

Case studies and clinical tips for improving speech recognition and addressing patient complaints

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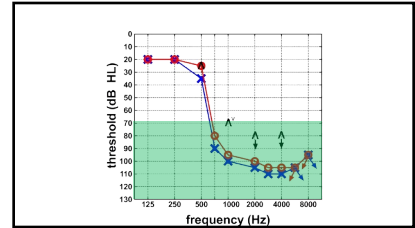
VANDERBILT UNIVERSITY  
MEDICAL CENTER

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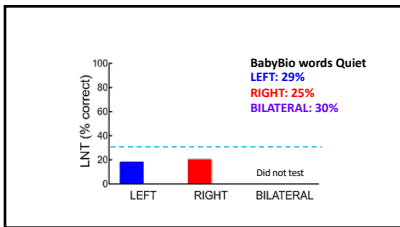
**Case 1**

- 4.5-year old female
- Term birth, no complications
- No family history of hearing loss, passed NBHS
- Identified at 3 years of age with severe-to-profound SNHL in the high-frequency range
  - Etiology: mutations in TMRSS3 gene
    - Autosomal recessive nonsyndromic hearing loss
- Fitted with HAs at 3 years of age, home FM systems
- Auditory verbal therapy 2x/week
- Home audiologist and ENT → too much hearing for CI

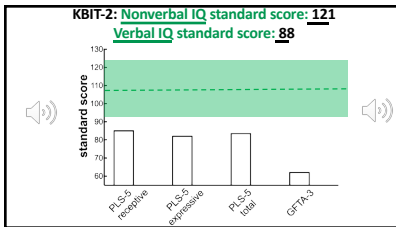
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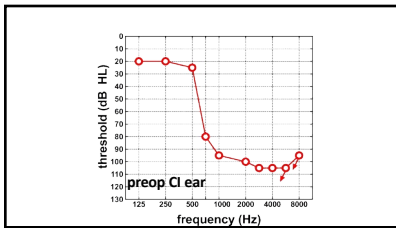
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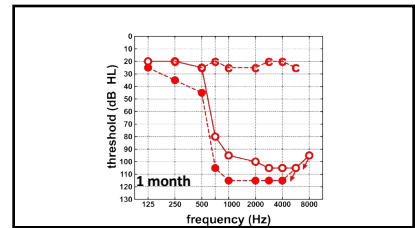
**Case 1**

- CI in RIGHT ear 1 month after CI workup
  - 4.5 years old
- Nucleus CI522

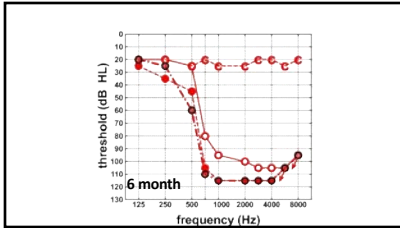
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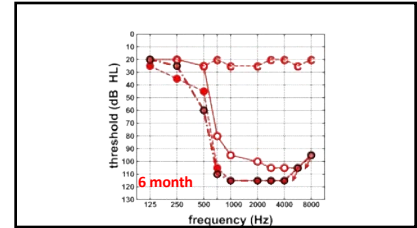


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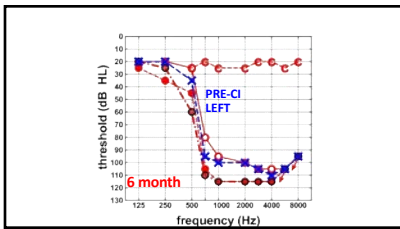
**Case 1**

- CI in **RIGHT** ear 1 month after CI workup
  - 4.5 years old
  - Nucleus CI522
- 3 months after **RIGHT** CI → CI532 in **LEFT** ear

