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Audiological Accommodations for Special Populations: A Capstone Case Series

Hannah Belke
Illinois State University

Antony Joseph
Illinois State University, arjosep@ilstu.edu

Hannah M. Belke, B.S.

For Fulfillment of the Doctor of Audiology Degree

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Advisor: Antony Joseph, MA, Au.D., Ph.D., ABAC, CCC-A, CPS/A, F-NAP

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Effects of Vision Loss on Audiological Services: A Case Report

Abstract 1

Introduction: Deaf-blindness is a term that refers to people with dual sensory impairments who, typically, have some residual hearing and usable vision. Individualized attention should be employed when working with these patients to ensure effective intervention. Case Presentation: A young female presented to the clinic with cortical blindness and essentially unilateral (right-sided) sensorineural hearing loss. Discussion: For special populations, such as those with deaf-blindness, audiologists need to be aware of testing and environmental considerations due to challenges presented by comorbidities. Senses, such as touch, may be used when testing these patients. The use of paper material, placement of furniture, and adjusted lighting may improve patient satisfaction and should be considered by clinicians. Conclusion: Deaf-blindness can affect pediatric and adult populations so clinicians should provide a special intervention with these patients and families for inclusivity and patient-centeredness.

Effects of Vision Loss on Audiological Services: A Case Report

Introduction

Individuals who are deafblind have combined losses of hearing and vision and should receive hearing amplification for improved quality of life and safety purposes (ASHA, n.d.). Visual reinforcement audiometry inherently uses vision as a method of measuring hearing thresholds. When vision cannot be used to measure hearing, responsive intervention should be employed. Thus, communicative, physical, and environmental accommodations should be considered. Those with dual impairments require unique and thoughtful intervention to ensure they have the opportunity to reach their full potential (National Center on Deaf-Blindness, n.d.), with hearing-health care that is individualized and patient-centered.

Case Presentation

In this case, a young female was seen in the clinic for an audiological evaluation and hearing aid selection appointment, accompanied by her father. She presented to the clinic with difficulty hearing in school and wanted hearing aids. She was already aware of her hearing loss but had not previously received treatment. Her mother reportedly used medications during pregnancy. Born full-term with a neonatal cerebrovascular accident, the patient experienced meningitis at birth, and her medical history included cerebral palsy and cortical blindness.

Otoscopy revealed clear ear canals and healthy appearing tympanic membranes, bilaterally, and immittance testing pointed to normal middle ear function. Pure tone air and bone conduction audiometry were performed to establish the type and severity of hearing sensitivity. The results demonstrated precipitously sloping moderately-severe sensorineural hearing loss in the right ear in the mid-to-high frequencies. Normal hearing was found in the left ear with mild hearing loss and a notch at 6000 Hz (Figure 1). A Stenger test was performed for 1000-8000 Hz using pure-tone stimuli, which was negative for malingering. Additional audiological data has been provided in Table 1.

Management

Upon receiving medical clearance, a right receiver-in-the-canal (RIC) hearing aid with a SecureTip earmold was selected and ordered. Real ear measurements were performed with this instrument inserted, using speech mapping with the Desired Sensation Level pediatric prescriptive method. Targets for soft, average, and loud speech input from 250-4000 Hz were ascertained. Consequently, speech mapping confirmed that both /s/ and /sh/ sounds were audible. Sound recovery was enabled, which moved high-frequency sounds to lower frequencies where hearing thresholds were better. Maximum power output did not exceed the predicted uncomfortable loudness levels. The feedback manager was assessed, and no significant feedback was evident. In the end, the patient expressed a comfortable physical and acoustical fit. Frequency-modulated and direct microphone systems were demonstrated for the patient and her family, specifically addressing her difficulties in school settings.

Discussion

It has been reported that children with hearing loss are 2-3 times more likely to develop vision abnormalities than children with normal hearing (ASHA, n.d.). The term deaf-blindness is used to describe populations with dual sensory impairments who have some residual hearing and usable vision. The three primary etiologies of deaf-blindness are congenital genetic syndromes (e.g., Usher and CHARGE syndromes), prenatal complications (e.g., rubella and herpes), and postnatal complications (e.g., meningitis and stroke) (NCDB, n.d.).

