Auditory-Based Intervention

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Speech-Language Pathologist
Auditory Consultant

Outline

• Golden rule of intervention
• Family-centered intervention
• Auditory skills hierarchy
• Factors affecting auditory skills development
• Auditory learning strategies
• Modifying your approach to maximize auditory learning opportunities
Introduction

• Golden Rule of Intervention
  • The purpose of what we do:
    – Assist children in achieving their full potential as communicators

Parent & Team Input

Formal Assessment

Ongoing Assessment

Continuums

+ SCALES

Golden Rule of Intervention

You Are The Coach!

• Who is on the child’s team?
  – Primary: Parents, child
  – Secondary: therapists, teachers, audiologists, aides, interpreters, etc.

• Consider your team’s...
  • Learning styles
  • Backgrounds with communication development
  • Backgrounds with hearing loss

• Who will help develop auditory skills?
Auditory-Based Intervention

**Examples Of Daily Routines And Family Activities**

- Individual therapy
- Story bedtime
- Nap
- Playtime
- Cooking
- Dressing
- Afternoon nap
- Story before nap
- Lunch

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**The Term “Natural Environment”**

- “Natural environment does not mean just “a place” but activities, opportunities, and events in child’s life.”
- “Natural environments are not just places but the many different kinds of learning activities happening in different places.”

Ski-Hi Curriculum

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**Why Routines?**

- Routines are repetitive and offer opportunities to practice.
- Families can learn or practice a skill within a routine limiting need for generalization.
- Including a skill within a routine is meaningful & practical.
- Routines have a certain order and predictability.
- Routines have predictable language/social scripts.
- Routines usually have positive outcomes for the child and are intrinsically motivating.
- Family activities are usually enjoyable for the family/child.
- A skill can be incorporated across a variety of routines.
- A specific routine or family activity can incorporate a variety of skills.

Adapted from Ski-Hi Curriculum
A.F.S. Bricker, 2002
Factors Affecting Choice Of Routines/Activities

- Family history, culture, values
- Personality or style of family members
- Number of people in household
- Environmental arrangements, sharing bedroom/bathrooms
- Work or school schedules
- Age and gender of members of household
- Medical needs; physical and mental health

Ski-Hi Curriculum, 2004

Routine Based Intervention

<table>
<thead>
<tr>
<th>Routines</th>
<th>Wake-Up</th>
<th>Breakfast</th>
<th>Diaper Change</th>
<th>Bed Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responds To Sounds &amp; Words:</td>
<td>Response: Name</td>
<td>Responds: Refrigerator Door</td>
<td>Responds: Up you go!</td>
<td>Responds: Time for bed!</td>
</tr>
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</table>

Activity Based Intervention

<table>
<thead>
<tr>
<th>Activities</th>
<th>Responds To Name</th>
<th>Follows 1 Step Direction with Visual Support</th>
<th>Uses voice Greetings/Commands</th>
<th>Uses 2 word constructions</th>
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</thead>
<tbody>
<tr>
<td>8:20-8:30 Arrival</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>8:30-8:30 Opening</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>8:30-8:30 Centers</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>8:30-9:00 Potty</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>8:30-10:00 Snack</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>10:00-10:30 Departure</td>
<td>X</td>
<td>X</td>
<td>X</td>
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</tbody>
</table>
Auditory-Based Intervention

Auditory Consultant Resource Network
Boys Town National Research Hospital

SCALES
- Weight
- Developmental Behavior
- Cognition
- Auditory
- Language
- Extra: Executive Function, Motor, Vision, Sensory, Memory, Organization, Attention
- Speech

DAP = Developmentally Appropriate Progress
DAS = Delayed Acquisition of Skills
DAC = Different and Additional Challenges

Home - A Balanced Approach

Pull-out/Individual
Classroom-Based
Pull-Out Small Group
Combination

A Balanced Approach

School
Home
Community

S = Social Emotional
C = Cognition
A = Auditory
L = Language
E = Extra
S = Speech

DAP = Developmentally Appropriate Progress
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Home - A Balanced Approach

School
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Home - A Balanced Approach

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Why “Auditory First”? 