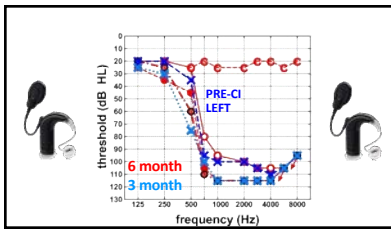
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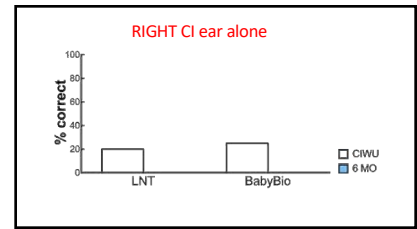
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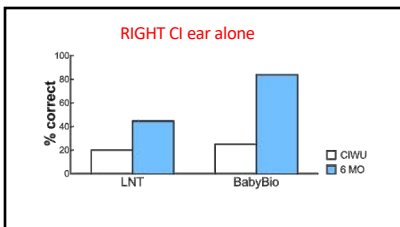
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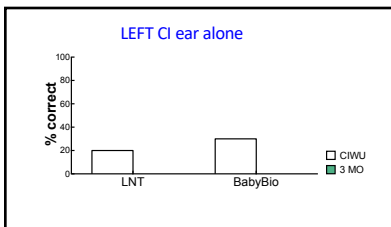
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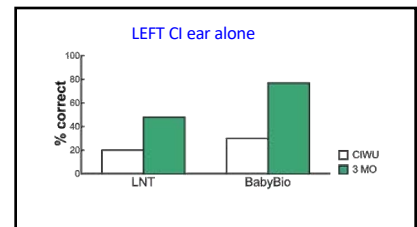
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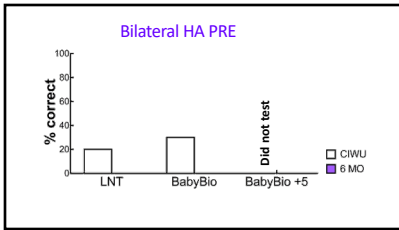
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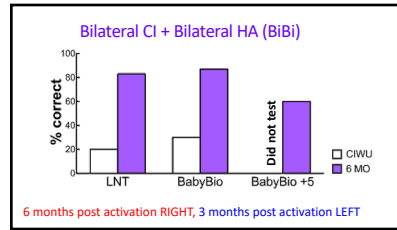
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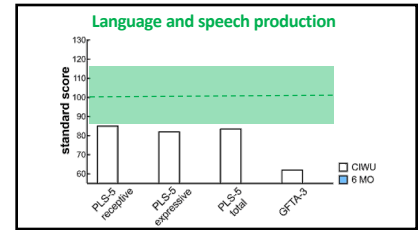
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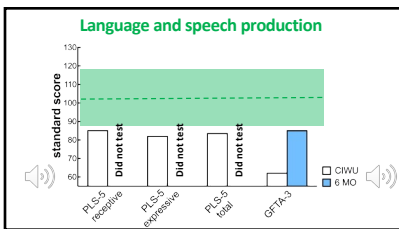
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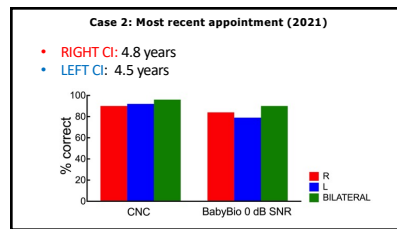
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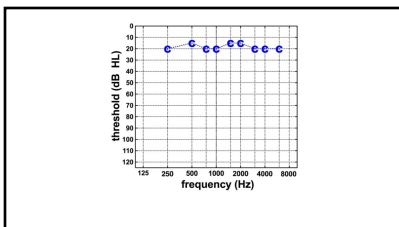
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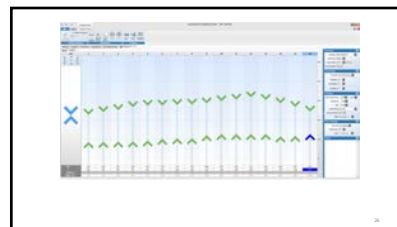
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- CASE 2**
- 45-year old female
  - Implanted at a relatively new CI center 9 months ago
  - Primary complaint:
    - constant humming sound
      - using both ClearVoice medium & high
  - Referring audiologist lowered the IDR from 80 to 70 dB

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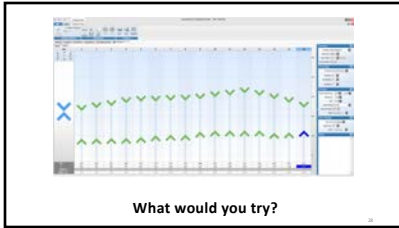
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- What would you try first?
- Lower and/or check M levels
  - Lower and/or check T levels
  - Decrease IDR to 60 dB
  - Try an UltraZoom program

