

Auditory Processing Disorders
Workshop & Forum
Therapy with iLS and IM
Case Studies from Little Listeners

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Bottom-up Therapy Recommendations for Decoding Deficits

- Speech-in-noise training
- Phonemic Training Program (PTP)
- Sound blending
- Missing sound and word activities
- Remedial reading activities focusing on sound-symbol association
- Fast ForWord or Earobics
- Orton-Gillingham or Wilson Reading Interventions
- Lindamood-Bell Learning Programs; Visualizing-to-Verbalizing Program, LiPS, Seeing Stars

Bottom-up Therapy Recommendations for Tolerance Fading Memory Deficits

- Speech-in-noise training
 - WINT-3 (Words-in-noise training)
 - STAMP (Short Term Auditory Memory Program)
 - Noise desensitization training
- Memory training
 - Rote memory exercises
 - Mnemonics
- Earobics or HearBuilder exercises

Bottom-up Therapy Recommendations for Integration Deficits

- Interhemispheric exercises (verbal-to-motor, motor-to-verbal)
- Dichotic listening training or Dichotic Offset Training
- Sensory Integration training
- Localization training
- Auditory-Visual training
- Executive Function training
- Activities to enhance transfer of function, extraction of key information and “parts-to-whole” skills

Bottom-up Therapy Recommendations for Prosodic Deficits

- Prosody training to focus on perception and production of suprasegmental aspects of speech, gestalt (part-to-whole) patterning skills, and oral reading with exaggerated prosodic features.
- Key word extraction training
- Basic temporal patterning training
- Auditory discrimination using non-speech stimuli (frequency, intensity, or duration difference limens; tonal glides)
- Speech-language intervention for pragmatics and prosody of speech.
- Word games and Rebus puzzles
- Music Therapy

Bottom-up Therapy Recommendations for Output/Organization Deficits

- Speech-in-noise training
 - Speech-in-noise training
 - Speech-language intervention focused on expressive language skills
- Memory training
 - Rote memory exercises
 - Mnemonics

Bottom-up Therapy Recommendations for Associative Deficits

- Refer directly to Speech/Language Pathology for a language processing evaluation.
 - Speech/Language therapy should focus on “use of rules” in language
 - Increasing linguistic familiarity
 - Contextual derivation of word meaning
 - Preteaching new information
 - Stating rules first
 - Metalinguistic/metacognitive strategy training to enhance auditory comprehension and memory
 - Chunking meaningful units
 - Verbal chaining
 - Mnemonics
 - Rehearsal/reauditorization
 - Paraphrasing
 - Summarizing
 - Teach organizational strategies
- Orton Reading Program or Lindamood Bell Learning

Bottom-up Therapy Recommendations for ALL Deficits

- Isolated skills practices for primary Auditory Processing skills:
 - Auditory Closure
 - Auditory Figure Ground
 - Dichotic Listening
 - Temporal Patterning
- Phonemic Synthesis Training:
 - Phoneme Recognition
 - Phoneme Discrimination
 - Phoneme Manipulation

Top-Down Recommendations; Tips for Teachers

- Attention:
 - Gain visual & auditory attention
 - Speak at eye level
 - Use cueing – “listen,” “ready”
 - Assign peer partners
 - Mark transitions between activities
 - Review before transition
 - Provide note-taking assistance when age appropriate

Top-Down Recommendations; Tips for Teachers, cont....

- Flexible Preferential Seating:
 - Seat student near primary source – 3-8 feet
 - Avoid seating near noise sources
 - Consider dominant ear, if applicable
 - Provide quiet study/work areas
 - Use daily routines
 - Use ear plugs during seat work or testing
 - Use FM amplification

Top-Down Recommendations; Tips for Teachers, cont....

- Instruction:
 - Speak clearly
 - Use natural gestures
 - Reduce distractions
 - Alert the student before instruction
 - Reduce motor activities during instruction time
 - Repeat/Rephrase instructions and allow ample response time
 - Provide examples and modeling
 - Identify key words
 - Give written and verbal instructions
 - List steps on a chart or card for sequences
 - Encourage self-advocacy, asking for clarification
 - Check for comprehension

Top-Down Recommendations; Tips for Teachers, cont....

