Hearing is just the beginning...

The 1st Auditory-Verbal Principle:
- Children need to hear before they can listen.
- They need to listen before they can process spoken language through listening.
- They need to process to become independent in spoken communication.

Whenever you hear “ear” think “BRAIN!”

Average Number of Words Understood by Typically Developing Children

<table>
<thead>
<tr>
<th>Age</th>
<th># of Words</th>
</tr>
</thead>
<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>1500</td>
</tr>
<tr>
<td>5</td>
<td>2500</td>
</tr>
<tr>
<td>6</td>
<td>15,000</td>
</tr>
<tr>
<td>7</td>
<td>20,000</td>
</tr>
</tbody>
</table>
• If the child’s technology is not worn every waking moment, no other intervention will suffice if the family’s desired outcome is listening and spoken language.
• The child’s auditory brain must be accessed, stimulated, and developed to reach the desired outcome of listening and spoken language, and technology is the only way through the doorway for a child with hearing loss.
• The motto should be: **Eyes open, equipment on**!


**TEAM**

• **T**: Therapists (SLP, AVT, AV Ed)

• **E**: Educators (ECI, Deaf Ed, AI, Mainstream Teacher)

• **A**: Audiologists

• **M**: Members of the family and medical community

= **Successful listeners!!!!!!**


**Aggressive Audiological Management—Hearing Aids**

• Birth to 30 months
  • Un-aided testing every 3 months
  • Aided testing every 3 months
  • Earmolds frequently

• 3 years to 5 years
  • Un-aided testing every 6 months
  • Aided testing every 6 months
  • Earmolds every 6 – 12 months

• 5 years and older
  • Un-aided and aided testing annually
  • Earmolds as needed


**Cochlear Implant Programming for Children**

• Initial stimulation after clearance is obtained from the neurotologist
• Follow-up mapping within 2–4 weeks after initial stimulation
• Each CI should be mapped at least twice a year or sooner if concerns arise
  – Age-appropriate behavioral audiometry techniques should be used during the programming sessions.


**CI Programming Schedule After a “Good” Program is Attained**

<table>
<thead>
<tr>
<th>Age of child</th>
<th>Frequency of programming and verification sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 3 years</td>
<td>Every 6 months</td>
</tr>
<tr>
<td>3 to 5 years</td>
<td>Every 6 months</td>
</tr>
<tr>
<td>6 years and older</td>
<td>Every 12 months</td>
</tr>
</tbody>
</table>

*Programming and verification should be scheduled more frequently if speech is not audible or if steady gains in speech/language skills are not being attained.*

Checking Amplification

- Equipment should be checked at the **beginning of every day**.
- Before therapy begins, administer the Ling Six Sound check to determine if the equipment is functioning properly.
- Working on auditory–oral skills with equipment that is not functioning properly will prove to be ineffective.

Ling Six Sound Check

- Developed by Daniel Ling
- Six sounds and a silent period
  - Have child “listen”
    - Child can look down
    - Stand behind the child
    - Try using an acoustic speech loop
  - Child will detect or identify sound

**Ling Sound Check**

- /a/, /i/, /u/, /s/, /ʃ/, /m/, “nothing”
- Sound randomly produced
- Period of silence
  - To allow child to recognize a sound was not produced
  - Speaker asks, “What did you hear?”
  - Child says, “Nothing”
- Can be done in 10–15 seconds
- Should be done at 3ft, 6ft, and 9ft

**Listening Check Box**

- Battery tester
- Listening stethoscope
- Blower
- Extra batteries
- Wax loop
- Otoease & ototerm
- Toupee tape
- Scissors
- Monitor earphones from CI companies, listening check equipment from CI companies, signal check from CI companies
- TOYS

**Audiogram Symbols**

- **RIGHT**
  - Air Conduction Unmasked = O
  - Air Conduction Masked = \(\Delta\)
  - Bone Conduction = <
  - Bone Conduction Masked = []

- **LEFT**
  - Air Conduction Unmasked = X
  - Air Conduction Masked = \(\square\)
  - Bone Conduction = >
  - Bone Conduction Masked = [ ]

Air conduction in Soundfield = S
Aided (with hearing technology) in Soundfield = A
Arrow means no response at limits of equipment.

