

Online Session 10

Aural Hab:
Child




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Supporting Success for Children with
Hearing Loss

This Week's Learning Objectives You will be able to ...

- 1 Describe key elements of behaviors related to APD and habilitation of auditory processing deficits
- 2 Discuss key concepts related to habilitation of children with auditory neuropathy spectrum disorder
- 3 Describe vestibular habilitation and when it should be provided
- 4 Describe the necessity of collaboration in the management of children with auditory deficits


Auditory Processing Disorders

- NOT due to higher-order cognitive disorder, language disorders or language processing disorders. Can affect up to 5% of children.
- Symptoms seen in the classroom:
 - Understanding speech in noise
 - Difficulty following directions
 - Difficulty discriminating between similar sounding speech sounds
 - May ask for frequent clarification
 - Reading, spelling, understanding verbal instruction may also be symptoms
 - Performance on tasks that do not rely heavily on listening and then responding typically much better



Collaboration

- Must have input on school performance as part of the diagnostic decision-making process
- Audiologist diagnoses
- Multidisciplinary team determines relevance and potential need for services/supports
- In addition to performance on APD battery we need to know:
 - Written and oral language competencies
 - Academic challenges
 - Cognitive function including subtests for language and auditory processing as part of determining strengths and nonstrengths



Classroom Function Checks

Investigate for children age 7-8 or older

Can ask teacher to complete:

- CHAPs
- SIFTER

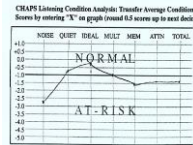
Can ask child to complete:

- LIFE-R

Trying to answer:

Are there functional listening challenges?

How do they seem to be impacting the student?



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Treatment of APD – 3 areas

1. Changing the learning or communication environment

- a. Use of FM to improve S/N
- b. Teacher accommodations to ensure comprehension

2. Recruiting higher-order skills to help compensate for the disorder

- a. Strengthening problem-solving
- b. Language, memory, attention improvements

3. Remediating the auditory deficit directly

- a. Computerized programs
- b. Work with SLP on auditory processing skills
- c. School-based or home-based

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Challenging to obtain services!

- APD is not one of the 13 disability categories specified within IDEA
- In order to receive special education services a child must qualify under
 - Learning disabilities
 - Speech/language disorder
- APD diagnosis along with evidence of challenges in the classroom *may* result in a 504 Plan under which hearing technology *may* be provided
- Response to Intervention techniques *may* provide supports needed for student to cope



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Remediation per Subtype (Bellis)

Auditory Decoding Deficit

It looks like issues with hearing in noise, sound blending, poor auditory discrimination, spelling

1. Improve acoustic clarity – FM

2. Speech sound training – early literacy

- Which of the following start with the 'buh' sound: mat, pear, bear, cat?

3. Auditory closure activities

- We went to the store and bought _ilk, _read, _eat

4. Speech-to-print skills

- Listen: mmmm can you find the letter that makes this sound on your worksheet? N M P B

<http://www.slideshare.net/sterncenter/building-blocks-speech-to-print-webinar> Preliteracy skill focus

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Efficacy of FM

Research: *Assistive listening devices drive neuroplasticity in children with dyslexia* (Proceedings of the Natl. Academy of Sciences)

"Assistive listening devices (classroom FM systems) may reduce auditory processing variability by enhancing acoustic clarity and attention. We assessed the impact of classroom FM system use for 1 year on auditory neurophysiology and reading skills in children with dyslexia. FM system use reduced the variability of subcortical responses to sound, and this improvement was linked to concomitant increases in reading and phonological awareness. Moreover, responses consistency before FM system use predicted gains in phonological awareness. A matched control group of children with dyslexia attending the same schools who did not use the FM system did not show these effects. Assistive listening devices can improve the neural representation of speech and impact reading-related skills by enhancing acoustic clarity and attention, reducing variability in auditory processing."

<http://www.pnas.org/content/109/41/16731.abstract?sid=3b5aa6-f83f-494c-967d-583da7e4443c>

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Remediation per Subtype (Bellis)

Prosodic Deficit

It looks like good auditory discrimination but difficulties with pragmatic language and prosody

1. Knowledge of emotional states
 - Match photos of emotions with words
 - Role play body language with meaning
2. Prosody training – typical for L2 learners
 - RTP – Real-Time Pitch
 - Extracting key words from an ongoing message

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Remediation per Subtype (Bellis)

Integration Deficit

It looks like good auditory discrimination but auditory based language disorder, visual-spatial issues impacting writing/reading, slow to process

Strengthening phonemic knowledge

- Phonemic Synthesis Therapy Kit (Jack Katz)
- Magic Penny Reading Program (Pre-K – 2nd)
- OT/PT for coordinating both hands/feet

Output-Organization Deficit

It looks like difficulty sequencing, organizing, remembering auditory information, word retrieval issues, poor performance in noise, artic errors, etc.

