Speech and Language Development in ABI Candidates: Setting Expectations

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UNC Pediatric ABI Feasibility Study

• The purpose is to demonstrate the safety and efficacy of the Nucleus 24 Multichannel Auditory Brainstem Implant
  » Demonstrate safety of the surgical procedure
  » Tolerance of device stimulation
  » Potential for auditory benefit beyond that experienced with cochlear implant (CI)

• May provide the preliminary experience for a larger-scale clinical trial
• Requires a team approach among surgeons, audiologists, SLPs, electrophysiologists, and families
## Demographics

<table>
<thead>
<tr>
<th></th>
<th>UNC1</th>
<th>UNC2</th>
<th>UNC3</th>
<th>UNC4</th>
<th>UNC5</th>
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</thead>
<tbody>
<tr>
<td>Previous CI</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Age at ABI</td>
<td>3.33</td>
<td>2.50</td>
<td>3.50</td>
<td>5.50</td>
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<td>Gender</td>
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<td>Side</td>
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<td>R</td>
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<td>Etiology</td>
<td>CHARGE</td>
<td>Michel Aplasia</td>
<td>CHARGE</td>
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<td>Com Mode</td>
<td>Cued Speech</td>
<td>ASL</td>
<td>SEE</td>
<td>SEE</td>
<td>ASL</td>
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</tbody>
</table>
Childhood Development after Cochlear Implantation (CDaCI)

Study PI: Niparko

Researchers and participants from HRI have moved to USC

^ future follow-up of NH controls is pending
Listening Goals – Year One CI

- **Full Time Use of CI**
- **Discriminate patterns of speech**
- **Open set recognition of common phrases/words**
- **Consistently responds to name**
- **Phrases/Words Closed Set**
One Year Post ABI

- Full Time Use
- LLS
- Songs
- Phrases

Subject 1
Subject 2
Subject 3
Subject 4
Subject 5

11/3/15
18-24 months Post ABI

Subject 1
Subject 2
Subject 3
Speech Sounds 1 year post CI

- Spontaneous vocalizations
- Word approximations
- /b, p, m, n, w, h/
- Duration/Intensity/Pitch
- Vowels
Speech production ABI vs. CI*

*Identifying Early Phonological Needs in Children with Hearing Loss

N = 22

- CI users
- ABI 1
- ABI 2
- ABI 3
- ABI 4
- ABI 5
Language 1 year post CI

Up!
Mama
No
Spoken Language – 12 months post-activation CI vs. ABI

<table>
<thead>
<tr>
<th></th>
<th>CI users</th>
<th>ABI users</th>
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</thead>
<tbody>
<tr>
<td>OWLS Expression</td>
<td>65</td>
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<tr>
<td>OWLS Comprehension</td>
<td>70</td>
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<tr>
<td>OWLS Composite</td>
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<td>55</td>
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</table>

11/3/15
What have we learned?

Looks like a CI – Not a CI
Listening Skills-1 year post ABI

100% wear device

60% identify multi-syllable words in a closed set

80% imitate duration/spectral cues

100% have detection audiograms
Speech Skills-1 year post ABI

- 100% vocalize
- 60% use vowel variety
- 80% use initial sounds to imitate words /b, m/
- 80% have increased their quality voice for pitch and duration

11/3/15
Language 1 year post ABI
Pediatric ABI users can...

- detect sound
- develop quality sounding voices
- discriminate word pairs

Need a Visual support for LANGUAGE.
Thank you!