



VoicePro: Reading and APD Applications



LEARNING OUTCOMES

1. Participants will identify three key points for implementing enhanced auditory instruction utilizing the VoicePro system across all disciplines while working with individuals diagnosed with auditory processing weaknesses, dyslexia, or other learning challenges.
2. Participants will demonstrate three or more multi-modal strategies for therapeutic and/or classroom instruction which promote engagement and attention while building stronger neurological foundations for learning.
3. Participants will correlate three or more learning barriers to reading comprehension with intervention strategies that will address weaknesses from a foundational level while incorporating technology enhancements to remediate learning gaps.



Individuals with weaknesses in literacy development, auditory processing, and/or related skills can be compared to those who are trying to climb a mountain without sufficient foundational skills or equipment to master the environmental changes occurring along the way.

To manage or overcome the challenges, a team approach is needed to address foundational skills, environmental modifications/enhancements, higher order (language and cognitive) skills, and compensatory strategy needs.



AUDITORY PROCESSING DEFICITS

- Has difficulty understanding verbal directions
- Stops listening to "figure out" what is being said
- Works "overtime" to understand auditory information
- Has difficulty understanding jokes and sarcasm (tone of voice)
- Experiences challenges with understanding paragraph-length spoken information
- Says "huh" or "what" frequently
- Recalls only part of a verbal message
- Misunderstands words due to discrimination problems
- Appears to tune out or daydream



AUDITORY PROCESSING & AUTISM





READING CHALLENGES

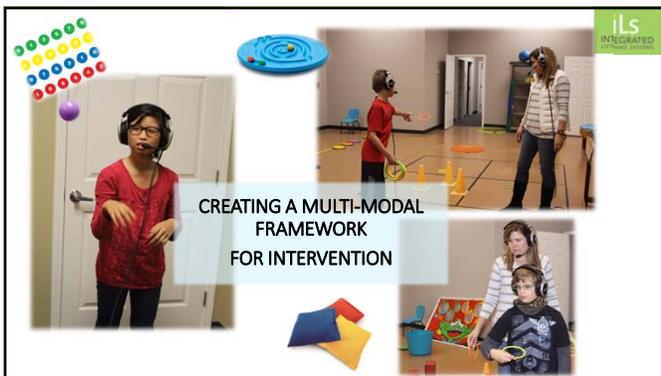
- Often has a right ear weakness/left ear dominance
- Has difficulty rhyming
- Has difficulty with sound-symbol relationships
- Unable to accurately blend sounds into words
- Demonstrates a weak phonics foundation
- Has poor reading fluency
- Demonstrates poor written expression



LEARNING BARRIERS TO READING COMPREHENSION



- Auditory Processing Disorder
- Vocabulary Weaknesses
- Weaknesses in Phonological Awareness and Phonics
- Visual Disturbances (Acuity, Oculomotor, Perceptual)
- Working Memory Deficits
- Executive Function Weaknesses
- Directionality Deficits
- Spatial Orientation Weaknesses



Auditory Discrimination

- Speech Targets (Sounds/Words)
- Non-Speech Targets (Loudness, Pitch, Duration)

Auditory Closure

- Filtered Words Listening Tasks ("Muffled," Unclear Speech)

Binaural Integration & Separation

- Dichotic Listening Tasks (Differing Words or Phrases to Opposing Ears)
- Localization Training (Identification of Sound's Location/Origin)

Temporal Processing

- Sweep Direction Identification (Identification of Increasing or Decreasing Pitch Changes)
- Toning Patterns (High-Low Pitch Variations & Identification)

Competing Acoustic Signals

- Auditory Figure Ground Listening Tasks (Speech in Noise)

BOTTOM-UP TREATMENT APPROACHES

"A growing body of research indicates that inclusion of direct skills remediation, or bottom-up therapy, can change auditory behavior."---
Geffner & Ross-Swain, 2013
(ASHA, 2005b; Bellon-Harn, Harn, & Watson, 2007; Chermak, 1998; Chermak & Musiek, 1997; Ferre, 2010)