- Time:
 - Avoid fatigue
 - Give short activities instead of one big one
 - Provide short breaks
 - Alternate between difficult and less difficult activities
 - Avoid higher level tasks when student is fatigued
 - Allow extended time or give fewer items within a specific time frame.
 - Give adequate response time.

Top-Down Recommendations; Tips for Teachers, cont....

- Preview & Review:
 - Review, preview, and summarize class lessons
 - Provide pre-teaching materials and assignments
 - Avoid divided attention
 - Review and orient; provide an outline and key vocabulary to use in following the discussing and for review
 - Frequently summarize key points
 - Give salient clues to identify and emphasize important information
 - Use verbal review strategies to ask questions periodically about the material presented
 - Give individualized attention
 - Reference important pages
 - Encourage class participation

Top-Down Recommendations; Tips for Teachers, cont....

- Classroom Adaptations:
 - Record instructions
 - Arrange classroom seating to reduce background noise and lump in smaller groups
 - Avoid open classrooms
 - Close windows and doors

Top-Down Recommendations; Tips for Teachers, cont....

- Self Advocacy:
 - Encourage self-monitoring
 - Encourage self-advocacy
 - Suggest counseling if there are social/emotional concerns

Top-Down Recommendations; Tips for Teachers, cont....

- Organizational Strategies:
 - Encourage the use of agendas and/or calendars
 - Clearly present organizational expectations
 - Refer out for executive function and/ or organizational training when appropriate

Top-Down Recommendations; Tips for Parents

- Learn child's strengths and weaknesses
- Simplify language
- Give full attention
- Work one-on-one daily
- Gain auditory & visual attention
- Start with short work periods
- Give short/simple directions
- Exercise patience; never assume a child is ignoring you
- If a task is too difficult, simplify and move on
- Encourage the use of compensatory strategies
- Teach independence
- Insist child completes activities
- Use positive reinforcement and praise
- Slow speech rate & pauses
- Try rephrasing if repetition doesn't work.
- Allow child extra time to process & organize thoughts
- Avoid speaking to child from different room
- Avoid downtime after school before completing homework or chores
- Create quiet environment to read and study
- Read aloud to your child and discuss what was read
- When child is upset, communicate with as few words as possible and clarify later

Top-Down Recommendations; Classroom Modifications

- External modifications
- Ceilings
- Floors
- Windows
- Walls and doors
- Seating and furniture arrangement
- Ventilation
- Lighting
- Special Purpose Areas

Little Listeners Therapy; “Bottom-Up” Tools

- Integrated Listening Systems (iLS) Language Program:
 - Filtered Words
 - Auditory Figure Ground
 - Dichotic Words
 - Auditory Memory
- Phonemic Synthesis Training Program
- Interactive Metronome
- HearBuilder for Home Exercise Program (HEP)
- Parent & Patient Education

Integrated Listening Systems (iLS) Language Program - Filtered Words

10 tracks

- ~~1. Filtered at 3K with a carrier phrase~~
- ~~2. Filtered at 3K without a carrier phrase~~
3. Filtered at 2.5K with a carrier phrase
4. Filtered at 2.5K without a carrier phrase
5. Filtered at 2K without a carrier phrase
6. Filtered at 1.5K without a carrier phrase
7. Filtered at 1.25K without a carrier phrase
8. Filtered at 1K without a carrier phrase
9. Filtered at 875 Hz without a carrier phrase
- ~~10. Filtered at 725 Hz without a carrier phrase~~

(I skip tracks 1, 2 & 10 because the words are too easy)

Integrated Listening Systems (iLS) Language Program -Auditory Figure Ground

6 Tracks with multi-talker babble

- ~~1. +10 SNR with 2 overlapping soundtracks of noise~~
- ~~2. +7.5 SNR with 2 overlapping soundtracks of noise~~
3. +6.5 SNR with 2 overlapping soundtracks of noise
4. +5 SNR with 4 overlapping soundtracks of noise
5. +3 SNR with 4 overlapping soundtracks of noise
6. 0 SNR with 4 overlapping soundtracks of noise

