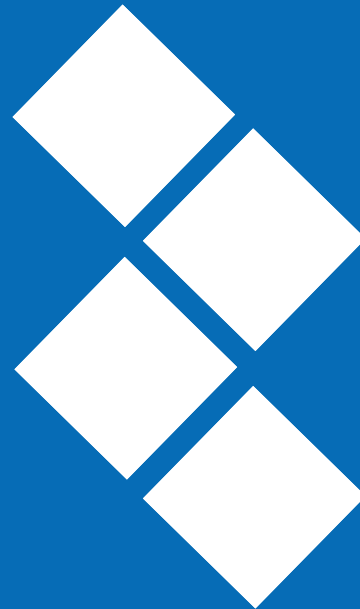


PEPNet



**Advancing educational
opportunities for people who
are deaf or hard of hearing**



www.pepnet.org

PEPNet

Advancing educational opportunities for people who are:

- **Deaf or hard of hearing**
- **Deaf or hard of hearing, and with co-occurring disabilities**

Regional Centers

PEPNet, a national collaborative network of four regional centers



PEPNet's Mission

To improve educational outcomes,
PEPNet partners with:

- Educators
- Service Providers
- Parents

PEPNet is sponsored by:

The U.S. Department of Education,
and Office of Special Education Programs.



www.pepnet.org

Working with MAPs

Assistive Technology and
Communication Strategies for
Cochlear Implant Users

Today we will talk about:

- Myths
- Criteria for candidates
- What a cochlear implant is & is not
- How it works
- What benefits it gives the user
- How AT interfaces with a CI
- How to troubleshoot

Who Gets a CI?

CRITERIA FOR CANDIDATES

Who Gets a CI?

- Team approach
- Criteria
 - Children
 - Adults
- General changes over time
- How assessment will change in the future

Susan Amberg, AuD

David Haynes, MD

Tamala Bradham, PhD

Vanderbilt Bill Wilkerson Center for Otolaryngology and Communication Sciences

Bilateral Cis: Are 2 > 1?

- Considerations:
 - Age
 - Candidate history
 - Future technology
- Binaural advantage

Susan Amberg, AuD

David Haynes, MD

Tamala Bradham, PhD

Vanderbilt Bill Wilkerson Center for Otolaryngology and Communication Science

Expectations

- Overall
- Late deafened adults
- Personal
- Implant center

Susan Amberg, AuD

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How Does It Work?

WHAT IS A COCHLEAR IMPLANT?

What is a Cochlear Implant?

- An electronic device designed to provide functional hearing to people who are severely to profoundly deaf
- Converts acoustical signals into highly processed electrical patterns
- These patterns are then relayed to the electrodes which are inserted into the cochlea

