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This issue of Loud & Clear includes information about how to maximize the reading potential of children with cochlear implants. Topics of focus include:

- The history of reading and hearing loss
- The partnership between reading and spoken language
- Strategies for therapy
- Best book features for various stages of literacy

READ ALL ABOUT IT: LITERACY STRATEGIES FOR THE VERY YOUNG CHILD WITH HEARING LOSS

By Krista S. Heavner, MS, CCC-SLP/LSLs Cert AVT®

Edited by Carissa Moeggenberg, MA, CCC-A and Patricia Trautwein, AuD

The History of Reading as it Relates to Hearing

Children with severe-to-profound hearing loss have historically demonstrated poor reading abilities^{1,2} mostly due to limited access to sound. The larger majority of deaf children have achieved reading comprehension levels of a fourth grade average.³ Technology has not always provided access to speech, and historically children were often taught to rely only on visual methods to learn language and communicate. As a result, sign language was often their first or only option. Due to poor access to sound, learning phonics for children with hearing loss has been virtually impossible. While their peers with normal hearing were sounding out words, most children with significant hearing loss

faced the challenge of using sight words and memorization.

New technology, such as digital hearing aids, FM systems and cochlear implants, is now granting access to all sounds within the speech spectrum, thereby providing new opportunities for children once destined to struggle to listen and speak. In fact, because hearing and speaking provide many of the prerequisite skills necessary for reading, children with hearing loss who receive a cochlear implant early in life have the potential to learn to read as well as children with normal hearing.^{4,5,6} Of course, children must develop many skills before formal reading instruction can begin, such as:

- a) cognitive development to support reading
- b) experiential knowledge with a wide range of developing schema
- c) the ability to relate to a story
- d) print recognition
- e) the ability to infer meaning
- f) substantial spoken vocabulary



It appears that children with cochlear implants have an advantage in developing the background knowledge and experiential schema shown to contribute to reading success. This may be because children with cochlear implants possess the ability to overhear new language and vocabulary, leading to the development of these skills at a much faster rate³.

Once a child has access to sound with a cochlear implant, he or she has all of the sounds necessary for speech within their grasp; therefore, a phonics approach might be used. For profoundly deaf students using cochlear implants, learning sound-to-symbol relationships is easier because of access to sound! With phonics, the student “sounds out” each word, “hearing” the resulting word in his or her mind’s ear and then recognizing what it is and what it means.⁷ Consonants are made more audible due to high-frequency accessibility—and access to all frequencies allows for discrimination between formants in vowels. Because children with implants are now entering the mainstream at earlier ages, many will be learning to read in classrooms with their hearing peers and have auditory access that allows them to benefit from phonics instruction.³

Improved access to sound also contributes to improved phonemic awareness, which is the ability to think about the sounds of language differently from the meaning of language⁸. Phonemic awareness is a prerequisite for understanding the relationship between sounds and letters, and it is also a prerequisite for understanding phonics. This is a complex skill because sounds in words change according to the sounds that

“ *A basic premise of Auditory-Verbal education is that limited-hearing children need the same foundation of listening experiences as a normal-hearing child, regardless of the age at which intervention occurs.*⁹ (Pollack, 1997) ”

accompany them. Even for children with typical hearing, it is often difficult to teach that words are made of little sounds. A sight word approach has been used in conjunction with phonics because not every word can be “sounded out,” and English has many exceptions to its rules. However, for children who are hearing impaired and may already rely a great deal on visual cues to learn about the world, sight reading does not give the entire picture of a word, which is based on sound. “Rather, it is the breaking down and manipulation of spoken language that is of interest.”⁷ This understanding provides us with one rationale for children learning the

language spoken around them as preparation for learning to read that language.⁷

Therapy and Reading: The Input Phase

The first question many professionals and parents may have regarding reading is “How do I get started teaching the child with a cochlear implant to read?” First, it is important that the therapist or teacher is knowledgeable about the milestones of children with typical hearing. The Auditory-Verbal and Auditory-Oral approaches to teaching spoken language to children with hearing loss utilize the developmental milestones of children with typical hearing to develop treatment plans. Literacy skills can also be developed naturally. Once a child has access to sound, the use of developmental milestones for learning to read can be used in establishing long-term and short-term goals and planning therapy. (Readers are referred to Winter 2007 Tools for Schools e-newsletter at www.BionicEar.com for information on developing treatment plans using typical developmental milestones.)

