

EEEEK!
**There's a Cochlear Implant
Recipient in My Office!**

Part 2
Completing the Soundscape

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1985

- A joint American-French expedition locates the wreck of the RMS Titanic.
- Microsoft Corporation releases the first version of Windows, Windows 1.0.
- Various artists...record the song "We Are The World" as USA for Africa. to raise money for famine relief
- Coca-Cola Company introduces New Coke (6 months later they returned to the original formula)

From www.thepeoplehistory.com

1985

and

1985

The Nucleus 22 cochlear implant system became the first multichannel cochlear implant to receive FDA approval for use in adults.

1990

- East and West Germany reunite including currency and economies .
- "The Simpsons " is aired on Fox for the first time.
- The Space Shuttle Discovery places the Hubble Space Telescope in orbit revolutionizing astronomy.
- A 16 megabit chip is shown for the first time

From www.thepophistory.com

1990

and

1990

The Nucleus 22 cochlear implant system became the first multichannel cochlear implant to receive FDA approval for use in children.

Fast Forward to 2010

- Three implant systems now have FDA approval for use in adults and children
- There are now over 35,000 cochlear implant recipients in the United States
- Realistic outcomes for cochlear implant recipients have moved beyond “aid to lipreading” and now include significant auditory only open set speech recognition
- Bilateral implantation is not unusual
- In-built telecoils are common in implant processors

**Cochlear Implants: Growing Pains
Parisier, 2003**

- Not all those who could benefit from the technology are receiving treatment
- A critical shortage of cochlear implant trained audiologists exists
- Encourages the development of community based service delivery systems

Opportunities for Audiologists

- Bimodal stimulation
- Personal FM technology
- Assistive Listening Technology
- Alerting Systems

Bimodal Stimulation

- The use of a cochlear implant in one ear and a hearing aid in the other ear.
- Different from hybrid stimulation – the use of both acoustic and electrical stimulation in the same ear.

Bimodal Stimulation

- It is important to have a plan for both ears.
- Patient choice should be an active, not a passive process.
- Options include
 - Bilateral hearing aids
 - Unilateral hearing aid
 - Bilateral implantation
 - Unilateral implantation
 - Bimodal stimulation
 - No technological intervention

Bimodal Stimulation

- Potential Benefits
 - Improved speech understanding in quiet
 - Improved speech understanding in noise
 - Improved localization, especially in horizontal plane
 - Improved music perception/appreciation

Bimodal Stimulation

- Potential Pitfalls
 - Negative impact on speech understanding in noise
 - Fluctuating thresholds in unimplanted ear contribute to fluctuations in patient performance
 - Feedback (most common reason for rejection in systematic clinical observations)
 - Additional expense(s)

Bimodal Stimulation - Candidacy

- Research exists, but has generally focused on describing benefit rather than delineating criteria for recommending a specific intervention
- Often varies based on audiologic factors not specifically related to recipient's hearing status
 - Insurance coverage for bilateral implantation
 - Shifting trends within the profession

Bimodal Stimulation - Candidacy

- Clinic philosophy has a strong influence
 - Little support for bimodal listening arrangement due to concern for competition between signals
 - All unilaterally implanted CI recipients use a contralateral hearing aid regardless of residual hearing
 - Pediatric vs. adult applications

Bimodal Stimulation - Candidacy

- Examine Expectations
 - Speech recognition?
 - Localization?
 - Prevention of neural atrophy?

Bimodal Stimulation - Candidacy

- Residual hearing
- Aided thresholds
 - At 2000 Hz
 - Articulation Index
- Speech recognition

Bimodal Stimulation - Candidacy

- Articulation index graph

Bimodal Stimulation - Fitting

- Balancing loudness
- Use of prescriptive hearing aid fitting methods
- Hearing aid features
 - Adaptive directional microphone technology?
 - Frequency compression?
 - Noise reduction?
- Need for more research

Bimodal Stimulation – Assessing Benefit/Outcomes

- Use age appropriate test materials
- Be aware of ceiling and floor effects
- Test at normal conversational speech and soft speech levels
- Test in quiet and in noise
- Test each ear independently as well as both ears together

Personal FM Systems

- Even when excellent speech understanding has been achieved in quiet, speech understanding in noise often remains a challenge

- Personal FM technology is known to be one of the most effective means of improving speech understanding in noise

Personal FM Systems

- Potential Benefits
 - Improved speech understanding in noise
 - Decreased listening effort

Personal FM Systems

- Potential Pitfalls
 - More equipment to troubleshoot
 - Not as predictable as with hearing aids
 - Interactions between implant and FM technology
 - Environmental interference
 - Device programming changes can effect benefit
 - Not all recipients will benefit
 - Additional expense
 - Recipient motivation

Personal FM Systems – Candidacy

- Recommend a minimum of 6 months of implant experience prior to fitting unless open set speech recognition skills are present prior to that time.
- At minimum, Ling Sound Identification should be present in CI only, FM only, and CI+FM conditions.
- Ideally recipient should:
 - Demonstrate open set speech recognition skills
 - Be able to self report/assess sound quality.

Personal FM Systems – Fitting and Monitoring

- Do not assume that default settings are sufficient. Verify and validate!
- Work with CI audiologist to determine audio mixing settings on processor
- Modified Functional Listening Evaluation (www.cde.state.co.us/cdesped/download/pdf/FLEdoc.pdf)
 - Close/quiet/no FM
 - Distance/noise/no FM
 - Distance/noise/FM

Personal FM Systems – Fitting and Monitoring

- Complete system check
- Use age appropriate test materials
- Sentences provide face validity
- Consider difficulty of sentences relative to purpose of FM system use
- Be aware of ceiling and floor effects
- Monitor regularly

T-coil Applications

- In addition to speech understanding in noise, recipients often have difficulty with phones and audio devices
- Texting has improved “phone” access for many individuals with hearing loss, but other needs still exist
- Many implant processors now have an in-built telecoil. Others have user friendly telecoil adapters

T-coil Applications Compatibility Considerations

- Signal mixing ratios
- Processor features and settings
- Combining with other accessories

T-coil applications Induction hook vs. neckloop

- Personal preference
- Monaural vs. binaural input
- Dexterity
- Safety
- Visibility
- Color options
- Signal strength

**T-coil Applications -
Examples**



Williams Sound
Child size



ClearSounds
Amplified

**T-coil Applications -
Examples**



Hatis Epic Stereo



NoiZFree

**T-coil Applications -
Examples**



Hatis Director

**T-coil applications
Phone vs. Audio Device**

- Jack size
- In line microphone

**T-coil Applications -
Examples**

NoiZFree
Audio



NoiZFree
Cellphone

Bluetooth

- Blue tooth friendly processors
- Access via T-coil application
- Caution regarding iPhone and iTouch
- Caution regarding digital and multiline phones
- Dongles

Bluetooth – Examples



NoiZFree
Beetle



Artone

Alerting Devices

- Add a degree of confidence and support independence
- Many adults are unaware of options/don't even know to ask
- Many parents don't realize how much they are doing for their teens

Alerting Devices

- Most commonly discussed
 - Alarm clocks
 - Fire alert systems
 - Weather alert systems
 - Baby monitors

Alerting Devices

- Frequently expressed fears
 - Being alone at night
 - Being in the shower
 - Not hearing someone enter the house/apartment

Alerting “Devices”

- Hearing Assistance Dogs

- Companion Dogs

Case Study 1

- Details of Case Studies will not be posted with on-line handouts. While only de-identified patient data be used in the presentation, not including Case Study details further protects patient confidentiality.

Case Study 2

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Case Study 3

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