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Fast ForWord

- K-12 "A targeted workout for the brain"
- "Neuroscience research has shown that **with the right input, the brain can change and reconfigure itself throughout life**, proving that student potential is endless."
- "The Fast ForWord program develops and strengthens memory, attention, processing rate, and sequencing—the cognitive skills essential for reading intervention program success."
- The strengthening of these skills results in a wide range of improved critical language and reading skills such as phonological awareness, phonemic awareness, fluency, vocabulary, comprehension, decoding, working memory, syntax, grammar, and other skills necessary to learn how to read or to become a better reader."

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Earobics

- Pre-K – grade 3
- “It helps educators address the challenges of reading through technology, multimedia materials, and professional development.
- Using a “right-tool-for-the-task” approach, Earobics delivers highly differentiated instruction for students in pre-kindergarten to third grade, and provides the support each student needs to succeed.”

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Research

- Review of 16 studies (13 FFW, 3 Earobics), 5 other non-speech and simple speech sounds training programs.

“The results suggest that, apart from the phonological awareness skills, the FFW and Earobics programs seem to have little effect on the language, spelling, and reading skills of children. Non-speech and simple speech sounds training may be effective in improving children’s reading skills, but only if it is delivered by an audio-visual method. There is some initial evidence to suggest that CBAT may be of benefit for children with APD.”



Dev Med Child Neurol. 2010 Aug;52(8):708-17. doi: 10.1111/j.1469-8749.2010.03654.x. Epub 2010 Mar 29.

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Teri Bellis’ comments

“Improvement seen in auditory skills as a result of FFW, Earobics and other similar programs has far less to do with the specifics of the programs but rather is due to an “auditory vigilance” effect.

Simply engaging in any challenging auditory activity daily for an extended period of time will result in improvement in auditory skills because we are stimulating auditory areas of the brain.”



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Strategies for the Teacher

- Preferential seating for clear visual access
- Have the student look at the speaker’s face
- Limit background noise distractions
- Present directions in short, concrete segments, with visual cues
- Rephrase directions
- Maintain structure and schedules (predictability)
- Preview materials to be presented, using a variety of media
- Build student’s self-esteem at every opportunity



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Suggested CAPD Treatment Hierarchy (SLP):

Missing language concepts (spatial concepts, adjectives, pronouns, etc.) are a foundation and must be taught if needed.

Processing of simple "wh" questions and yes/no questions are also required. This should be done in the early stages of therapy (ages 3-5) and reinforced throughout.

Typically suggested for ages 5 and up. (Although can be modified for younger children)

- 1) **Attending** (auditory awareness/vigilance, recognizing pitch changes, tapping patterns, attending to the direction of sound, identifying environmental sounds, etc.)
- 2) **Phonemic Awareness & Auditory Discrimination/Closure** (followed by concepts such as plurals, past tense verbs, possessives, if the child has not mastered it in the earlier years)
- 3) **Initiating Specific Clarification** communication repair requests/clarification
- 4) **Auditory Memory/ Retention of Linguistic information** (improving the length of time the child can hold on to a verbal message by giving him specific strategies to do so) through:
 - Subvocalization, •Chunking •Visualizing
- 5) **Auditory Figure-Ground improvement** (improving the ability to focus on a verbal message with competing noise)
- 6) **Higher level listening tasks requiring inferential reasoning**, paraphrasing, predicting, explaining cause/effect, idioms, humor etc.
- 7) **Higher level listening tasks requiring the child to listen** to a lecture, identify the important elements, and take notes.

This, supplemented with classroom acoustic modifications, teacher modifications in presentation, FM system or sound

http://www.hamaquchianandassociates.com/uploads/Supplemental_Auditory_info_for_Anaheim.pdf

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Make It Yours

Picture yourself working for a busy pediatric clinic. The audiologist who typically performs all of the APD evaluations is going on maternity leave. She asks you what you know about APD treatment.

- Do you know enough to be able to make recommendations in a report?
- Do you know enough to be comfortable discussing APD findings and recommendations with a school-based SLP?
- APD treatment is not 'one-size-fits-all.' Do you know what APD diagnostic findings (subtypes) support FM use recommendations?

