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Hear now. And always

What happens during a cochlear implant candidacy evaluation?

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Cochlear

Tracy Murphy, AuD
North Shore Audio-Vestibular Lab

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Financial Disclosures

Terry Zwolan

- Employee, Cochlear Americas

Tracy Murphy

- Employee, North Shore Audio Vestibular Lab

Learner Outcomes

- After this course, participants will be able to describe the FDA approved indications for patients with Single Sided Deafness.

- After this course, participants will be able to list procedures typically used in a cochlear implant candidacy evaluation.

- After this course, participants will be able to describe, to patients, what will happen during a cochlear implant candidacy evaluation.

Our Mission

We help people hear and be heard.

We **empower** people to connect with others and live a full life.

We **transform** the way people understand and treat hearing loss.

We **innovate** and bring to market a range of implantable hearing solutions that deliver a lifetime of hearing outcomes.

Introduction

- Cochlear Implants were first approved by the FDA for use in adults in 1985 and for children in 1990.
- Since that time, many changes have taken place, including improvements in technology, changes in CI candidacy, and changes in procedures used to determine candidacy for a CI.
- Today, we'll use case studies to demonstrate procedures being used to evaluate CI candidacy of various patients, including traditional patients (those with bilateral moderate to profound SNHL), and those most recently able to receive a CI, such as those with Single Sided Deafness (SSD).
- This course will provide case examples of patients who have been evaluated for a cochlear implant, including those with Single Sided Deafness (SSD), Traditional candidates, and patients who qualify for hearing preservation surgery, such as those with normal low frequency hearing and severe to profound high frequency hearing loss*.

*The Cochlear Nucleus Hybrid L24 cochlear implant system is indicated for unilateral use in patients aged 18 years and older who have residual low-frequency hearing sensitivity and severe to profound high-frequency sensorineural hearing loss, and who obtain limited benefit from appropriately fitted bilateral hearing aids.

Adult Indication: Nucleus® Cochlear Implant

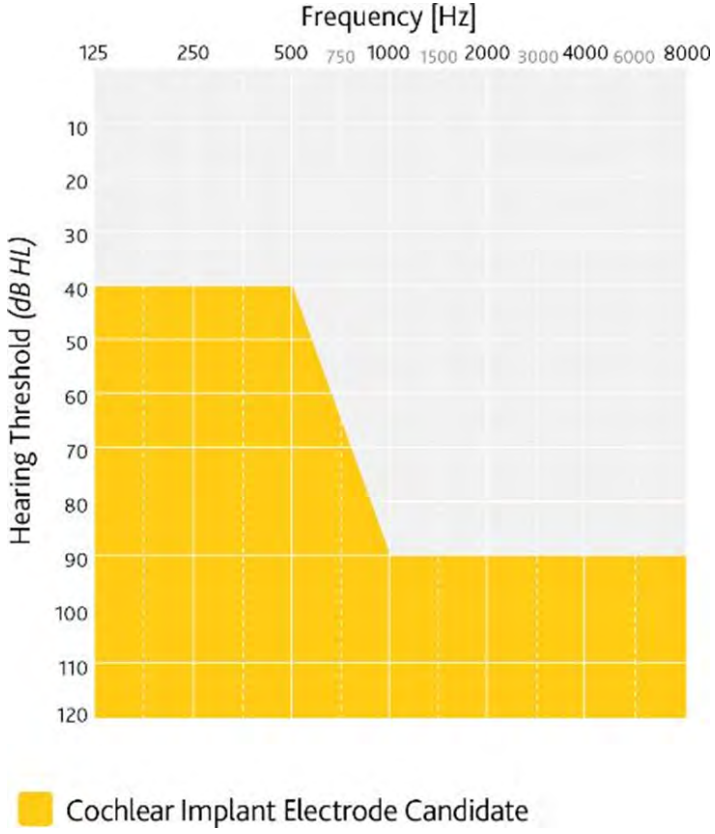
Nucleus Cochlear Implants are intended for use in adults who have bilateral moderate to profound sensorineural hearing impairment and obtain limited benefit from appropriately fit bilateral hearing aids.

- ✓ Moderate to Profound hearing thresholds in the low frequencies

  Profound (≥ 90 dBHL) in the mid to high frequency range

- ✓ Limited benefit from amplification

  50% or less in the ear to be implanted (60% or less in the best-aided condition) on recorded sentence measures



NOTE: As of 9/26/22 the Medicare[1] coverage policy now states *limited benefit from amplification as defined by test scores* ***less than or equal to 60%*** *correct in the best-aided listening condition on recorded tests of open-set sentence cognition*.

1. https://www.cms.gov/medicare-coverage-database/view/ncacal-decision-memo.aspx?proposed=N&ncaid=306

Adult Indication: Hybrid™ L24 Implant*

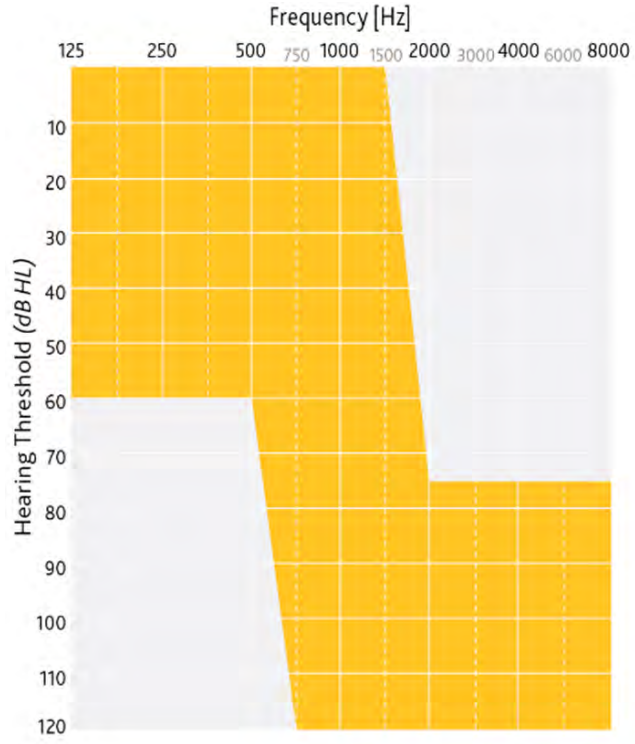
The Nucleus Hybrid L24 cochlear implant system is indicated for unilateral use in patients aged 18 years and older who have residual low-frequency hearing sensitivity and severe to profound high-frequency sensorineural hearing loss and who obtain limited benefit from appropriately fit bilateral hearing aids.

✓Severe to profound high frequency hearing loss

≥ 75 dBHL PTA for 2, 3 & 4 kHz

✓Limited benefit from amplification

10-60% aided word score in the ear to be implanted and up to 80% aided word score in the opposite ear



*The Acoustic Component should only be used when behavioral audiometric thresholds can be obtained and the recipient can provide feedback regarding sound quality. The Hybrid L24 Implant is approved in the US for adults 18 and older for unilateral use only.