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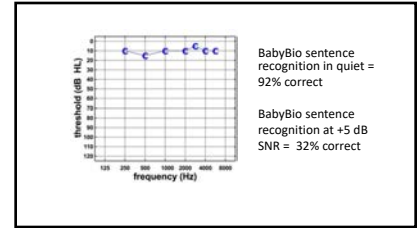


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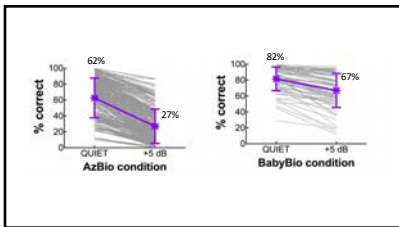
**CASE 3**

- 10-year old male
- History of progressive hearing loss, implanted 3 years ago at another clinic
  - CI24RE(CA)
- Family just relocated to the area, transferred care to your clinic
- No one in family has complaints or concerns
- But an audiologist at your center notes the following:

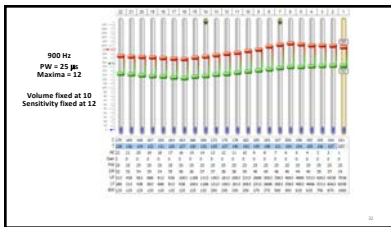
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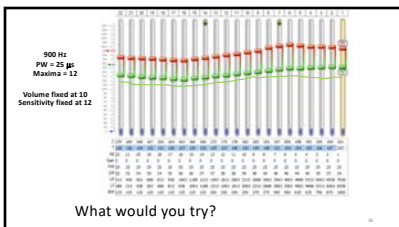


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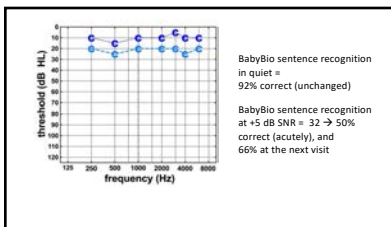
What would you try first?

01 Lower and/or check C levels	02 Lower and/or check T levels	03 Add SCAN	04 Increase loudness growth (G) setting
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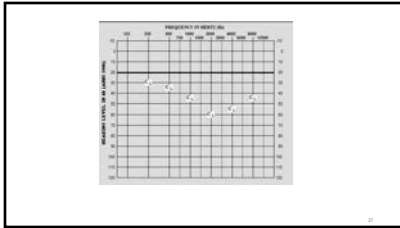


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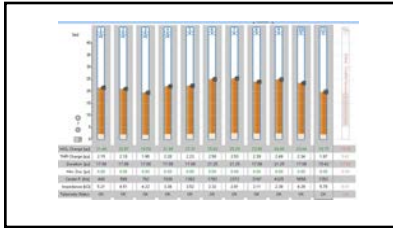
**CASE 4**

- 63-year old female
- 1 year post-activation
- Left MED-EL Synchrony FLEX24
  - Sonnet EAS

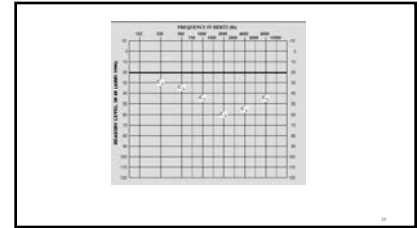
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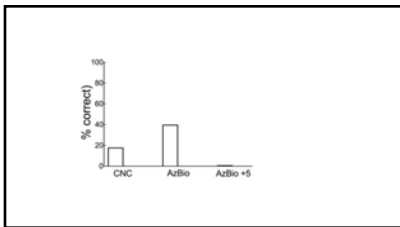
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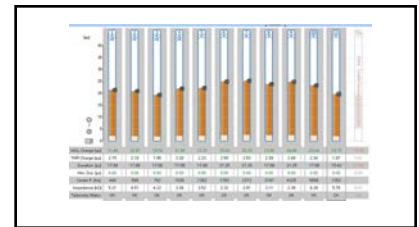


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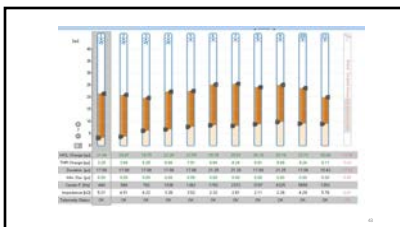
What would you try first?