Factors Affecting Auditory Development

**Physiological**
- Degree of hearing loss
- Age of onset
- Type of hearing loss
- Cognitive ability
- Additional conditions

**Environmental**
- Age of beginning intervention
- Use of amplification
- Family involvement
- Multiple languages
- Quality of intervention
- Resources available to family


Auditory-Based Intervention: Who Can Benefit?

- Children with permanent hearing loss, regardless of hearing technology
- Children using a variety of communication modes:
  - Oral communicators
  - Total communicators
  - Manual communicators*

**Prerequisites:**
- Appropriate amplification/hearing technology
- Family commitment to developing listening and spoken language skills*

**Hearing vs. Listening**

**Hearing** is acoustic access to the brain; it includes improving the signal-to-noise ratio by managing the environment and utilizing hearing technology.

**Listening** is attending to acoustic events with intentionality.

Hearing must be made available before listening can be taught.

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**Erber's Hierarchy of Auditory Skills**

- Detection
- Discrimination
- Identification
- Comprehension

Erber (1982)
Erber's Hierarchy Of Auditory Skills

- Detection
- Identification
- Discrimination
- Comprehension

That sounds DIFFERENT.

Erber (1982)
Erber’s Hierarchy Of Auditory Skills

Comprehension

Detection

Identification

Discrimination

I UNDERSTAND that!

Erber (1982)

Comprehension

Focused Auditory Process

E. is an engaging and animated young girl. She loves art. She always commits to her art projects until they are prefect in her eyes! She also likes to re-enact stories from the weekend or her favorite books.
Child E

- Age 4:9
- Normal birth and early development
- Regression in speech production: 18 mos.
- Decreased responses to sound: 24 mos.
- Severe to profound hearing loss dx: 2:11
- Right side CI: 3:6
- Hearing age: <3;0

18+ month gap?

Cochlear Implant: Comprehension

A AV V O OS S W WV V

"E"

A Learner Approach
S.C.A.L.E.S. Focus

- **Auditory: Home, Classroom, Peers, Therapy**
  - ID of words in closed sets of same syllable
  - Answer Level 1-2 Questions
  - Follow directions with 3-4 critical elements
- **Language: Home, Classroom, Peers, Therapy**
  - Increased utterance length, possessive pronouns, Wh questions
- **Speech: Home, Classroom, Peers, Therapy**
  - Production of initial /f,k,g,s/, medial /n,t,d,k,g,f/
  - Natural intonation, phrasing, stress, volume

Early Speech Perception Test

ESP Monosyllable Examples:  boot, book, boat, etc.
Mr. Potato Head Examples:  Find Mr. Potato Head’s blue shoes.  Find his nose.  Mr. Potato Head wants orange ears.
**Erber's Hierarchy Of Auditory Skills**

- Detection
- Discrimination
- Identification
- Comprehension

See Page 23 ACRN Handbook
Erber (1982)

**Child E. 4; 9mos.**

<table>
<thead>
<tr>
<th>Skill</th>
<th>SS</th>
<th>%ile</th>
<th>LA</th>
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<tbody>
<tr>
<td>Vocab.</td>
<td>76</td>
<td>5</td>
<td>3;2</td>
</tr>
<tr>
<td>PPVT (Sign)</td>
<td>41</td>
<td>&lt;0.1</td>
<td>&lt;2;0</td>
</tr>
<tr>
<td>PPVT (Spoken)</td>
<td>76</td>
<td>5</td>
<td>3;2</td>
</tr>
<tr>
<td>EVT</td>
<td>80</td>
<td>9</td>
<td>3;5</td>
</tr>
</tbody>
</table>

**Single Word And Multiple Elements**

- ACLC 1 Element: 88%/58%
- ACLC 2 Elements: 90%/32%
- ACLC 3 Elements: 60%
- ACLC 4 Elements: 20%
Auditory-Based Intervention

Child E: 4;9 mos.