Single Sided Deafness (SSD)

Single Sided Deafness: (5 years +)

Ear to be implanted:

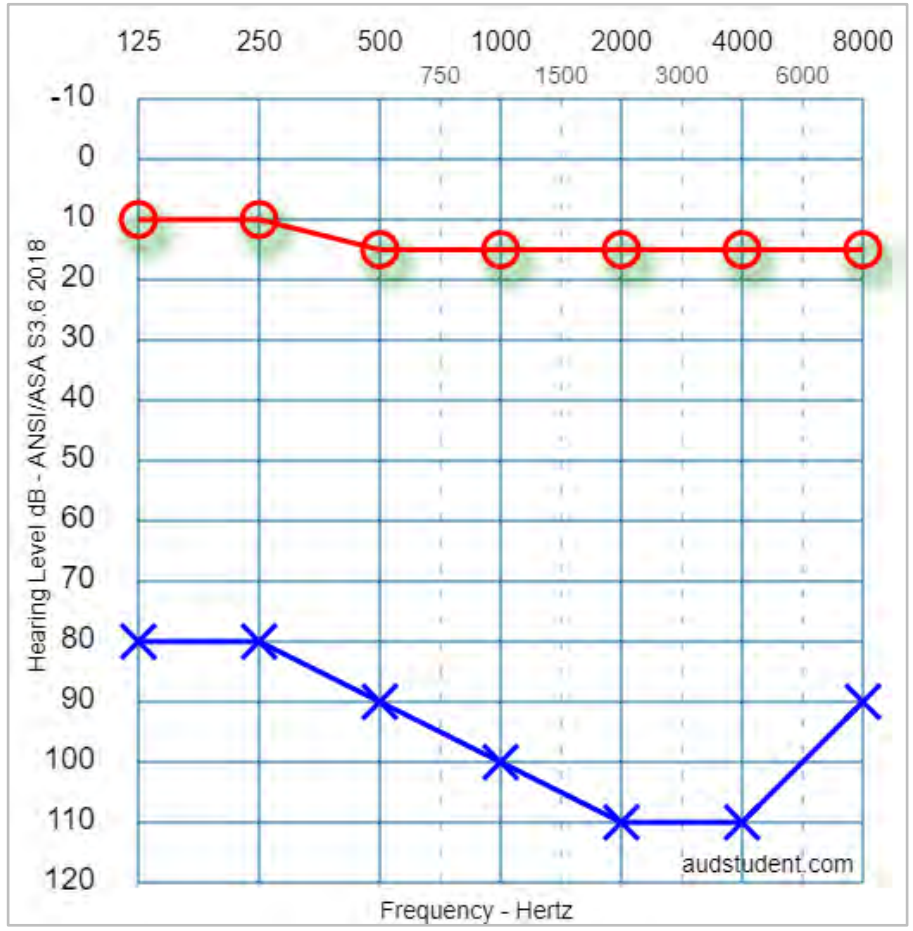
Severe to profound sensorineural hearing loss defined as:

Pure-tone average at .5, 1, 2, 4 kHz >80 dB HL

Aided CNC word score or developmentally appropriate word test ≤ 5%

Contralateral Ear:

Normal or near normal hearing defined as: Pure-tone average at .5, 1, 2, 4 kHz ≤30 dB HL



When to Consider a Cochlear Implant Evaluation (Adults)

If your patient meets ANY of the criteria below, consider referring the patient for a full cochlear implant evaluation to determine candidacy*

Daily Interactions

Patient experiences ANY of the following:

- ☐ Struggle to hear on the phone
- ☐ Have difficulty understanding unfamiliar speakers
- ☐ Withdraw from social events
- ☐ Often need others to repeat themselves

Audibility

Greater than or equal to

60 dB[1]

(in the better ear)

Pure Tone Average (0.5, 1k, 2 kHz)

Speech Understanding

Less than or equal to

60%[1]

(in the better ear)

Unaided Word Recognition Score

*This provides a recommendation of when an adult may be referred for a cochlear implant evaluation but does not guarantee candidacy based on indications. (Only for adults). For more information on candidacy, please visit www.cochlear.us/cicandidacy

1. Zwolan TA, Schvartz-Leyzac KC, Pleasant T. Development of a 60/60 guideline for referring adults for traditional cochlear implant candidacy evaluation. Otolo Neurotol, 41:895-900.

What Happens During an Adult Cochlear Implant Evaluation

Goals

- To determine if average benefit from a CI is **better than** the individual's **benefit from Has**
- To assess the individual's **goals** and **motivation**
- To determine if a CI will be recommended for improved hearing

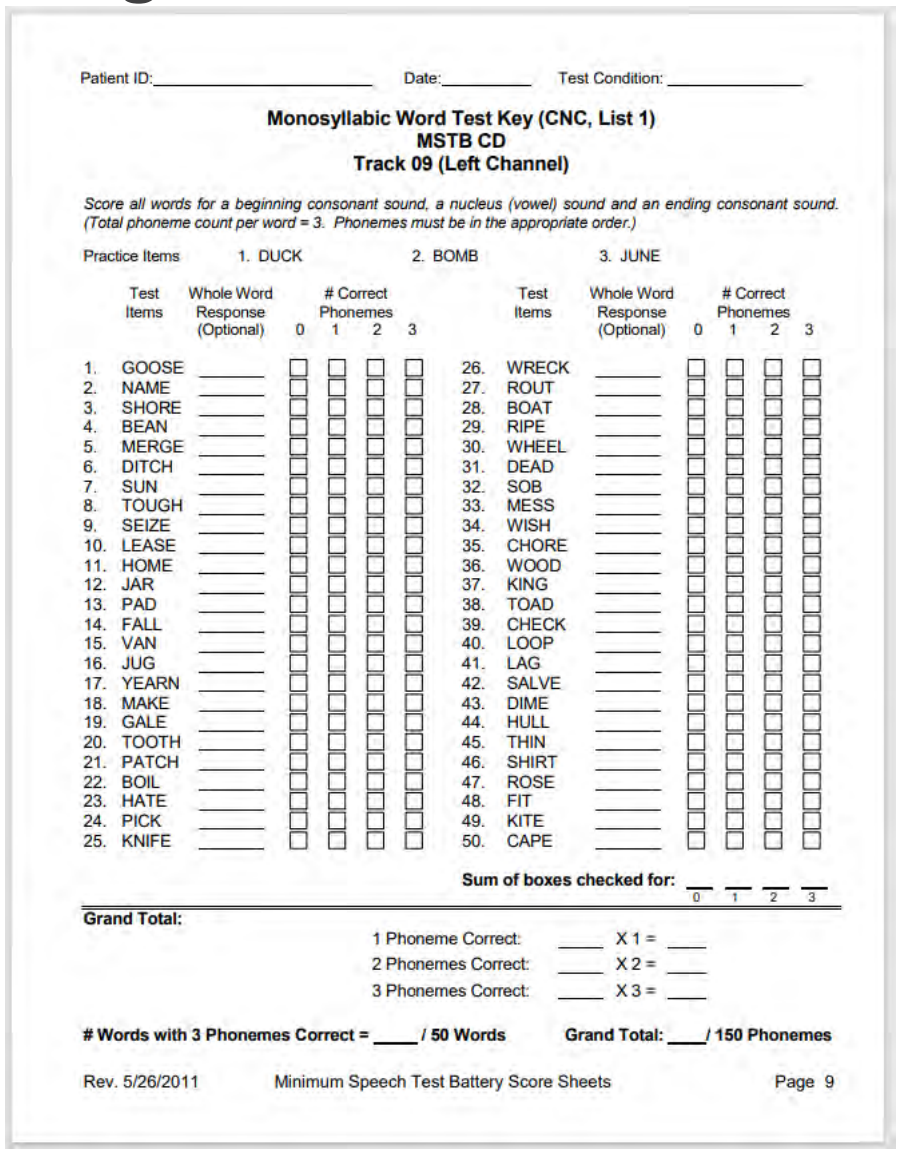
What's Included?

- **Aided** speech perception testing using optimized hearing aids
- Recorded materials presented in **soundfield** at a **conversational** level
- **Objective** and **subjective** measures

Results

- Treatment **recommendation**
- **Next steps** in the process (medical, device choice, insurance authorization)
- Resources to answer questions and **provide guidance**

Speech Recognition Test Materials



Patient ID:_____ Date:_____ Test Condition: _____

Monosyllabic Word Test Key (CNC, List 1)
MSTB CD
Track 09 (Left Channel)

Score all words for a beginning consonant sound, a nucleus (vowel) sound and an ending consonant sound. (Total phoneme count per word = 3. Phonemes must be in the appropriate order.)

