Auditory Strategies for the Classroom Setting & Acoustic Access

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Highlights

- Acoustic Access-What’s new?
- Auditory-Verbal Strategies
- Ling 6 Sounds
- Auditory Hierarchy/Auditory Learning Guide
- Lesson Plan
- Videos
- Discussion
Hearing Aid Amplification
Hearing Aid Technology
Hearing Aids

- Hearing Aid + Ear Mold
- CHL, SNHL, MHL and sometimes AN
- Mild to moderately-severe HL
How Hearing Aids Work

• Hearing aids are designed to make sounds louder
• These amplified sounds are then sent through the damaged part(s) of the ear
• Appropriate for almost any type or degree of hearing loss
• For many children, amplification is a sufficient means to hear and understand spoken language.
Hearing Aid Programming and Verification
Access to the Speech Spectrum
**NCH Audiology Speech Perception Hierarchy**

**Presentation Level = 60 dB SPL (Noise = 55 dB SPL)**

**Easier → Harder**

<table>
<thead>
<tr>
<th>Easier</th>
<th>Harder</th>
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<tbody>
<tr>
<td>Questionnaires</td>
<td>Sentences in Noise (+5 s/n) Complete if score is ≥ 50% in quiet</td>
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<tr>
<td>Older</td>
<td>Younger</td>
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<tr>
<td>Questionnaires</td>
<td>Sentences in Quiet</td>
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<tr>
<td>Word Recognition - Closed Set</td>
<td>Sentence in Quiet - Closed Set</td>
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<tr>
<td>Word Recognition - Open Set</td>
<td>Sentences in Quiet - Closed Set</td>
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<td>LittleEARS Birth and up</td>
<td>PSI Sentences 3+ Years *CI candidates and recipients</td>
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<tr>
<td>IT-MAIS Birth - 3 years</td>
<td>HINT-C 3+ years</td>
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<tr>
<td>MAIS 3-4+ years</td>
<td>BKB Sentences in Quiet 3+ years</td>
</tr>
<tr>
<td>Speech and Spatial Hearing Adults</td>
<td>AZ Bio Pediatrics 6-11 years</td>
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<tr>
<td>Spatial Hearing Adults</td>
<td>AZ Bio 12+ years</td>
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<td>Speech and Spatial Hearing Adults</td>
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<td>PSI Words 3+ Years * CI Candidates and Recipients</td>
<td>AZ Bio Pediatrics 6-11 years</td>
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<tr>
<td>NU-CHIPS 3+ years</td>
<td>AZ Bio 12+ years</td>
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<tr>
<td>LNT/MLNT 3+ years</td>
<td>NU-6 5-6 years</td>
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<tr>
<td>PSI Words 3+ Years * CI Candidates and Recipients</td>
<td>CNC 6+ years</td>
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<tr>
<td>WAPI 4 years</td>
<td>WIPI Standard 6 years</td>
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<tr>
<td>PBK 4+ years</td>
<td>LNT/MLNT 3+ years</td>
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**Stop Criteria**
- Discontinue test if patient scores < 25%
- Continue a test if a patient scores between 25-75%
- Proceed to the next hardest test in hierarchy if the score is greater than 75%
Pediatric Hearing Aids
Oticon Sensei
Oticon OPN
Phonak Sky
GN Resound

ReSound Up Smart™
Bone Conduction Amplification
Bone Conducted Amplification

• Amplification for use in cases of congenital malformation or conductive and mixed hearing loss when traditional hearing aids are contraindicated (Anosis, atresia, microtia, EAC stenosis, chronically draining ear)

• Also possible treatment option for single sided deafness in older children and adults
SoftBand BAHA
Osseointegrated Abutment
Osseointegrated Attract
Cochlear Implants
Cochlear Implant Components
Who is a CI Candidate?

- **Traditional Pediatric Candidates Include:**
  - *Children 12 months – 17 years*
  - Severe to profound sensorineural hearing loss in both ears
  - Limited benefit from binaural amplification (≤ 30% correct words and ≤ 40% correct sentences)
  - Lack of progress in the development of auditory skills
  - Highly motivated parents and/or patient with realistic expectations regarding benefit
CI Candidates (cont.)

