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Who Is Here?

- Parents
- SLP/s
- Teachers of the Deaf
- Audiologists (you are excused!)
- Cert. AVTs
- Classroom Teachers
- Other Educators
- Other Guests (Grandparents? Physicians? Others?)
FOUNDATIONS OF AUDITORY TEACHING
By using today’s incredible “sensory technology,” children with severe and profound hearing loss can and are making use of auditory information to develop spoken language – through listening!
The Options for “Success”…

Have *never* been more exciting!

**Why?**
- (Universal) Newborn Hearing Screening
  - Increased survival rates of “at risk” infants
- Increased focus on EARLY INTERVENTION & clinical efficacy
- Advances in sensory technology, most notably, **cochlear implants**!
The Sky’s the Limit!

Why?
• Early Identification
• Excellence in Audiology
• Sensory Technology
• Auditory Learning / Early Intervention
• Professional Certification of LSLS/s
On-site audiology program with the early intervention program

Pediatric Test Assistant
(Birth to age 3-years-old)

Active parent participation

Comprehensive testing protocol
Let’s talk about HEARING!

- Pinna
- Tympanic Membrane
- Semicircular Canals
- Cochlea
- Hearing Nerve (VIII N)

Outer Ear
Middle Ear
Inner Ear
Audiograms

• Right Ear AC – Red circle
• Left Ear AC – Blue cross/x
• Right Ear BC – Red <
• Left Ear BC – Blue >
• A – “Aided” Threshold
• S – Soundfield Threshold (no ear specificity)
• PTA – Pure Tone Average (average of scores for RE or LE for 500, 1000, & 2000 Hz)
"Cheat Sheet" for Reading an Audigram

- **Right Ear**
  - Right is Red.

- **Left Ear**

This is your child's hearing **WITHOUT** hearing aids using air conduction testing (sound traveling through the air usually through headphones or ear inserts).

This is your child's hearing **WITHOUT** hearing aids using bone conduction testing (sound vibrations traveling straight to the inner ear).

The arrow pointing down indicates that at a given pitch (or frequency in Hz) when presented with the loudest level (or intensity in dB), no response or sound was heard.

These are the symbols written when masking noise is used. The top symbols are for air conduction, the bottom symbols are for bone conduction.

This is your child’s hearing **WITH** their hearing aids (A or cochlear implant(s) [C or CI or CI/CR]).

*A* This handy reference, to be given to parents to make audigram information less complicated for them to understand, was created by Jennifer Rakers (2008). *FIRST YEARS* students. It was adapted from the FIRST YEARS reference document, "How to Read an Audigram: Auditory Thresholds," [here](https://firstyears.org/download.htm).
Audiograms

Image from League for the Hard of Hearing
Levels of Auditory Functioning

Comprehension:
Is there meaning to this sound?

Recognition/Identification:
Is this sound distinct from other sounds?

Discrimination:
Is this sound different from other sound?

Detection:
Was there a sound?
“Speech Sounds”

- Vowels
- Diphthongs
- Consonants

NOT frequency-specific
Vowel “Quadralateral”

“Back” Vowels: /u, U, o, “aw”/

“Mid” Vowels: /”ah,” a, ^, schwa, “er”, ae/

“Front” Vowels: /”eh,” e, I, i/
<table>
<thead>
<tr>
<th>Vowel</th>
<th>Example</th>
<th>1st Formant</th>
<th>2nd Formant</th>
</tr>
</thead>
<tbody>
<tr>
<td>/i/</td>
<td>bee</td>
<td>270</td>
<td>2290</td>
</tr>
<tr>
<td>/I/</td>
<td>bit</td>
<td>390</td>
<td>1990</td>
</tr>
<tr>
<td>/ɛ/</td>
<td>bet</td>
<td>530</td>
<td>1840</td>
</tr>
<tr>
<td>/æ/</td>
<td>bat</td>
<td>660</td>
<td>1720</td>
</tr>
<tr>
<td>/ɑ/</td>
<td>box</td>
<td>730</td>
<td>1090</td>
</tr>
<tr>
<td>/ə/</td>
<td>bail</td>
<td>570</td>
<td>840</td>
</tr>
<tr>
<td>/U/</td>
<td>book</td>
<td>440</td>
<td>1020</td>
</tr>
<tr>
<td>/u/</td>
<td>boot</td>
<td>300</td>
<td>870</td>
</tr>
<tr>
<td>/ʌ/</td>
<td>but</td>
<td>640</td>
<td>1190</td>
</tr>
<tr>
<td>/ɜ/</td>
<td>bird</td>
<td>490</td>
<td>1350</td>
</tr>
</tbody>
</table>
First Formant (F₁)
Second Formant (F₂)
Speech Recognition Threshold

Spondees/Spondaic Words
2 syllable words with equal stress on each syllable –
Primarily reflects LOW frequency hearing