Practice Items 1. DUCK 2. BOMB 3. JUNE

	Test Items	Whole Word Response (Optional)	# Correct Phonemes 0	1	2	3		Test Items	Whole Word Response (Optional)	# Correct Phonemes 0	1	2	3
1.	GOOSE		☐	☐	☐	☐	26.	WRECK		☐	☐	☐	☐
2.	NAME		☐	☐	☐	☐	27.	ROUT		☐	☐	☐	☐
3.	SHORE		☐	☐	☐	☐	28.	BOAT		☐	☐	☐	☐
4.	BEAN		☐	☐	☐	☐	29.	RIPE		☐	☐	☐	☐
5.	MERGE		☐	☐	☐	☐	30.	WHEEL		☐	☐	☐	☐
6.	DITCH		☐	☐	☐	☐	31.	DEAD		☐	☐	☐	☐
7.	SUN		☐	☐	☐	☐	32.	SOB		☐	☐	☐	☐
8.	TOUGH		☐	☐	☐	☐	33.	MESS		☐	☐	☐	☐
9.	SEIZE		☐	☐	☐	☐	34.	WISH		☐	☐	☐	☐
10.	LEASE		☐	☐	☐	☐	35.	CHORE		☐	☐	☐	☐
11.	HOME		☐	☐	☐	☐	36.	WOOD		☐	☐	☐	☐
12.	JAR		☐	☐	☐	☐	37.	KING		☐	☐	☐	☐
13.	PAD		☐	☐	☐	☐	38.	TOAD		☐	☐	☐	☐
14.	FALL		☐	☐	☐	☐	39.	CHECK		☐	☐	☐	☐
15.	VAN		☐	☐	☐	☐	40.	LOOP		☐	☐	☐	☐
16.	JUG		☐	☐	☐	☐	41.	LAG		☐	☐	☐	☐
17.	YEARN		☐	☐	☐	☐	42.	SALVE		☐	☐	☐	☐
18.	MAKE		☐	☐	☐	☐	43.	DIME		☐	☐	☐	☐
19.	GALE		☐	☐	☐	☐	44.	HULL		☐	☐	☐	☐
20.	TOOTH		☐	☐	☐	☐	45.	THIN		☐	☐	☐	☐
21.	PATCH		☐	☐	☐	☐	46.	SHIRT		☐	☐	☐	☐
22.	BOIL		☐	☐	☐	☐	47.	ROSE		☐	☐	☐	☐
23.	HATE		☐	☐	☐	☐	48.	FIT		☐	☐	☐	☐
24.	PICK		☐	☐	☐	☐	49.	KITE		☐	☐	☐	☐
25.	KNIFE		☐	☐	☐	☐	50.	CAPE		☐	☐	☐	☐

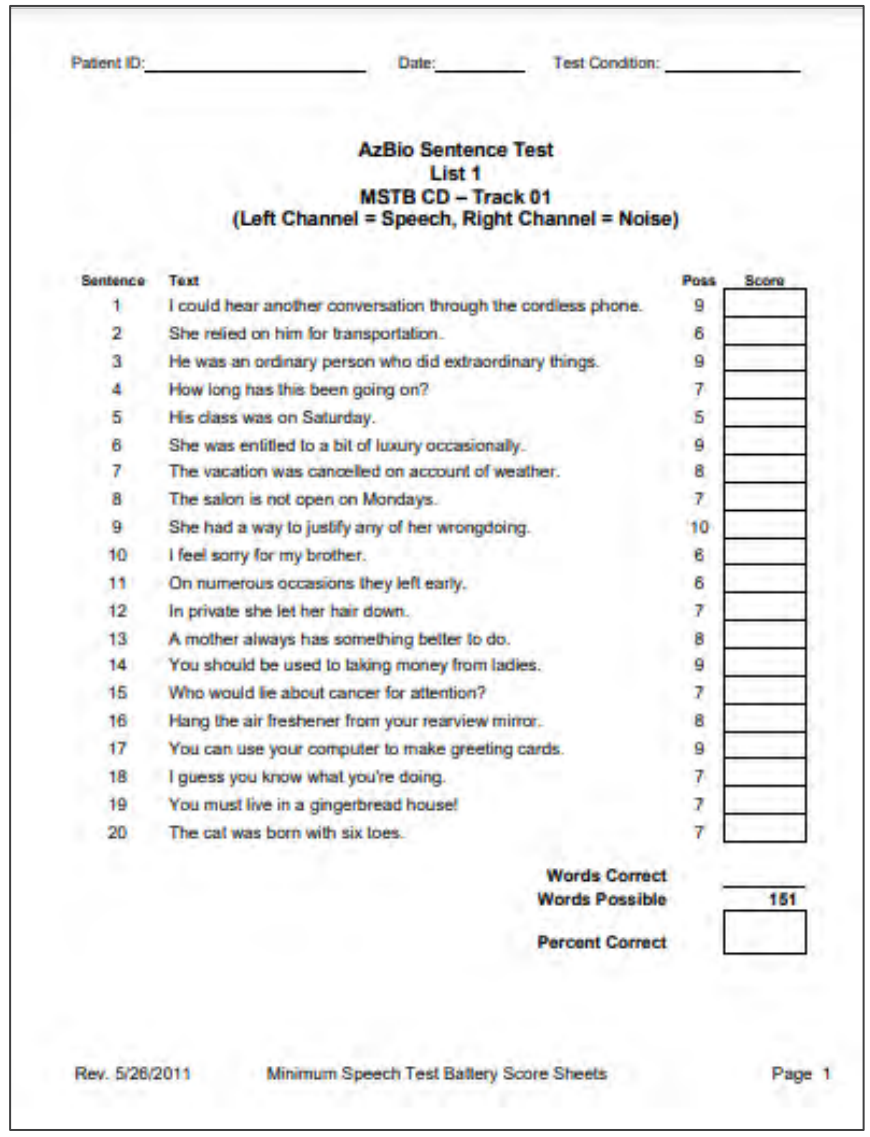
Sum of boxes checked for: 0: ___ 1: ___ 2: ___ 3: ___

Grand Total:

1 Phoneme Correct: ____ X 1 = ____
2 Phonemes Correct: ____ X 2 = ____
3 Phonemes Correct: ____ X 3 = ____

 # Words with 3 Phonemes Correct = ____ / 50 Words **Grand Total: ____/ 150 Phonemes**

Rev. 5/26/2011 Minimum Speech Test Battery Score Sheets Page 9



Patient ID:_____ Date:_____ Test Condition: _____

AzBio Sentence Test
List 1
MSTB CD – Track 01
(Left Channel = Speech, Right Channel = Noise)

Sentence	Text	Poss	Score
1	I could hear another conversation through the cordless phone.	9	
2	She relied on him for transportation.	6	
3	He was an ordinary person who did extraordinary things.	9	
4	How long has this been going on?	7	
5	His class was on Saturday.	5	
6	She was entitled to a bit of luxury occasionally.	9	
7	The vacation was cancelled on account of weather.	8	
8	The salon is not open on Mondays.	7	
9	She had a way to justify any of her wrongdoing.	10	
10	I feel sorry for my brother.	6	
11	On numerous occasions they left early.	6	
12	In private she let her hair down.	7	
13	A mother always has something better to do.	8	
14	You should be used to taking money from ladies.	9	
15	Who would lie about cancer for attention?	7	
16	Hang the air freshener from your rearview mirror.	8	
17	You can use your computer to make greeting cards.	9	
18	I guess you know what you're doing.	7	
19	You must live in a gingerbread house!	7	
20	The cat was born with six toes.	7	