(I skip the first 2 tracks because the words are too easy)

Integrated Listening Systems (iLS) Language Program – Dichotic Words

10 Tracks with a Right Ear Lead/10 Tracks with a Left Ear Lead

1. 3 Word Phrase, 1000ms lead, +5dB Lead Ear
2. 3 Word Phrase, 500ms lead, +5dB Lead Ear
3. 3 Word Phrase, 300ms lead, +5dB Lead Ear
4. Spondee, 400ms lead, +5dB Lead Ear
5. Spondee, 250ms lead, +5dB Lead Ear
6. Spondee, 150ms lead, +5dB Lead Ear
7. Single Syllable Word, 300ms lead, +5dB Lead Ear
8. Single Syllable Word, 200ms lead, +3dB Lead Ear
9. Single Syllable Word, 100ms lead, +3dB Lead Ear
10. Single Syllable Word, 0ms gap between ears, R=L dB

(Skip 3-word phrases for most kids; older kids – too easy, younger kids – too hard to remember all 3 words in phrase)

Integrated Listening Systems (iLS) Language Program – Auditory Memory

7 tracks of random, single syllable words

1. 2 Words – 40 pairs
2. 3 Words – 25 sets
3. 3 Words – 26 sets
4. 4 Words – 25 sets
5. 4 Words – 32 sets
6. 4 Words – 25 sets
7. 5 Words – 25 sets

When they struggle with words, I make up my own lists and start with word pairs (shoe, sock, red, green) and teach them the concept of chunking first.

Then I progress to visualizing the words (boy, six, pink, peach) as they hear them (picture boys in a group of six wearing pink shirts and eating peaches).

Phonemic Synthesis Training Program

- 15 lessons
 - Present lessons 1-6 without the repeating words with older kids
 - Present 2 lessons per session with visual cues for younger kids
 - Use LAC-3 block concept to help kids with visual cues that aren't letter symbols if they struggle with PST in the auditory only mode.
 - 3 blocks each of six colors
 - Blocks represent sounds
 - They manipulate the blocks to represent the sounds that they hear
 - Have kids that struggle with perseverations of sounds and blends repeat the sounds they hear first before saying the word that the sounds make.
 - Throw a ball, jump on the trampoline, swing, or any other motor task while presenting sounds to reduce monotony and keep them alert.

Interactive Metronome (IM)

IM is a patented training tool that improves synchronization in the brain, resulting in greater neural efficiency and demonstrable outcomes for the following skills:

- Cognition
- Speech/Language & Auditory Processing
- Social/Behavioral Skills
- Sensory Processing
- Motor Skills
- Academic Performance
- Athletic Performance

IM continued...

Contraindicated for:

- Seizure Disorder
- Vestibular Hypersensitivity
- Inflammation/Pain/Edema

Training involves synchronizing a motor task (i.e. – hand clapping) with a computer generated metronome beat. There is real-time feedback, auditorily and visually, on the precise ms timing of the motor task to the auditory, visual or a/v stimulus. The neural timing network of the brain is responsible for coordination of this skill and involves the Dorso-Lateral Pre-Frontal Cortex, Basal Ganglia, Cingulate Gyrus and the Cerebellum.

Typically used in our clinic during the 2nd round of therapy, once the iLS tracks have been mastered.

“Repetition and improved efficiency of the motor control pathways ‘free up’ the active working memory and cognitive resources for planning and more complex motor tasks.” *IM Provider Training Manual*

HearBuilder

An online therapy tool designed to strengthen, listening, memory, comprehension and reading skills.

- Easy online access from any computer or tablet
- Customized by grade level
- Gradually increases complexities of tasks
- Online monitoring access for therapist
- 4 different activities
 - Memory
 - Sequencing
 - Phonological Awareness
 - Following Directions

I use this as my HEP along with a handbook of alternate activities. Kids that consistently follow the HEP make the most progress in therapy.