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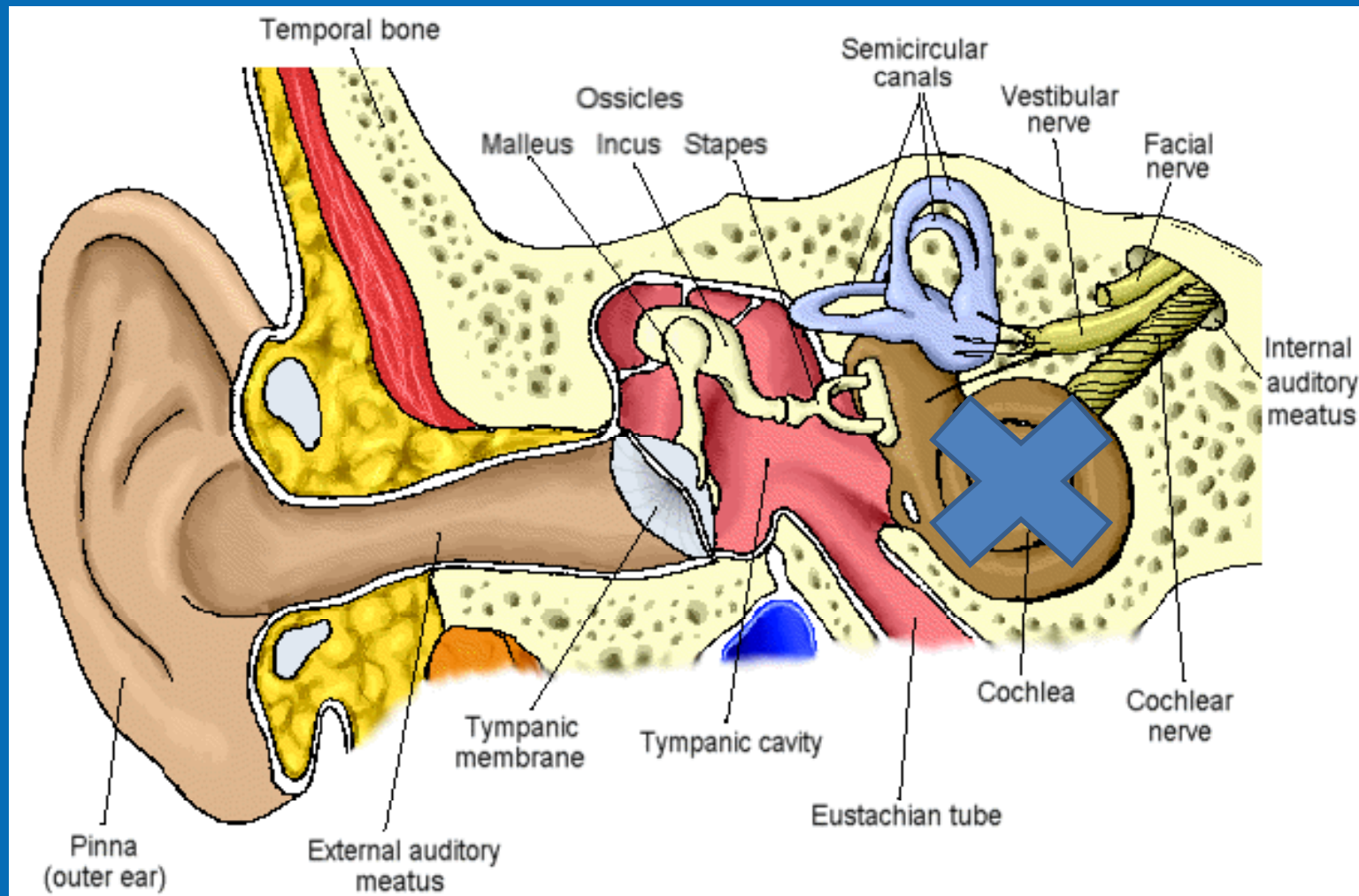
Vanderbilt Bill Wilkerson Center for Otolaryngology and Communication Sciences

