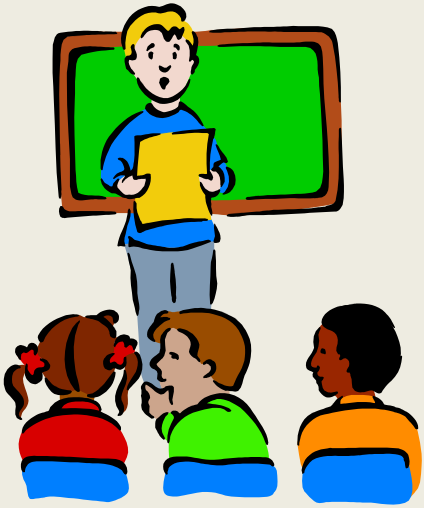
Parent Information Package

Central Auditory Processing Disorders

Assessment and Management



BC Children's Hospital Audiology Department

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What Is Auditory Processing?

Auditory processing is how sound is received, represented, and transmitted along the pathways of the hearing nerve. At the brain level it is how auditory information interacts with the other senses and memory. In brief, ***it is what we do with what we hear.***

Hearing begins with perceiving and identifying that a sound is present. This is followed by a series of auditory skills that function together to analyze and make decisions about incoming information. These auditory skills include:

- **Auditory Discrimination**: perceiving differences in frequency (pitch), intensity (loudness) and duration (patterns of time).
- **Sound Localization/Lateralization**: determining the position of a sound source relative to one's position in space, and determining in which ear the sound is being heard.
- **Auditory Attention**: directing and sustaining attention to relevant acoustic signals.
- **Discrimination of Figure-Ground**: selectively listening to speech in background of noise.
- **Speech Discrimination:** discriminating between words and sounds that are acoustically similar.
- **Auditory Closure**: understanding a whole word or message when a part of it is missing (e.g. an unclear or degraded signal).
- **Auditory Synthesis**: blending or merging isolated speech sounds into words.
- **Auditory Analysis:** identifying single units of sound and grammatical markers embedded in words (eg., walk vs. walk-ed)
- **Auditory Association:** attaching meaning and associating sound (linguistic and environmental) with its source
- **Auditory Memory (short term, sequential):** immediate recall of acoustic signals and the order of presentation (eg., recall a series of numbers in correct order)
- **Working Memory**: storing signals into memory while processing incoming signals
- **Auditory Cohesion:** drawing inferences from conversations and interpreting abstract information

A Central Auditory Processing Disorder (CAPD) is a disruption in any of the auditory skills listed above. It is not the result of hearing loss, language or cognitive challenges. CAPD can lead to difficulty in language, learning and communication. It can also occur in tandem with other conditions (for example, Attention Deficit Disorder or Learning Disability), but it is important to know that CAPD is not the result of these conditions.

What Are The Symptoms And Causes Of CAPD?

Children with CAPD may show the following behaviours:

- Misunderstand spoken language in situations of competing speech or noise
- Give inappropriate responses, asks 'what' and 'huh' frequently
- Be slow to respond
- Have difficulty attending and be easily distracted
- Have difficulty locating sound
- Have difficulty learning songs or nursery rhymes
- Have difficulty with reading, spelling and learning

One of the known causes of CAPD is delayed neurologic maturation. Less common is brain injury or diseases that affect brain function. Risk factors for CAPD include:

- Traumatic or premature birth
- Severe illness during the early infancy period
- Longstanding early-childhood ear infections
- Family history

CAPD is thought to occur in 2 – 5% of children and is twice as likely to be present in males.

What Are The Steps To The Evaluation of CAPD?

I. **Referral –** The request for an assessment may begin with parents or teachers who are noticing that a child (who has normal hearing) is having difficulties that appear to be auditory specific (see symptoms, above). Or a psychologist or speech-language pathologist may make a referral to an audiologist for a CAPD assessment as part of a psycho-educational or speech-language evaluation.

There may be a variety of CAPD symptoms that are similar to or can be confused with other conditions. For this reason, assessments by a Psychologist and/or Speech/Language Pathologist may be requested by the Audiologist as part of the screening process.

Information provided by these professionals is often helpful to identify any possible co-existing behaviours and conditions, and to show the child's strengths and weaknesses in language, attention, and cognitive processing. Ultimately, this will help the Audiologist select the comprehensive auditory tests that will target auditory processing difficulties particular to the child.

II. The Comprehensive Assessment for CAPD - If screening results are unclear or indicate possible CAPD, the audiologist arranges a comprehensive CAPD assessment that is individualized to the child. CAPD tests are designed to challenge the auditory system. The goal is to identify specific auditory processing difficulties (for example, auditory closure, and pitch discrimination). The assessment includes tests in a sound booth using a variety of listening tasks. In the list of tests below, the auditory skills being tested are shown in brackets.