Words Correct ____
Words Possible 151

Percent Correct

Rev. 5/26/2011 Minimum Speech Test Battery Score Sheets Page 1

Case 1: Patient referred for CI evaluation based on the 60/60 referral guideline

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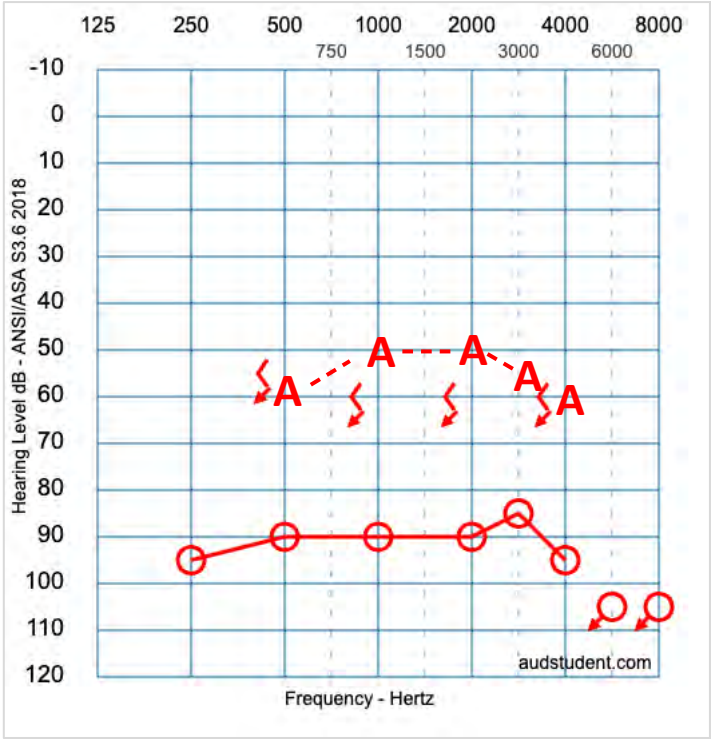
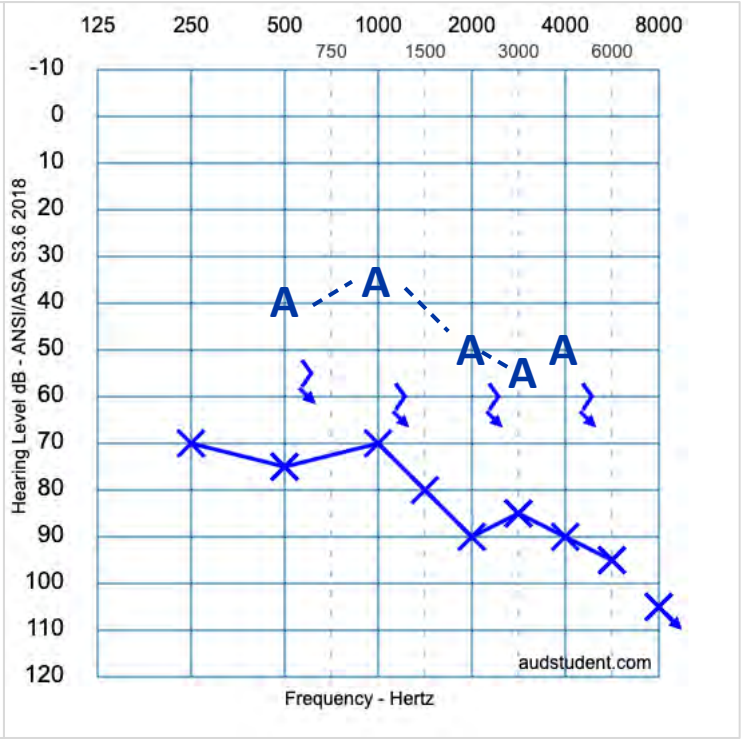
Right 4-28-2023



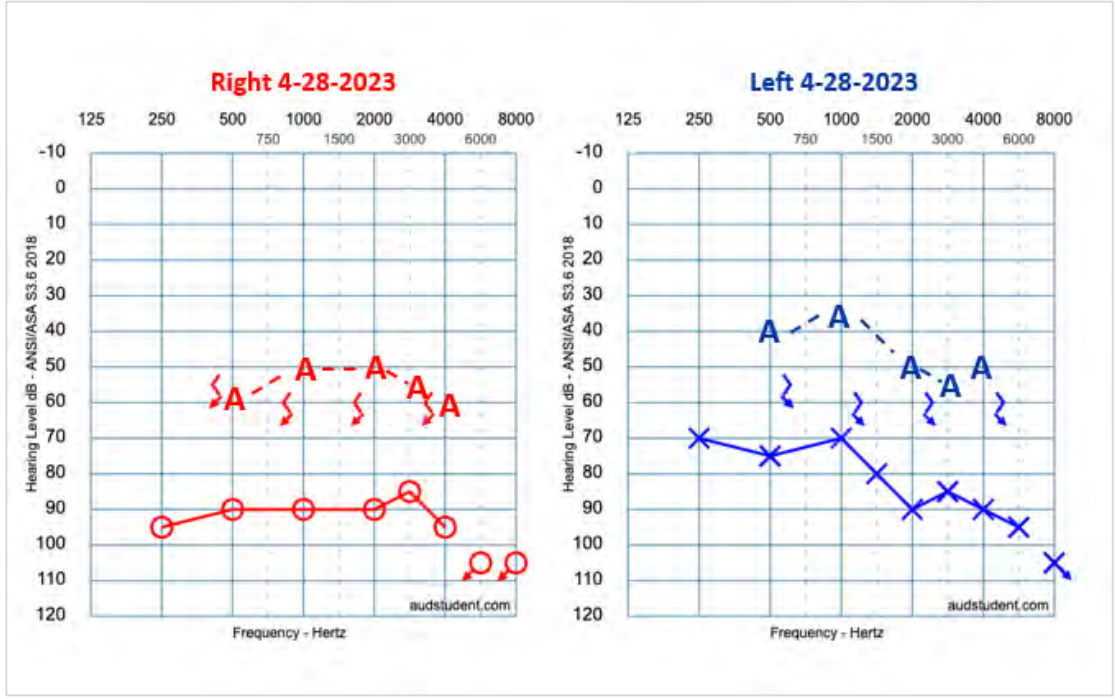
Left 4-28-2023



- 87 year-old male
- Evaluated for cochlear implant candidacy in 2020 but wasn't ready to proceed at that time
- Wore bilateral Phonak hearing aids with high power receivers
- Heard 'well enough'
- Struggled to understand speech at normal conversational levels
  - Family/grandchildren
  - Church
  - Restaurants and meetings
- Very loud speaking voice

CI Candidacy Evaluation Includes Audiometric testing, HA verification, Best Aided AzBio score for each ear

	Right Ear Best Aided	Left Ear Best Aided
AzBio Sentences quiet	**0%**	**51%**



Sentences presented to each ear in quiet at 60dBA

CI Candidacy Evaluation
Check to see if patient meets insurer's indication of sentence score

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	Right Ear Best Aided	Left Ear Best Aided	Bilateral Aided
AzBio Sentences quiet	**0%**	**51%**	
AzBio Sentences +10 SNR			**6%**

Sentences presented bilaterally using a +10 Signal to Noise to replicate typical listening situation.

Patient qualified for Medicare coverage of CI based on Best Aided Sentence score less than 60%.

Examine other factors that impact candidacy (audiometry, motivation and preference, etiology, expectations, person support).

Refer to MD for medical evaluation and radiological testing to complete candidacy process.