- 01 Increase and/or check MCL levels
- 02 Increase and/or check THR levels
- 03 Switch to HDCIS
- 04 Increase magplaw to > 1000

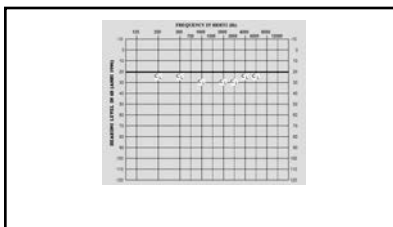
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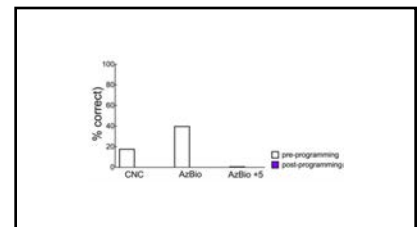
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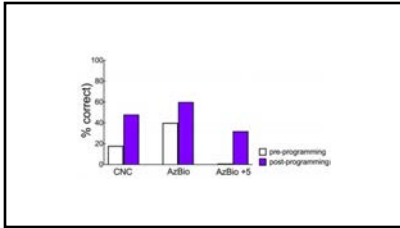
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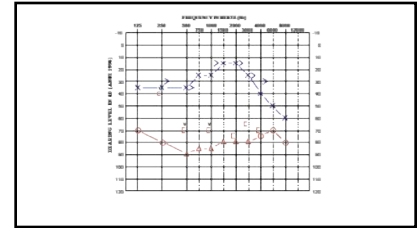


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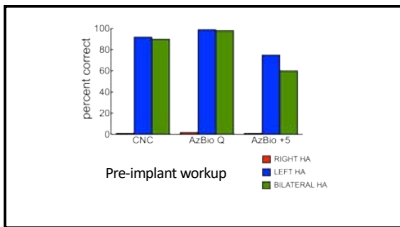
**CASE 5**

- 60-year old male
- Trial attorney
- Asymmetric hearing loss for 8 years
  - Meniere's Disease
- 1 year prior to pre-implant workup → significant distortion in right ear
- Phonak BICROS
  - CROS on the R ear
  - Audeo S Smart IX on L side

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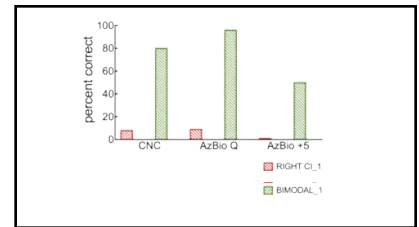


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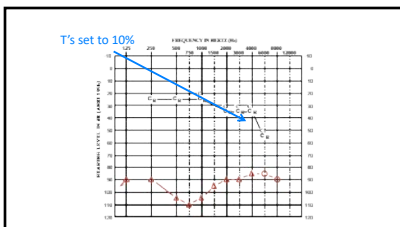
**Patient details**

- Right ear: HR90K mid-scala
- HiRes Optima-P
- T levels set to 10% of M levels
- IDR: 60 dB
- "I'm not a good performer with my implant."
- Traveled to Vanderbilt to enroll in research
- image-guided CI programming (IGCIP)
- electrode fully in scala tympani

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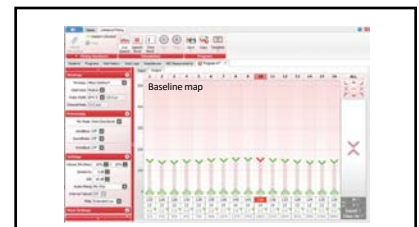
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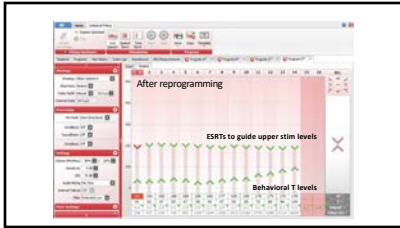
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- Research assistant brought his audiogram to me at 5:00 pm
- ESRTs then swept and balanced M levels using tone bursts
- Switched from Optima-P to Optima-S
- E15 & E16: **very poor** loudness growth
  - Deactivated E15 & E16
- Measured T levels
  - Increased IDR from 60 to 70 dB
  - Re-measured aided detection thresholds

