



# 2015 Southwest Orientation and Mobility (SWOMA) Conference

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## O&M for Travelers with Auditory Impairments

November 6, 2015

1:00 PM-2:30 PM

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# O&M for Travelers with Auditory Impairment

by Lelan Miller

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Figure 1 Photograph of a scraggly bunch of bluebonnets blooming in a sidewalk crack.

## What it's like to be a traveler with auditory impairment

[https://www.youtube.com/watch?v=3yQzm\\_36DMY](https://www.youtube.com/watch?v=3yQzm_36DMY)

YouTube video

## How we hear

Building the human ear from a funnel, coffee can, birthday balloon, hammer, baby teething ring, pool noodle, computer cable, Velcro, and a desktop.



Figure 2 A photograph of Lelan's explanation of the various parts of the ear which include the pinna (a funnel), ear canal (paper towel tube), ear drum (coffee can with a balloon stretched over it), hammer (toy hammer), anvil (anvil), stapes (stirrup), cochlea (pool noodle), auditory nerve (computer cable), labyrinth (teething rings).

## **Etiology of deafblindness in children**

- CHARGE
- Usher Syndrome
- Down Syndrome
- Meningitis
- Congenital Rubella Syndrome
- Complications of Prematurity
- Cognitive delays
- Undetermined

Colorado Department of Education

[https://www.cde.state.co.us/sites/default/files/documents/cdesped/download/pdf/dbetiologiesrelatedto deafblindness.pdf](https://www.cde.state.co.us/sites/default/files/documents/cdesped/download/pdf/dbetiologiesrelatedto%20deafblindness.pdf)

## **Etiology of deafblindness in adults**

- Usher Syndrome
- Congenital Rubella Syndrome
- Combat injuries and trauma in veterans
- Ototoxic medications and chemotherapy
- Later age onset of hearing and vision impairment

## **Deafblindness is...**

Deafblindness is a continuum of residual hearing and vision. There is a wide range and great diversity of vision and hearing loss.

## **Intensity is...**

Intensity is “loudness” and is measured in decibels.

## How loud is loud?

- 15 dB pin drop from a height of 1 centimeter heard at a distance of 1 meter
- 45 dB normal conversation at distance of 1 meter
- 50 dB car idling at 0 mph
- 70 dB conventional car accelerating to 45 mph
- 100 dB motorcycle

## Decibels on the Audiogram

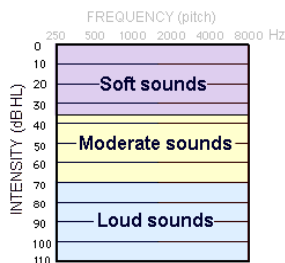


Figure 3 Image of an audiogram showing decibels of sound on the left from 0 dB (top) to 110 dB (bottom): Soft sounds include 0-35 dB, moderate sounds include 35-70 dB, and loud sounds include 70-110 dB.

## Frequency

The Queen of England vs the Fiesta Queens of San Antonio



Figure 4 A photo of a group of Fiesta Queens riding on a float and waving to the crowds in San Antonio.

## Frequency on the Audiogram

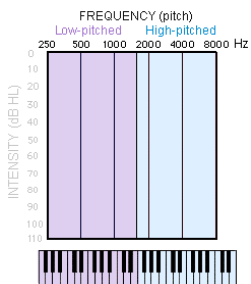


Figure 5 An audiogram showing frequencies across the top ranging from 250 Hz (upper left) to 8000 Hz (upper right). Below is a piano keyboard showing low frequencies on the left and high frequencies on the right.

## Severity of Hearing Impairments

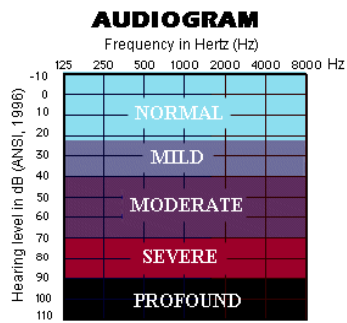


Figure 6 An audiogram showing the severity of hearing losses which includes normal (0-25 dB), mild (25-40 dB), moderate (40-70 dB), severe (70-90 dB), and profound (90-115+ dB) losses.

