The sequential dilemma: Factors affecting success in delayed sequential implantation in adolescents

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Disclosures

- Med El Audiology Advisory Board*

*at the time of abstract submission
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Objective

- Evaluate outcomes in children with sequential bilateral cochlear implants based on age at time of second CI
- Determine if there are factors related to use of the second CI
- Identify factors that may assist clinicians in counseling and assist parents in the decision making process when considering a sequential bilateral CI
Review


- Aural preference syndrome exists when sequentially implanted (Gordon et al, 2015)

- Literature review indicates outcomes vary widely with sequential implantation
Methods

- Retrospective review of children who received a sequential cochlear implant at a single facility
- Subjects included children who received their first CI 1-14 years of age and their second CI 9-18 years of age
- Data included etiology of hearing loss, age at 1st vs 2nd implant, time between ears, amplification use in the contralateral ear prior to 2nd implant, and word/sentence scores of 1st vs 2nd ears
**Subjects**

- 70 recipients identified
  - 2 with multiple disabilities were removed due to additional disabilities that impacted speech recognition
  - 1 lost to follow up
  - 10 removed as no data available due to recently received 2nd CI
  - Final N = 57 (31 females, 26 males) – all regularly used their first device
    - 28 use their second CI
    - 29 are non-users of their second CI
Most recent speech recognition of the 1st ear

![Graph showing speech recognition rates for words and sentences with and without users.](image-url)
Etiology of HL, all subjects

- Congenital
- Progressive
- EVA
- Premature
- AN
- CMV
- Usher syndrome
- Meningitis
- Mondini dysplasia
Etiology of HL, Users vs. Non-Users of 2nd Device

- Congenital
- Progressive
- EVA
- Premature
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Users vs. Non-Users
Average Age of Activation of 1st and 2nd ears in months, users vs non-users

- 1st Ear:
  - Users: 4 yrs 10 mos
  - Non Users: 3 yrs 3 mos

- 2nd Ear:
  - Users: 12 yrs 11 mos
  - Non Users: 13 yrs 7 mos

- Time between ears:
  - Users: 8 yrs 1 mos
  - Non Users: 10 yrs 4 mos

* p=0.05

(p=0.05)
HA use & pre-op word score prior to 2nd CI

HA use prior to 2nd CI

- Users: [Bar Graph]
- Non Users: [Bar Graph]

Words

- Users: [Bar Graph]
- Non Users: [Bar Graph]

*p<=.05
Mode of Communication: Users vs Non-users
1 year post 2nd ear - word & sentence recognition scores of the 2nd ear

1 yr post 2nd ear

- p<.05

% | users | non-users |
---|---|---|
words | n=18 | n=9 |
sentences | n=15 | n=7 |
Findings

Words

<table>
<thead>
<tr>
<th>Age</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 yrs, 8 mos</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10 yrs, 2 mos</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>6 yrs, 7 mos</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
</tbody>
</table>

Sentences

<table>
<thead>
<tr>
<th>Age</th>
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</tr>
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</tr>
<tr>
<td>10 yrs, 2 mos</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>6 yrs, 7 mos</td>
<td>18</td>
<td>19</td>
<td>20</td>
</tr>
</tbody>
</table>

Legend:
- Words for 1st ear
- Words for 2nd ear
- Sentences for 1st ear
- Sentences for 2nd ear
Additional Analyses

- Correlation analyses were performed using group data to examine the relationship between various factors and device use/non-use.
- The following factors were significant:
  - 1 year post-op sentence score of 2nd ear ($r = -.428, p = .047$)
  - 1 year post-op word score of 2nd ear ($r = -.48, p = .011$)
  - Time between ear 1 and ear 2 ($r = .28, p = .035$)
Summary

- USERS OF THE 2nd CI:
  - Were significantly older than non-users when they received the 1st CI
  - Demonstrated significantly shorter time between ears than non-users
  - Demonstrated significantly higher word and sentence recognition scores in the 2nd ear one year post activation of the second CI than non-users
Conclusions

- Although patient care is trending towards simultaneous bilateral CIs, a large number of potential sequential bilateral CI recipients are seeking a 2\textsuperscript{nd} implant.
- Although 50\% of these patients are non-users of their 2\textsuperscript{nd} device, 50\% of them use them.
- Data from this study can be used to counsel families of such children regarding factors that may contribute to device use/non-use and regarding expectations of performance.
Thank you

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