Benefits of Cochlear Implant Rehabilitation for Adults

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What is Our Challenge?

- Many teens and adults are getting cochlear implants
  - *Expanding criteria for cochlear implant candidacy*
  - *People have greater knowledge of cochlear implants*

- Therapy post initial stimulation is a standard for children, but recommendations vary significantly by program for teens and adults
Adults Have Different Outcomes with Cochlear Implants For Many Different Reasons

<table>
<thead>
<tr>
<th>Prelingual and Postlingual</th>
<th>Sudden and Progressive Hearing Loss</th>
<th>Different causes of hearing loss</th>
<th>Different types of hearing loss</th>
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<td>Variety of ages</td>
<td>Different knowledge and access to technology</td>
<td>Additional Health Considerations</td>
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What is Aural Rehabilitation?

• American Speech Language Hearing Association: “If you are an adult, aural/audiologic rehabilitation services will focus on adjusting to your hearing loss, making the best use of your hearing aids, exploring assistive devices that might help, managing conversations, and taking charge of your communication.”

From website: http://www.asha.org/public/hearing/Adult-Aural-Rehabilitation/
What Does AR Look Like In Real Life?
Aural Rehabilitation Takes Resources

**COST**
- Copays
- Materials
- Travel

**TIME**
- Travel to Center
- Practicing
- Visits

**EFFORT**
- Honesty about challenges
- Practicing when busy
- Exercises are hard work
When Something Comes At A Cost, It Had Better Work!

THIS BETTER BE WORTH IT
Is Aural Rehabilitation Worth It?
Things To Remember:

✓ Aural Rehabilitation is so diverse - there are not studies that will say “Aural Rehabilitation works.”

✓ Studies tend to look at individual benefit from a technique rather than achieving a standard goal

✓ Not every aspect of aural rehabilitation has been measured; some areas are hard to measure
Aural Rehabilitation

• When doing a systematic review of the research studies mentioning aural rehabilitation, trends emerged:
  
  • Aural Rehabilitation should contain synthetic training
  • There may be a place for analytic training

(Sweetow & Palmer, 2005)
Environmental Sounds

• Usually one of a person’s first auditory experiences

Computer programs effective at helping people hear sounds (15.8 percentage points improvement on average)

Training improved the practiced sounds but not the ability to recognize new sounds in the environment

(Shafiro, Sheft, Kuvadia, & Gygi, 2015)
Speech Recognition

- Speech tracking exercises can help speech recognition (Bernstein, Bakke, Mazevski, et al; 2012)

- Performance in sentence recognition improved 15-20%

- Effect may be greater with in-person training over computer (Plant, Bernstein, & Levitt, 2015)
Speech Recognition

• Improved recognition of consonants and vowels can occur with aural rehabilitation (Zeh & Bauman, 2015)

On average, people scored 20 percentage points higher than their baseline.
Speech Articulation

- Traditional speech therapy helps adults with cochlear implants improve their speech sounds (Pomaville & Kladopoulos, 2013)

Production of individual speech sounds increased between 12.7 to 83.3 percentage points
Music Appreciation

• Many aspects of music can be improved:
  • Melody recognition
  • Timbre identification (what instrument)
  • Sound quality
  • Pitch recognition
  • Comprehension of lyrics
  • General enjoyment of music

(Gfeller, Guthe, Driscoll, & Brown, 2015)
Music Appreciation

**Sound Quality** *(Hutter, Argstatter, Grapp, & Plinkert, 2015)*

- Subjective ratings increased from “poor” to “good” after training

**Timbre Identification** *(Hutter, Argstatter, Grapp, & Plinkert, 2015)*

- Bilateral CI users improved from identifying 74% to identifying 80% of instruments
- Unilateral CI users improved from identifying 33% to identifying 63% of instruments

**Melody Recognition** *(Hutter, Argstatter, Grapp, & Plinkert, 2015)*

- Bilateral CI users increased from recognizing 45% to 57% of melodies
- Unilateral users increased from recognizing 33% of melodies to 48% of melodies
Telephone Use

- When training with speech filtered to telephone frequencies:
  - Recognized sentences on the phone better after training
  - Understood one syllable words on phone better
  - Reported benefit from training

(Ihler, Blum, Steinmetz et al, 2017)
Accessories

• Cochlear implants come with accessory options that work via telecoil or through Bluetooth that improve listening

• Options vary by manufacturer
### Accessories

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<tr>
<th>Advanced Bionics</th>
<th>Cochlear Corporation</th>
<th>Med-El</th>
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<tr>
<td>• Roger FM-20% performance benefit; 82% improvement in 70dB (Wolfe et al, 2015)</td>
<td>• Mini-Mic- improved sentence recognition up to over 60% in noisy environments; even improved in quiet (Wolfe, white paper)</td>
<td>• Quattro 4.0 Bluetooth streaming for phone, TV, music</td>
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<tr>
<td>• Microphone placement options</td>
<td>• Phone Clip- improved hearing on phone in quiet and in noise</td>
<td>• Telecoil options for microphone only, telecoil only, and microphone +telecoil available on remote</td>
</tr>
<tr>
<td>• ComPilot Bluetooth streaming for phone, TV, music</td>
<td>• TV Streamer- improved hearing TV</td>
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Not an exhaustive list! Also, each implant has programming options to help in difficult listening situations.
Computer Versus In-Person Therapy

Computer programs can help CI recipients improve listening skills

- Henderson Sabes & Sweetow, 2007
  - Using the Listening and Communication Enhancement (LACE) program for 10 hours led to improved performance in 80% of people who completed it

- Fu, Galvin, Wang, & Nogaski, 2004
  - Using a computer program for at least 10 hours, improvement was seen for most participants, though amount and time of progress varied significantly
Computer Versus In-Person Therapy

“Although self-directed training approaches are both time- and cost-effective, the reliance on this model of rehabilitation does not take advantage of the unique training and professional rehabilitation skills of audiologists and other communication specialists and may not always be the best method to improve communication difficulties for individuals with hearing loss.”

(Plant, Bernstein, & Levitt, 2015)
Conclusions:

• Various target areas of Aural Rehabilitation have been demonstrated to have impact for adults with cochlear implants.

• Adults can anticipate personal improvement with Aural Rehabilitation
More Information!

http://www.acialliance.org/page/ACIABlog

Constructive Communication
Quality of Life Improvement
Emotional Impact of Cochlear Implants
Music Appreciation
Word Lists for Auditory Training
Adult CI Support Groups
Self Learning Tips
Unilateral Hearing
Cochlear Implants in Adults and Older Children with Prelingual Hearing Loss

Cochlear Implants for Adults with Congenital Hearing Loss
Assistive Listening Technology
The Bilateral Cochlear Implant Experience
Being the Only Deaf Person in the Family

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