

Surgical Hearing Restoration

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Computer-Integrated Surgery
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Johns Hopkins University

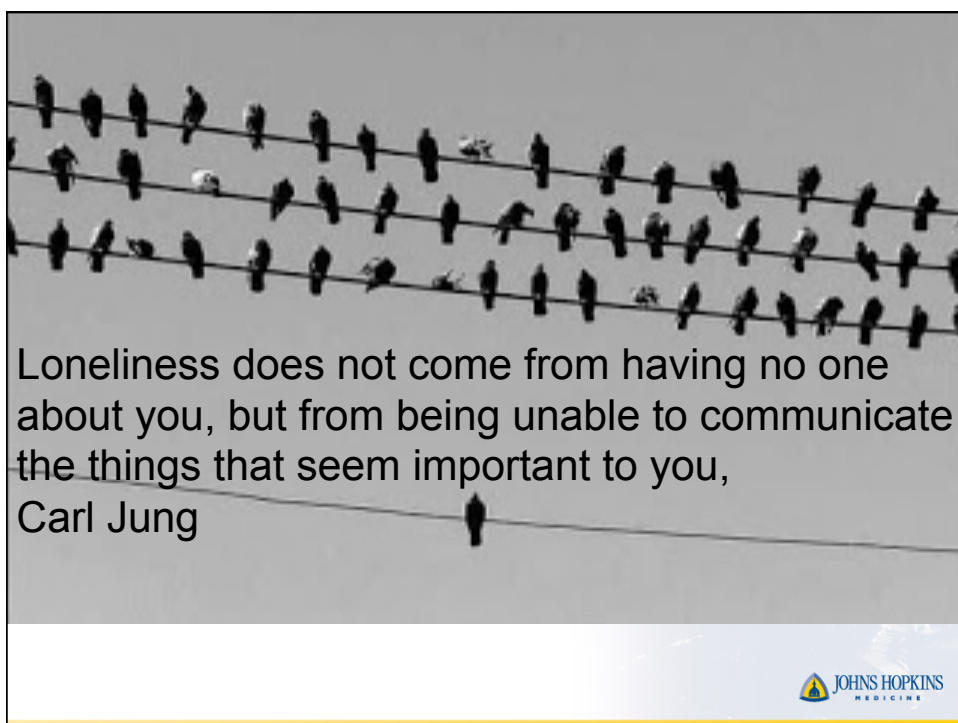
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Otolaryngology, Head and Neck Surgery
Otology, Neurotology, and Skull Base Surgery
Pediatric Otolaryngology



JOHNS HOPKINS
MEDICINE

100
YEARS
1914-2014

JOHNS HOPKINS
OTOLARYNGOLOGY-
HEAD AND NECK
SURGERY



Loneliness does not come from having no one
about you, but from being unable to communicate
the things that seem important to you,
Carl Jung

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Surgical Hearing Restoration

- Introduction: Silence, the oral communicating world, and thank you.
- I: Hearing loss: mechanical failure of sensory transduction?
- II: Types of Surgical Hearing Restoration
- III: Impact of Deafness: Self Portraits, Deaf Culture
- IV: Impact of hearing loss on 4 main domains of life, and approach to your patient with hearing loss



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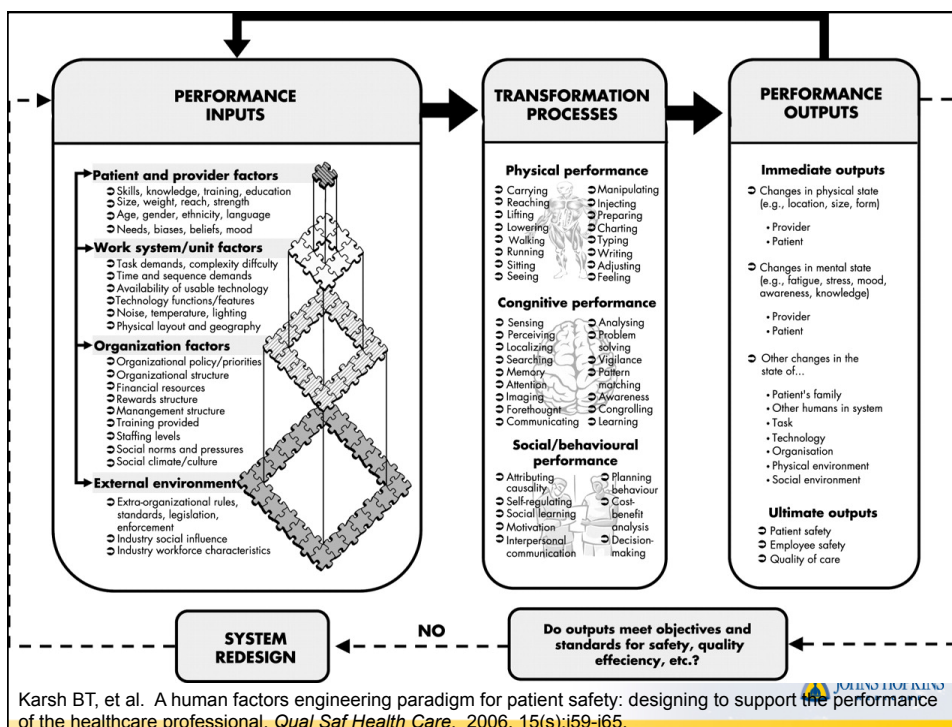