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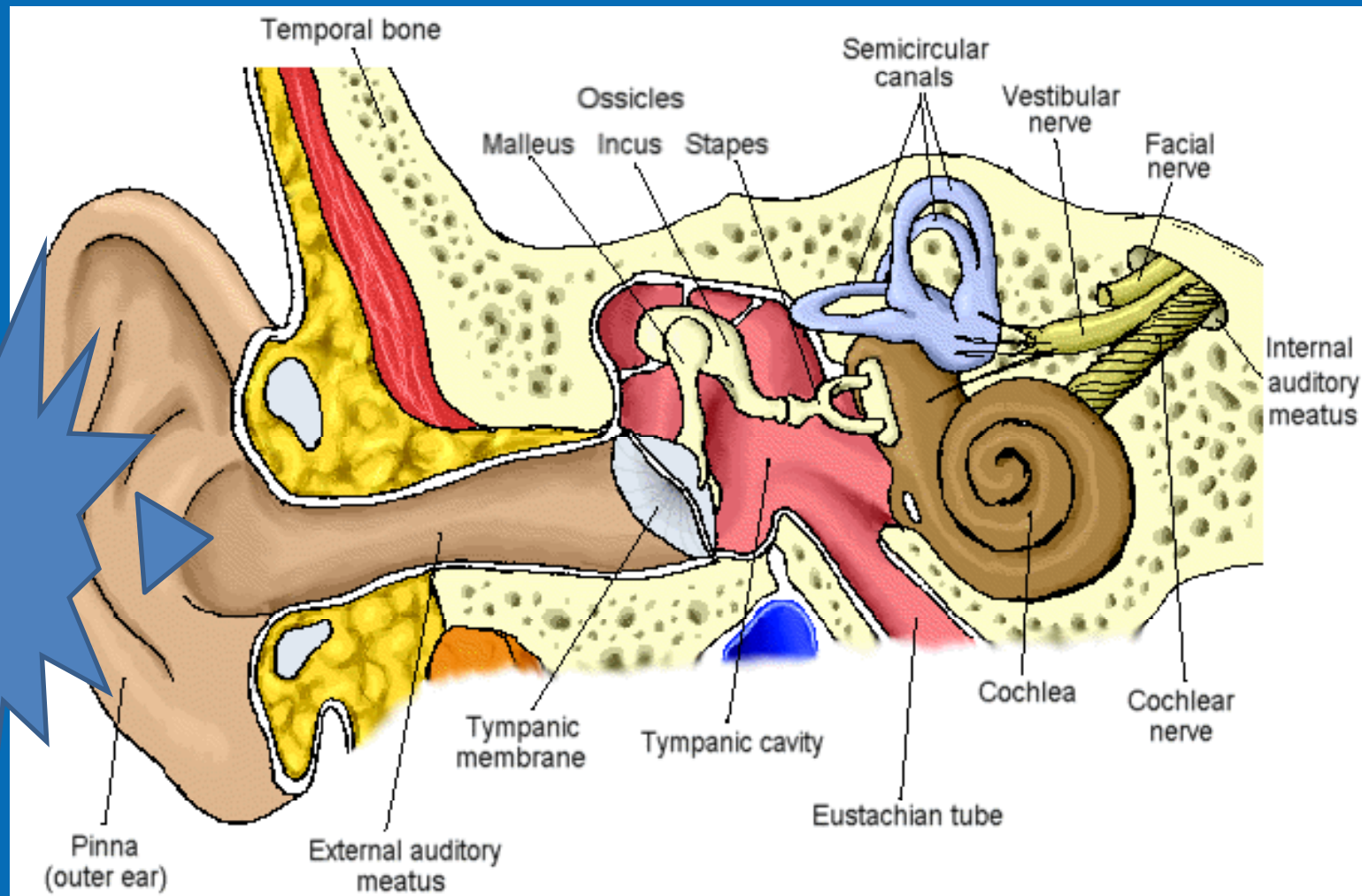
How is a Cochlear Implant Different from a Hearing Aid?

- Hearing aids:
 - acoustically amplify sound
 - rely on the responsiveness of hair cells
- Cochlear Implants:
 - bypass damaged hair cells
 - stimulate auditory pathway directly through the application of electrical current