Spoken language and vocabulary provide the foundation for reading, which is the reason that reading aloud to all children is necessary.¹¹ The first step to developing literacy in a natural

manner is through input of spoken language. As the above quote indicates, it takes a period of listening before the child with hearing loss or with normal hearing can be expected to produce sounds and words. Regardless of the age of the child, input is necessary, and reading aloud is a way to introduce spoken language to the child. Parents may also provide input of spoken language by discussing sounds in the environment, drawing attention to new vocabulary and experiences, and narrating activities throughout the day. The parent can further provide input through reading and discussing books with the child. The therapist or teacher may provide a foundation of spoken language by planning activities that allow for abundant input of new vocabulary within a therapy session or activity. New sounds and exposure to new experiences can give rise to new vocabulary in a very natural way.

Reading-Aloud and Comprehension

In the same manner that spoken language ability is the foundation for reading, listening comprehension feeds reading comprehension. A child who has been read to from a young age is not only better prepared to read,¹¹ but has heard more than 30 million words by age 3 and has a vocabulary of 20,000 words by age 6.¹²

Additionally, this child scores highest on reading, math and general knowledge tests.¹³ We learn language in three main ways:

- 1) Immersion: Hearing meaningful words again and again
- 2) From “superheroes” such as mom, dad, brother and sister
- 3) In a meaningful context (Words such as “a”, “an,” and “the” cannot be taught in isolation and therefore are learned in meaningful context.)

“ *There are two ways for words to enter a child’s brain—the eyes or the ears...if a child is not reading yet, it leaves just the ears!* ”

Reading aloud to children with typical hearing or with hearing loss is essential for developing complex comprehension skills. When an adult reads to a child, three important things happen, and these things provide additional support for reading aloud to a child with hearing loss who is learning spoken language:

- 1) The child will develop a pleasure connection with the book
- 2) Both parent and child learn something from the book they are sharing (e.g. new story, plot, character traits)
- 3) The adult is pouring sounds and syllables called words into the child’s ear...and this becomes vocabulary!!¹⁰

The Therapy Session

When planning therapy for the infant with hearing loss, the first thought may be that books are not appropriate due to a baby’s lack of maturity and attention. However, the opposite is actually true. It is important to begin introducing books to children as early as in the womb and certainly as soon as the child is born. Jim Trelease, in his book “The Read-Aloud Handbook” advocates for reading aloud to children as early as in utero because the child becomes accustomed to his mother’s rhythmic voice and it is comforting. It is well-documented that reading aloud to children with normal hearing facilitates development. Research has indicated that

measurable long-term storage of sound and word patterns begins as early as 8 months of age, and while debates exist about the development of the brain in the first 3 years of life, Trelease says regarding early read-aloud exposure, “Learning (and life) is easier if the first three years are enriched, but later opportunities can be rewarding if there is an ideal learning environment. Still, later learning will be more arduous.” Children hearing the most language will have the best chance of having the greatest language skills. Clinical experience has also revealed that parents are often uncomfortable reading to an infant or young child with significant hearing loss because of the

child's behavior or lack of attention, or simply because the child is unable to hear. It is very normal for a baby with normal hearing to grab at the book, attempt to eat the book, or just crawl away, yet continuing to read and introduce the concept to a baby is important. A baby with hearing loss will behave in much the same manner. Nevertheless, it is important to use a book in each therapy session and model expansion of the content in the book through use of props, acoustic highlighting with the voice ("motherese"), and model paraphrasing. It is important to keep in mind that there is no perfect way to incorporate books into therapy with young children with hearing loss. It is necessary, however, that therapists utilize books and model strategies for parents so that an appreciation for reading and the vocabulary learning that accompanies reading is addressed. The books used should be current, of high interest to the child, and relevant to the child's life and experiences.

When planning a therapy session for a child of any age, it is recommended to incorporate activities representing goals from the following areas of development: audition, speech, cognition, language, vocabulary and literacy. For therapists and parents who have very limited time, a book might be helpful in meeting some of the goals in one activity. For example, a young child might be disinterested

“Until a child is four months old, it doesn't matter a great deal what you read, as long as you are reading.” —Jim Trelease

in “The Three Pigs” if the book is only read to him or her and the vocabulary is too difficult. However, if the therapist is able to use props such as finger puppets, felt boards, manipulatives, or masks, the child suddenly enjoys the reading experience. For a very new listener, teaching the parent how to modulate the voice for different speakers in a story, and how to paraphrase longer, more challenging text might also increase the child's attention.

