THE ART AND SCIENCE OF AMPLIFICATION:

SUCCESSFUL LIVING WITH HEARING LOSS

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HEARING AID USER RATES


Hearing Difficulty Rate

- Have hearing difficulty
  - 10.6%

Hearing Aid Rate

- Have hearing aid(s)
  - 3.2%
PRESBYCUSIS

- Hearing loss (HL) related to the aging process
- Definition
  - Impaired auditory thresholds
    - High frequency range
  - Impaired frequency and temporal discrimination
  - Impaired sound discrimination
  - Impaired speech discrimination
  - Impaired auditory memory
- Caused by sensory and neural loss and metabolic changes
- Changes along the entire auditory pathway
WAITING FOR HEARING INSTRUMENTS-
THE AVERAGE IS 7 YEARS

Cost
- Hearing instruments are expensive, which can be a barrier

Need
- The need is not always clear or blame is shifted to other communication partners

Benefit
- Cost: benefit ratio is unclear to many patients

Aging
- Perception is hearing instruments are for “old” people
### Why Patients Shouldn’t Wait

<table>
<thead>
<tr>
<th>Auditory Deprivation</th>
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<td>• Lack of input at the peripheral leads to decline of auditory nerve and cortical reorganization</td>
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CORITCAL REORGANIZATION

• With hearing loss there is reorganization
• Mid and low frequencies move to take over absent high frequencies
• Has a negative impact when high frequencies are re-amplified

Eggermont & Roberts (2004)
INTRODUCTION OF AMPLIFICATION

- Frequency resolution confusion
  - The longer the region is not amplified, longer to acclimatize

Eggermont & Roberts (2004)
WHY PATIENTS SHOULDN’T WAIT

**Auditory Deprivation**
- Lack of input at the peripheral leads to decline of auditory nerve and cortical reorganization

**Social Isolation**
- Withdraw from social activities due to difficulties with communication
SOCIAL ISOLATION

- Reduce communication can lead to communication breakdown
- Continued communication difficulties can lead to social withdraw
  - Depression

WHY PATIENTS SHOULDN’T WAIT

- **Auditory Deprivation**: Lack of input at the peripheral leads to decline of auditory nerve and cortical reorganization
- **Social Isolation**: Withdraw from social activities due to difficulties with communication
- **Cognitive changes**: Research suggesting cognitive decline related to hearing loss
Influx of new research on cognitive function and hearing loss


- Significant effect between hearing loss and:
  - Digit Symbol Substitution (processing speed)
  - Digit Symbol Copy (processing speed)
  - Letter Comparison (processing speed)
  - Pattern Comparison (processing speed)
  - Useful Field of View (processing speed)
  - Trail Making Test part B (executive function, inhibition, set-shifting)
  - Stroop Color Word Test (executive function, inhibition)
  - Digit Span (verbal memory)
  - Pattern Span (spatial memory)
  - Hopkins Verbal Learning Test (memory)
  - Mini Mental State Exam (global screening)
HEARING INSTRUMENTS
WHAT THEY WON’T DO

- Restore normal hearing
- Only amplify what you want
- Unrealistic Expectations

+ =
GOAL OF HEARING INSTRUMENTS

Audibility
Cosmetics

Features
Older Adults Most Likely Age Group to Describe Their Smartphone as ‘Freeing,’ ‘Connecting’

% of U.S. smartphone owners who say that the following items from each pair describe how they feel about their phone:

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<thead>
<tr>
<th></th>
<th>Leash</th>
<th>Freedom</th>
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<tr>
<td>Total</td>
<td>30</td>
<td>70</td>
</tr>
<tr>
<td>18-29</td>
<td>36</td>
<td>64</td>
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<tr>
<td>30-49</td>
<td>32</td>
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<td>50-64</td>
<td>22</td>
<td>77</td>
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<tr>
<td>65+</td>
<td>18</td>
<td>82</td>
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<table>
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<tr>
<th></th>
<th>Distracting</th>
<th>Connecting</th>
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<tr>
<td>Total</td>
<td>28</td>
<td>72</td>
</tr>
<tr>
<td>18-29</td>
<td>37</td>
<td>63</td>
</tr>
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<td>30-49</td>
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PEW RESEARCH CENTER

http://www.pewresearch.org/fact-tank/2015/04/29/seniors-smartphones/
Seniors slow to adopt mobile technology

77% of adults 65 and older now own cellphones, up from 69% in 2012.

18% of adults 65 and older own smartphones versus 55% of all adults.

18% of adults 65 and older own tablets versus 34% of all adults.

Source: Pew Research Center


2. Does the user need any additional accommodations?

Hearing: Hearing-impaired seniors may want to add on captioning or relay services, which are free as guaranteed by the Federal Communications Commission’s Universal Services Program. With these services, the user can see a transcript of the conversation as it’s happening. While the services themselves are free, the data needed to run them is not, so users who will rely on them may need a more robust data plan, especially if opting for a video relay service, says Matt Gerst, director of external and state affairs for CTIA, a wireless communications trade group.

Gerst says that all wireless handsets are given a rating for their compatibility with hearing aids. You can find a device’s hearing aid compatibility rating through either the FCC or on a service provider’s website.
CALLS

- Stream:
  - Calls
  - Skype
  - FaceTime
GEOTAGGING

Geotag settings to specific locations
AUDIO STREAMING:

- Binaural wireless 3.0
- Transmitter
- TV
- Phone
- Microphone
- Cell Phone
- Computer
- Music
- Phone
- mp3
- PC

Devices connected include:
- Phone
- mp3
- PC
- TV
- Transmitter
REMOTE MICROPHONES

• Listening to that one person in noisy environments:
  • Restaurants
  • Café
  • In the car
  • In the home
LOCATING A LOST HEARING INSTRUMENT

• If a hearing aid is lost - use GPS to find it
  • Out of the house – map
  • Close by - hot/cold
The overall purpose of these features:

• Provide audibility for the hearing loss
• Reduce auditory deprivation
• Customize the acoustical environment
• Allow patients to socialize with family/friends
• Reduce social isolation
REFERENCES