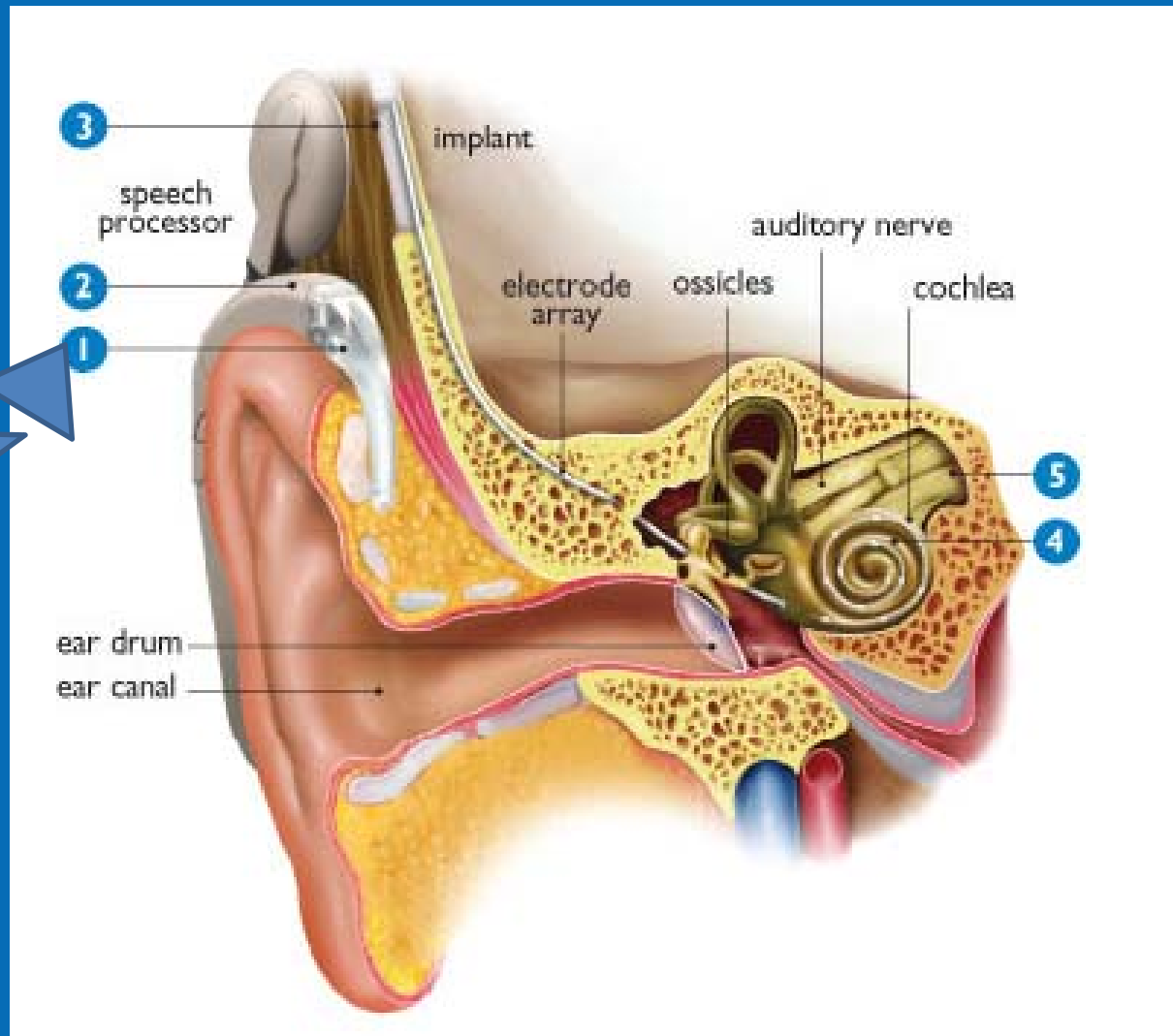
SENSORY Hearing Loss



Hearing Aid and Sensory Hearing Loss



CI Stimulates Nerve Directly



Graphic courtesy of MedEl

www.pepnet.org

Components of all Cochlear Implant Systems

- A Microphone & Cable
- B Speech Processor
- C Antenna/Transmitter
- D Receiver/Stimulator
- E Electrode Array