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Auditory Neuropathy - ANSD

- Cochlea receives sounds normally; signals leaving the cochlea become disorganized or the auditory nerve does not process sound normally

- **Occurs on a CONTINUUM** Common features:
 - Hearing loss of some degree.
 - The degree of hearing loss can vary widely from mild to profound loss.
 - The degree of hearing loss is not predictable.
 - Difficulty understanding speech, especially in noise.
 - Speech understanding difficulties that are worse than can be predicted from other tests of hearing function.
 - Hearing that appears to fluctuate from day-to-day or even from hour-to-hour.
 - Other neuropathies that may affect coordination for activities like writing, running or talking



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Great need for support

- Families will 'see' their child respond to sound
- They 'know' that the child is hearing
- Frustration at this ability not allowing the child to build on what he hears in a way that allows typical language growth.
- Website by a parent: www.auditoryneuropathy.tripod.com
- DHH professionals have little experience working with the ANSD population
- Families will need to constantly advocate and inform educators about the child's strengths, issues and what works best



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Analogy

Think about driving your car with the radio on, but you have a frayed wire somewhere between the radio and the speaker system.

The sound is entering the perfectly operational radio but is not able to get through the wire and into the speaker in the correct way.

You can 'hear' the talk radio station but none of the words are clear. Turning up the radio doesn't help!

Now replace the words radio, wire, and speaker in that sentence with the words cochlea, nerve and brain.

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Learning to Communicate

- No single teaching approach works
 - Trial and error / observation and collaboration!
1. Does an FM system seem to improve focus on verbal communication, comprehension, language growth?
 2. Do LSLS strategies work? Specifically, can the child discriminate linguistic elements vs just sounds?
 3. If presented with visual learning strategies (English-based sign, cued speech, visual phonics) is there a marked difference in communication (attention, comprehension, learning)?

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Visual communication methods

- Most families want the child to eventually speak
- Cued speech is a visual input method. The child would not typically use cues to express themselves
- Use of an English-based sign system is preferred over ASL so that the sign can be paired with spoken English and speechreading.
- Families who want the child to become part of the Deaf culture/community would use ASL
- LSLS approach is ineffective with most children with ANSD unless implanted

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Auditory Training

- If the child appears to be able to use audition for language learning (even if not fully effectively) then auditory training should occur
- Focus on skill development per the auditory hierarchy (see Auditory Skills Checklist, ALL)
- Discrete auditory development goals should be identified, taught and monitored for progress
- Once implanted a child's auditory skill development should resemble that of children with SNHL
- Hearing aid use should only be continued if there is evidence that it helps processing sound, not just hearing more that doesn't make sense
 - Improved WDS, FLE using sentences

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Audiologic Management

- Monitor cochlear and neural sensitivity
- Degree of inconsistency in hearing (if not implanted)
- Performance in discriminating speech in quiet and in noise
- Potential improvements over time (auditory maturation)
- Collaboration with parents and school team on optimizing effective use of audition



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Make it Yours!

Picture yourself as an educational audiologist in a cooperative that serves 30 school districts. A child with ANSD will be moving to your school district. He is 4 and will be starting kindergarten in the fall.

- What are the key points you need to find out about the child before the school can begin figuring out an appropriate program?
- What pieces of information will you as the ed aud need to collect?
- What will you need to think about regarding this student's ability to function in a typical kindergarten?

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Vestibular Issues – Case Example

- As an infant, "Sam" was diagnosed with congenital, profound hearing loss due to Mondini malformation, an inner-ear abnormality. Following a hearing aid trial, he received a left-sided cochlear implant when he was 21 months old. But despite Sam's significant gross motor developmental delays—he could not sit independently until 18 months, stand independently until 24 months, or walk independently until 30 months.
- At age 17, Sam was still unable to ride a two-wheeled bike. We recently saw him at the Boys Town National Research Hospital clinic for a vestibular evaluation. We learned that Sam has no vestibular input, and diagnosed a global, bilateral vestibular loss. After identifying his vestibular loss, we found his visual acuity to be abnormal during head movement.
- Sam has never received physical therapy. If he had, many of his functional deficits could have been addressed and potentially improved: Vestibular rehabilitation exercises can help improve visual acuity, reading acuity and gross motor developmental delay. Unfortunately, at the time of Sam's initial diagnosis, vestibular testing was virtually nonexistent—clinicians typically neither recommended nor performed vestibular tests on children with hearing loss.

http://www.asha.org/Publications/leader/2013/131201/Unspun.htm?utm_source=asha&utm_medium=newsletter&utm_campaign=leaderlive120413

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Vestibular Issues - prevalence

- The association between vestibular and hearing loss is significant:
- Vestibular loss is present in approximately 50 percent of children prior to cochlear implantation.
- There is a small risk—about 10 percent—for additional vestibular loss following cochlear implantation, as a result of the surgical procedure.
- Vestibular loss is also more likely to occur as hearing loss becomes more severe.