When clinicians provide care for patients with deaf-blindness, special accommodations should be made due to inherent limitations. Patience, on behalf of the clinician, is required as these special considerations severely take more time. For these cases, additional time may need to be assigned to the encounter. First, determine the preferred sense of the individual. In most cases, it will be tactile. Next, allow your client time to get comfortable by exploring the room to avoid invading their personal space. Be aware that some individuals may be tactile and defensive. It is important to maintain this approach throughout the encounter. As an example, during otoscopy, allow your patient to physically examine the otoscope and other instruments before they are used. The same approach may be used for other equipment (Katz et al., 2015).

Visual reinforcement audiometry may be especially difficult for an individual with deaf-blindness. For conditioning, pairing the auditory stimuli with a vibrotactile stimulus is suggested instead. When selecting a reinforcer, consult with the caregiver to determine the interest of the child. Use a light positioned close to the patient and dim the lights or use the bone oscillator for reinforcement (Madell & Flexer, 2014). Lastly, it is helpful to consult with the caregiver about an appropriate response for the child. Deaf-blindness may present with physical disabilities as well. Conditioned play audiometry can typically be performed but may require personalized adjustments when conditioning for the assessment.

Clinics can make accommodations to their facilities to increase the customer satisfaction level of those with visual impairments. Assistive technology, such as hand-held magnifiers and portable readers, may allow patients to visualize the controls on their amplification devices and read educational materials. Printed materials should be provided in font size fourteen or larger, using non-glossy paper. Lighting considerations are crucial for those with vision loss as they may have sensitivity to glare and light. Light dimmers should be installed in the testing and counseling areas, and furniture positioned strategically to allow sufficient room for navigation and service dog usage. Patients with visual impairments should be provided detailed verbal instructions due to a lack of information that is typically received through visual means (Busacco, 2010).

Conclusion

This case study aimed to amplify the importance of accommodating patients with deaf-blindness. Special intervention recommendations are imperative, not only for the pediatric population. Sensory losses may be a consequence of the natural aging processes so adult populations may benefit from the accommodations as well.

Patient Accommodations in Skilled Nursing Facilities: A Case Report

Abstract 2

Introduction: Sensorineural hearing loss (SNHL) is a bioelectric disturbance caused by inner ear impairment that may produce difficulty with verbal communication. With increasing numbers of aging adults, patients seeking audiology services may reside in skilled nursing facilities, requiring special accommodations. Case Presentation: An older male, residing in a skilled nursing facility, presented to the clinic with profound SNHL in his right ear and severe to profound SNHL in his left ear. Discussion: Service providers should consider including periodic in-service training for nursing staff and other caregivers, a hearing aid checklist, loss prevention strategies, and large printed instructions. Hearing instruments, by themselves, typically will not provide sufficient improvement for patient communication. Audiologic rehabilitation (AR) resources should be provided by amplification dispensers. Conclusion: Collaboration between Audiology and facilities may improve a patient's ability to continue their AR to achieve communication.

Patient Accommodation in Skilled Nursing Facilities: A Case Report

Introduction

It has been estimated that 6.6 million Americans, aged 12 years or older, have severe to profound hearing loss in at least one ear (Goman and Lin, 2016). Sensorineural hearing loss (SNHL) is a bioelectric disturbance caused by inner ear impairment that may produce difficulty with verbal communication (Katz, 2015). People with profound SNHL have extreme difficulty discriminating speech sounds. With the increasing number of aging adults with hearing loss, many patients seeking audiology services may do so while residing in skilled nursing facilities. This demands the administration of treatment and management protocols for older hearing-impaired populations (ASHA, 1997).

Case Presentation

An older man was scheduled in the clinic for an audiological evaluation and hearing aid selection appointment. He was accompanied by a friend. The older man resided in a nursing home, used a wheelchair and leg brace, and had an articulation problem. Upon arrival, he began communicating with a whiteboard and marker and continued this way for the entire appointment. He reported childhood hearing loss and the use of a body-worn amplification system for over 70 years, until eight months before the encounter. He reported a history of occupational noise exposure, a stroke, heart disease, hypertension, hypothyroidism, measles, and a family history of congenital hearing loss.