**FREQUENCY RANGE**

- In Hertz
- LOW to HIGH pitch
- 250 Hz thru 8,000 Hz

**DEGREE Or Level of Hearing loss**

- 0 – 15 dB: Normal
- 15 – 25 dB: Slight hearing loss
- 25 – 40 dB: Mild hearing loss
- 41 – 55 dB: Moderate hearing loss
- 56 – 70 dB: Moderately-severe hearing loss
- 71 – 90 dB: Severe hearing loss
- 91+ dB: Profound hearing loss
**Ling Sound Check**

- **Intensity**
- **Frequency**
- **Manner**

**Behavioral Observations**

- Change in frequency of vocalization, voice quality and/or vocal intensity
- Omission or confusion of consonants that were formerly present
- Emergence of disruptive or withdrawn behavior

**Environmental Acoustics**

- **Signal to Noise Ratio** is the key to hearing intelligible speech – speech must be 10x louder than background sounds. (Plomer, Carol, 2014. Attaining and Sustaining Language and Literacy Through Hearing Technology)

- Be aware of background noise
  - Other children
  - TV/stereo on
  - Dishwasher running

- **Room acoustics**
  - Hardwood floors – noisy
  - Area rugs – dampen sounds

**Auditory Oral Strategies**
Cochlear Americas: Listen Learn and Talk Guide

- Guide for parents and therapists on auditory-oral techniques, goals, hierarchies, and therapy.


Positioning

- Cochlear implant side for most benefit (if 1 sided CI only)
- 6 inches from the microphone of HA or CI
- Single CI does not allow localization of sound
- Get on the child’s level

Speaker’s Voice

- Avoid using a:
  - High-pitched voice
  - Breathy voice
  - Over-exaggerated mouth movements
  - Monotonous voice
- Use parentese
  - Intonation
  - Pitch patterns

Reduce Visual Cues

- Allow students to rely on their cochlear implant(s) or hearing aid(s)
- Inhibit pointing, gesturing, tapping
  - “Close the door”
  - “Sit down”
- Don’t give it away with eye gaze

Auditory Sandwich

- Give information auditorially
- Give visual cue
  - If information is NOT understood
- ALWAYS go back to audition

Acoustic Highlighting

- Emphasize particular words or sounds
  - Intensity changes
  - Pitch changes
  - Duration changes
  - Repetition
Auditory Bombardment

• Use of target frequently in therapy
• Don’t miss an opportunity to use their target
• Therapy may be the only opportunity for the child to hear the target again and again

Check for Comprehension

• Comprehension verses pleasing the listener.
  "What did you hear me say?"
  - Child is obligated to respond to the question
  - Builds self-confidence
  - Check themselves

Clarify the Message

• Reword
• Repeat
• Visual cue – deliberate use of eye gaze
• Use shorter utterances
• Use simpler language
• Use familiar language

Wait Time

• OWL
  - Observe
  - Wait
  - Listen
• At least 8 second wait time
• Limit teacher talk/explanation

Sabotage

• Deliberately do something wrong to cause a reaction
• To encourage communication don’t have everything ready or available for the child

Hand Cue

• Use only when necessary
• Use to prompt for vocalization
• Use to prompt for listening
• Can substitute as a stuffed animal, toy, acoustic screen or book
**Repetition**

- Repeating what the child has said for reinforcement
- Repeating what the child has said to draw attention to an error

**Expansion/Extension**

- Expansion: expand the child’s utterance for correct grammar but do not provide new information
- Extension: expand the child’s utterance for correct grammar and include new information

**Increase Listener Responsibility**

- Avoid rescuing
- Avoid translating
- Avoid yes/no questions
- Avoid using a pattern of responses
- Don’t overlook the quiet child who is behaving
- Teach clarification strategies