Photos courtesy Cochlear Americas

Creating A Map

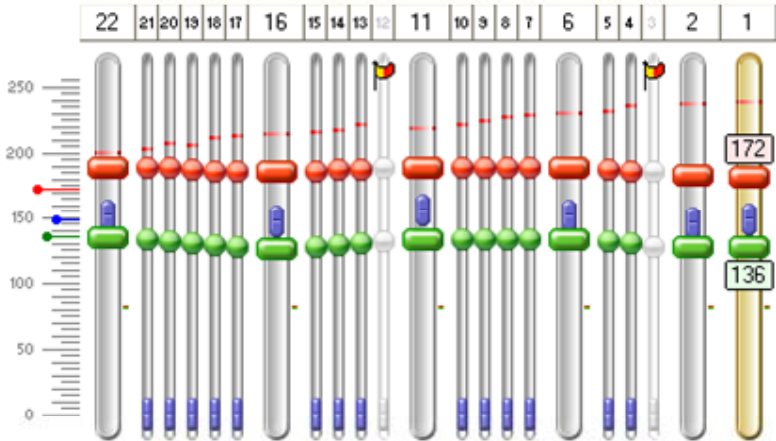
- Threshold and Comfort Levels for electrical stimulation are established
- May use Objective Measures
 - (NRT or NRI)
- Sound Field Audiogram for Verification
- Speech Perception of 6 Ling Sounds

Freedom Implant (Contour Advance) Freedom Implant (Contour Advance)

Processor: Freedom SP, S/N: DEMO1 [Stop] [Checkmark]

#40 (Unsaved)

[Save] [Print] [Undo] [Redo] [Play] [Mute] [Help] [Volume] [Mixer] [Data] [Settings] [Close]



	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
C	180						176					180					180					174	172
T	142						134					141					141					135	136
MRK	151						147					155					151					145	148
AE	22						16					11					6					2	1
SM/IE	MP12						MP12					MP12					MP12					MP12	MP12
Gain	0						0					0					-1.5					-4	-5
PW	25						25					25					25					25	25
DR	38						42					39					39					39	36
UF	313						1063					1938					4313					6938	7938
LF	188						938					1688					3688					5938	6938
BW	125						125					250					625					1000	1000
Tested	<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Method (Behavioural)

- Select NRT/Objective Levels
- Change Programming Method

Streamlined Programming

Set Ts: 5, 1, 10 [Play] [Stop]

Live Cs: 5, CL [Play] [Stop]