Pure tone air and bone conduction revealed profound SNHL in the right ear and severe to profound SNHL in the left ear. Additional audiological data have been provided in Table 2.

Management

A left behind-the-ear (BTE) hearing aid with a custom, silicone, full-shell earmold without a vent was selected and ordered. Before fitting this instrument, the manufacturer's support line was contacted for guidance on adjusting the device to perform as linearly as possible, given the patient's history of linear-gain amplification use. Linear compression was prescribed. We used the DSL-5 Adult fitting formula, maximized maximum power output limits, disabled all advanced features, and created a "music" startup program to maintain an omnidirectional microphone setting. A delayed startup time of 10 seconds was enabled due to facilitate caregiver assistance.

Later, the patient returned for a hearing aid fitting appointment. A live transcription application on an Apple iPad was activated for communication enhancement. Real ear measurements were administered, using speech mapping targets for loud speech inputs. The gain was maximized from 250-1000 Hz., and the maximum power output was limited to the estimated uncomfortable loudness levels. The feedback manager was examined, and no significant feedback was observed. The patient expressed a comfortable physical and acoustical fit, so realistic expectations were explained. Multiple copies of printed daily care and maintenance instructions were provided for use at his home.

Discussion

Audiologists should collaborate with other healthcare providers to provide accommodations for older patients with hearing loss who reside in skilled nursing facilities.

Periodic in-service training for nursing staff and/or other caregivers is recommended by ASHA (1997) to support patient AR. Such a program should cover the effects of presbycusis, psychosocial effects of hearing loss, realistic expectations about hearing loss, hearing aid troubleshooting procedures, methods to facilitate communication, and procedures to report lost hearing aids (ASHA, 1997). Adult learning principles have shown that if a caregiver can relate to and understand a patient, the use and function of hearing aids or other hearing assistance technology increases, as well as patient communication. Bi-monthly checks of hearing instruments should also be conducted to ensure that they are clean and working properly. This may help to avoid unnecessary travel to clinics to identify device defects.

Lost hearing assistance technology is a common challenge in skilled nursing facilities. A hearing aid checklist should be maintained by staff, in skilled nursing facilities (ASHA, 1997), and should include the resident's name and room number, hearing aid make/model and serial number(s), ear(s) fitted, hearing aid battery size or rechargeable. If any level of assistance is necessary, any pertinent information such as high-risk for loss and volume control settings should be included in the checklist. Additional steps that may be taken to prevent the loss of the device are labeling hearing aids with a name and bright color, establishing nighttime storage in a hard or rechargeable case, and considering attaching a cord or clip (Healthy Hearing, 2020). Audiologists should provide information to the patient and their caregiver about extended warranties and supplemental insurance for loss and damage purposes. Consulting with the administration to ensure ADA compliance at the skilled nursing facility should be done as well. Large and simple printed instructions that can be applied as a nursing order and hung up in the patient's residence should be given to the patient and their caregiver at the time of the hearing aid fitting encounter.

Treatment and management of patients with profound SNHL may be challenging as some amplification may offer limited acoustic benefits. When patients are not a good candidate for cochlear implantation or are not interested, this may present additional challenges. Other sources of technology that may ease patient communication include real-time captioning and captioned telephone services.

In addition to hearing instruments, successful communication is affected by the proper application of communication strategies. Such strategies may be presented in AR programs, which have been shown to greatly reduce hearing handicaps (Beynon, Thornton, & Poole, 1997). Topics for AR and counseling may include controlling communication situations, easing the strain of listening, realistic expectations in difficult situations, self-advocacy, and repair strategies. (Schow, 2001). Figure 2 is a summary of strategies that clinicians may discuss with their patients to improve communication and quality of life. All AR should be monitored using outcome measures for assessment of self-efficacy.

Conclusion

This case presents accommodations that may be implemented when working with patients with profound SNHL and who reside in skilled nursing facilities. Collaborating with these facilities allows patients to continue their audiologic rehabilitation with the goal of improved communication.