## Types of Auditory Impairment

- Conductive
- Sensorineural
- Mixed
- Unilateral

### Conductive

Referring back to our jerrybuilt model of the ear and implications for your O&M lessons.

### Sensorineural

What we can learn from Silly Putty about sensorineural hearing loss.

### Mixed

Essentially a mixture of conductive and sensorineural loss, commonly seen in CHARGE.

### Unilateral Loss

“One ear hearing, one ear deaf”

### Amplification

We could line up 20 deafblind clients and...

## Cochlear Implants



Figure 7 Graphic of a cochlear processor riding on top of the pinna and a circular transmitter an inch anterior to the pinna.

## Digital Hearing Aids/Analog Hearing Aids

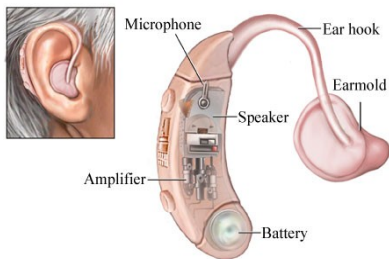


Figure 8 Graphic of a hearing aid riding on the outer ear with earmold placed in the ear so that it occludes the entrance to the ear canal. Also shown are the parts of the hearing aid which include the earmold, ear hook, microphone, speaker, amplifier, and battery.

## Bone Anchored Hearing Aid (BAHA)

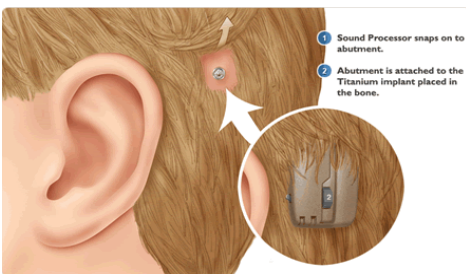


Figure 9 Graphic of a Bone Anchored Hearing Aid (BAHA). The image shows an area posterior to the pinna where the Sound Processor of the BAHA snaps on to an abutment which is attached to a Titanium implant in the skull.

## Unilateral Loss



Figure 10 The photo shows two hearing aids connected by a wire and one hearing aid has an earmold. Contralateral Routing of Signals (CROS) takes sound from the deaf ear and transmit to the normal hearing ear with better hearing.

Contralateral Routing of Signals (CROS) hearing aids are hearing aids that take sound from the ear with poorer hearing and transmit to the ear with better hearing.

## FM



Figure 11 Two photos showing the use of an FM system. Photo on the left, a deafblind client wears a neckloop. She holds a small microphone the size of a flashdrive. She wears digital hearing aids. On the right she demonstrates the FM with a fellow deafblind client. He is speaking into the microphone. The sounds are travelling into her neckloop and then into her hearing aids.



## **Top Ten Questions for the O&M to Ask**

- 1. What is the etiology?**
- 2. What does the unaided audiogram show?**  
[Starkey Hearing Loss Simulator]
- 3. What does the aided audiogram show?**
- 4. What amplification is in use?**
- 5. How do I make sure the amplification is working?**
- 6. What programs are there and what are the programs for?**
- 7. What does the communication assessment show?**
- 8. Bilateral or unilateral loss?**

## 9. What adjustments do we make for weather conditions?



Figure 12 Images shows hearing aid being inserted into a "sock" which protects it from the elements. Image from EarGear.com

## 10. Ask to add the "on travel" program

### Microphone Position

What happens when the microphone is tucked away BEHIND the pinna?