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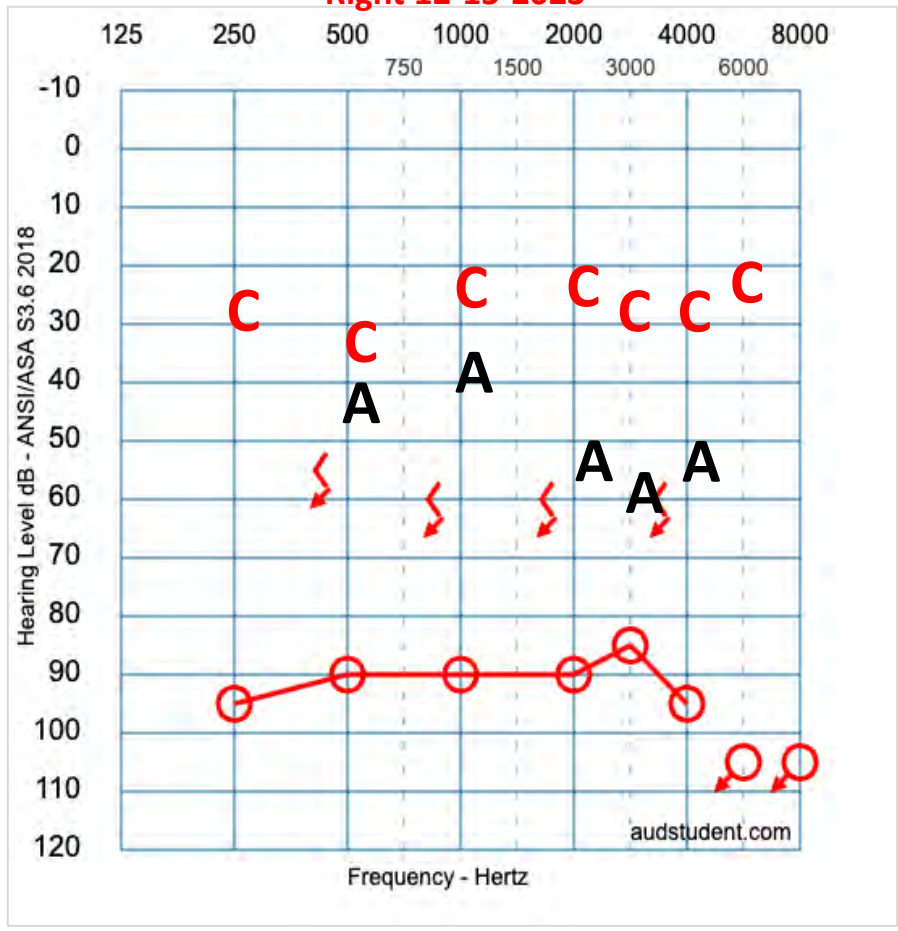
Pre-operative Scores

	Right Ear Best Aided	Left Ear Best Aided	Bilateral Aided
AzBio Sentences quiet	0%	51%	
AzBio Sentences +10 SNR			6%

3 Months post-operative Scores

	Right CI
CNC Words	54%
AzBio Sentences quiet	83%
AzBio Sentences +10 SNR	41%

Right 12-15-2023



Improved access to speech information!

Case 2: Patient referred for CI evaluation based on the 60/60 referral guideline

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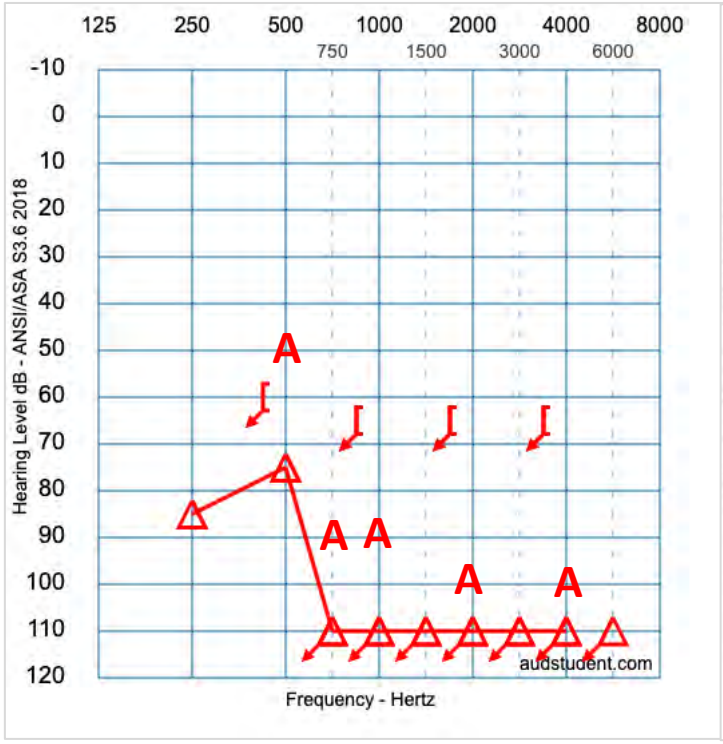
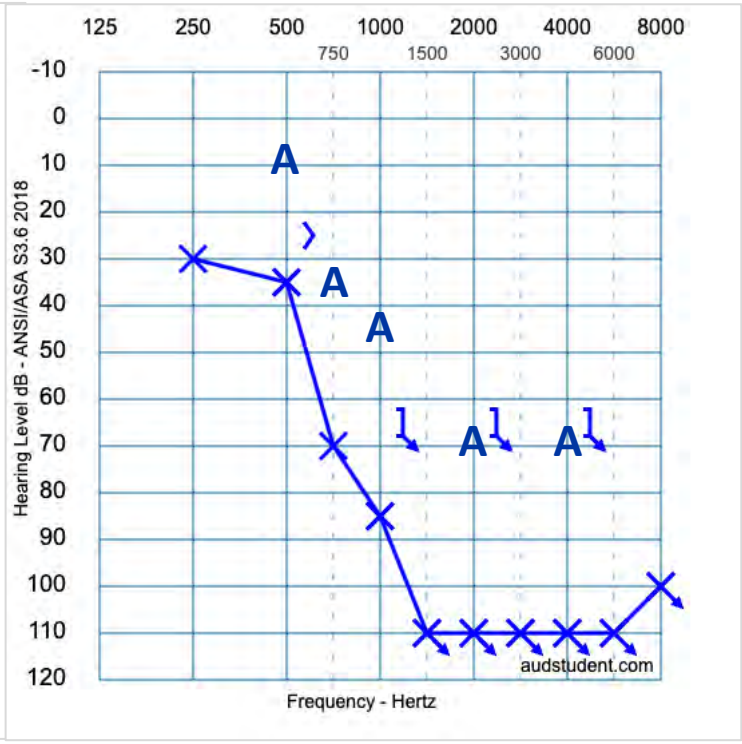
Right 7-29-2022