Objectives

By the conclusion of this talk, you will be able to:

Describe basic types of hearing loss

Describe basic types of surgical hearing restoration



I. Types of Hearing loss

- Sensory transduction of sound follows a logical path of motion of air to bone to liquid, creating electricity in the cochlea.
- Objective* testing in a sound booth with a combination of air conducted tones, bone conducted sounds, and “blinded” speech discrimination testing.



I. Types of Hearing loss

Conductive Hearing Loss:

Mechanical failure, nerve function intact, sound energy is wasted.

Sensorineural Hearing Loss:

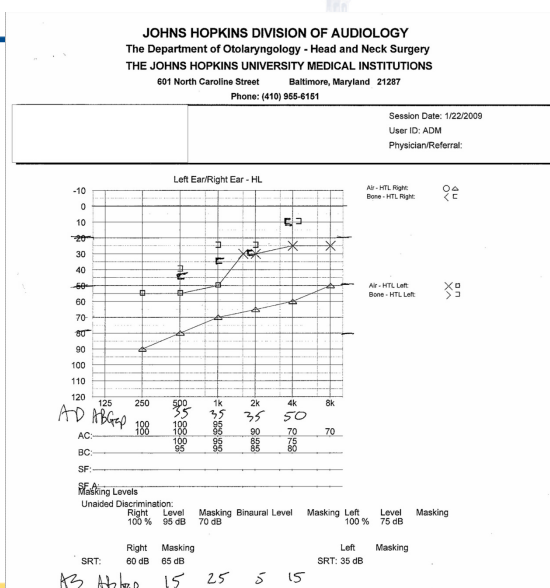
Nerve function lost, audition impaired regardless of stimulation.

Mixed Hearing Loss:

Combination of both.

DEMO Time!:

Let's all give ourselves a conductive loss.

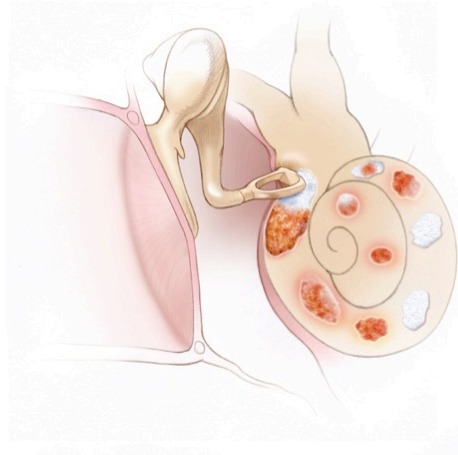




II. Types of Surgical Hearing Restoration

- Stapes surgery
- BAHA, Bone Anchored Hearing Aid
- Cochlear Implantation
- Otosclerosis
- Single Sided Deafness
- Bilateral Sensorineural Hearing loss

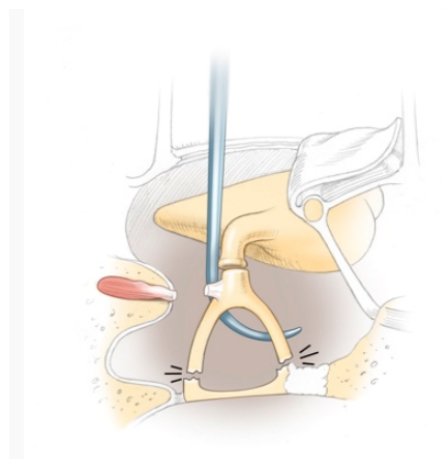
II. Types of Surgical Hearing Restoration