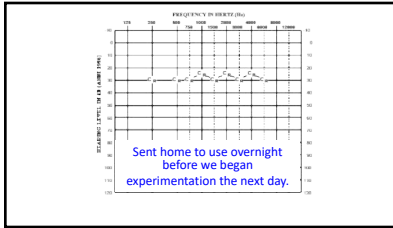
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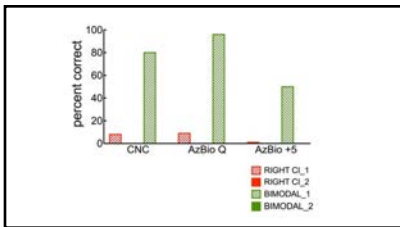
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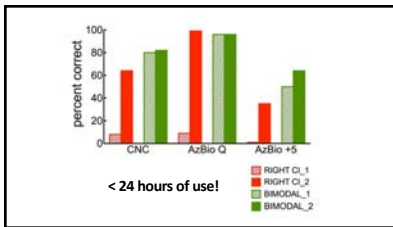
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Results:  
Speech understanding

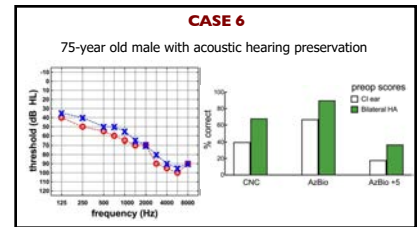
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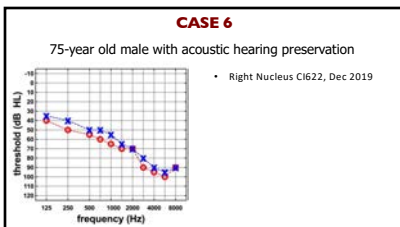
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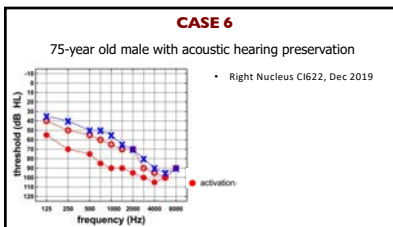
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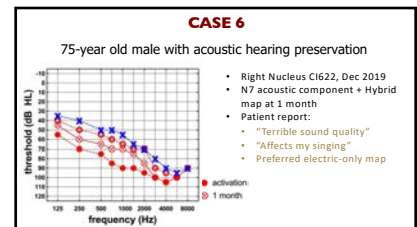
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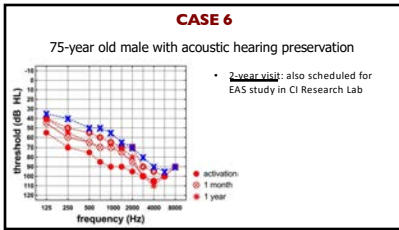
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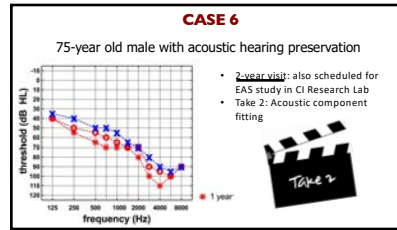
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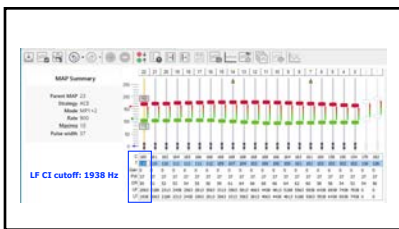
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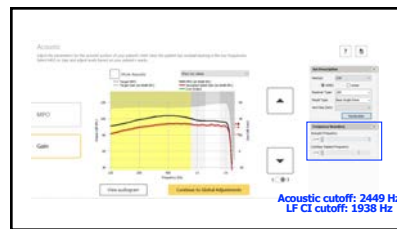
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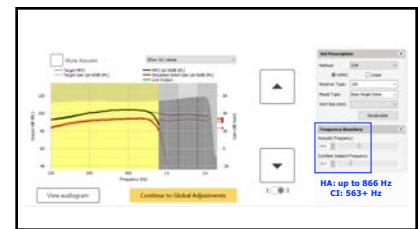
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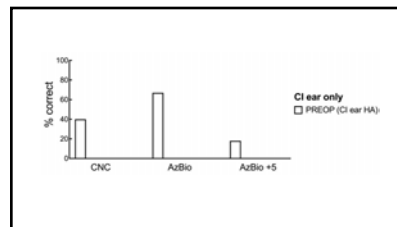
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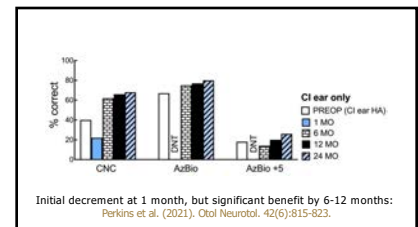
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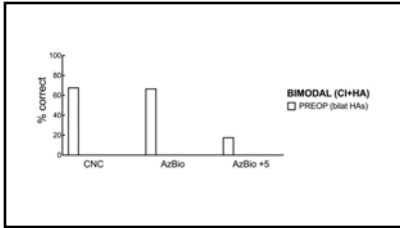