- ACLC  Sign/Spoken  Spoken
  - 1 Element  88%  58%
  - 2 Elements  90%  32%
  - 3 Elements  60%  DNT
  - 4 Elements  20%  DNT

---

Child E: 4;9 mos.

- PLS-3  SS  %ile  LA
  - AC  78  7  3;7
  - EC  63  1  2;8
  - TLS  67  1  3;1

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Levels Of Abstraction For Preschool Discourse

Question Abstraction Examples

- Level 1: 5th %tile
- Level 2: 1st %tile
- Level 3: 5th %tile
- Level 4: 1st %tile

S.C.A.L.E.S. Focus

- Auditory: Home, Classroom, Peers, Therapy
  - ID of words in closed sets of same syllable
  - Answer Level 1-2 Questions
  - Follow directions with 3-4 critical elements

Focused Auditory Process

1. What’s the auditory content & level?
2. What’s the set type & size?
3. What’s the A-V plan?
4. What’s the auditory strategy?

See handout “Focused Auditory Teaching”
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Auditory Content & Expectations

TASK GAUGES
- Receptive Focus
- Expressive
- Follow Direction Point
- Verbal Response
- Sign-Verbal Response
- Sentences Word Converse

Language Triangle

Language Content/Concepts
- Teacher Language
- Student Language

Speech Perception

ESP Monosyllable Examples: boot, book, boat, etc. Mr. Potato Head Examples: Find Mr. Potato Head’s blue shoes. Find his nose. Mr. Potato Head wants orange ears.
Focused Auditory Process

1. What’s the auditory content & level?
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4. What’s the auditory strategy?

See handout “Focused Auditory Teaching”

Closed Set

- The easiest type of listening is in a closed set, where the contents of the set are present or clearly defined.
- Examples: Numbers 1 – 10, names of family members, days of the week, colors

Bridge Or Limited Set

- A bridge or limited set is one in which the context or category is clearly established, but the specific items in the set are not clearly present or defined.
- Examples: Animals at a zoo, snacks, clothing items
Open Set

- No established content and possibilities are unlimited
- Examples: Carrying on a conversation over the telephone, Listening to a news program on the radio or TV

Where’s Waldo?

Goal: ID of words in closed sets of same syllable

Targets:
Eyes, shoes, nose, hat, ears, mouth, arms, etc.

What Type Of Listening Set?

Targets: Eyes, shoes, nose, hat, ears, mouth, arms, etc.
Closed Set: given/obvious choices
Focused Auditory Process

1. What’s the auditory content & level?
2. What’s the set type & size?
3. What’s the A-V plan?
4. What’s the auditory strategy?

See handout “Focused Auditory Teaching”

Listening Context: Familiarity

New: Language and concepts being presented for the first or second time

Review: Language and concepts that have been presented repeatedly over a period of at least 2 weeks

Routine: The language of the daily activities of the classroom: transition, snack, instructional routines, etc.

A-to-V Plan

<table>
<thead>
<tr>
<th></th>
<th>Auditory</th>
<th>Av</th>
<th>AV</th>
<th>Visual</th>
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<tbody>
<tr>
<td>New</td>
<td></td>
<td>A</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Review</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Routine</td>
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<td>X</td>
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</table>


E’s Continuum

Understanding of Auditory/Visual/Sign

<table>
<thead>
<tr>
<th>Auditory (A)</th>
<th>AV</th>
<th>Visual (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Formerly Robbins, 2001; Nussbaum, Scott, Waddy-Smith, Koch, 2004)

Use of Sign and/or Spoken Language

<table>
<thead>
<tr>
<th>Oral (O)</th>
<th>OS</th>
<th>Sign (S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Waddy-Smith, Clerc Center, 2004)

Use of Vocalizations and/or Words

<table>
<thead>
<tr>
<th>Words (W)</th>
<th>VW</th>
<th>Vocalizations</th>
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</thead>
<tbody>
<tr>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(ACRN, 2011)

Use of Gestures and/or Pictures/Signs

| N/A | Picture/Signs (P/S) | Gestures (G) |
|     | ✓                | ✓            |

How Much Extra Support Is Needed?