Courtesy of Robert Jackler, Atlas of Skull Base Surgery and Neurotology



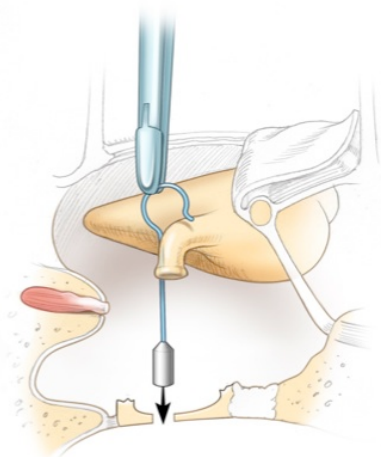
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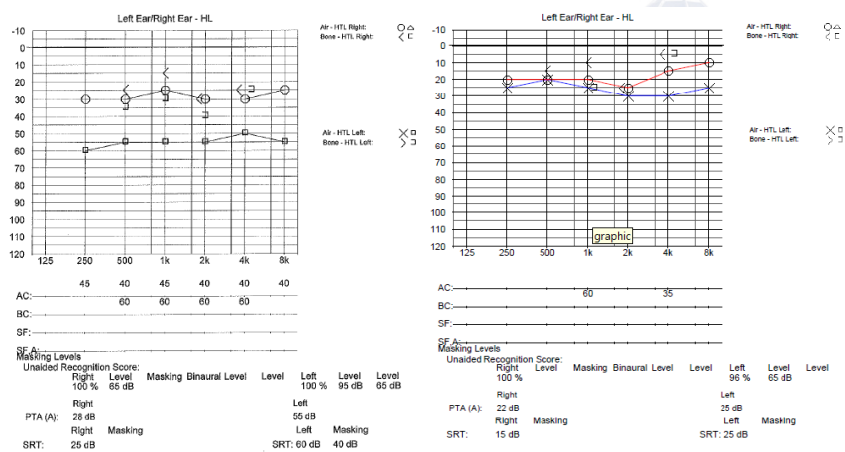
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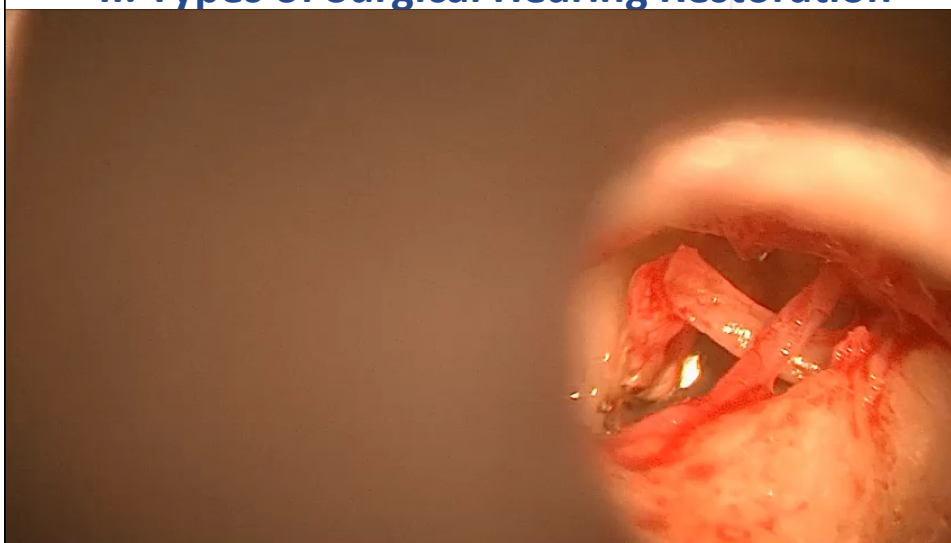