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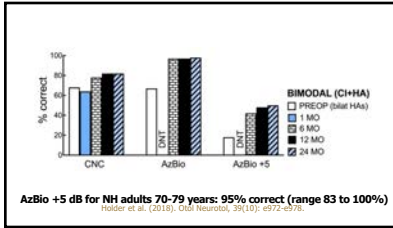


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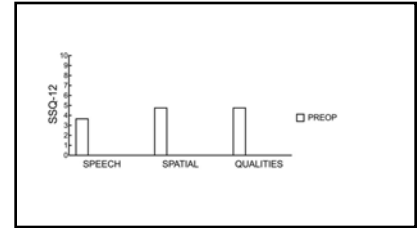




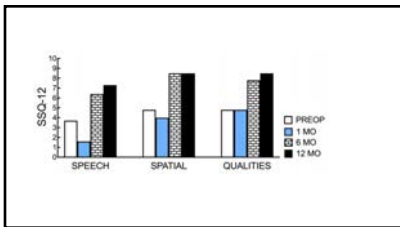
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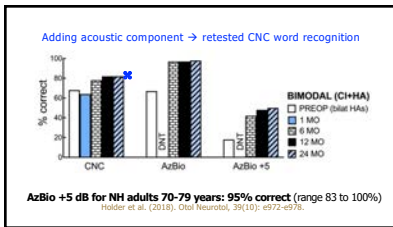
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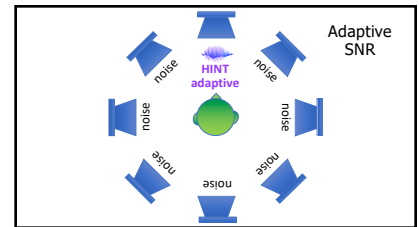
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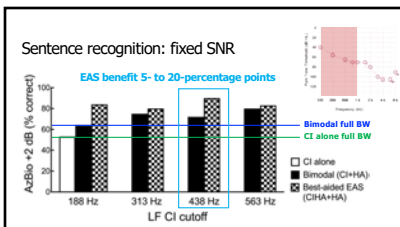
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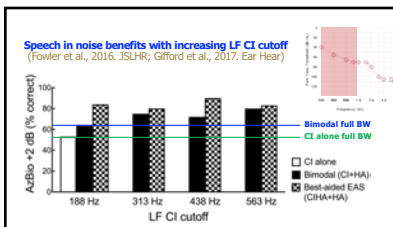
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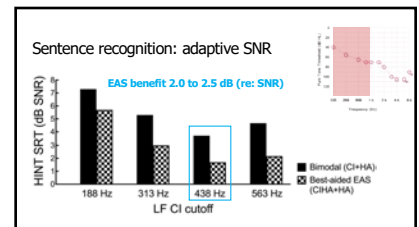
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**CASE 6**  
75-year old male with acoustic hearing preservation

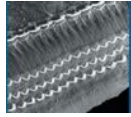
**Summary:**

- Left the study visit with EAS/Hybrid programs
  - Acoustic BW: up to 866 Hz
  - Electric BW: 438-7938 Hz
- "The improvement is enormous. I sang the whole way home. I can't wait till our next rehearsal!"



