Listening Therapy for Central Auditory Processing Disorders

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Presentation Abstract

• This presentation will review the need for deficit-specific treatment of central auditory processing disorders
• The differences between auditory and language intervention strategies will be emphasized in order to provide referrals to the individual’s most appropriate provider.
• A review of dichotic listening therapy in clinical practice will be provided.

Boggy Ground

• Definitions of Central Auditory Processing Disorder ([CAPD]) abound
• The “Gold Standard” for assessment seems somewhat mythological
• Divisiveness in the field of audiology should encourage us to learn from colleagues in other fields
Position Statement

- The practice of audiology includes providing services for [(C)APD].
- Audiologists are the professionals qualified to diagnose the global auditory deficit known as (C)APD.
- Audiologists should also be involved in the individual’s intervention plan for (C)APD.


Position Statement

- Speech/language pathologists (SLPs) are uniquely qualified to delineate the cognitive—communicative and/or language factors that may be associated with [(C)APD].

Bellis (2002). When the Brain Can’t Hear: Unraveling the Mystery of Auditory Processing Disorder.

Important Considerations

- Are current evaluations sufficient in scope to consider the possibility of (C)APD?
- Do test results suggest (C)APD or other factors?
- Can the individual participate in testing?
- Will the results of (C)APD testing add anything to current management?

Bellis (2002). When the Brain Can’t Hear: Unraveling the Mystery of Auditory Processing Disorder.
How Should We Start?

- "The test battery process should not be test driven; rather, it should be motivated by the referring complaint and the relevant information available to the audiologist."


Case History

- Serves as the genesis for which auditory tests should be administered
- It should also serve as the potential referral for other assessments
  - Comprehensive language testing
  - Cognitive testing
  - Educational testing
    - Always returning to the reason for the visit

Teamwork

- The SLPs role in (C)APD focuses on "collaborating in the assessment of (C)APD and providing intervention where there is evidence of speech, language and/or other cognitive-communication disorders."

Where We Begin to Divide

Audiologists
(C)APD Tests
• Monaural low-redundancy speech tests
• Temporal processing tests
• Dichotic listening tests
• Sound localization
• Electrophysiologic testing

SLPs
Language Assessments
• Receptive and expressive vocabulary tests
• Receptive and expressive language tests
• Pragmatics tests
• Metalinguistic awareness
• Written language tests

Auditory vs Language Processing

Auditory Processing – mishearing the information
• The listener is utilizing sound identification

Language Processing – misunderstanding the information
• The listener uses their knowledge of language and their knowledge of the world to interpret the speaker’s message

Diagnosis Should Lead to Treatment

"Intervention for (C)APD should be implemented as soon as possible following the diagnosis to exploit the plasticity of the CNS, maximize successful therapeutic outcomes, and minimize residual functional deficits."

Interventions

- Modifications/Accommodations
- Compensatory Strategies
- Direct therapy/treatment


Modify & Accommodate

- Improve access to target sound (FM system)
- Preferential seating?
- Creating a more favorable signal to noise ratio (classroom acoustics)

Auditory Interventions

IEP
- Provision of lecture notes, pre-teaching, written instructions, visual aids

Compensatory Strategies

- Active listening
- Metacognitive/metalinguistic training
- Increase redundancy of the learning environment
- Repetition, Rephrasing
- Checks for understanding
- Vocabulary building

Language Interventions
Deficit Specific Treatment

- Auditory-based (bottom-up) stimulus driven
  - Acoustic signal enhancement (FM)
  - Auditory training
- Language-based (top-down) strategy driven
  - Cognitive and metacognitive strategies

Detection

- The ability to identify the presence/absence of sound
  - If the ears cannot hear the sound, the brain cannot process the absent sound
  - If hearing sensitivity is abnormal we must address the hearing loss – sensory deficit that cannot be "trained" through neural plasticity
    - Hearing aids
    - Assistive listening devices

Auditory Discrimination

- The ability to accurately perceive subtle sound differences
- Assessment through auditory closure and auditory figure-ground tasks
  - Computer software training to provide the practice necessary to become fluent in auditory discrimination
  - Referral to SLP/AR for phonological training, minimal contrast pairs
Temporal Processing

- The rate of speech and the pauses between speech sounds determine accurate perception and therefore meaning
  - Computer software training
  - Referral to SLP/AR for temporal resolution
  - Referral to SLP/AR for prosody training

Localization

- Essential skill for hearing speech accurately in noise.
  - Typically not a direct complaint; therefore often not offered direct remediation plans unless little progress is seen in other speech-in-noise training

Dichotic Listening

- Different information presented to each ear simultaneously
  - Binaural integration – requires both pieces of information
  - Binaural separation – requires ear directed information only
What is Dichotic Listening Therapy?