<table>
<thead>
<tr>
<th>A</th>
<th>A V</th>
<th>AV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed Set</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Bridge Set</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Open Set</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

A-V CLASS CONFIGURATION/PLAN

Auditory-to-Visual Communication Continuum

<table>
<thead>
<tr>
<th>Auditory Communication</th>
<th>AV</th>
<th>Visual Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auditory communicator</td>
<td>A</td>
<td>Auditory communicator</td>
</tr>
<tr>
<td>Hearing-impaired child</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Robbins, AML; Loud and Chien; 2001; Advanced Bionics Corporation

Handbook page 6-9
Auditory-Based Intervention

Focused Auditory Process

1. What’s the auditory content & level?
2. What’s the set type & size?
3. What’s the A-V plan?
4. What’s the auditory strategy?

See handout “Focused Auditory Teaching”

Auditory Learning Strategies

• When deciding which strategy to use, consider…what is your desired response?
  – Input/imprint (receptive)
  – Imitation (receptive/expressive)
  – Comprehension (receptive)
  – Use (expressive)

Auditory Strategies - Input

• Direct child’s auditory attention (“Listen”)
• Auditory Sandwich
• Tell, then show
• Use parentese
• Acoustic Highlighting
• Low-lighting
• Auditory space
• Modeling
• Repetition
Optimize The Auditory Environment (Input)

Distance
Noise
Volume
Rate
Technology

Auditory Sandwich

Listen alone!
Listen with support
Listen alone!

Auditory Sandwich
### Auditory Strategies - Imitation

- Model, then WAIT
- Ask, “What did you hear?”
- Use a partner as a model
- “Tell mom…”
- Auditory closure
- Give target in the form of question (Did he jump?)
- “Can you say…?”
- Give a choice

### Auditory Strategies - Comprehension

- Give a direction and pause in natural context/routines
- Ask a variety of questions
  - Avoid asking too many!
- Sabotage/change a familiar routine

### Imitation ≠ Comprehension
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Checking Comprehension

Activity Based Intervention

Sabotage

Auditory Strategies – Encourage Use

• Stop talking!
• Look expectantly and WAIT
• Sabotage the situation
• Role reversal
• Obligatory context
6. What’s the visual support plan?
7. Did it work?
8. How will you modify?

See handout “Focused Auditory Teaching”
6. What’s the visual support plan?
7. Did it work?
8. How will you modify?

See handout “Focused Auditory Teaching”
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Visual Support Decision

<table>
<thead>
<tr>
<th>Less Challenging</th>
<th>More Challenging</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Auditory + Tactile</td>
<td></td>
</tr>
<tr>
<td>• Auditory + Visual</td>
<td></td>
</tr>
<tr>
<td>— Direct language cues (sign, written, gestures, pictures)</td>
<td></td>
</tr>
<tr>
<td>• Auditory + Visual</td>
<td></td>
</tr>
<tr>
<td>— Indirect cues (speechreading, facial expression)</td>
<td></td>
</tr>
<tr>
<td>• Auditory Only</td>
<td></td>
</tr>
</tbody>
</table>

6. What’s the visual support plan?
7. Did it work?
8. How will you modify?

Focused Auditory Process

See handout “Focused Auditory Teaching”
Modify: Auditory Skill Level

Comprehension
Identification
 Discrimination
 Detection

Identification ➔ Comprehension

Identification Targets: Eyes, shoes, nose, hat, ears, mouth, arms, etc.