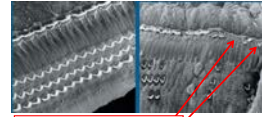
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**Case 7**  
Cochlear Dead Regions  
area of the cochlea with little-to-no surviving IHCs



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**Case 7**  
Cochlear Dead Regions  
area of the cochlea with little-to-no surviving IHCs



Severe to profound hearing loss associated with hair cell damage

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**Prevalence of cochlear dead regions**

[Preminger et al. \(2005\). JAAA. 16:600-613](#): n = 49 patients, 29% had dead regions

[Vinay & Moore \(2007\). Ear Hear. 28:231-241](#): n = 317 patients, 592 ears, 57% of patients (46% of ears) with thresholds > 70 dB HL had dead regions

[Hornsby & Dundes \(2009\). JAAA. 20:251-263](#): n = 59 patients (117 ears), 84% of patients had dead regions

[Cox et al. \(2011\). Ear Hear. 32\(3\): 339-348](#): n = 170 patients (307 ears), 31% of patients (23% of ears) had dead regions

85

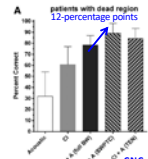
**Zhang et al. (2014). Ear Hear, 35:410-417.**

- N = 22 bimodal adults, (11 with DR)
- What is the effect of amplified bandwidth in ears with DR vs those without DR?

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**Zhang et al. (2014). Ear Hear, 35:410-417.**

**A** patients with dead region 12-percentage points



Percent Correct

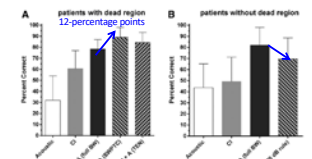
CNC words

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**Zhang et al. (2014). Ear Hear, 35:410-417.**

**A** patients with dead region 12-percentage points

**B** patients without dead region



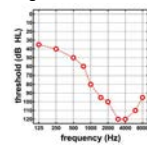
Percent Correct

CNC words

88

**Case 7**  
Bimodal hearing

- 75-year old male
- CI422 in left ear
- Considerable health problems
- Struggling with CI & HA



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DR at 1000 Hz

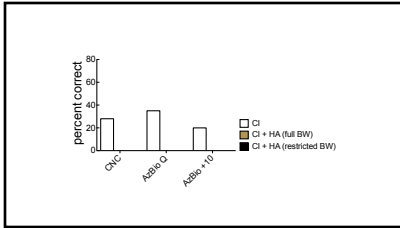


patient's preferred HA setting

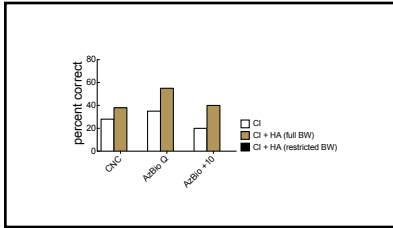
patient's HA setting → max audibility

patient's HA setting → remove audibility in dead region

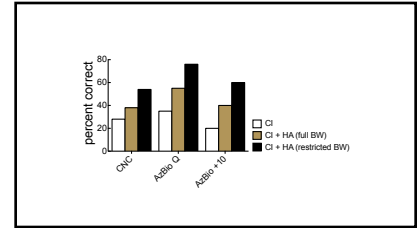
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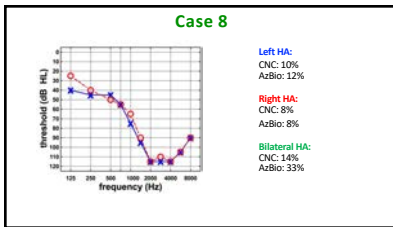


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**Case 8**

- 78-year old male
- Longstanding bilateral SNHL likely due to noise exposure (military service, farming equipment)
- Wore HAs for 30 years prior to pursuing CI

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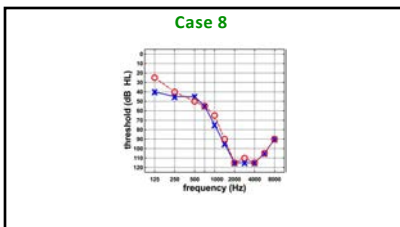