**Therapy Considerations**

**Easiest to Hear**

- No background noise
- Key word at the end of the sentence
- Slightly slower rate

**Hardest to Hear**

- Noisy background
- Key word in the middle of a sentence
- Normal rate

**Easiest to Hear**

- Greatest acoustic contrasts
- Small set of choices (2-4)
- Distance – close to the microphone (6 inches)

**Hardest to Hear**

- Less varied (minimal pairs...)
- Large set (4-12)
- Distance – far from the microphone

**Easiest to Hear**

- Increased pitch variation and rhythm
- Clear enunciation
- Increased repetition

**Hardest to Hear**

- Normal rhythm
- Less clear and/or unfamiliar voice
- No repetition
### Therapy Considerations

**Easiest to Hear**
- Simple language, short sentences
- Emphasis on unaccented words (prepositions, articles)
- Consonants when vowels are whispered

**Hardest to Hear**
- Complex language
- No special emphasis
- Consonants when vowels are shouted

### In Order for Therapy to be Efficient and Effective, Remember…

- Make sure equipment is working
- Use an FM System or Positioning Strategy
- Room acoustics
- Auditory Oral Strategies
- Communication with parents and professionals

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**Practice makes PERMANENT!** not Perfect!!!

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### Resources

**Alexander Graham Bell Association**

- [www.listeningandspokenlanguage.org](http://www.listeningandspokenlanguage.org)
  - Find services in your area.
  - Family resources including: teen resources, financial aid programs, and parent/family blogs.
  - Professional resources: career center, parent guidance education and support, listening and spoken language development, web resources
  - Advocacy resources
  - Conventions for professionals and families offered every two years (CEUs available).

**Advanced Bionics**

- [www.advancedbionics.com](http://www.advancedbionics.com)
  - Online event calendar – find online, local and regional events.
  - The Listening Room – free resources to support the development of language and listening skills
  - Familiar Sounds Audiogram
  - Ling Six Sounds cards and games
  - Tool for Schools – classroom management and assessment tools
  - Apps - ABle Clix, AB Listening Adventures, VocAB Scenes, IT-MAIS
Cochlear Americas
www.cochlearamericas.com
- Cochlear Hope Online Courses
- Cochlear Hope Speech Sounds – consonants and vowels
- Telephone with Confidence
- Self-Auditory Rehabilitation Web-Sites
- Sound Foundation for Babies
- Sound Foundation for Toddlers
- Cochlear Implant School Resource Guide
- Cochlear Implant Listening Skills Development
- Listen Learn and Talk Program

MED-EL
www.medel.com
- HearPeers – online community for implant users
- SoundScape Starting Out
- My LittleEARS Diary
- Online Games
- Hearsay Newsletters
- Loudness Scale Charts
- Music and Young Children with CIs
- Online Hearing Test

Oticon Pediatrics
www.oticonusa.com
- Product support for all devices
- Brain Hearing
- Hearing Solutions for Teenagers
- Connectline Products

Phonak
www.phonak.com
- Online Hearing Test
- The Listening Room
- Phoneme Perception Test
- eLearning
- Child Hearing Assessment Toolkit (CH.A.T.)
  - Click on "For Professionals" then choose "Pediatrics"
  - Includes checklists and rating scales for listening, communication access, placement, self-advocacy, and educational performance.
  - The checklists/scales can be e-mailed to all team members

Toolbox for Hearing Aids
- Battery Tester
- Listening Stethoscope
- Earmold blower
- Wax Loop
- Otoseal and Otoferm
- Toupee Tape
- Scissors
- Spare batteries
  - Size 13 (orange package)
  - Size 675 (blue package)

Toolbox for Oticon Medical Ponto
- Battery Tester
- Listening Test Rod
- Magnet Tool
- Spare batteries
  - Size 13 (orange package)
Toolbox for Cochlear Americas Baha 4
• Battery Tester
• Baha Listening Test Rod
• Magnet Tool
• Spare batteries
  – Size 13 (orange package)