Left 4-29-2022



- PTA > 60 dB HL
  - RE 105
  - LE 77
- WRS < 60%
  - RE CNT
  - LE 20%

Patient referred for CI evaluation based on meeting the 60/60 referral guideline

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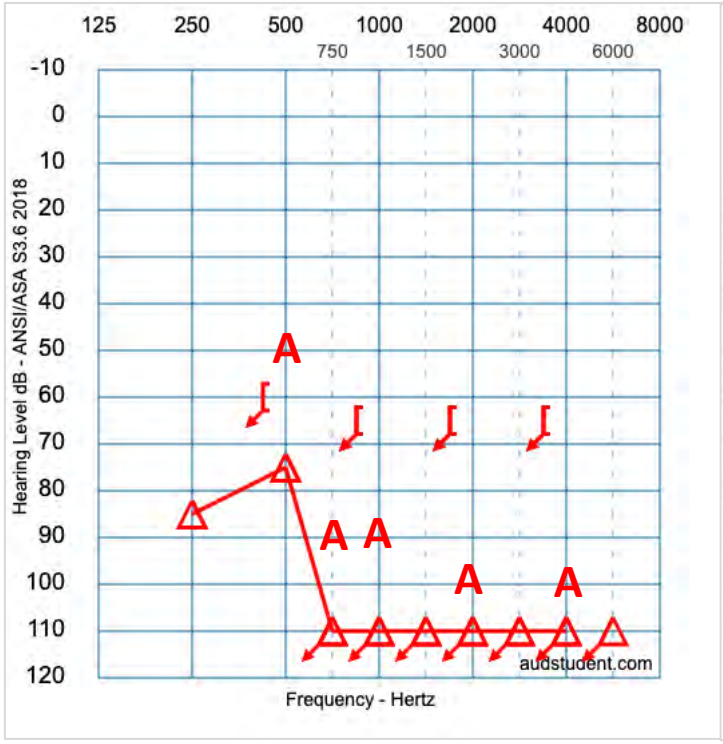
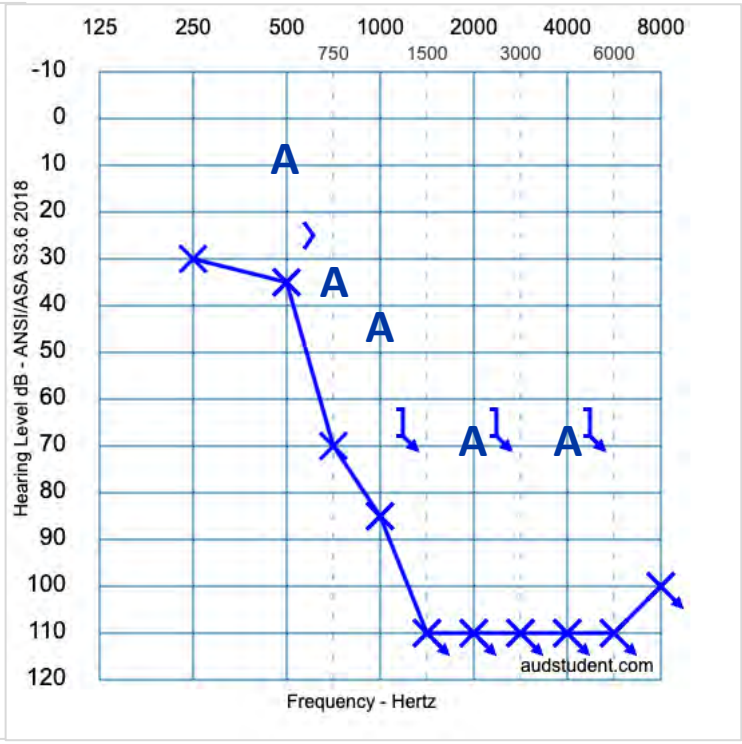
Right 7-29-2022



Left 4-29-2022



- 73 year-old female
- 20+ year history Meniere's disease in right ear
- Hearing loss progressed dramatically in the right ear one year prior to CI evaluation
- Left TM perforation
- Stopped wearing right aid years ago. Only wore left aid to help on phone
- Difficulty hearing in restaurants, the car and when playing piano

CI Candidacy Evaluation Audiometric testing, HA verification, Best Aided AZ Bio score for each ear

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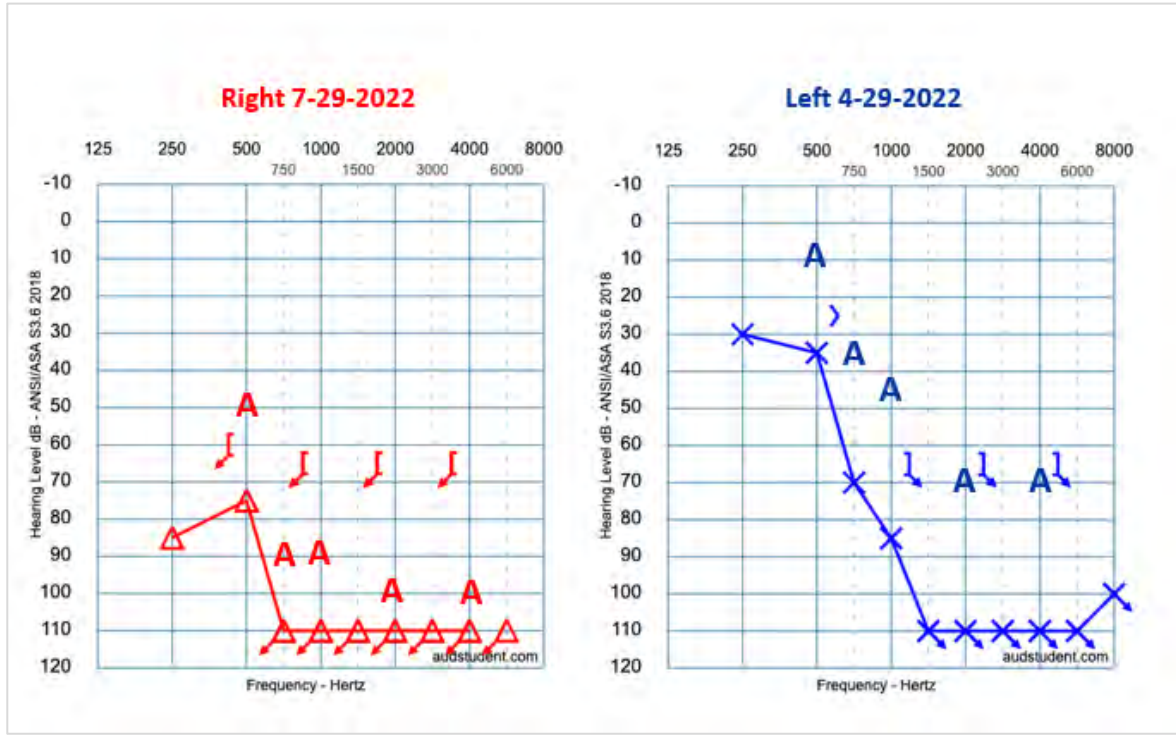
	Right Ear Best Aided	Left Ear Best Aided
AzBio Sentences quiet	**10%**	**39%**

Patient meets Medicare indication of <60% best aided sentence recognition in each ear



CI Candidacy Evaluation
AzBio Sentences +10 SNR
Everyday Listening Condition

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	Right Ear Best Aided	Left Ear Best Aided	Bilateral Aided
AzBio Sentences quiet	**10%**	**39%**	**43%**
AzBio Sentences +10 SNR			**8%**

Sentences presented bilaterally using a +10 Signal to Noise ratio to replicate typical listening situation.

Patient qualifies for Medicare coverage of CI based on best aided sentence recognition score < 60%.

Examine other factors that impact candidacy (audiometry motivation and preference, etiology, expectations, person support).

Refer to MD for medical evaluation and radiological testing to complete candidacy process.