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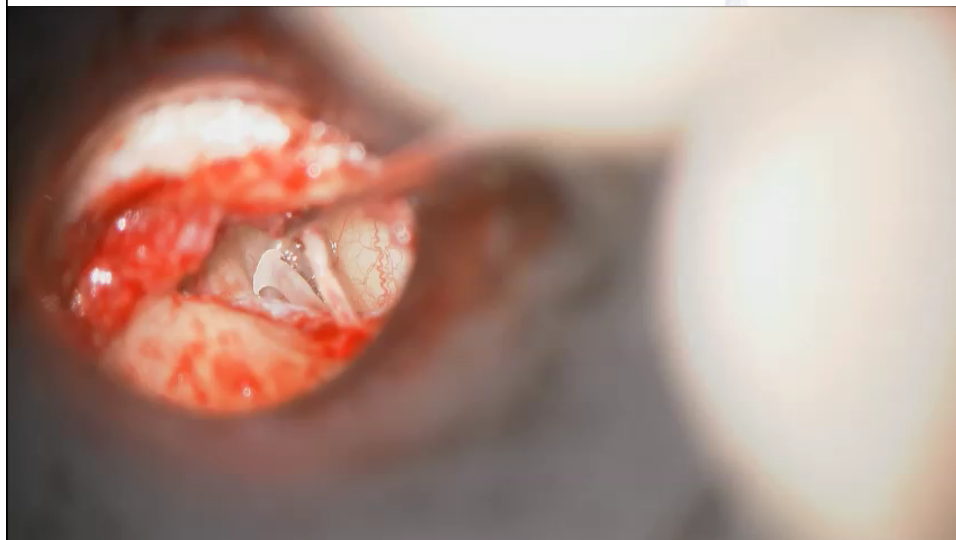
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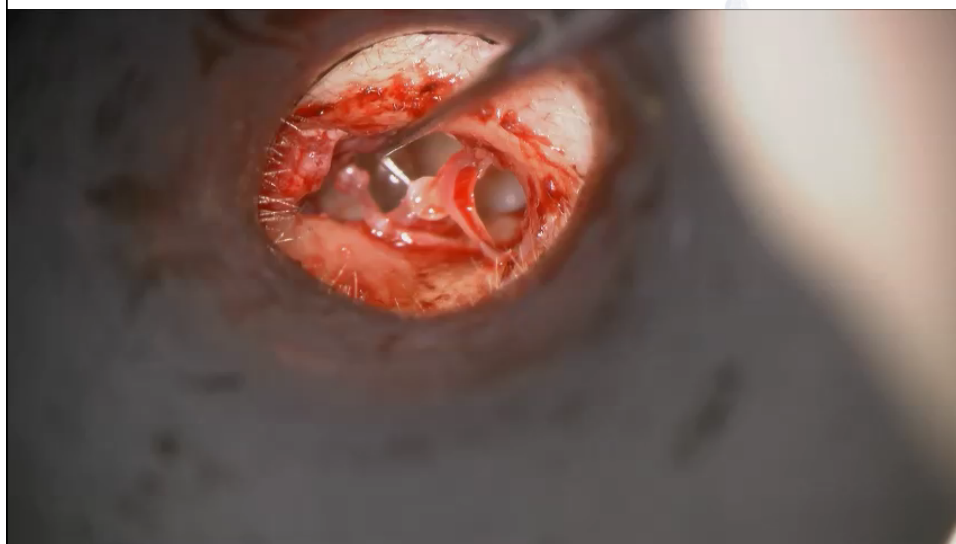
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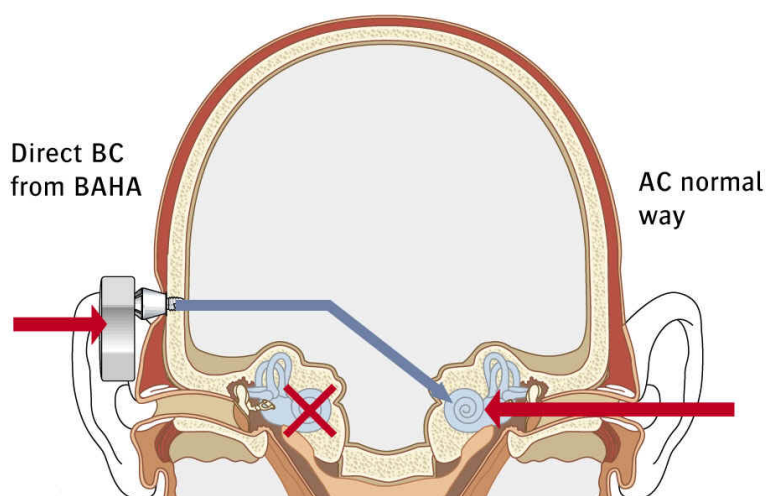
- The Bone Anchored Hearing Aid [BAHA]



Stewart CM, et al. Bone Anchored Devices in Single-Sided Deafness. *Adv Otorhinolaryngol.* 2011, 71:92-102



II. Types of Surgical Hearing Restoration



Courtesy UC Irvine, Department of Otolaryngology, Head and Neck Surgery



II. Types of Surgical Hearing Restoration

- What *is* the deficit with Single Sided Deafness?

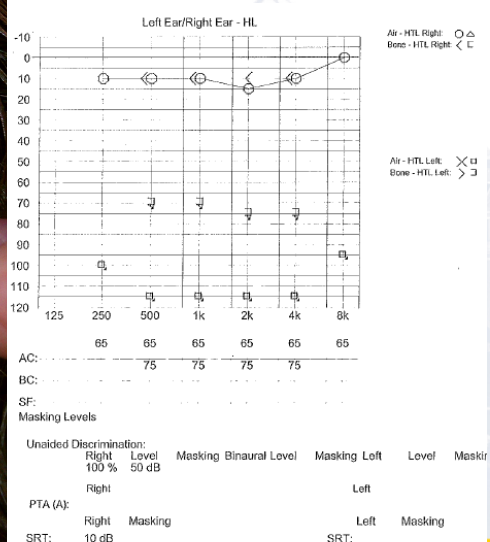
TABLE I.
Speech, Spatial and Qualities of Hearing (SSQ) Summary Subscales.

