TETN #20442

O&M for Students with Deafblindness Who Use Assistive Listening Devices: Teaching Identification and Use of Environmental Sounds

February 27, 2014

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Developed for
Texas School for the Blind & Visually Impaired Outreach Programs
O&M for Students with Deafblindness Who Use Assistive Listening Devices:
Teaching Identification and Use of Environmental Sounds

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Types of Hearing Losses and Impact of Assistive Listening Devices (ALD)
- Conductive
- Sensorineural (SNHL)
- Mixed
- Central Auditory Processing Disorder

Audiology Report
- The TX State reporting form has a section asking if the loss is conductive or sensorineural.
- Ask the AI/DHH teacher or the audiologist to explain it to you.

Types of ALDs (Assistive Listening Devices)

Hearing Aids
- Analog
- Digital

Cochlear Implants
- Unilateral
- Bilateral

FM Systems

Hearing Aids
- 90% are digital, especially ones worn by children as they grow out of old ones and newly prescribed ones are almost always digital
- Digital aids are programmable for different listening purposes
- Digital aids can be reprogrammed if the wearer’s hearing changes
What hearing aid programs are typically created by the audiologist?

Programs are created for listening:
- To speech
- To music
- In the presence of ambient noise

Three Specific Auditory Skills Related to Environmental Sounds

**IDENTIFICATION:**
- knowing the source of a sound

**DISCRIMINATION:**
- being able to hear or pull out a specific sound when other sounds are present

**LOCALIZATION:**
- Knowing the location from which a sound source is emanating
- Tracking a moving sound

What about listening for environmental sounds?
- Most programs are designed to cut out environmental sounds
- Directional microphones found in most digital aids focus on what is in front of the person wearing the aids – creating tunnel hearing

The Development of Localization Skills
- The brain uses binaural (2 ears) hearing to determine where a sound is coming from
- Binaural aids & cochlear implants should be encouraged to make possible the development of localization skills
How do hearing aids affect the ability to localize on sounds?

- Localization is a learned skill, developed over time and with much practice – this is especially true for persons wearing ALDs
- People with sensorineural hearing loss may have more difficulty with localization
- Asymmetric hearing loss may make localization more challenging
- Any time hearing aids are changed or new program added, additional time and practice will be needed for re-development and/or adjustment of localization skills

Compression: What is it?

- To bring soft sounds into range of person's hearing, an audiologist will
- make soft sounds louder, but
  - does not increase loud sounds equally
  - so relationship of sounds are drastically altered.
- Compression of sounds may affect ability of student to make judgments about how close or far away sound source is.

Collaboration Is the KEY!!

It is vital to collaborate with:

- AI/Deaf Hard of Hearing (DHH) teacher
- Classroom teacher
- Family members

AND !!!

- Audiologist, whenever possible!!!

Describe listening goals related to O&M instruction and purpose for each goal

Collaboration Ideas

- Develop shared goals with AI/DHH teacher
- Ask for training on how to perform listening checks and maintain aids
- Share how aids are working in different environments and for different purposes
- Include practice of skills student has learned from AI/DHH teacher while student is out in community
Cochlear Implants

Used for persons with sensorineural hearing loss:

- When hearing aids are not adequate
- When anatomy of cochlea and nerve would work with implant

How are cochlear implants different from hearing aids?

- Hearing aids send sound through middle ear which sends it on to cochlea
- Cochlear implants have two parts
  - An external processor that collects sounds
  - An internal implanted electrode that is fed into the cochlea to stimulate it on 22 points

Quality of Sound Generated by a Cochlear Implant

- Sound may appear more mechanical, at first
- Eventually sounds are perceived as more like normal speech (by persons previously having hearing)

Cochlear Implants for the Visually Impaired

- Implant surgery is first step
  - Following surgery, audiologist will program device(s)
  - Information is gathered from individual, family & others about hearing goals
  - O&M specialist should provide information about types of sounds student will need to hear for purpose of learning O&M skills
  - “Maps” (programs) are created for sound processing
- Programming of a cochlear implant is ongoing process that may take months or years

Training Needs of Students with New Cochlear Implants

- IDENTIFICATION of sounds requires extensive training from Auditory Verbal Therapist
- Training in DISCRIMINATION and LOCALIZATION of environmental sounds would be provided by an O&M specialist while on lessons in the community
FM Systems: How do they work?