SRT ≠ PTA
Speech Perception / Word Recognition

- Raspberries
- Call Baby’s “Name”
- Body Part Recognition
- Picture Plates (closed set):
  - NU-CHIPS
  - WIPI
- Open Set
  - PB-K
CNT = Could Not Test

To me – CNT is “unacceptable”
Can almost always get some information about speech perception
   Even if its only
   Long vs. Short
   “Ahhh” versus “Beep Beep Beep”
Ling Six (Seven) Sound Test

Consider “NO SOUND” as the 7th Sound

ah (/a/)
oo (/u/)
ee (/i/)
sh
s
m

(Rosemarie Drous, Formerly of the Helen Beebe Speech & Hearing Center)

(Ling & Ling, 1978)
## Ling Six Sound Test

<table>
<thead>
<tr>
<th>Sound</th>
<th>1’</th>
<th>3’</th>
<th>6’</th>
<th>9’</th>
<th>12’</th>
</tr>
</thead>
<tbody>
<tr>
<td>/u/ oo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/a/ ah</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/i/ ee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/ʃ/ sh</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/s/ ss</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/m/ mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Ling Sound Check

Clinical Application

• “Good” Mistakes
• “Bad” Mistakes

• Patterns of Error/s?
Early Speech Perception (ESP) (Moog & Geers, 1990)
ESP

Clinical Application

Pattern Perception-ONLY?
Speech Sound Recognition/ID?
Auditory Assessment

- Infant-Toddler Meaningful Auditory Integration Scale (IT-MAIS)
  - Zimmerman-Phillips, Osberger & Robbins, 1997

- Meaningful Auditory Integration Scale (MAIS)
  - Robbins, Renshaw, & Berry, 1991
PEACH

Parents’ Evaluation of Aural/Oral Performance of Children

Ching & Hill, 2007

11 Peach Items (6 Quiet; 5 Noise)
Frequency Ratings (n=5) of Reported Behavior
(Never/Seldom/Sometimes/Often/Always)
(0%, 25%, 50%, 75%, >75%)
School Measures

• Teachers Evaluation of Aural Performance of Children (TEACH) (Ching & Hill, 2005)
• Preschool SIFTER, SIFTER, Secondary SIFTER
• Listening Inventory for Education (LIFE) Student Appraisal / Teacher Appraisal (Anderson & Smaldino, 1998)
• Functional Listening Evaluation (Johnson, 2002)
• Functional Auditory Performance Indicators (FAPI) (Stedler-Brown & Johnson, 2004)
“Sample” **Auditory Dx Battery**

- **Youngest**: Ling 6, ESP, IT-MAIS, PEACH
- **Preschool**: Ling 6, ESP, IT-MAIS, GASP!, TAC
- **Older**: Ling 6, ESP, GASP!, TAC, Listening Comprehension Test-2, SIFTER
Hearing Assistive Technology

Hearing Aids

Cochlear Implants

Other Implantable Devices

Hearing Assistive Technology

(especially FM/IR systems)
“Game Changer” – Cochler Implants

- Contour Advance Electrode X-ray
The “New” AG Bell Association’s Knowledge Center
• “Recommended LSLS Protocol for Audiological Assessment & Cochlear Implant Monitoring”
  (AG Bell Academy, 2008; 2014)
ESSENTIAL KNOWLEDGE AREAS OF A LISTENING AND SPOKEN LANGUAGE SPECIALIST

- Hearing and Hearing Technology: 12%
- Auditory Functioning: 16%
- Spoken Language Communication: 16%
- Strategies for Listening and Spoken Language Development: 18%
- Child Development: 9%
- Parent Guidance, Education and Support: 13%
- Emergent Literacy: 6%
- Education: 6%
- History, Philosophy, and Professional Issues: 4%
AG Bell Academy
LISTENING AND
SPOKEN LANGUAGE
SYMPOSIUM

The Brain Science of Hearing:
Connecting New Pathways to Spoken
Language
JULY 9-11, 2015
Baltimore Marriott Waterfront
USE the CI Manufacturers

- Websites
- Cochlear Ltd. / Cochlear Americas
- Listening Room – Advanced Bionics
- MED-EL – BRIDGE to Better Communication
goldbed@ccf.org
dgoldberg@wooster.edu
Hearing Technology Worn Throughout the Child’s Waking Hours (www.swimoutlet.com/www.poolrafts.com)
Consider Trying:

- www.hearinghenry.com

- #1 -- EAR GEAR — Spandex sleeve slips over hearing devices. Has stretch cord and plastic locking clip. www.gearforears.com

- Oto/Critter Clips www.westone.com
  - JoyBandsLLC.com
  - www. Silkawear.com
  - Ciwear.com

- Frogglez – “No Hazzle Swim Goggles www.thegromet.com

- www.hannaandersson.com (BEWARE!)
And one more recommendation:

Order a MedicAlert bracelet today!

Suggested Wording:
- Patient has hearing loss
- Patient uses hearing aids/cochlear implants (CI)
- NO MRI before talking to CI Centre

www.medicalert.org
www.LaurensHope.com