Parent/Patient Education

- Review of results after assessment
- Handouts that explain the “Hierarchy of Processing” and how therapy works
- Tuning fork lesson to explain how sound travels and the importance of preferential seating (usually done as the 2nd session activity)
- Constant redirection on eye contact, body language, proper communication, etc...
- Teach memory strategies – chunking, mnemonics, acronyms, etc...

Little Listeners Therapy; Program Structure

- 15 initial sessions, at least twice weekly for 30 minutes each (Allows enough time to work through the entire iLS Language Program and PST Training Program)
 - Session 1 - Intro to iLS and Hear Builder
 - Session 2 - iLS and Tuning Fork Activity
 - Sessions 3-13 - iLS and Teach a deficit specific activity
 - Sessions 14 & 15 - 1 hour reassessment
- Once weekly sessions can be considered for kids with mild deficits IF the parents commit to diligence with the HEP!

Little Listeners

Stats from 2014 Therapy clients

- 70 kids were enrolled for 2014; 54 completed therapy in 2014
 - 5 kids were still active at the time the study was completed
 - 11 kids were d/c'ed without reassessments for various reasons (mostly financial)
- Outcome measures on the 54 completed therapies:
 - 100% *improved*
 - 80% mastered goals after the 1st round of therapy
 - Goals = Age appropriate scores on reassessment
 - 10% required a 2nd round of therapy to master goals
 - 10% improved but continued therapy at home or with another discipline at the parent's request
- ***Kids that were diligent with the HEP were the most successful!***

Little Listeners Therapy: 2nd Round Therapy Structure

- Focus only on lingering weaknesses for iLS and therapy activities
 - i.e. – if only dichotic weaknesses persist, focus on the last two tracks of the iLS DW program, requiring directed ear responses or with a running discourse in the opposite ear to simulate Binaural Separation activities.
- Add Interactive Metronome to increase the whole brain activity (incorporates Auditory, Visual, Motor, Vestibular and sensory)
- Decrease intensity to once weekly for 10 sessions, typically

Therapy alternatives for kids not meeting goals:

- Continue live voice listening activities with an SLP, OT and/or tutor
- Continue with HEP (HearBuilder) at home and reassess in 6 months rather than one year
- Discharge when progress slows or parents request a “break.” Reassess in 6 months rather than a year, adjust goals and initiate a new round of therapy.

Decoding Activities & Games

- Word games:
 - Boggle
 - Scrabble
 - Bananagrams
 - Word A Round
 - Mad Gab
 - Hangman
- I Spy
- Phoneme discrimination with letter cards
- Sentence Absurdities
- Missing Word/Sound Activities

Integration Activities & Games

- Feely Bag Game
- Ned's Head
- Juggling

Miscellaneous Activities & Games

- Keyboard training with pitch and duration patterns (Temporal Patterning)
- Rush Hour, Logic Dots, Shape-by-Shape (Reasoning Skills)
- Memory Match, Cosmic Catch, Simon, Bop-It (Memory, Sequencing and Speed)
- Story Cubes (Comprehension Skills)

Success Stories...

- Average Age – 9.1 years
- Average length of therapy – 96 days
- Average number of sessions completed – 13.4
- 35/54 male (65%)
- 5/10 of the kids that did not meet goals had significant case histories and multiple involvement:
 - CP, Cognitive Delay, ODD, Severe ADHD, Dyslexia...
- 7/10 of the kids that did not meet goals were enrolled in specialty schools or home schooled for learning disabilities.

Success Stories...

- M. Franks
 - Goals were to improve decoding skills for Chinese major in college
 - 17 year old female with Misophonia for gum, tapping, clicking, whistling, breathing and sniffing
 - SPIN scores improved from SEV RE/MOD IAD to WNL
 - Aud Closure skills improved from 76% LE to 88% (RE nl)
 - Memory improved from (6/6/2/5) to (10/9/7/5)
 - SSW Total NOE improved from 11 errors to 6 and all WNL
 - Subjective improvement included:
 - Feedback from Chinese teacher that understanding improved
 - Greater confidence with oral tests in Chinese
 - Improved test scores in school
 - Fewer misophonic episodes
 - Referred to Speech/Language afterwards due to patterns on TAPS memory testing and lingering sentence memory weaknesses

Success Stories...

