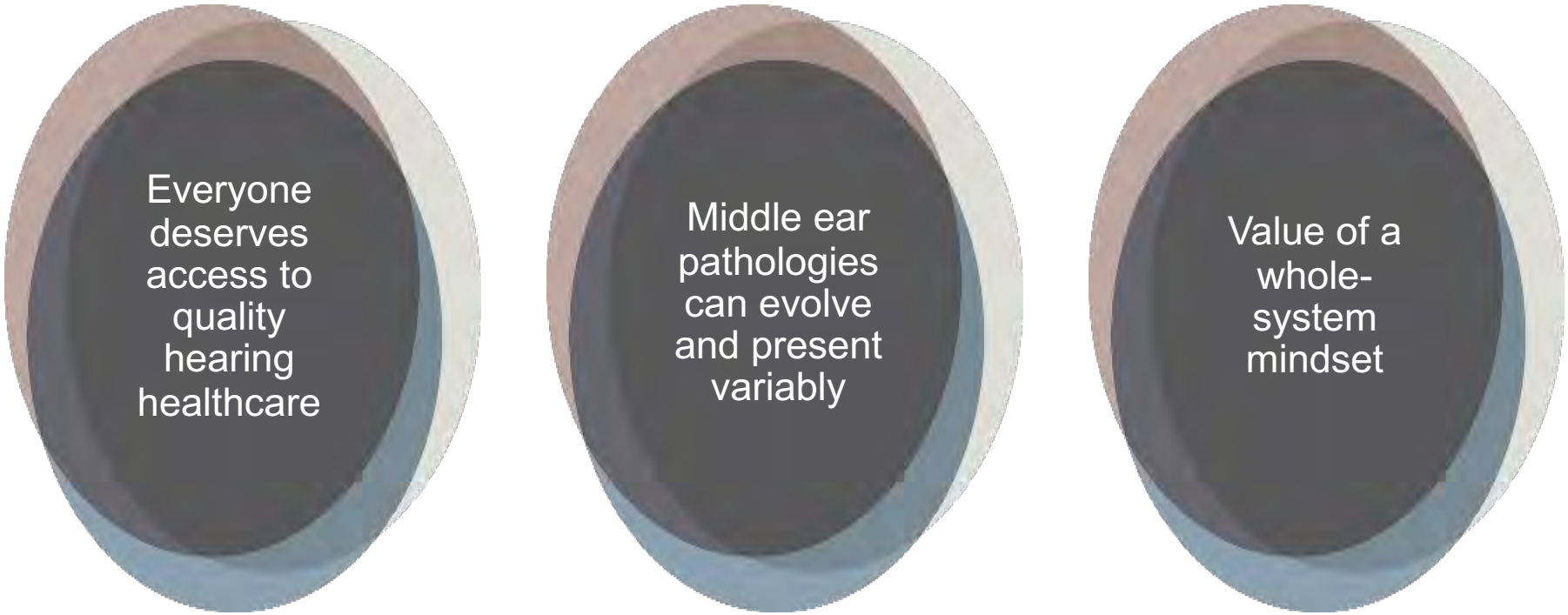
TOYNBEE VS VALSAVA MANEUVERS

ARE HEARING AIDS STILL AN OPTION?

CONTINUED FOLLOW UP

CONTINUOUS MONITORING, NOT A STABLE LOSS

Lessons learned



Summary and Key Takeaways

Investigate more!

“Do the best you can until you know better.
Then when you know better, do better.”

— Maya Angelou

Thank you!

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