Set Ts and Cs

C T T & C

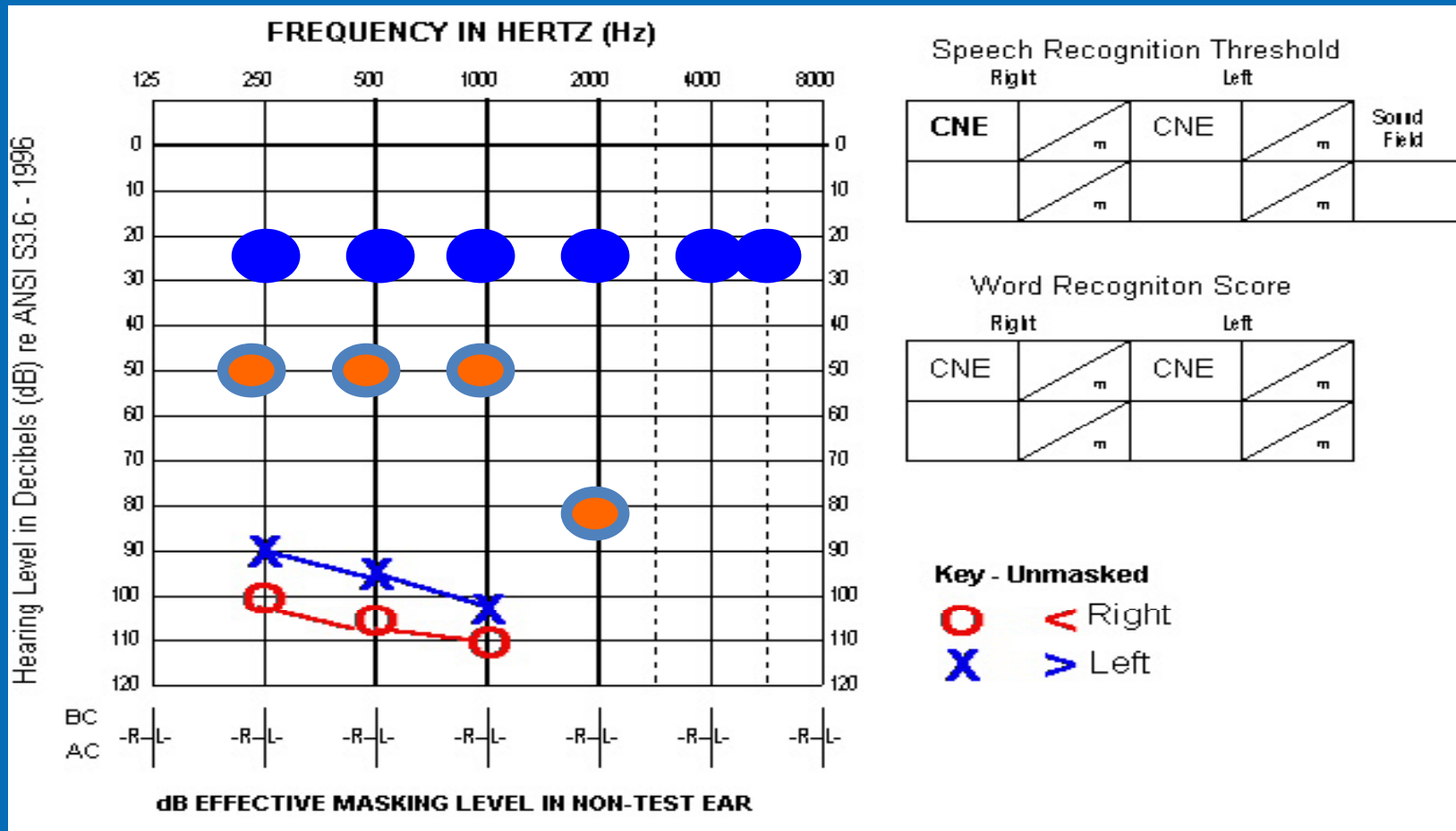
5, 1, 10 [Play] [Stop]