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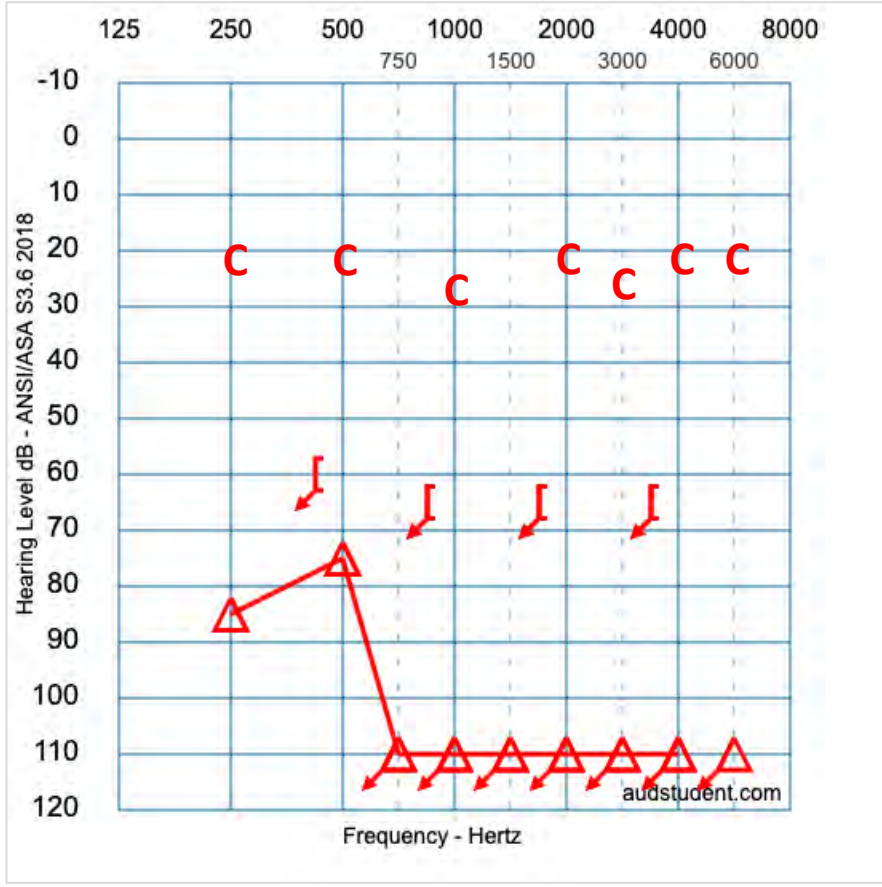
Pre-operative Scores

	Right Ear Best Aided	Left Ear Best Aided	Bilateral Aided
AzBio quiet	10%	39%	43%
AzBio Sentences +10 SNR			8%

Post-operative Scores

	Right CI
CNC Words (3 months)	7%
AzBio Sentences quiet (3 months)	92%
CNC Words (6 months)	84%
AzBio Sentences +10 SNR (6 months)	69%

Right 12-21-2022



Case 3: Patient with Single-Sided Deafness (SSD) referred for CI Evaluation

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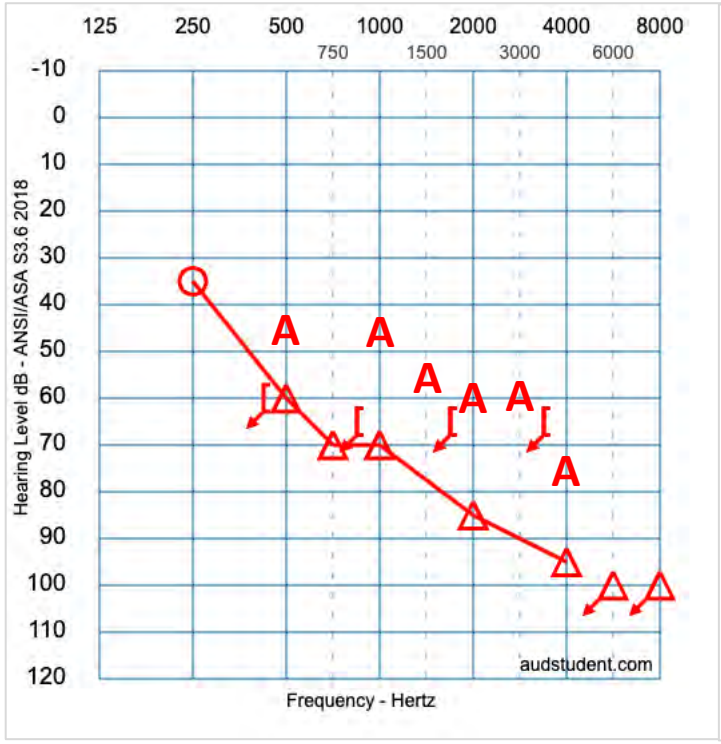
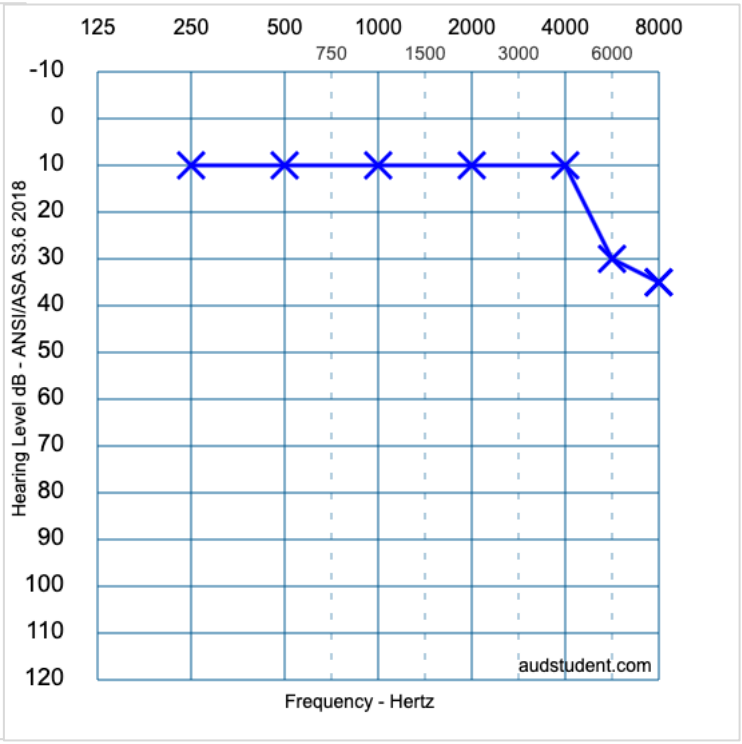
The Art of Hearing - The Science of Balance

