Working With Children Who Use Cochlear Implant Technology

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Introduction
The educational trajectory for children with hearing loss, who are identified early and equipped with high level technology capable of giving them full access to the auditory spectrum, is far beyond the expectations of their predecessors (e.g., Nicholas & Geers, 2006; Moeller, 2000).

In order to maximize achievement, more must be understood about factors that contribute to success and ways in which to support families, educators, speech language pathologists, audiologists and other professionals in meeting their needs.
The Concerns

- Children with hearing loss (HL) are particularly vulnerable for speech, language, reading and academic problems (Marschark, 2007; Traxler, 2000)

- Relatively few empirical studies have examined ways to improve literacy and academic learning in this population resulting in many unknowns
  - Existing evidence covers a heterogeneous group

- Parents and educators may not have the requisite skills to facilitate language learning and literacy in this population
Speech and language development rely upon incidental learning, typically through overhearing, and the ability to self-monitor. Intertwined with play and early social interactions, joint attention. Our job is to maximize all of these!
Hearing vs Listening

- Hearing loss is sensory deprivation and affects brain development
- Reading, listening, language, social skills, and other important developmental concerns rely upon consistent and early input
- Hearing aids and cochlear implants can provide the necessary auditory and brain stimulation for typical development but require consistent and appropriate use.
  - Parents and professionals must be tenacious in monitoring audition and correcting concerns.
Cochlear Implant Technology

Questions and Concerns
Optimal auditory access

- Daily listening checks (Ling test)
- Attention to auditory skill development
- Review basic acoustics
  - Tools for Schools (http://www.bionicear.com)
When to Refer

- Hearing aids vs CIs
- Questions about appropriate function
- Bilateral, hybrid and other options
Troubleshooting Implants

- Early intervention concerns
- Classroom problems
- Interfacing with other equipment
- Other
Developmental Concerns and Challenges

Early intervention and working with parents
Children who are DHH spend significantly less time in episodes of JA and significantly more time alone with objects than do hearing children.

Other differences of children who are DHH:

- Spend virtually no time in symbol-infused JA while their hearing peers spend nearly one third of their time in this attention state;
- Spend significantly more time in coordinated JA than do their hearing peers;

Prezbindowski, 1998
JA continued

Time spent in JA increases in 2\textsuperscript{nd} year but children who are DHH may not infuse symbols into their interactions.

- By the end of the second year of life, the use of language qualitatively changes the nature of the mother-child in hearing children but may not for those who are DHH.
- This suggests that language provides a unique and powerful means of attracting and holding children in episodes of JA
  - Without these same episodes mothers of children who are DHH do not have the same opportunities to enculturate (e.g., culture info as well as problem-solving and other important lessons).

Lederberg & Prezbindowski, 2000
Phonological Awareness

- Research suggests that children who are DHH can develop phonological awareness similar to hearing children, but often exhibit delays in differences in development (although research on this topic is limited).
- Some suggest it is the missing link in reading problems of children who are DHH.
  - Syllable
  - Rhyme
  - Phoneme

James, et al., (2005)
Reading

Language & Lexicon

Phonological Representation
Syllable
Onset/Rime
Phoneme

James, 2005
• Phonological awareness developed over time in CI users and in the same sequence as that found in hearing children;
• Syllable and rhyme awareness developed before phoneme awareness;
• CI users rely on orthographic knowledge to make phonological judgments;
• There was no significant relationship between phonological awareness and reading after the effect of vocabulary knowledge was controlled.
<table>
<thead>
<tr>
<th>Dimension</th>
<th>Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonology</td>
<td>Managing breath stream for speech</td>
</tr>
<tr>
<td></td>
<td>Rotating tongue forward and backward to establish vowel postures</td>
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<td></td>
<td>Moving articulators smoothly and continuously from one articulatory posture to the next.</td>
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<td>Pragmatics</td>
<td>Loss of conversational fluency</td>
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<td>Modified speaking style</td>
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<td></td>
<td>Inappropriate topic shifts</td>
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<td></td>
<td>Superficial content</td>
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<td></td>
<td>Frequent clarification</td>
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<td></td>
<td>Bluffing and misunderstanding</td>
</tr>
<tr>
<td>Dimension</td>
<td>Concern</td>
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<tr>
<td>---------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Semantics</td>
<td>May not have sufficient vocabulary variety.</td>
</tr>
<tr>
<td></td>
<td>May not have complex vocabulary.</td>
</tr>
<tr>
<td></td>
<td>May not understand subtle differences or figurative language.</td>
</tr>
<tr>
<td>Syntax</td>
<td>May demonstrate unsophisticated grammatical forms and sentence structures.</td>
</tr>
<tr>
<td></td>
<td>May have a reduced mean length of utterance (MLU).</td>
</tr>
</tbody>
</table>
Children can effectively “use language to learn about language”

(Brown & Cambourne, 1987, p. 15)

- Increase children’s willingness to persist in language & literacy exchanges.
- Identify motivating and effective ways of promoting language and literacy.
- Insure parents have requisite knowledge and skill to foster literacy development.
Examining and encouraging children’s willingness to persist in early language and literacy exchanges.