- C. Bowen
 - Goals were to improve reading skills – limited success with over 12 months of reading interventions
 - 8 year old male with allergies and frequent ear infections from 1-3 years. No other diagnoses
 - SSW Total NOE scores improved from 33 to 12
 - Filtered Words scores improved from 44%RE, 48%LE to 60%RE, 72%LE
 - SCAN scores improved from SS4 to SS16 for CWDE, SS5 to SS9 CS. FW score was SS9 (no pre-tx comparison)
 - Subjective improvement included:
 - Attention, following directions, and task completion improved according to mom at home
 - School reported overall improvement

Success Stories...

- Pohl siblings
 - 12 YO female, 10 YO male. Both adopted from Mexico and biologically unrelated. Both Dyslexic and attending Schenck School
 - Surprisingly similar pre-testing results
 - Male –
 - SSW Total NOE improved from 22 to 8
 - PST improved from 15/15 to 24/23
 - PPST improved from 70% (v) to 80% (v)
 - Low Pass FW improved from 68% to 76%LE (RE nl)
 - SCAN-3C CWDE improved from SS5 to SS10
 - SCAN-3C TCS improved from SS6 to SS9
 - Subjective improvements:
 - Better attention at home and at school
 - Improved reading skills
 - Improved confidence
 - Less frustrated and fewer tantrums

Success Stories...

- Pohl siblings cont....
 - Female –
 - SSW Total NOE improved from 31 to 14
 - PST improved from 21/21 to 23/23
 - SCAN-3C CWDE improved from SS6 to SS10
 - SCAN-3C CS improved from SS6 to SS7
 - SCAN-3C TCS improved from SS4 to SS7
 - Subjective improvements:
 - Improved performance at school
 - Improved reading skills
 - Improved confidence

Success Stories...

- D. Abadie
 - Recommended by GCA to address educational issues
 - 15 YO male – ADHD, Anxiety, PDD-NOS, suspected Asperger's, Language Disorder, SI, and Visual Processing Disorder, OCD, “Quirky Kid”
 - SSW Total NOE improved from 11 errors to 8, with a Type A Pattern remediated to no Ear/Order Effect, no significant reversals and no Type A Pattern. Excessive errors in LC condition at first re-eval so completed 10 more session with IM and Total NOE was reduced to 5 with no significant scores.
 - Subjective Improvement included:
 - Improved attention
 - Reduced anxiety and OCD symptoms
 - Better reading comprehension scores

Success Stories...

- A. Gunnigle
 - Goals were to determine foundational processing skills for more success with language and reading interventions
 - 13 YO - Significant developmental and communication disorders:
 - Severe Autism
 - Language Disorder
 - OCD
 - SI
 - Visual Processing
 - Delayed speech and motor milestones
 - Only echo speech
 - Normal SPIN skills at initial assessment
 - FW for NU-6 words were (40%R, 60%L) at initial assessment. SCAN-3C FW at reassessment = SS12
 - CNT SSW or SCAN-3C DW, but iLS LP for DW was mastered on the last track with at least 90% accuracy
 - Memory skills remain deficient and transferred to SLP
 - Subjective improvements include:
 - Less frustrated with communication
 - Reduced self-stimulation
 - Increased benefit from SLP interventions

Therapy Hiccups & Challenges

- N. Lease falling apart on Fridays (much improvement by discharge date)
- S. Sauro d/c'ing before reassessment because not progressing (referred to reading specialist)
- E. Long – behavior issues during therapy (overloaded with therapy and reduced motivation)
- Helicopter parents – J. Miller, Goldstein, Blakely
- Medicaid evals and therapy – getting around that
- Fractured families – K. English, R. Horjesi

Q & A

- What are some other things you have had to consider to make the most of your therapy sessions?
- What are some other activities/games that enhance therapy for the various deficit categories?
- What are some challenges you have met in therapy and how did you overcome them?