Toolbox for Cochlear Americas Nucleus 6
• Your Toolbox
  – Monitor earphones
  – Signal Check
  – Extra 675 Cochlear Implant Batteries
  – Toupee Tape
• Child’s Backpack
  – Extra Batteries
  – Disposable &/or Rechargeable
  – Remote Assistant

Toolbox for Advanced Bionics Naida CI Q70
• Your Toolbox
  – Listening Check
  – Headphones/earbuds
  – Extra 675 CI batteries
  – Toupee Tape
• Child’s Backpack
  – Extra Batteries
  – Disposable &/or Rechargeable

Toolbox for MED-EL Opus II
• Your Toolbox
  – MED-EL Listener
  – Headphones
  – Signal Checker
  – Extra 675 batteries
  – Toupee Tape
• Child’s Backpack
  – Extra Batteries
  – Disposable &/or Rechargeable

Listening Check /Troubleshooting Resources
Hearing Aids
• Oticon Medical Ponto
  http://www.oticonmedical.com/~/asset/cache.ashx?id=38587&type=14&format=web
  – Troubleshooting the soft band
  http://www.oticon.com
  – Click on “Products” then “Product Support”
• Cochlear Americas Baha
  http://www.cochlear.com/apps/accm/connect/us/home/home&k#_sukle
  – Click on “For Recipients” tab
• Phonak
  http://www.phonak.com
  – Click on “Usage and Support”

Cochlear Implants
• Cochlear Americas
  http://www.cochlear.com/apps/accm/connect/us/home/home&k#_sukle
  – Click on “For Recipients” tab
• Advanced Bionics
• MED-EL Rondo
  http://www.youtube.com/watch?v=0QXG5zvDzAs&list=PLT--N4wea5BDj9Dqcay-oMJ1T8XpgTG5
• MED-EL-Opus 2
Listening Training Resources

- The Listening Room - Advanced Bionics provides printable activities for listening development.
- Funzee Everyday Sounds CD-ROM by Super Duper Inc. - Environmental sounds.
- Cottage Acquisition Scales for Listening, Language and Speech (CASLLS) by Sunshine Cottage - listening, language, and speech developmental hierarchies.

Professional Educational Resources

- Speech and the Hearing Impaired Child by Daniel Ling (2002)
- Foundations of Spoken Language for Hearing-Impaired Children by Daniel Ling (1990)
- 50 FAQs about AVTedited by Warren Estabrooks
- Facilitating Hearing and Listening in Young Children by Carol Flexer (1998)
- Cochlear Hope Courses - free webinars
  - [www.lslogic.org](http://www.lslogic.org)
  - [www.sunshinecottage.org](http://www.sunshinecottage.org)
  - [www.carolflexor.com](http://www.carolflexor.com)

Additional Articulation & Language Tools for Therapy

- Pacific Kid ([www.pacifickid.net](http://www.pacifickid.net))
- Enchanted Learning ([www.enchantedlearning.com](http://www.enchantedlearning.com))
- Articulation Station App by Little Bee Speech
- Speech That Works App by Sunshine Cottage
- InTense App by Algoma Games for Health
- Jumbo Artic Books and CD ROMs
- Speech Corner ([www.speechcorner.com](http://www.speechcorner.com))
- Primary Concepts – Articulation Boxes ([www.primaryconcepts.com](http://www.primaryconcepts.com))
- Make A Scene apps by Innivo
- My PlayHome apps by PlayHome Software Ltd.

References

- Caleffe-Schenck, Nancy. 2013. Getting Started
- Flexer, Carol. 2014. Attaining and Sustaining Language and Literacy Through Hearing Technology
- Foster, Hornor, & Jones, Audiologists, Sunshine Cottage School for Deaf Children. 2015. Pediatric Audiology Best Practices: Information Every Team Member Needs to Know.

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