- Degree of mutual engagement between a parent and child during book reading interactions acts as a critical scaffold to facilitate language and literacy skills (Kaderavek & Sulzby, 1998)

- Children with language impairment (Kaderavek & Justice) and hearing loss (Kaderavek & Pakulski) are less likely to remain engaged in parent-child storybook reading without modifications
Basic building blocks of typical early language and literacy experience

- Semantics/vocabulary
- Syntax
- Phonological & phonemic awareness
- Pragmatic skills
- Other (e.g., print knowledge)
Influencing the home environment: A socio-cultural perspective

Stobbart & Alant, 2008

- **Affective context**: Parents’ values and beliefs about literacy and expectations of literacy development
- **Educational context**: Collaboration between parents and educators and extent to which parents receive support and guidance from professionals
- **Physical and functional context**: The “culture of literacy” in the home and the family’s literacy routines.
- **Language context**: Interaction between parent and child and use of facilitative language techniques
Other parental factors that can facilitate language and literacy acquisition

- Deep involvement in child’s language and literacy development and education
- Print materials available in the home & daily reading
- Connections between the text and the child’s real-world experiences are made
- Facial expressions and postures to signal changes in characters and dialogue occurs in storybook reading and toy play
- Engagement is monitored in language based activities and child’s lead is followed, maintaining joint attention
- Demonstrate positive affect and enjoyment during reading and language activities
• Explain or reference literacy terms such as author, page, letter, word, sentence, story
• Demonstrate orientation of book
• Write lists and notes together
• Facilitate narrative productions
• Monitor language load and reword as necessary
• Scaffold; use of didactic reading strategies
• Request a label or description for drawings

*e.g., DesJardin, et al., 2008; Kaderavek & Pakulski, 2007; Lartz & Lantina, 1998; and Toscano, McKee, & LePoutre*
High level (facilitative) techniques
- Parallel talk
- Open-ended question/phrase
- Expansion
- Recast

Lower level techniques
- Imitation
- Label
- Closed-ended question
- Linguistic mapping
- Directive
- Comment
Motivating and effective ways of promoting language and literacy in young children

- Use a variety of book genres
  - Manipulative book
  - Multiple copies
  - “Creative memories” book or “experience book”
  - Pair books with movement/song
  - Pair books with other *extension* activities
Benefits of manipulative features and multiple copies:

- Provide tangible aspects of the storybook that simultaneously promote development of vocabulary and other important story elements.
- Give children a sense of control when they might otherwise sense that the task is too difficult, particularly if language load is high.
- Can be used to role-play, which also lends to improved understanding of a story.
One day a boy named Joe decided he wanted a pet frog.

He got a net and a bucket to put the frog in.

Then he and his dog started off to find one.

The frog jumped inside a musical instrument.

When the musician tried to play music, the sound was terrible.

So he looked inside his instrument to see what was the matter.

Experience Books

- Provide opportunities for implicit and explicit language and literacy teaching and learning
- High interest
- Appropriate for therapy, school and family use
- Encourages child to create using narrative, writing, and other skills.
Maximizing the experience book

Jack and the Beanstalk

This is the picture of Jack, the damsel, the giant, the minister, Old Mother Twaddle, and the bean seller.

Measuring Bean Plants
After 2 Weeks

<table>
<thead>
<tr>
<th>Name</th>
<th>estimate in inches</th>
<th>tallest plant</th>
<th>shortest plant</th>
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<tbody>
<tr>
<td>Selia</td>
<td>5</td>
<td>6 1 4</td>
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</tr>
<tr>
<td>Cail</td>
<td>12</td>
<td>6 3</td>
<td></td>
</tr>
<tr>
<td>Leisha</td>
<td>6-8</td>
<td>8 6 6</td>
<td></td>
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<tr>
<td>Ayla</td>
<td>2</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Varalyn</td>
<td>3 1/2</td>
<td>7 4 5</td>
<td></td>
</tr>
<tr>
<td>Mom</td>
<td>3</td>
<td>7 4 0</td>
<td></td>
</tr>
<tr>
<td>Penny</td>
<td>2</td>
<td>6% 82%</td>
<td></td>
</tr>
</tbody>
</table>
Using “Creative Memories”

My friends and me
Extension activities: *Linking literacy to daily activities*

“Head to Toe”
by
Eric Carle
School-Age Children

Unique concerns and challenges
Enhancing literacy interest in school-age children

- Book Buddies
- Readers Theatre
- Role-play
Scaffolding a reading interaction

Do
- Maintain engagement
- Encourage children’s prior knowledge of story themes
- Support children’s story recall
- Help children identify the main theme, draw conclusions and provide story details

Don’t
- Overly exaggerate
- Quiz or tax with questions
- Emphasize too many different concepts (print or idea)
- Give up!
Reader’s Theatre

- Children read aloud from a chosen book or script
- Minimal props; no acting
- Thought to increase reading fluency, motivation, and language/literacy skills
Role-Play

- Dramatic re-enactment or role-play used to increase motivation; high interest
- In “Bear Lake” study, narrator read story and children acted out parts, including minor speaking roles
- Use of props and costumes
  - Can include art, science, and other academic activities
- Results in more sophisticated retellings/narratives

Pakulski & Kaderavek, 2001
References