The first three years of a child's life are crucial to the foundation of listening and learning. The same applies

for a young child with hearing loss learning to process and comprehend spoken language. The chart below includes information about the child's and adult's roles in a therapy session, as well as behavior that might be observed at different stages in a child's development of literacy and listening skills.^{3,10,14} The “adult” might be the therapist, teacher and/or parent. The ages and stages of development that are included are in reference to the developmental age of a child with typical hearing, which can be applied to treatment planning for a child with hearing loss who is of a particular listening age.

Conclusion

In summary, the therapists, teachers and parents of a child with hearing loss should keep in mind that the potential now exists for their child to learn to read well—and expectations should be kept high! The use of developmental milestones and read-aloud strategies utilized with children with typical hearing can be helpful in developing treatment plans, establishing goals and expectations, and conducting individualized therapy sessions.



Therapy with the Infant		
The Adult	The Child	Book Features
<ul style="list-style-type: none"> • Modeling (for parents) • Exposure to print • Familiarity with books • Familiarity with adult voice • Point to pictures • Use books with bright colors and tactile properties • Parentese (acoustic highlighting with the voice) • Read a few pages at a time • Watch for cues to turn the page • Use simple phrases • Make up your own words 	<ul style="list-style-type: none"> • Listen and observe • Bonding with the adult • By 6 months of age, the child wants to hold/touch/eat the book • Increased interest in pictures, bright and bold colors • Interest in pictures of faces 	<ul style="list-style-type: none"> • Simple, large pictures • Bright designs • Chunky/board books • Fold-out books • Cloth/vinyl books

Therapy for the Six to Twelve-Month-Old		
The Adult	The Child	Book Features
<ul style="list-style-type: none"> • Continue with Parentese • Follow child's lead—opportunity to explore turning pages • Talk about pictures • Keep books on low shelves • Offer a teething toy! • Make up "story" 	<ul style="list-style-type: none"> • Attends to pictures • Recognizes familiar objects • Turns pages with help • Vocalizes in response to reading • Pats pictures • Prefers pictures of faces • Listens and observes with increased attention, yet continues to have short attention span for long books 	<ul style="list-style-type: none"> • Board books • Pictures of babies • Familiar objects • Bath books • Small plastic photo albums • Nursery rhymes • Books about routine events • Multisensory books

Therapy for the Toddler		
The Adult	The Child	Book Features
<ul style="list-style-type: none"> • Point out author name/illustrator • Use rhyme • Continue to expand on the vocabulary in the books • Choose books with topics familiar to the child (relevancy) 	<ul style="list-style-type: none"> • Turn pages • Holds book • May be too mobile to stay interested • Points to and names familiar objects in book • Enjoys familiar routine • May ask to be read to 	<ul style="list-style-type: none"> • Books that label • Sturdy books • Books of familiar routines • Rhyming • Repetition (same books over and over) • Repetitive Phrases

Therapy for the 18 to 24-Month-Old		
The Adult	The Child	Book Features
<ul style="list-style-type: none"> • Use props/finger puppets • Choose relevant books • Encourage participation • Continue to model for the parent • Encourage participation • Offer an occupying toy • Relate books to child's life 	<ul style="list-style-type: none"> • Fills in words for familiar phrases • "Reads" aloud • Child's attention fluctuates—expect it! • Recites familiar passages 	<ul style="list-style-type: none"> • Board Books • Simple Rhymes • Simple stories about familiar routines and animals • Bedtime Stories • Character Books • Predictable Books • Books with flaps • Repetitive • Large Print

Therapy for the 2 to 3-Year-Old		
The Adult	The Child	Book Features
<ul style="list-style-type: none"> • Provide props • Fun! • Use popular, high interest material • Child can fill-in the blanks • Prepare to read and re-read • Continue using books during routines • Read at bedtime • Read books as many times as requested!! • Relate books to child's experiences • Provide crayons and paper 	<ul style="list-style-type: none"> • Idea of plot emerges • Can get involved in story • Can understand pictures relating to story • Protests when adult "reads" incorrectly • Reads to self • Idea of plot emerges • Learns to turn paper pages • Searches for favorite pictures • Recites phrases and may recite stories • Coordinates text with pictures • Protests when adult gets a word wrong 	<ul style="list-style-type: none"> • Simple stories • Rhyming books for memorization • Counting, Shapes, Alphabet, Sizes, Animals, Vehicles, Playtime • Character Books

Note:

Contact the author at Kheavner@advancedbionics.com for a handout regarding therapy strategies for children beyond 3 years of age.

See "Read Aloud Handbook" by Jim Trelease for specific book suggestions for each stage of development.

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