Right 1-26-24



Left 1-26-24



- PTA
  - RE 77.5
  - LE 10
- WRS
  - RE CNT
  - LE 100%

Patient with Single-Sided Deafness (SSD) referred for CI Evaluation

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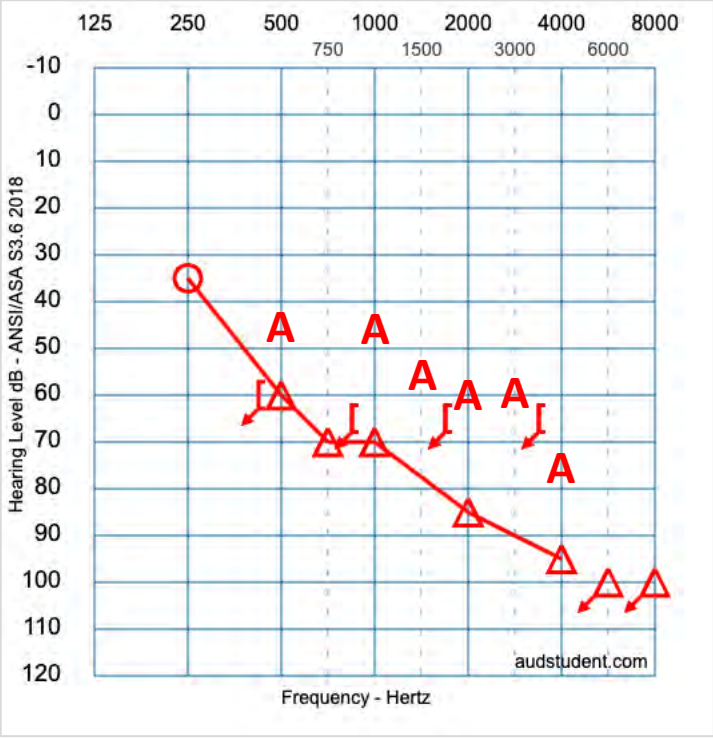
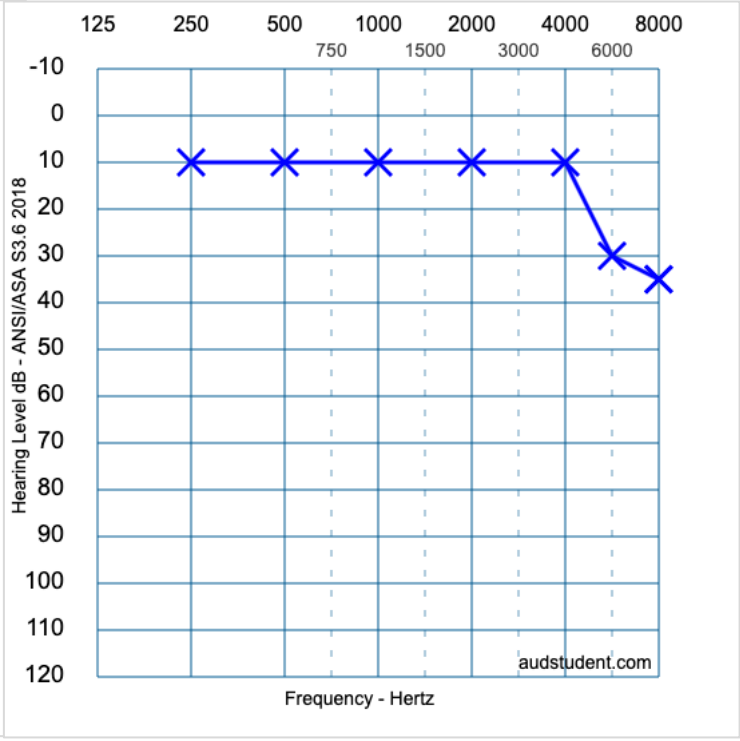
Right 1-26-24



Left 1-26-24



- 64 year-old female
- Sudden hearing loss, right ear, mid November. Partially recovered
- Increased listening effort in quiet
- Cannot understand conversation in noise
- Feels clumsy, difficulty concentrating, cannot localize sound sources, debilitating tinnitus
- Unsuccessful trial with ReSound Nexia CROS

CI Candidacy Evaluation Step 1: Audiometric testing, HA verification, Best-Aided CNC Words

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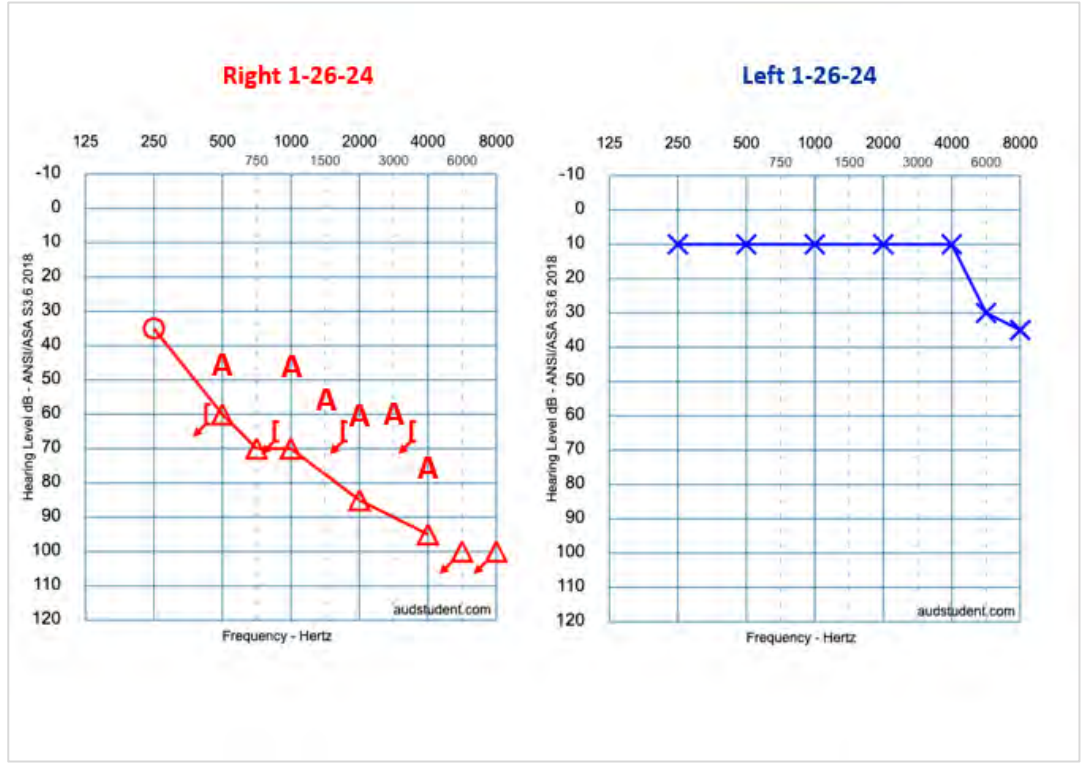
Currently working to determine if insurance will cover CI for SSD

	Right Ear Best Aided	Left Ear Best Aided
CNC Words	**18%**	**N/A**



CI Candidacy Evaluation
Best aided AzBio Sentences & Patient Questionnaires

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Speech recognition testing helps identify difficulties in noise

	Right Ear Best Aided	Bilateral Best Aided
CNC Words	**18%**	**N/A**
AzBio Sentences-quiet 60dBA	**24%**	
AzBio Sentences – 0dB SNR		**13%**

Patient questionnaires help identify functional Impact SSD has on hearing, Quality of Life, and Tinnitus

Questionnaires	
SSQ12	**36**
CIQOL-10	**34**
THI	**82**

Counseling about outcomes of CI for SSD

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- Improved localization
- Improved spatial awareness
- Improved speech recognition, particularly in background noise
- Potential tinnitus reduction in implanted ear
- Improvements in quality of life
- Helpful to meet with SSD recipient

Conclusion

- Today, a variety of patients could be evaluated for cochlear implant candidacy, including those with bilateral significant hearing loss, those with single sided deafness, and those with significant low frequency hearing.
- Evaluation of CI candidacy includes audiometric testing, HA verification, speech recognition testing, functional evaluation of hearing using patient questionnaires, examination of factors that impact performance, counseling and setting of appropriate expectations.
- Intervention with a CI typically results in great improvements in detection, recognition, and quality of life.[1-3] Many patients continue to wear a hearing aid in the contralateral ear and can receive benefit bimodally.

Join us on February 20th for a review of how the 60/60 guideline can help you determine if the time is right for you to refer some of your patients, so they can be evaluated for different hearing technology.

1. Balkany et al (2007) Nucleus Freedom North American clinical trial. Otolaryngol, Head Neck Surg, 136:757-762.
2. Runge CL et al (2016) Clinical outcomes of the Nucleus 5 cochlear implant system and SmartSound 2 signal processing, J Am Acad Audiol, 27(6):425-40.
3. Leigh JR (2015) Evidence-based guidelines for recommending cochlear implantation for postlingually deafened adults. Int Jour Audiol, 55(sup2):S3-S8

The content of this guideline is intended as a guide for information purposes only and does not replace or remove clinical judgment or the professional care and duty necessary for each specific recipient case. Clinical care carried out in accordance with this guideline should be provided within the context of locally available resources, expertise, and standards of care and practice.

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