95

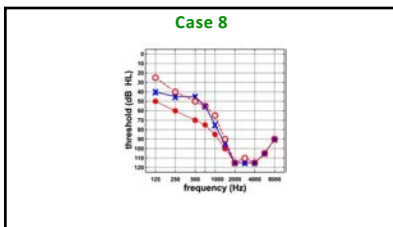
**Case 8**

- 78-year old male
- Longstanding bilateral SNHL likely due to noise exposure (military service, farming equipment)
- Wore HAs for 30 years prior to pursuing CI
- Right** CI512

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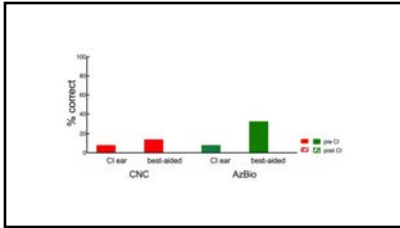


98

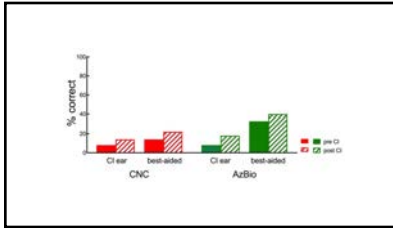
**Case 8**

- 78-year old male
- Longstanding bilateral SNHL likely due to noise exposure (military service, farming equipment)
- Wore HAs for 30 years prior to pursuing CI
- Right** CI512
- Fitted with N7 + acoustic component
- Not happy with CI*
- Not doing well*
- Datalogging: 9.4 hours/day

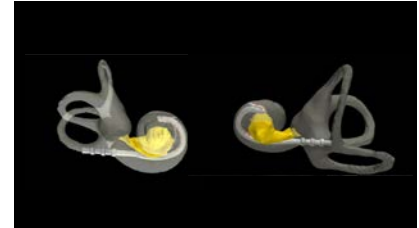
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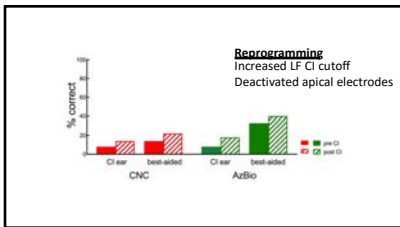
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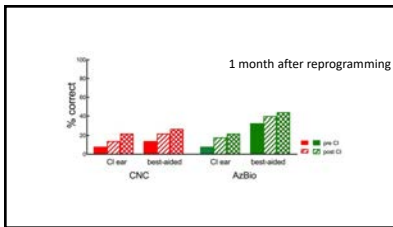
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104

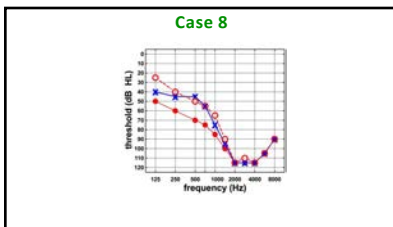
**Case 8**

- 78-year old male
- Longstanding bilateral SNHL likely due to noise exposure (military service, farming equipment)
- Wore HAs for 30 years prior to pursuing CI
- **Right** CI512
- Fitted with acoustic component in Hybrid map
- Not happy with CI
- Not doing well
- Datalogging: 9.4 hours/day
- **EXPLANTED & reimplanted (CI512 with intraop CT)**

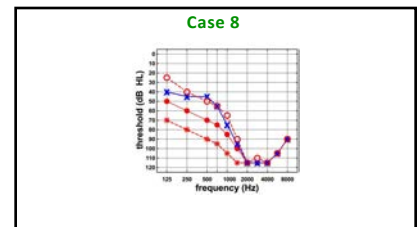
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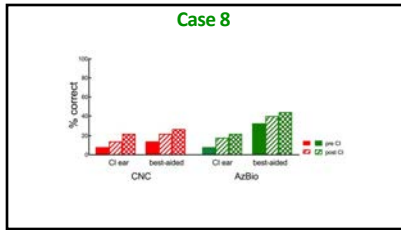
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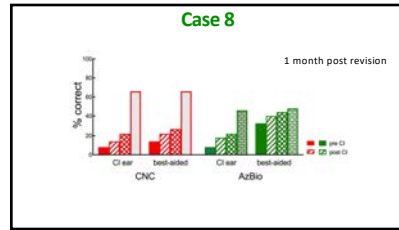
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Questions?  
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 Vanderbilt Cochlear Implant Research Laboratory

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