SSQ Summary Subscale	Example Questions
Speech Hearing	
Speech in quiet	You are talking with one other person in a quiet, carpeted lounge room. Can you follow what the other person says?
Speech in noise	You are talking with one other person. There is continuous background noise, such as a fan or running water. Can you follow what the person says?
Speech-in-speech contexts	You are in a group of about five people in a busy restaurant. You cannot see everyone else in the group. Can you follow the conversation?
Multiple speech-streams and switching	You are listening to someone talking to you, while at the same time trying to follow the news on TV. Can you follow what both people are saying?
Spatial Hearing	
Spatial location	You are outside. A dog barks loudly. Can you tell immediately where it is, without having to look?
Distance and movement	In the street, can you tell how far away someone is, from the sound of their voice or footsteps?
Qualities of Hearing	
Sound quality and naturalness	Do everyday sounds that you hear seem to have an artificial or unnatural quality?
Identification of sounds and objects	Do you find it easy to recognize different people you know by the sound of each one's voice?
Segregation of sounds	You are in a room and there is music on the radio. Someone else in the room is talking. Can you hear the voice as something separate from the music?
Listening effort	Do you have to put in a lot of effort to hear what is being said in conversation with others?

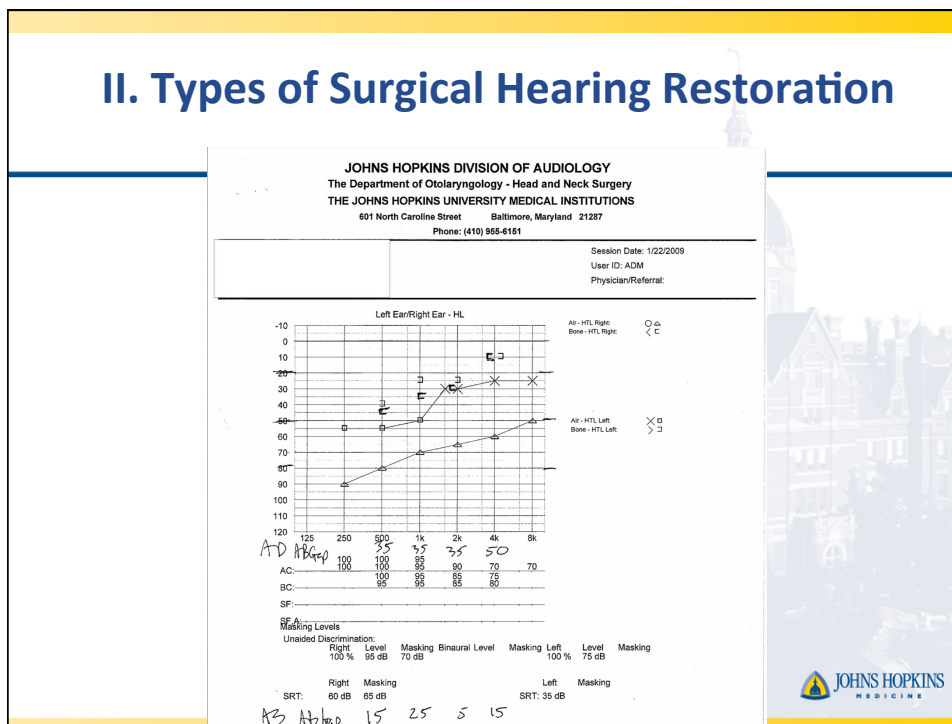


Douglas SA, et al. Spatial hearing disability after acoustic neuroma removal. *Laryngoscope*. 2007, 117:92-1648-52

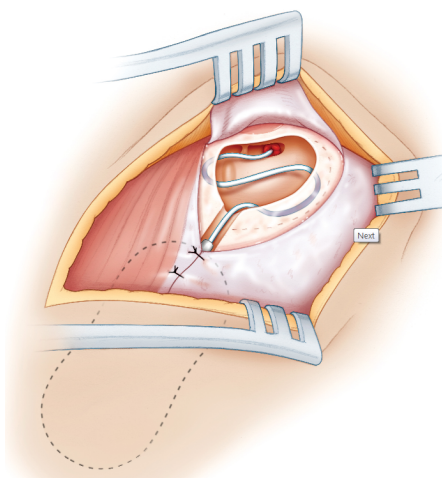
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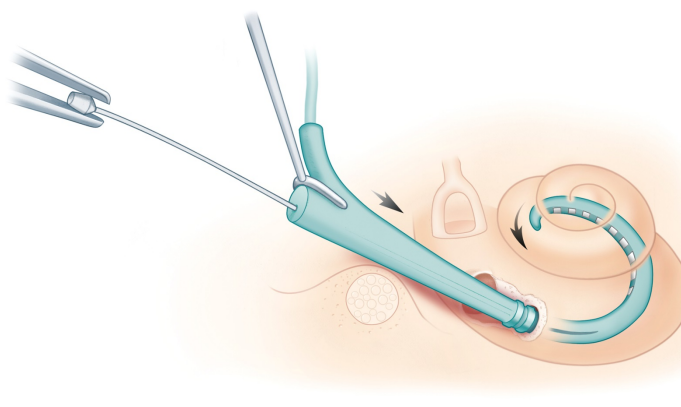