- An auditory intervention designed to strengthen (central) auditory processing skills
  - specifically binaural integration and binaural separation
- Provides an enhanced auditory signal to the weaker ear by restricting input to the dominant ear.

Targeting the weaker side

- Evidence for hemiplegia (Constraint-Induced Movement Therapy, 1997) designed to improve physical movement after stroke on the effected side
- Amblyopia - Treatment for amblyopia involves forcing the brain to pay attention to the images of the amblyopic or weaker eye so that vision in that eye gets stronger

Dichotic Listening Therapy

- ARIA – Auditory Rehabilitation for Interaural Asymmetry (Moncrieff & Wertz)
- CIAT – Constraint Induced Auditory Training (Hurley & Davis)
- DIID – Dichotic Interaural Intensity Difference (Musiek & Shochat).
DIID

- Formal protocol – utilizing 2 channel audiometer under headphones or in the sound field 30 minutes per session 3 times per week for 6–8 weeks
- Informal protocol - CD player with an audio book and a laptop computer with DVD utilizing significant dialogue as training materials

DIID continued

- Excellent resource "Procedural Guide for Professionals" (2012) available
- No commercially available stimulus materials; however some resources are provided in the Procedural Guide

CIAT

- Designed to be used informally with a CD player, stereo headphones and earphone splitter (monitoring earphones can be used for scoring)
- Materials are pre-recorded with intensity differences (up to ~40 dB)
- Training is recommended for 20–30 minutes per session 2–3 times per week
CIAT continued

- Enormous selection of recorded materials commercially available for purchase
- Excellent manual including overview, background, case studies, exercises, worksheets and references

ARIA

- More formal training utilizing two-channel audiometer through loudspeakers
- Current training is recommended for one hour each week, 4-6 sessions total
- Excellent training protocol including criteria for training eligibility, overview, exercises and data management
- Wide variety of training materials

From Theory to Practice

- 9 patients seen in practice utilizing ARIA training protocol
- All demonstrated performance improvements in non-dominant ear through post-test measures of (C) APD
- Subjective questionnaires indicated behavioral improvements in auditory success in a variety of listening environments
Measuring Success

- Repeat initial (C)APD assessment (all tests, not just dichotic measures)
  - Directly following treatment
  - 6 months, one year
- Repeat language testing
- Behavioral questionnaires
  - Client
  - Family
  - Teacher

Subjective Comments

- “She’s become more talkative. She asks for help when she needs it.”
- “His conversation isn’t so choppy, much more fluid.”
- “Her hairstylist wanted to know what we’ve been doing – she’s a new person.”
- “She tells me to stop repeating things, she can do it the first time.”
- “I hear better.”

Benefits

- Viable service for clients with dichotic listening weaknesses
- Compliance with ASHA and AAA guidelines for (C)APD services
- Improves examiner’s skills for initial assessment of (C)APD
Challenges

• Which program to use?
• Business proposal
• Population served
• Equipment and space needed
• Protocols for training
• Duration of services
• Guidelines for measuring efficacy/success
• Productivity and reimbursement
• Utilizing aural rehabilitation codes

Formal Vs. Informal

Formal
• Additional service for your practice
• Defined starting point and goals for each session
• Improved performance in less time
• Increase motivation
• Monitor progress/ fine tune
• Move-past plateaus
• Enhance commitment

Informal
• Cost – no insurance or billing
• Convenience of service
• No driving
• No time constraints
• Greater whole language vs. auditory intervention
• More real world - goal is to summarize the plot

EVERY ACCOMPLISHMENT STARTS WITH THE DECISION TO TRY.
References