Designed to help overcome two conditions that make listening difficult

- The presence of background noise
- Distance away from a sound source

The teacher wears a microphone that is electronically tied to either:

- A receiver in the student’s hearing aid
- A loop worn by the student that sends a signal to the student’s hearing aid

FM Systems for O&M Instruction

- FM system does not interfere with student’s ability to hear environmental sounds except when person with microphone speaks.
- It allows O&M specialist to be heard:
  - When student is not close
  - Over other sounds being taken in by student
- Is not a 2-way system – student does not use to talk to O&M specialist
- Blue Tooth Technology and Hearing Aids

Blue tooth technology is built into many digital hearing aids

- Allows for coupling hearing aid directly to another device like iPod, television, cell phone, computer, etc.
- Small inexpensive microphone can be used to send signals to hearing aids

Who Purchases an FM System?

- If there is an educational need, district purchases equipment.
- Families &/or service groups sometimes purchase equipment

Before recommending FM system, make sure student’s hearing aids are compatible with equipment
Collaborating with the AI Professionals

- Provide brief description of O&M’s role to educational team
- List skills that student needs to develop:
  - Identifying auditory clues and landmarks
  - Localizing for purpose of using sound as a direction-taking resource
  - Attending to one sound when other sounds are present
  - Other skills individualized for your student
- Invite AI teacher on an O&M lesson with your shared student
- Ask about impact of student’s hearing loss (aided and unaided) on the ability to develop and use the skills needed for O&M instruction
- Determine need for audiologist to adjust the device/create additional programs
- Work with AI/Deaf & Hard of Hearing (DHH) teacher to develop auditory training IEP goals and objectives for identifying and using environmental sounds for O&M training
- Determine who, what, where and when the training is to be provided
- With DHH teacher, determine if student can learn how to maintain the device and switch between programs
  - In a quiet setting
  - In the community
- Learn how to use and troubleshoot listening device(s)
  - Do a listening check before the lesson
  - Know how to switch channels
  - Effective use of the microphone (for FM devices)
  - Changing the batteries
  - Effects of different kinds of weather on the devices
Strategies Unique to Teaching O&M to Students with ALDs

Ongoing assessment of how child uses hearing in many types of environments with different levels and types of sounds. DOCUMENT!

- Do this aided and unaided so student understands how ALD’s help with gathering critical auditory information.

Assess and teach sound and movement concepts such as loud/soft, coming/going, fast/slow, go/stop, busy/quiet, etc.

Determine ability to localize on sounds

- In a quiet indoor environments
- In indoor environments with some competing sounds
- In quiet outdoor environments
- In outdoor environments with increasing levels of competing sounds
  - Assess ability to accurately walk towards a sound source
  - Assess ability to track a moving sound source
  - Assess ability to determine when a passing sound source is
    - Coming towards the student
    - Going away from the student
    - At the closest point near the student

Ongoing assessment and instruction of:

- How far away a car is when the student first hears it
  - Use quarter/half/whole blocks as a measurement
  - Use # of seconds as a timing increment
- Ability to determine if a vehicle is coming:
  - From the left side
  - From the right side
  - From in front of the student
    - Towards the student
    - Turning away from the student
  - From behind the student
    - Coming past the student
    - Turning away from the student
Teach problem solving and assessment of risks related to:

- Consistency of ability to hear needed information
- Properly working hearing devices
  - Extra batteries always available
  - Clean ears and earmolds
- Factors that change sounds
  - Wind
  - Rain
  - Snow
  - Masking noises

Teach alternate methods to accomplish travel goals:

- Use of crossing cards
- Use of looping bus routes
- Use of alternate routes that may be longer, but with fewer complex/noisy intersections
- Use of ParaTransit services
- Use of alternate modes of transportation
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Figure 2: TSBVI logo.

Figure 3: IDEAs that Work logo and disclaimer.

This project is supported by the U.S. Department of Education, Special Education Program (OSEP). Opinions expressed here are the authors and do not necessarily represent the position of the Department of Education.