Sweep

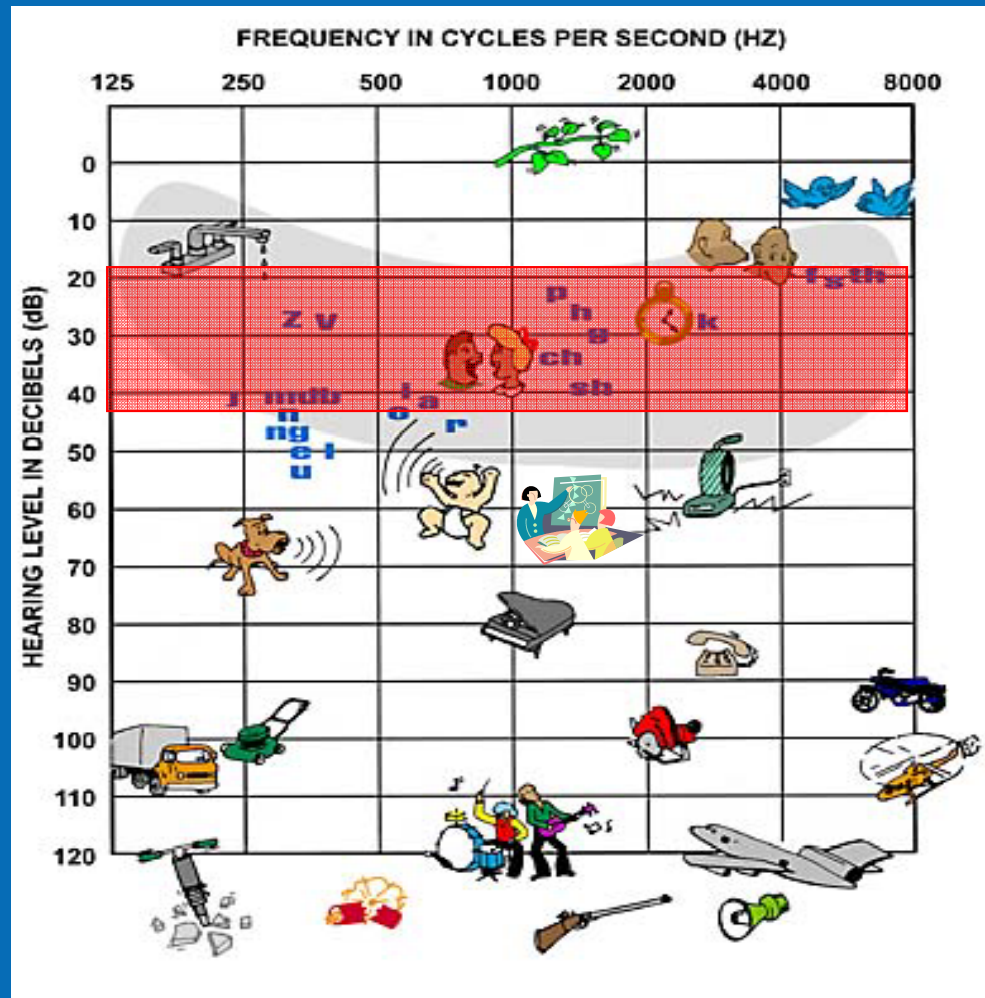
C T 25%

Selected Channels All

HA vs. CI: Audibility

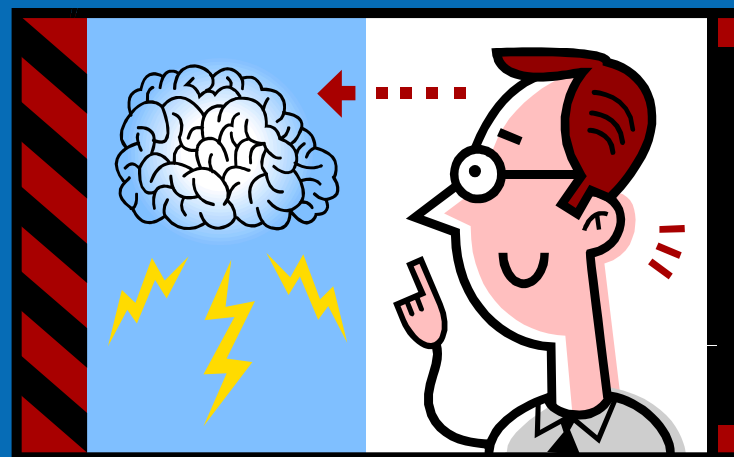


Typical Post CI Audiogram



Audibility.... Now What ?

- Learning to Hear
- Connecting the visual cues
- Role of Auditory Memory
- Continuum of Auditory Learning
- Brain Plasticity



CI USER BENEFITS

Benefits of Cochlear Implants: Adults

- Sound Awareness
- Speech Understanding without speechreading, at a comfortable listening level
- Telephone Use

“Other” Changes Post-CI

- Incidental Conversations and Comments
- More “friendly”
- Self-Confidence improves
- Relationship Changes

Benefits of Cochlear Implants: Children

- Earlier implantation means more spoken language
- Correlation between good oral skills & good sign skills
- Improved socialization with hearing peers
- Benefits of binaural/bimodal stimulation
- Most continue to wear their CIs

ALDS & Other Technology

EXTENDING CAPABILITY

www.pepnet.org

Assistive Listening Devices

- Wireless FM with neck loop
- FM boot
- Bluetooth?