- **Non-Traditional Pediatric Candidates**
  - Auditory Neuropathy Spectrum Disorder (ANSD)
  - Moderate to Severe SNHL with poor speech perception abilities
  - Steeply sloping HL (i.e. Severe to profound mid-to-high freq. SNHL)
  - Children <12 months
    - Behavioral results in the sound booth that correspond with ABR results, usually around 8-9 months of age
    - Medical history suggests risk of ossification
Prognosis

• In most cases, a cochlear implant can restore a patient’s access to sound, however, this does not guarantee that that patient will learn to interpret these sounds as speech and learn to listen and speak.

• Aural habilitation/rehabilitation and duration of deafness are KEY!!

• A cochlear implant is NOT a “cure” for hearing loss.
Advanced Bionics
Cochlear Corp
Cochlear Corp
Med EL
Med EL
Overcoming Distance and Noise with FM/DM and HAT
Why FM and HAT?

• Hearing aids and cochlear implants are typically not enough to help children in listening situations with background noise, reverberation (echo), or when trying to communicate with someone at a distance.
FM/DM

- Frequency modulation (FM) and digital modulation (DM) are two ways that sounds can be transmitted over a distance.
- FM systems transmit sound using radio waves, whereas DM systems are transmitted using digital signals.
FM/DM

• Both FM and DM systems transmit sound from a microphone that is worn or used by a teacher, parent or any other communication partner directly to the child.

• Also called remote-microphone hearing assistance technology (RM-HAT)
Hearing Technology Connectivity

FM/DM, phones, computers GPS and beyond
Connectivity with Phonak Hearing Aids
Connectivity with Phonak Hearing Aids
Connectivity with Oticon Hearing Aids
Connectivity with Oticon Hearing Aids
Connectivity with Cochlear Corp
Connectivity with Cochlear Corp
Connectivity with Cochlear Corp
Connectivity with Advanced Bionics
Connectivity with Advanced Bionics
Connectivity with Med EL
Connectivity with Med EL
Connectivity with Med EL
Connectivity with BAHA
Auditory-Verbal Therapy

- Hearing and listening are an integral part of this type of therapy
- Family involvement is a cornerstone
- Aggressive audiological management and early intervention are key
- It’s an Early Intervention approach (birth-3) with mainstream component
- Families goal is listening and speaking outcomes
- The child has normal cognitive and developmental function

*Auditory-Verbal follows all 10 guiding principles (see handout)*
Factors that Affect Spoken Language/Communication Outcomes

- Age at diagnosis
- Degree of hearing loss
- Age at amplification
- Etiology of hearing loss/cochlear anatomy
- Early intervention
- Child’s cognitive function
- Other developmental diagnoses
- Parent involvement/carry-over
- All waking hour hearing technology use
- Parent’s communication choice for their child
- Access to resources
It takes a Village

Science, Technology, Medicine, Education
Other Communication Pathways

• Auditory-Oral-only difference is it uses speech reading
• Total Communication(combines sign/pictures/oral language/AAC
  • American Sign Language
  • Cued Speech

  – There’s no one size fits all, you must consider the myriad of factors that play into this decision making process
  -Communication can evolve overtime
What’s the Difference?

• **Auditory-Verbal**
  - Follows *ALL* the principles of the approach
  - Parent is always present and involved
  - It is an early intervention approach with a focus on **habilitation**

• **Auditory-Based**
  - Parent may not participate
  - May be very focused on *(re)habilitation*
  - May not follow all the principles of the Auditory-Verbal Approach, but uses AV strategies/techniques
Children who use Total Communication or Sign

• Children who do not rely exclusively on spoken language can still benefit from work on **audition**.

• The strategies from the Auditory-Verbal Approach can be used when working with these students; however, expectations/outcomes may be different.
Classrooms Today

• Heterogeneous Groupings—can make it difficult to help each child achieve at his/her own rate
• Amount of face to face instructional time varies due to pull outs/other factors
• Pressure to perform well on state achievement tests drives the curriculum
  – What to DO??????
Design instruction with purposeful auditory time

• Create small instructional groups based on ability (Part of the day) to allow for individualization

• Design some purposeful listening activities during down time

• Create a classroom environment that values and expects listening and speaking
  • E.g. take advantage of the natural routines of the school day/classroom themes/content
Auditory-Verbal Strategies

• Auditory Closure
• Auditory First
• Acoustic Highlighting
• Auditory Sandwich

• Repetition
• Ask “what did you hear?”
• Ask: Open Ended Questions

*See strategies handout*
Auditory Closure

- **Auditory Closure** is when a speaker begins a song, rhyme, or sentence and then stops talking in order to encourage the child to fill in a verbal response.