Low-Redundancy Monaural Speech Tests: The child is asked to discriminate distorted words or sentences (auditory closure) presented in quiet and background noise conditions.

Temporal Processing Tests: The child is asked to detect sound gaps (temporal resolution) and discriminate tone burst patterns varying in pitch and duration (frequency and duration discrimination, temporal ordering and labeling).

Dichotic Tests: With presentation of numbers, words, or sentences to both ears at the same time, the child is asked to repeat everything that is heard (binaural integration), or to direct their attention to one ear and repeat only what is heard in that ear (binaural separation).

Binaural Interaction: With presentation of parts of a sound pattern (speech or tonal) to both ears separately, the child is asked to repeat or detect what is heard. This requires skill in combining sounds presented either simultaneously (binaural interaction tasks) or sequentially (binaural fusion tasks).

- *CAPD testing can be time consuming and challenging for a child. To ensure an optimal assessment, a series of appointments may be needed.*

- *Most CAPD tests are standardized for children of grade-school age and older. There are fewer CAPD tests for pre-schoolers and children learning English as a second language. Likewise for children with hearing loss, developmental delay, or poor expressive speech.*

Electrophysiological tests (brain wave measures) carried out by the Audiologist may also be part of a CAPD assessment. These tests may require the child to be sitting quietly for several minutes at a time with or without tasks for focused attention.

The Audiologist can provide further details should these tests be recommended.

What Can Be Done To Help the Child With CAPD?

After the assessment, the audiologist will recommend a treatment plan that is customized to the child's auditory processing strengths and weaknesses. The goal of the plan is to increase the child's ability to use auditory information. The plan will include monitoring of the child's progress and a plan for follow up assessments.

Key to a successful treatment plan:

1. *A collaborative team of professionals working alongside the parents. Along with the audiologist, this may include the classroom teacher educational specialists, and a speech/language pathologist.*
2. *An individualized plan that looks at the child's age, learning style, and other challenges,*
3. *A comprehensive plan that aims to improve listening skills, as well as the listening environment, compensatory strategies, and instructional accommodations (described*

A Comprehensive Treatment Plan May Include:

Individual Intervention – Auditory Training: Auditory training is listening therapy to improve a child's ability to understand speech. Students may receive therapy from an audiologist or speech-language pathologist (SLP). Ideally, this is done in collaboration with the educational team (teacher, special education teacher, educational assistant) and is part of the child's Individualized Education Plan (IEP). Therapy may be in one-on-one sessions and/or include computerized auditory training programs.

Enhancement of the Listening Environment: Recommendations may be made to reduce background noise and improve the quality of the speech signal. Some examples: acoustic treatment of the classroom; preferential seating; speech enhancement technology.

Compensatory Strategies: These are designed to help the child develop self-advocacy. The goal of these strategies is to help the child recognize challenging listening situations, and be able to take steps to improve them. Some examples: asking for clarification or additional help; asking for noise to be reduced; asking for a break from listening.

Instructional Accommodations & Modifications: ***Accommodations*** are steps taken by parents and teachers to improve *how* the child accesses information. Some examples: use of a note taker; use of visual aids; pre-teaching; adjusting language level. ***Modifications*** are changes in *what* the child is expected to learn and can include changes to instructional content or expectations. Some examples: reducing the complexity of the material; shortened or alternative assignments.

We hope you find this information helpful. If you have any questions, please contact an Audiologist.

References:

American Academy of Audiology (Dec 2012) Central Auditory Processing Disorders Guideline. Available at: http://www.audiology.org/resources/documentlibrary/Documents/CAPD%20Guidelines%208-2010.pdf

Bellis, TJ. (2003). Assessment *and Management Of Central Auditory Processing Disorders in the Educational Setting: From Science to Practice, 2nd Ed. Clifton Park NY: Thomson Learning, Inc.*

Florida Department of Education: Technical Assistance Paper 10967 (2001) Available at: http://www.aitinstitute.org/CAPD technical assistance paper.pdf

Jerger, J., & Musiek, F. (2002). Report on the consensus conference on the diagnosis of auditory processing disorders in school-aged children. *Journal of the American Academy of Audiology*, 11, 467-474.

Additional Resources:

Bellis, TJ (2002) *When the Brain Can't Hear: Unraveling the Mystery of Auditory Processing Disorder*. New York NY: Atria Books.

Canadian Guidelines on Auditory Processing Disorder in Children and Adults: Assessment & Intervention (Dec 2012). Canadian Interorganization Steering Group for Speech-Language Pathology & Audiology. ***This 83 page document gives extensive background information for professionals and a description of the many considerations for assessment and intervention.***
Available at:
http://www.cshhpbc.org/docs/canadian_guidelines_on_auditory_processing_disorder_in_children_and_adults_english_final_2012.pdf