More about FM boot

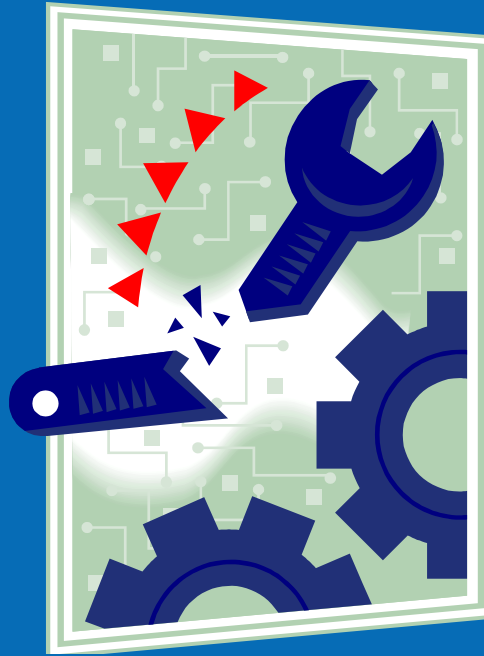
- Proprietary
 - Cochlear
 - Advanced Bionics
- Universal - MedEl

Other devices

- Patch cord
- Hands free neckloop

Telephone use

- Microphone
- T-switch
- Wireless phone ratings



TROUBLESHOOTING A COCHLEAR IMPLANT

NO SOUND! What Next?

- 99.9 times out of 100, the problem is EXTERNAL!
- Most users have a backup system!

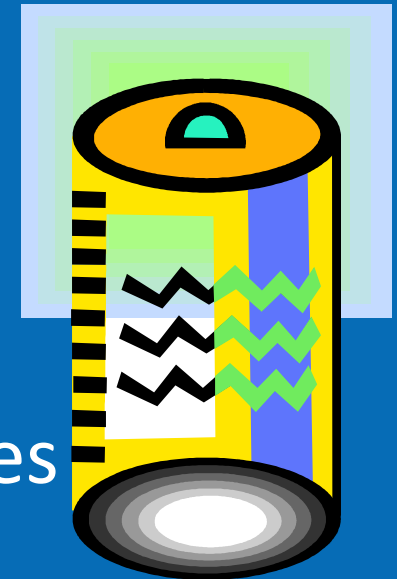
CABLES AND CORDS!

- They ARE the weakest link!



CHANGE THE BATTERY!

- If disposable battery – try a NEW one from a different pack
- If rechargeable
 - Try different battery
 - Try disposable battery
 - Charger?
- Always change all disposable batteries



MOISTURE!

- Recent wet “experience?”
- Summer
- Exercise



Features to Help Troubleshoot

- Flashing Lights
 - Microphone
 - Low Battery
 - Malfunctioning Device
- Audible Alarms
 - Low Battery
 - Headpiece off



Change Can Be Subtle

- Annual Evaluations
 - To assess the internal device
 - To maintain performance
 - To continue to improve!

Devices Can and Do Fail

- 10 year warranty on internal devices
- Usually completely “Dead”
- Occasionally “soft” failures
- Requires explant and re-implant surgery
- Good News (?): Patient receives current implant

When to Refer to the Audiologist

- Changes in Sound Awareness
- Changes in Behavior
- Changes in Speech Production
- Changes in Processor Settings

Where to Find Support

CI USER RESOURCES

www.pepnet.org

Support Groups

For Individuals and Parents Who Need Support

- Cochlear Implant Clubs
 - A Division of Hearing Loss Association of America www.hlaa.org
- Hearing Loss Association of America
- Association of Late Deafened Adults (ALDA) www.alda.org
- Say What Club? www.saywhatclub.com

CI Manufacturers

- MedEl
 - <http://www.medel.com/US/About-MED-EL/Introduction.php>
- Cochlear Corporation
 - <http://professionals.cochlearamericas.com/>
- Advanced Bionics
 - <http://www.advancedbionics.com/global/>

Proprietary Programs

- Advanced Bionics:
 - “Bionic Ear Association”
 - “Tools for Schools”
- Cochlear Corp:
 - “Cochlear Community”
 - “HOPE” -- Habilitation Outreach for Educators, Parents and Adults
- MedEl:
 - “BRIDGE - to Better Communication”

Finding More Information

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Thank you!

You were terrific!