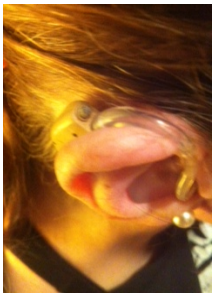


Figure 13 A photograph showing the hearing aid microphone set on top of the pinna pointing upward.

## **Hearing Aids**

- Compression
- Noise Reduction (ClearVoice for example)
- Frequency Broadband

## **Moving On...**

### **O&M Assessment**

Assess auditory skills in five main areas

#### **Detection**

#### **Discrimination**

#### **Characterization**

#### **Auditory Tracking**

#### **Localization**

### **O&M Auditory Skills Assessment for Deafblind Travelers**

## **Auditory Goals for O&M**

- Detect for presence or absence of sound
- Sound identification of environmental sounds
- Characterize changes in sounds
- Auditory landmarks and cues with and without background
- Estimating distance from a sound source with and without background
- Auditory tracking of a moving sound source on left and right side

## **Auditory Training**

Auditory skills development is similar to visual skills development - it requires structured and planned instruction that is provided regularly and consistently throughout early childhood into the youth and adult years, and should begin as early as possible.

## **Auditory Training – Strategies and Techniques**

- Start from simple skills and progress to more complex listening skills.
- When listening becomes difficult and aversive, consider alternative strategies.

## **Detection and Discrimination**

- Toys with something inside or nothing inside
- Musical chairs, bingo, Jeopardy
- Archive of non speech sounds for discrimination work
- Find Sounds
- <http://www.findsounds.com/types.html>

## **Characterization**

- Hands on approach to sounds, experimenting with sound and how they change
- Deaf education can teach vocabulary relating to “characterization” words (high/low pitch, fast/slow, above/below)
- Listening to patterns and rhythms

## **Tracking and Localization**

- Rolling balls with bells and beepers inside
- Remote control cars
- Bowling balls (vary the materials and surfaces)
- Intersection listening and acoustic highlighting

## **Modifications and Adaptations to O&M Instruction**

### **Communication with the Deafblind**

- Oral/aural communication – residual hearing, FM, speechreading, reading, writing
- Signed communication – visual, tracking, tactile

### **Teaching O&M with an Interpreter**

- Positioning for the three or four (?) of you
- Teaching then following
- Preconferences

### **Communication with the Public**

- Choose an easily accessible communication system.
- FAILS!!!
- Assume the public doesn't know anything ☺

### **Adapting the Cane and Cane Tip to the Deafblind Traveler**

- Communication
- Audiogram
- Tactile landscape of touch

### **Introducing a Cane**

- Teach tactilely, not in paragraphs.
- Video: Morning drop off time at Tom Green Elementary

## VibroTactile APS and the Deafblind Traveler

- Video: Lelan crossing with VibroTactile APS
- Video: Ramona crossing with Auditory APS

## Time? For Questions/comments/discussion



Figure 14 Photograph of a scraggly bunch of bluebonnets blooming in a sidewalk crack.

## RESOURCES

- Helen Keller National Center
- National Family Association for Deaf-Blind
- National Center on Deafblindness

## Support Service Providers and the Deafblind – Implications for O&M

Support Service Providers (SSPs) are specially trained professionals who enable people who have combined vision and hearing losses to access their environments and make informed decisions. SSPs provide them with visual and environmental information, guide technique, and communication accessibility.



Figure 15 Roger Poulin (left), a deaf and blind man from Washington, and his service provider Roni Lepore, who also is deaf, chatting by the lake on Friday in Millinocket. The two finished hiking the Appalachian Trail together on Tuesday at the top of Mount Katahdin in Baxter State Park.



**Handout produced and made accessible by  
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**Outreach Programs**



**Figure 16 TSBVI logo.**



"This project is supported by the U.S. Department of Education, Office of Special Education Programs (OSEP). Opinions expressed herein are those of the authors and do not necessarily represent the position of the U.S. Department of Education."

**Figure 17 IDEAs that Work logo and OSEP disclaimer.**