This Auditory Verbal strategy helps build the following Listening and Spoken Language skills:

- ✓ attention to speaker
- ✓ response from child
- ✓ turn-taking skills
- ✓ child’s use of spontaneous language
- ✓ expressive language expansion
Auditory Closure Example

Video
Auditory First

- **Auditory First** is an attitude as well as a set of conditions that will enable the child to have better access to speech and language.

This Auditory Verbal strategy helps build the following Listening and Spoken Language skills:

- ✓ self-advocacy skills for hearing equipment
- ✓ attention to auditory signal first and foremost
- ✓ a mindset of listening in the parent and child
- ✓ integration of listening into the child’s personality (Pollack et. al, 1997)
Acoustic Highlighting

- **Acoustic Highlighting** is an added vocal emphasis on an identified target.
- A target can be important sounds, words, parts of phrases, or grammatical structures in a sentence.

Acoustic Highlighting can be done in several ways:
- speak the target with more emphasis, increase the intensity
- pause slightly before saying the target
- whisper the target, decrease the intensity
- increase the duration of a target
- change vocal intonation or pitch
Auditory Sandwich

Auditory Sandwich, information is presented through listening before the introduction of visual or other support information is given to a child. When visual information is needed to assist in comprehension, the information is then put back in to the auditory only presentation. The Auditory Sandwich is also referred to as the Listening Sandwich.

This Auditory Verbal strategy helps build the following Listening and Spoken Language skills:

- suprasegmentals of speech
- attention to auditory input and the speaker
- parents’ belief that the child is able to gain information through listening alone
- ability to process language through audition
Equipment Check/Ling Check

- Right Ear
- Left Ear
- Detection
- Identification
- Listening Check

Nationwide Children’s
When your child needs a hospital, everything matters.
LISTEN!
Conditioned Play- “Listen & Drop”
SLP’s Role with Technology

• Hearing aid(s), cochlear implant(s), FM systems, and Baha devices are all “Brain Access Tools”

• If the tools are not working, not worn, or not programmed optimally it will result in speech, language, audition, and literacy delays for the child!

• If you think the child is not responding question equipment first!
With today’s hearing technologies we want “better than the speech banana” (Madell & Flexer, 2012)

Even with hearing technology we never achieve “normal hearing”

There is a difference between detection “I hear the sound” and identification “I comprehend what is being said”

We care about functional, real-world performance, what are they doing with the sound they are receiving?

How do we measure performance: Standardized Assessments comparing performance to same-aged typically hearing peers!
• Repetition is an indirect or informal language stimulation technique where a targeted sound, word, phrase or sentence is said more than one time (Weybright, 1984).

How is this strategy done?

There are two types of repetition:

• an adult repeats back what a child has said, but models correct articulation, vocabulary usage or grammatical structure
• an adult simply repeats the command or statement for a second time after appropriate wait time, in an effort to give the child another chance to hear and respond
Repetition with 3 Critical Elements
Ask: “What did you hear?”

• When a child gives an incorrect or inappropriate response, no response, or experiences a communication breakdown, the adult can ask, “What did you hear?” to prompt the child to give back the part of the message that was heard and attempt to repair the breakdown.
Ask: Open Ended Questions

• **Open-ended questions** are questions that require more than a yes/no or one word response (Bond & Wasik, 2009).

  • An open-ended question allows the adult to provide opportunities for the child to engage in conversation.

Some statements that facilitate further conversation are as follows:

• What happened?
• Tell me more.
• What do you think will happen next?
• Why did that happen?
• I wonder why.
Hierarchy of Auditory Development

Erber’s Model
Four levels of auditory skill development.
Auditory skill levels do not represent discrete benchmarks.

Copied from
http://www.hearingjourney.com/Listening_Room/Teens_and_Adults/Listening_Playbook/Maximizing_Your_CI/1_What_is_Rehabilitation/index.cfm?langid=1
The Auditory Learning Guide

Not a cookbook
Not a “program”
Not all-inclusive

Vocabulary, literacy, and LANGUAGE goals must be incorporated throughout.

It is a starting point.

Color Coded based on expectations per year of listening experience
Auditory Learning Guide

- Used to develop auditory-learning goals
- Progression from easier skill to more difficult (year 1, year 2, etc.)
Reduce Strategies

• When the child is performing within normal limits
  • Normal conversational rate
  • Add background noise
  • Increase the set size to open set
  • Reduce repetition
  • Add distance
  • Work on group conversations (i.e. cafeteria/centers)
Sets and Set Size

Sets

Closed

Small 4-6

Open

Medium 8-10

Large 12+
Self-Advocacy

• 1. Describes basic concepts of hearing (how we hear/how the ear and balance systems work).