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Vestibular checklist items

- ___ avoids/dislikes playground equipment; i.e., swings, slides, merry-go-rounds
- ___ prefers sedentary tasks, moves slowly/cautiously, avoids taking risks, "wimpy"
- ___ avoids/dislikes elevators and escalators; may prefer sitting while they are on them or, actually get motion sickness from them
- ___ may appear terrified of falling even when there is no real risk of it
- ___ afraid of heights, even the height of a curb or step
- ___ fearful of feet leaving the ground
- ___ fearful of going up or down stairs or walking on uneven surfaces
- ___ afraid of being tipped upside down, sideways or backwards; will strongly resist getting hair washed over the sink
- ___ startles if someone else moves them; i.e., pushing chair closer to the table
- ___ as an infant, may never have liked baby swings or jumpers
- ___ may be fearful of, and have difficulty riding a bike, jumping, hopping, or balancing on one foot (especially if eyes are closed)
- ___ may have disliked being placed on stomach as an infant
- ___ loses balance easily and may appear clumsy
- ___ fearful of activities which require good balance
- ___ avoids rapid or rotating movements



<http://www.sensory-processing-disorder.com/sensory-processing-disorder-checklist.html>

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Vestibular Habilitation – Adaptation Exercises

“Astronaut Training” = vestibular hab treatment

- Incorporates imposed movement, visual and auditory activities
- Often performed by an OT
- Perform head movements while keeping a target in focus – increase speed incrementally
- Various positions: sitting, standing, lying, walking
- Moving the arm and head in opposite directions doubles the effort needed to keep eyes on target
- Balance exercises to decrease dizziness



<http://www.youtube.com/watch?v=gpu5i2ufnaQ3:0>

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Audiologist's role

- Identify signs of vestibular issues during case history
- Refer and/or perform vestibular evaluation
- Refer to OT for vestibular habilitation (clinical and/or school)



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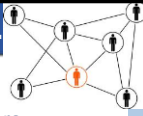
Make it Yours!

You are new to your position as a clinical audiologist in your 4th year experience. A mother brings her 6-year-old daughter in for her annual audio evaluation. She has a 45 dB loss and is a successful hearing aid user. In doing your case history with the mom, you ask her if she has any developmental or educational concerns. Mom says she is doing okay in school but seems very clumsy and doesn't enjoy playing with other children very much.

- What else could you ask mom or the child?
- If you suspect a vestibular issue, what should you do?

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You are not an island....



Working with pediatrics is challenging. We need to obtain information from others so our management will benefit their function. You are part of a NETWORK of people who provide services and supports to children with hearing loss. You have the potential to be the only consistent person in the child's life, over time, who understands hearing loss and his hearing history. If you do NOT communicate with the others on the child's team, you are doing only half the job!

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Who you should know....



- Contact in early intervention – DHH Teacher?
- Local SLP who works clinically with expertise in working with children who are DHH
- DHH Coordinator at surrounding school districts +/or the DHH teachers School SLP - DHH
- Preschool DHH teacher Source for ASL classes
- Educational Audiologist Voc Rehab FTRI office
- Clinical social worker/psychologist who could work with tweens/teens who have identity issues
- Contact for parent-to-parent network (if any)
- Names of 'veteran' moms willing to talk to 'new' moms (especially of varying ethnicity)

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Make it Yours!



Gina Oliva, age 5, comes to you for her first audiologic evaluation. Mom reports that she is a bright girl who chatters constantly but has been having problems in school. You identify a mild sloping to moderate hearing loss.

Who do contact – what will you share that will potentially improve Gina's school and social experiences?

Fast forward. Gina returns to you as a 16 year old. You immediately notice her speech is not as clear. Her hearing loss is now moderate sloping to profound at 2000 Hz.

Who do contact – what will you share that will potentially improve Gina's school and social experiences?

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Final Words

It has been an honor to work with such a bright group of students! It is very daunting how much a new audiologist must know. Your work in this class to understand and integrate information on management of children with hearing loss has been impressive.

Thank you for the honor of teaching you, my future colleagues!



Karen Anderson

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