AUDITORY TEMPORAL PROCESSING SKILLS

- Auditory Associations
- Auditory Sequencing
- **Rapid Perception**
- Same-Different Tasks





READING AND APD CONNECTIONS

- Weaknesses in phonological decoding and primary word recognition (sight word) decoding abilities are associated with auditory temporal processing deficits.
- Individuals with reading disorders demonstrate a significantly higher number of errors in discrimination of duration and frequency patterns (i.e. temporal processing tasks).
- Children with reading disorders tend to have greater deficits in non-speech temporal processing than adults with reading disorders, possibly due immature or underdeveloped auditory systems.



- Phonological Awareness**
 - Rhyming Activities
 - Same/Different Auditory Word Comparisons
 - Phoneme Manipulations
 - Sound Blending
 - Decoding
- Auditory Memory**
 - Digit Span (Forward and Reverse)
 - Multi-step Directions
 - Word or Sentence Recall
- Auditory Comprehension**
 - Answering Questions/Recalling Information
 - Following Directives in Contextual Situations
- Auditory Cohesion**
 - Problem-Solving/Reasoning
 - Auditory Associations
- Metacognitive Strategies**
 - Subvocalizing, Chunking, and Mnemonics
 - Visualizing
 - Compensatory Strategies

TOP-DOWN TREATMENT APPROACHES

Effective auditory processing is also dependent on other higher order cognitive communication skills such as phonological processing, linguistic processing (comprehension & interpretation of auditory input), executive functioning, and metacognition. (Geffner & Ross-Swain, 2013)

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A COLLABORATIVE MODEL FOR TREATMENT



GETTING STARTED



A Multi-Modal Intervention

- ✓ Addresses foundational skills
- ✓ Implements environmental modifications/enhancements
- ✓ Addresses higher order (language and cognitive) skills
- ✓ Supports compensatory strategy needs

TARGETED SKILLS





ADDRESSING MULTISENSORY NEEDS

- Listeners are bombarded daily with sensory information that must be processed quickly and effectively.
- The auditory, visual, vestibular, and tactile systems play key roles in this information processing.
- When an individual does not have full access to the acoustic signal (speech), he or she cannot succeed in school, work, or other daily activities.



AUDITORY TRAINING

- Enhance the auditory signal with amplification/assistive technology
- Provide direct skills remediation (bottom-up and top-down approaches)
- Implement auditory and movement tasks simultaneously for functional gains
- Teach metacognitive strategies



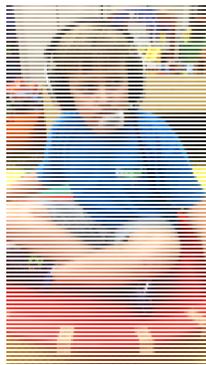
TASK PROGRESSION

- Begin task challenges near skill thresholds
- Address tasks as an isolated skill and then comparatively add in movements to address multi-tasking
- Progress the movement pattern(s) to a greater complexity
- Add in music or noise at a background level
- Modify challenges if frustration occurs

IMPLEMENTATION TIPS



- Use both recorded stimuli and natural voicing
- Implement auditory and visual stimuli simultaneously when needed and then progress task complexity by fading visual prompts
- Begin with rhythmic, sequential (movement) activities to activate subcortical processing in order to establish a foundation for improved fluency and temporal processing with reading tasks
- Utilize VoicePro programs for 15-30 minutes of a session
- Monitor for signs of auditory fatigue



SIGNS OF AUDITORY FATIGUE



- Withdrawal from task/"escape" behaviors
- Frustration
- Shortness of breath
- Visual distractibility
- Agitation/irritability
- Noncompliance
- Fidgeting/pulling on headphones
- Pushing microphone away
- Stuttering/dysfluencies in absence of a disorder

DEMONSTRATION OF ACTIVITIES



It has also been documented that stimulating the vestibular (inner ear) and cerebellar (motor activity) system through movement activities (spinning, crawling, rolling, jumping, bending, etc.) can result in "significant gains in attention and reading." (Jensen, 2005, 62).