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Figure 1 (Case 1)

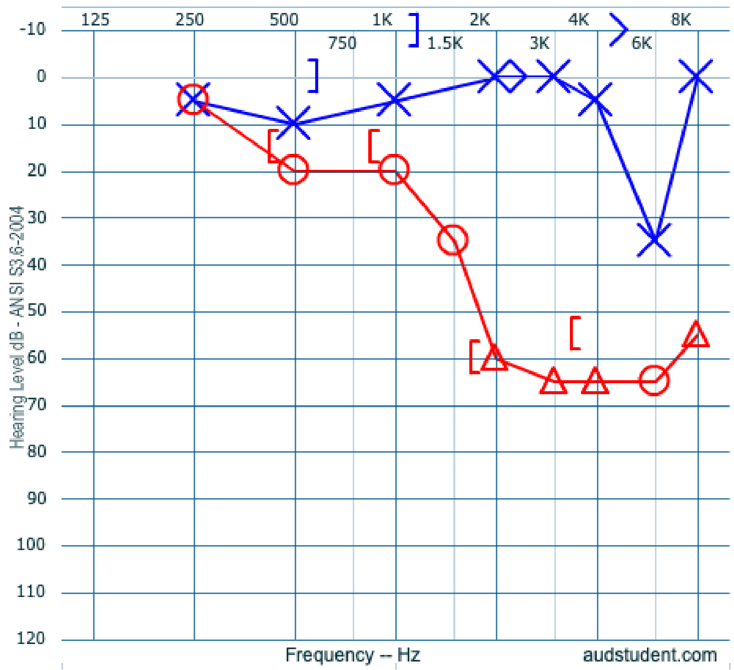

Figure 1. Air and bone-conduction threshold resources for the right and left ears.

Table 1 (Case 1)

Test	Right	Left	Information
Speech Recognition Threshold	20 dBHL	5 dBHL	Monitored live voice presentation of spondee words
Most Comfortable Loudness Levels	65 dBHL	60 dBHL	Monitored live voice
Word Recognition Scores (Suprathreshold)	76% at 65 dBHL (with 45 dB EM)	100% at 55 dBHL	Recorded NU-6 ordered by difficulty word lists
Uncomfortable Loudness Levels	90, 100, 100 dBHL	80, 85, 90 dBHL	Warbled tones at 750, 1500, 3000 Hz
Quick Speech in Noise	Binaural 3 dB SNR loss at 70 dBHL		List 1 and 2

Table 1. Speech audiometry results for left and right ears, including speech recognition, most comfortable loudness levels, uncomfortable loudness levels, and speech in noise (QuickSIN) data. HL = hearing level, EM = effective masking, SNR = signal-to-noise ratio

Table 2 (Case 2)

Test	Right	Left	Miscellaneous
Speech Awareness Threshold	105 dBHL	90 dBHL	Monitored live voice presentation of spondee words
Speech Recognition Threshold	CNT	105 dBHL	Monitored live voice presentation using spondee picture pointing board
Word Recognition Performance	CNT	44% at 105 dBHL	Monitored live voice presentation using NU-CHIPS

Table 2. Speech audiometry results for left and right ears, including speech awareness and recognition data. HL = hearing level

Figure 2 (Case 2)

CLEAR Communication (Listener)	
C	**Control** your communication situations, especially in noisy settings
L	**Look** at the person talking, use facial cues and body language
E	**Expect** difficulty in some situations, adjust your position
A	**Assertive:** let people know you have a hearing loss
R	**Repair** conversations, ask people to slow their speech rate a little

SPEECH Considerations (Talker)	
S	**Spotlight** your face, reduce distance, and look at the listener
P	**Pause** slightly between phrases, sentences, and messages
E	**Empathize** with the difficulties of hearing-impaired persons
E	**Ease** the stress of communication, get the listener's attention first
C	**Command** the environment by removing obstacles, improve lighting
H	**Have patience** when listening situations become difficult

Figure 2. Communication strategies for patients and their communication partners. *Adapted from Schow, 2001*