

THE CENTER FOR SPEECH EXCELLENCE

Auditory Processing Disorders

Central Auditory Processing Disorders and Brain Plasticity

Definitions: Central Auditory Processing Disorder (CAPD) refers to a difficulty in understanding speech in less than optimal listening conditions even though hearing is normal or near-normal. Brain plasticity refers to the ability of the brain to reorganize functions in response to changes in stimulation.

Characteristics of CAPD:

- Difficulty comprehending speech in the presence of background noise or competing speech
- Inattentiveness and short attention span
- Poor memory for auditory information, especially for complex messages
- Difficulty understanding verbal directions
- Academic underachievement and reading difficulties because of auditory-phonetic confusion

Research Reports:

- **Auditory Deprivation:** When either sensory or conductive hearing loss occurs, the brain adapts to the loss. Between 35 and 81 days following the loss, studies showed that areas of the brain, which processed the lost frequency, now process an adjacent frequency. For example, if the frequencies above 7,000 Hz were lost, those areas of the brain would now respond to 6,000 Hz. So whether the loss occurs due to brain lesion or ear problems, the brain's processing is changed.
- Plasticity allows the opportunity to improve auditory processing skills.
- Stimulation and experience activate and develop brain pathways. Lack of auditory stimulation leads to loss of auditory function
- Intervention is most effective during early maturation, though stimulation at any point has a positive effect.
- Repetition increases the likelihood that a message will be transmitted through brain cells (neurons). Sending the message repeatedly will stimulate the neurons involved, promoting their growth.
- Stimulation may extend the critical period for language development.

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Management:

Individuals with Central Auditory Processing Disorders (CAPD) need to develop:

- Selective attention to information and new comprehension strategies.
- Memory storage techniques such as verbal rehearsal (say it over and over to yourself.)
- Techniques for approaching a task, such as focusing only on relevant material.
- Segmentation skills, word knowledge, general knowledge, and self-monitoring skills.
- Memory strategies, such as chunking and using mnemonics.
- Efforts to derive meaning from context. This can be even more effective than using a dictionary because the meaning will be remembered or can be derived in the same way again.

Experience, expectations, and motivation influence all these. Changing the environment helps: reduce background noise and/or use an FM or assistive listening device. In lectures, instructor-prepared notes, tape recordings, a note taker, etc. will free an individual from taking notes so he can concentrate on listening rather than trying to divide his attention between auditory, visual, and motor demands.

Assistance:

We can provide the following assistance:

1. Evaluations to determine level of competency with material presented auditorily.
2. Reports to be shared with family, physicians, educators, and child care workers.
3. Therapy to focus on stimulation of the auditory system and teaching management skills.
4. Parents may observe and/or receive information on strategies for home reinforcement.

Information adapted from "Managing Central Auditory Processing Disorders in Children and Youth", by Gail D. Chermak and Frank E. Musiek and from "Auditory Neuroscience: Decade of the Brain" by Mitchell Schwaber.

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