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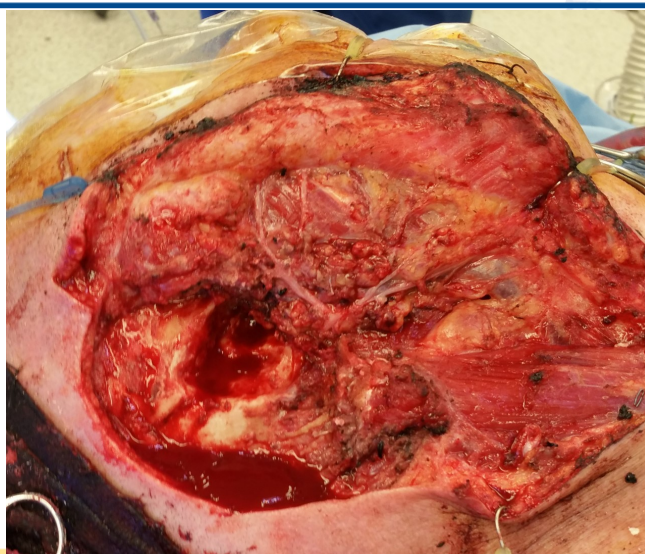
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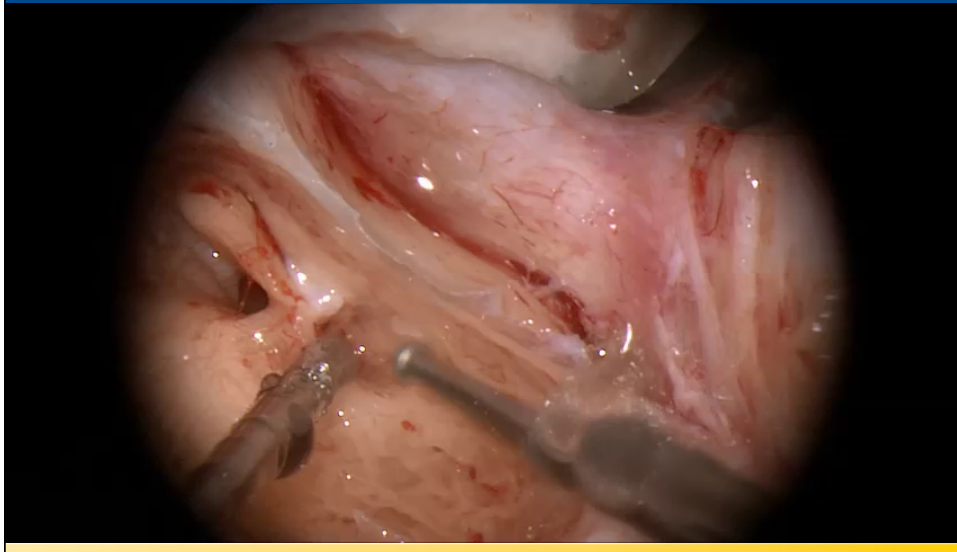
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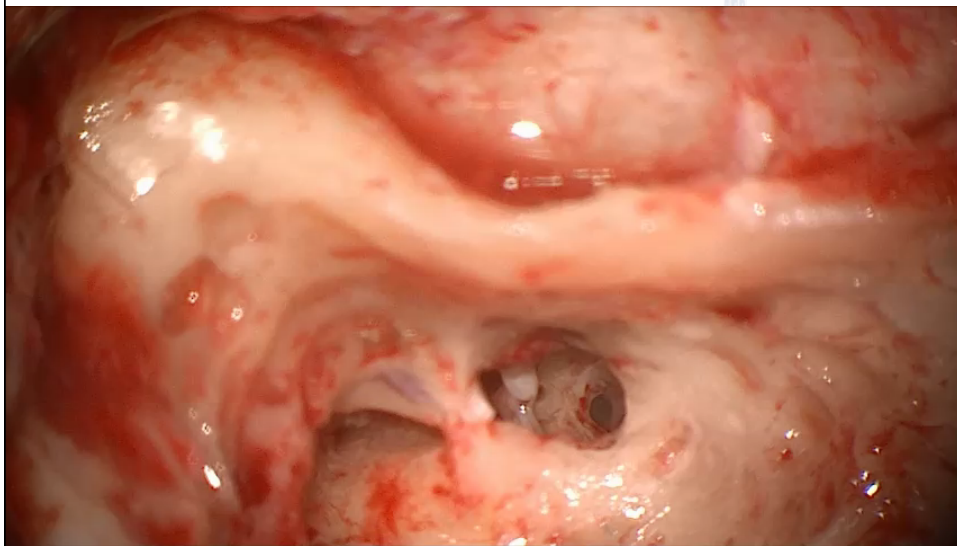
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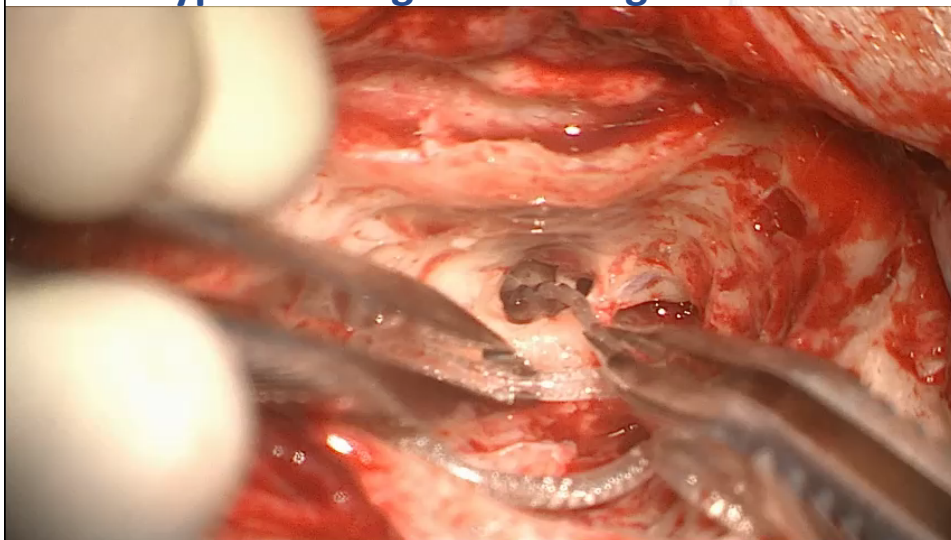