VoicePro Benefits



- Allows for direct auditory training with air and bone conduction to activate expressive and receptive language pathways
- Provides unique access to establish binaural integration and separation
- Establishes variability between recorded and spoken communication to expand auditory engagement
- Provides clarity to the sound source for compensatory needs while directly addressing remediation for improved comprehension

Movement

- Playbook Activities
- MeMoves
- Brain Breaks
- Brain Gym
- Sensorcises

Music

- Calming
- Sensory-Motor
- Speech-Language
- Songs with Lyrics

Multi-Tasking sequential Processing

- Attending
- Listening
- Scanning
- Balancing
- Moving
- Discriminating
- Analyzing
- Organizing
- Remembering



USING TECHNOLOGY - AMPLIFICATION



• VoicePro (iLS)



- Apps-
Ear Machine
i-Hear

USING APPS WITH VOICEPRO



- Sound Match
- Touch the Sound
- Lumpty Learning
- Drum Challenge
- Simon Sings
- MelodyMelody
- iDichotic
- Dichotic Interaural Intensity Difference Training (DIID)
- Hear Coach
- Auditory Workout



REFERENCES



American Academy of Audiology (2010). *Clinical Practice Guidelines for the Diagnosis, Treatment, and Management of Children and Adults with Central Auditory Processing Disorder*. Retrieved from http://www.asha.org/pdfs/toolbox/CAPD-Guidelines_8-2010.pdf.

American Speech-Language-Hearing Association. (2005). Technical report: (Central) auditory processing disorders—Working group on auditory processing disorders. Rockville, MD: ASHA. American Speech-Language-Hearing Association (2005b). (Central) Auditory Processing Disorders—The Role of the Audiologist. [Position Statement]. Retrieved from www.asha.org/policy/PS2005-001114/.

Bailey, T. (2012). Beyond DSM: The role of auditory processing in attention and its disorders. *Applied Neuropsychology: Child* 1(2), 112-120.

Bellis, T. J. (2002). Developing deficit-specific intervention plans for individuals with auditory processing disorders. *Seminars in Hearing*, 23(4), 287.

Bellis, T. J. (2003). *Assessment and Management of Central Auditory Processing Disorders in the Educational Setting: From Science to Practice-2nd Edition*. Clifton Park, NY: Thompson Learning.

Chermak, G.D. & Musiek, F.E. (2002). Auditory training principles and approaches for remediating and managing auditory processing disorders. *Seminars in Hearing*, 23, 297-308.



Chermak, G. D. (1998). Managing central auditory processing disorders: Metalinguistic and Metacognitive approaches. *Seminars in Hearing*, 19(4), 379-392.

Geffner, D. & Ross-Swain, D. (2013). *Auditory Processing Disorders: Assessment, Management, and Treatment-2nd Edition*. San Diego, CA: Plural Publishing.

Jensen, E. (2005). *Teaching with the brain in mind*. (2nd edition). Alexandria, VA: Association for Supervision and Curriculum Development.

Musiek, F. E., Shinn, J., & Hare, C. (2002). Plasticity, auditory training, and auditory processing disorders. *Seminars in Hearing*, 23, 273-275.

Ratey, J.J. (2008). *SPARK: The Revolutionary New Science of Exercise and the Brain*. New York, NY: Hachette Book Group.

Ross-Swain, D. (2007). The effect of auditory stimulation on auditory processing disorder: A summary of the findings. *International Journal of Listening*, 21(2), 140-155.

Scardina, V. (1979) & A. Jean Ayres. *The Comprehensive Program in Sensory Integration*, Western Psychological Services.