• 2. Describes some basic causes of hearing impairment (e.g., born with it, acquired from disease or illness, noise exposure).

• 3. Describes basic treatments and accommodations for hearing impairment (e.g., surgery, hearing aids, cochlear implants, sign language, hearing protection).

• 4. Describes basic parameters of the audiogram (e.g., frequency, loudness, continuum of audibility).

• 5. Describes basic communication characteristics associated with various hearing levels including distinguishing deaf and hard of hearing.

• 6. Understands and reports when amplification devices are functioning (i.e. ON/OFF).

• 7. Reports other malfunctions such as static, interference, intermittency.

• 8. Identifies the basic parts of personal hearing instruments used (e.g., earmold, microphone, speaker, battery compartment).

• 9. Identifies the basic parts of hearing assistance technology (HAT) used (e.g., transmitter vs receiver, attachment of audio shoes, charging).
Speech, Language, & Audition Assessment:

- Are they making **greater than 1 years progress** with audition/spoken language goals in **1 years time**?

- Is the child going to need educational supports to be successful?

- Does the child have access to the full speech spectrum of sounds necessary for spoken language development?

- How does the child’s speech, language, audition, vocabulary, and articulation compare to same age typically hearing peers?
Assessment- 3.0-5.0 + years

- **Age: 3-5 Years:**
- CELF-P
- ROWVT
- EOWVT
- Goldman Fristoe
- Auditory Skills Placement Test
- **Age: 5+**
- CELF-5
Vocabulary Development

• Pre-teaching of academic vocabulary

  – Children with hearing loss are less likely to acquire vocabulary though “incidental learning” or “overhearing” as compared to their typically hearing peers.
## Typical Vocabulary: Words Understood

<table>
<thead>
<tr>
<th>Age</th>
<th># of Words</th>
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<tbody>
<tr>
<td>2</td>
<td>300</td>
</tr>
<tr>
<td>2.5</td>
<td>500</td>
</tr>
<tr>
<td>3</td>
<td>900</td>
</tr>
<tr>
<td>4</td>
<td>1,500</td>
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<td>5</td>
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<tr>
<td>6</td>
<td>13,000</td>
</tr>
<tr>
<td>7</td>
<td>20,000</td>
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</tbody>
</table>

Adapted from Gard, Gilman, & Gorman (1980) *Speech and Language Development Chart*
Some Resources for Vocabulary Development:

- BrainPOP creates animated, curriculum-based content that supports educators and engages students
- Content is aligned to state standards
  
- For younger students/Pre-literacy Development: [www.starfall.com](http://www.starfall.com)
Advanced Bionics Materials


• Baby Beats Musical Kit (birth-3)

• VocAB Scenes

Angel Sound

- [http://angelsound.tigerspeech.com/](http://angelsound.tigerspeech.com/)
  - Online aural habilitation resource
  - FREE
  - Allows for tracking of performance
  - Allows for listening in background noise
MEANINGFUL DISCUSSION

• Table 1:
  – Topic: Fall Harvest
  – Age: 1st grade
  – Discussion: Identify 3 Auditory-Verbal strategies that you could incorporate into your lesson.
MEANINGFUL DISCUSSION

• Table 2:

– Topic: 4th grade English Language Arts

  CCSS.ELA-LITERACY.L.4.2
  – Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
  – CCSS.ELA-LITERACY.L.4.2.D
  – Spell grade-appropriate words correctly, consulting references as needed.

Task: Children are asked to write a paragraph in the journal about what they want to be when they grow up and why. Discuss how you would use **acoustic highlighting** and **repetition** for a child who is struggling with spelling.
MEANINGFUL DISCUSSION

Table 3:
– Topic: Goldilocks & the Three Bears; Book comparisons-Compare/Contrast
– Age: 3rd grade
  – Task: The child you are working with is asked to compare and contrast 3 different Goldilocks & the Three Bears books & draw a Venn Diagram to discuss details.
1. Talk about how you will address new vocabulary with the student.
2. 2. Provide some open ended question examples
Resources/References

• https://www.agbell.org/uploadedFiles/Connect/Publications/The_Volta_Review/VOLTA110n2.pdf
Everything is AWESOME!

https://www.youtube.com/watch?v=StTqXEQ2I-Y

“Kids today born with hearing loss have every opportunity to be AWESOME and successful! They just need people like us to guide them!”