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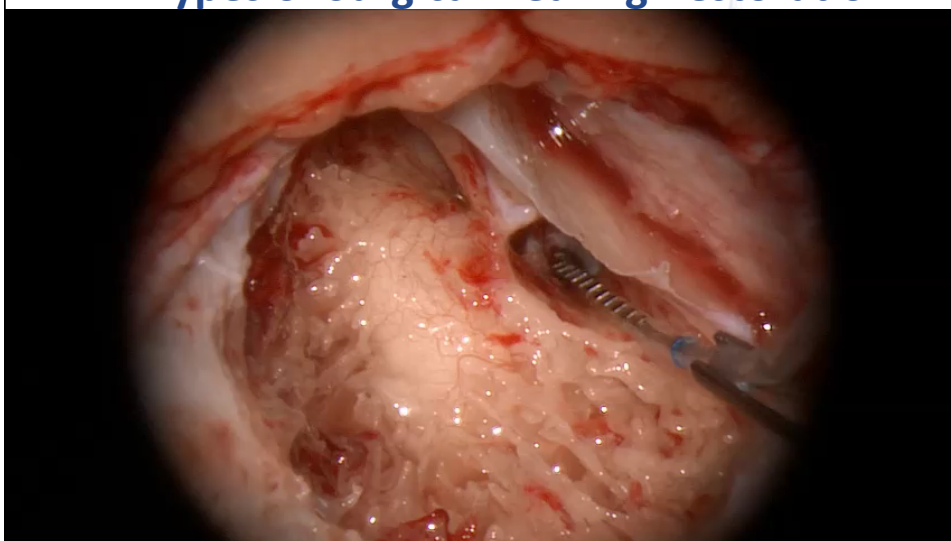
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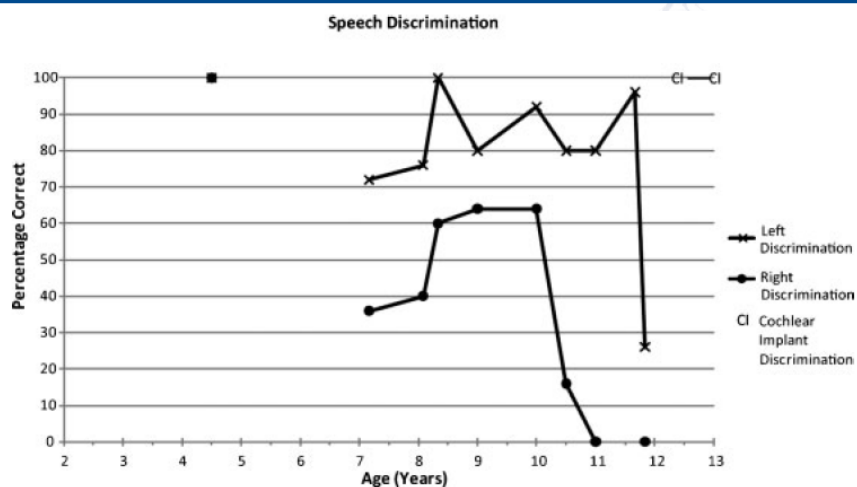
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Stewart CM, et al. The Clinical Picture of Large Vestibular Aqueduct Syndrome. *Sem in Hearing*. 2011,32:356-65