Comprehension Targets:
Mr. Potato Head needs something to help him see. (glasses)
Mr. Potato Head feels tired. Put him to sleep.
Help Mr. Potato Head keep his feet warm.

Modify: Set Size or Type

Less Challenging ➔ More Challenging

Closed Set (known topic) ➔ Bridge Set (mixed topics) ➔ Open Set (could be anything)
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Closed Set → Bridge Set

Closed Set Targets: Eyes, shoes, nose, hat, ears, mouth, arms, etc.

Bridge Set Targets: Body parts and clothing items

Modifications

- Natural Cues
- Indirect Cues
- Direct Visual/Verbal Cues

- Repeat Phrase
- Say With Facial Expression
- Say With Speech Reading
- Point To The Word Or Picture
- Say With An Eye Gaze
- Say With Natural Gesture
- Say Shorter Phrase
- Say With A Point To Object
- Ask Child To Repeat

Adapted from DynaVox Systems LLC

Modification - Visual Support Decision

- Auditory + Tactile
- Auditory + Visual
  - Direct language cues (sign, written, gestures, pictures)
- Auditory + Visual
  - Indirect cues (speechreading, facial expression)
- Auditory Only

Less Challenging

More Challenging
Auditory-Based Intervention

Focused Auditory Process

1. What’s the auditory content & level?
2. What’s the set type & size?
3. What’s the A-V plan?
4. What’s the auditory strategy?

See handout “Focused Auditory Teaching”

6. What’s the auditory chain/support?
7. What’s the visual support?
8. Did it work?
9. How will you modify?

See handout “Focused Auditory Teaching”
Auditory Inventory & Assessment Tools

- Auditory Skills Checklist, Cincinnati Children's Hospital: www.chc.org
- Auditory Skills Placement Test, Sindrey
- CID Early Speech Perception Test (ESP), Moog & Geers, www.cid.wustl.edu
- Compass Test of Auditory Discrimination, Sindrey: www.listeningtree.ca
- Contrasts for Auditory & Speech Training (CAST) Ertem: www.linguisystem.com

Auditory Inventory & Assessment Tools

- Early Listening Function (ELF), Anderson: www.hear2learn.com
- Early Speech Perception Test, CID
- Early Steps Auditory Skills Checklist, www.kandersonaudconsulting.com
- MAIS & IT-MAIS: Meaningful Auditory Integration Scale, Zimmerman-Phillips, Robbins, Osberger; Advanced Bionics: www.bionicear.com
- Test of Auditory Comprehension (TAC), Foreworks
- And more!

Resources

- Alexander Graham Bell Association for the Deaf and Hard of Hearing: www.agbell.org
- CASLLS and CASLLS Companion, Wilkes, E. www.sunshinecottage.org
- Hear & Listen! Talk & Sing! Estabrooks, W.: www.agbell.org
- HOPE Rehabilitation Resources. Cochlear Corporation: http://professionals.cochlearamericas.com/cochlear-academy/hope-rehabilitation-resources
- KidTrax (and more). Med El Corporation, a variety of therapy materials: www.medel.com
- Learn to Talk Around the Clock, Rossi, K.: www.agbell.org
- My Baby's Hearing www.babyhearing.org
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Resources

- Listen, Learn and Talk (and other materials), Cochlear Americas: http://hope.cochlearamericas.com
- The Listening Room, Advanced Bionics Corporation: www.hearingjourney.com
- Songs for Listening! Songs for Life!, Estabrooks, W.: www.agbell.org
- SPICE (Speech Perception Instructional Curriculum Evaluation), Central Institute for the Deaf, St. Louis, MO, http://www.cid.wustl.edu/
- Top Ten Strategies for Parents (Parent manual, professional manual, videotape) http://www.agbell.org/

References


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