III. Impact of Deafness, Self Portraits and The Deaf Culture

- For me there can be no relaxation in human society; no refined conversations, no mutual confidences. I must live quite alone and may creep into society only as often as sheer necessity demands....Such experiences almost made me despair and I was on the point of putting an end to my life, [1802].
- 1804-1808, Ludwig van Beethoven composes Symphony No. 5.

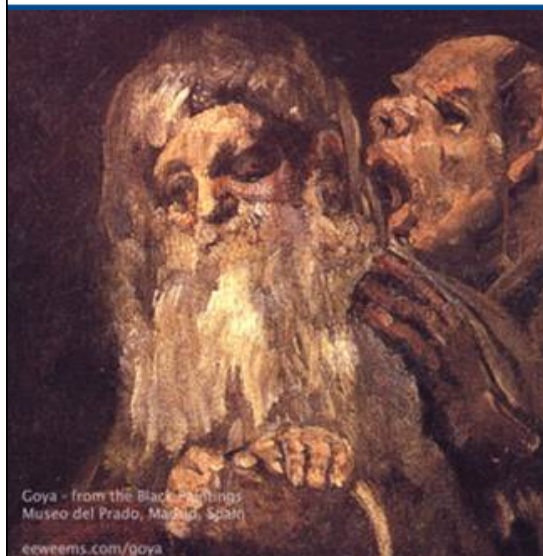
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Sir Joshua Reynolds, circa 1775, Self Portrait of a Deaf Man.



III. Impact of Deafness, Self Portraits and The Deaf Culture



Goya - from the Black Paintings
Museo del Prado, Madrid, Spain
eewtemis.com/goia

Goya, deaf circa 1792, moved into his "house of the deaf man," and created the "Black Paintings" Masterpieces circa 1819-1823.



III. Impact of Deafness, Self Portraits and The Deaf Culture



Nancy Rourke, a vital and important member of the Deaf Community and culture, very moving and compelling, here “The Mask of Benevolence.”



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Nancy Rourke, use of forced oralism and mainstream education on Deaf children



III. Impact of Deafness, Self Portraits and The Deaf Culture



Rochester Institute
of Technology, self
portrait, "pre"

III. Impact of Deafness, Self Portraits and The Deaf Culture



Nancy Rourke, "Alice Vase",
can you see "Alice"

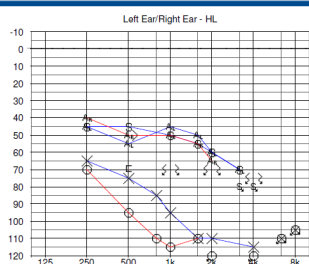
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Alice Cogswell and Thomas Gallaudet, campus of Gallaudet University.



IV. 4 Main Domains Life, Approach to the Patient with Hearing loss



AC: _____
BC: _____
SF: _____

SF A: _____
Masking Levels: _____
Unaided Recognition Score: _____
Right DNT: _____
Level: _____
Masking Binaural Level: _____
Level: _____
Left 20 % Level 100 dB Level _____
Right 105 dB Left 93 dB
PTA (A): Right Masking Left Masking
SRT: 95 dB SRT: 70 dB

Notes
S= Binaural aided, SRT = 45 dB HL
AL= Left aided
AR= Right aided
Speech perception testing at 80 dB SPL
Ac-Bio sentences: 15% (B); 0% (L); 0% (R)

Conversational difficulty with hearing loss

1. Work/School
2. Hobbies
3. Place of Worship
4. Home

I asked the Leonard Family to share their story with Internal Medicine Grand Rounds.



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- I: Hearing loss: mechanical failure of sensory transduction?
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- IV: Impact of hearing loss on 4 main domains of life, and approach to your patient with hearing loss
- Thank you very much.



- <http://www.wimp.com/appreciatesymphony/>

