



School-Based Audiology Advocacy Series

Minimal, Mild and Unilateral Hearing Loss/Single-Sided Deafness

(Approved by the Board of Directors of the Educational Audiology Association August 2017)

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Children with minimal or mild, unilateral hearing loss, or single-sided deafness (MMUSSD) often experience communication and educational difficulties. Unilateral hearing loss (UHL) refers to any level of hearing loss in one ear and normal hearing in the other ear while single-sided deafness (SSD) refers to a profound hearing loss in one ear and normal hearing levels in the other. The definitions have varied across studies but generally include three patterns of hearing loss (Centers for Disease Control and Prevention, 2005):

- Mild or Minimal HL: bilateral, three-frequency, air conduction pure tone averages between 20-40 dB HL
- High Frequency HL: air conduction thresholds ≥ 25 dB HL at two or more frequencies above 2KHz in both ears
- Unilateral HL: air conduction pure tone average is ≥ 20 dB HL in the impaired ear; single-sided deafness is a sub group of unilateral HL.

Prevalence of MMUSSD also varies by study. Overall school age estimates range from 54 per 1000 (Bess, Dodd-Murphy, & Parker 1998) to 84 per 1000 (Niskar et al 1998), a significant increase from a reported incident rate of .51 per 1000 at birth (Oyler & Mckay, 2008). Unilateral hearing loss had the highest prevalence rates in each of these studies.

According to Bess et al (1998), children with MMUSSD make up more than 5% of the school-age population. Thirty-seven percent of children with MMUSSD will fail at least one grade compared to only 3% of their normal hearing peers (Tharpe, 2008). These children typically hear well when they are in ideal acoustic listening environments; yet, many of these children experience difficulties understanding speech when listening at a distance, in noise, or in reverberant environments. Based upon an extensive literature review, Winiger et al. (2016) identified challenges commonly associated with MMUSSD in the areas of speech recognition, language development and competence, academic performance, psychosocial and emotional well-being, listening effort, and localization. Of additional consideration is the fact that up to 50% of children with hearing loss have co-occurring disorders (Mitchell & Karchmer, 2011). Not only can additional disorders mask the presence of hearing loss, but they may also increase the difficulties experienced by children as a result of their hearing loss. Children with UHL are four times more likely to require an IEP as compared to children with typical hearing and, if audiological needs are ignored, academic performance fails to improve (Lieu, Tye-Murray, & Fu 2012).

While interventions may vary depending on the type of hearing loss, the potential problems associated with MMUSSD are the same. Factors that may lead to educational problems include:

1. Difficulties understanding speech both in ideal and in challenging listening environments such as the classroom setting (Crandell, 1993) and poorer performance on complex listening tasks (Lewis et al., 2014).
2. For those with UHL, difficulties locating the direction of sounds (Bess, 1986).
3. Increased risk of speech production errors, language delays and deficits especially in structural language (Tharpe, 2008; Walker et al., 2015; Winiger et al., 2016).
4. Phonological delays and difficulties with reading comprehension (Ross et al., 2008).
5. Low attention, lack of motivation, poor attention in class, and reduced class participation (Flexer, 1995; Porter et al., 2013)
6. Behavioral problems associated with high internal stress such as noncompliance, aggression, impulsivity, and inflexibility. (Winiger et al., 2016).

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7. Strained communication with peers, difficulties making friends, and poorer peer relations (Tharpe, 2008; Winiger, et al., 2016).
8. Low self-esteem (Bess, Dodd-Murphy, & Parker, 1998; Winiger et al., 2016).
9. Higher fatigue, increased listening effort, and stress levels as compared to peers (Bess, Gustafson, & Hornsby 2014; Tharpe, 2008; Lieu et al., 2012).

Because children with MMUSSD are at high risk for academic difficulties, an educational audiologist should evaluate these students to verify that they have access to their educational programs in their school environments. Testing should minimally include assessing speech perception at normal and soft conversational levels in quiet and in competing noise. Additional components of the educational audiology evaluation follow as well as considerations for technology, accommodations and intervention.

Educational Audiology Evaluation Recommendations:

1. The child's perception of the impact of MMUSSD as well as the teachers' and caregivers' (Lewis et.al, 2014); examples of questionnaires that assess the functional impact include:
 - a. Listening Inventory for Education- Revised (LIFE-R) teacher and student versions (Andersen, Smaldino, & Spangler, 2011)
<http://successforkidswithhearingloss.com/life-r/>
 - b. Screening Instrument for Targeting Educational Risk (S.I.F.T.E.R.) (Andersen, 1989)
<https://successforkidswithhearingloss.com/uploads/SIFTER.pdf>
Preschool S.I.F.T.E.R. (Anderson & Matkin, 1996)
http://successforkidswithhearingloss.com/uploads/Preschool_SIFTER.pdf
 - c. Classroom Participation Questionnaire (CPQ) (Antia et al., 2007)
www.adevantage.com/Resources.html
 - d. Self-Assessment of Communication (SAC-A) and Significant Others Assessment of Communication (SOAC-A) (Elkayam & English, 2003)
2. The child's performance in his/her daily listening environment using varying distances, background noise, and with and without access to visual cues
 - a. The Functional Listening Evaluation (Johnson, 2013).
www.adevantage.com/Resources.html
 - b. Recorded Functional Listening Evaluation Using Sentences (Anderson & Johnson, 2013)
Purchase from: <http://successforkidswithhearingloss.com/fle-recorded/>
3. A classroom observation to determine how the child uses audibility to gain information and examination of the physical environment and classroom acoustics.
 - a. The Classroom Acoustical Screening Survey Worksheet (AAA, 2011, Appendix 7.1)
https://audiology-web.s3.amazonaws.com/migrated/20110926_HAT_GuidelinesSupp_Bpdf_53996ef98259f2.45364934.pdf

Technology Considerations:

1. Research strongly supports that children with mild or minimal hearing loss should be considered for amplification and/or remote-microphone hearing assistive technology (RMHAT) (AAA, 2013; Bagatto, 2016; Walker et.al, 2015).

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2. Research strongly supports that children with unilateral hearing loss should be considered for amplification and/or remote microphone hearing assistance technology (RMHAT) in the impaired ear if there is evidence of benefit. If the child has single-sided deafness, other options may be considered such as bone conduction aids/implants, contralateral routing of signals (CROS), cochlear implants, and/or RMHAT (AAA, 2013).

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Accommodations and Intervention Considerations:

1. Students with MMUSSD may require additional educational accommodations to ensure maximum auditory access to instruction such as alterations to the classroom to improve the listening environment, strategic seating for optimal auditory and visual access to the instructor and classmates, pre- and post-teaching, and visual aids.
2. Students with MMUSSD should be supported with an Individualized Education Program (IEP), if eligible for specialized instruction, or a 504 Plan for access supports. They need to be monitored closely to ensure that academic, speech/language, and social/emotional performance areas are maintained to determine whether additional resources are needed.
3. Audiologists must ensure that families understand the implications and risk factors associated with MMUSSD as well as available resources and interventions. As early as possible, children should understand their hearing loss, its impact on communication, and strategies for how they can improve and manage their access.

Summary

The language, communication, and learning needs of children with MMUSSD are often overlooked because these children can hear and speak. As a result, difficulties they experience are often attributed to other causes. However, the evidence clearly identifies the need for assessment and monitoring and, when necessary, intervention to support their educational progress. Waiting to intervene when problems surface is no longer acceptable practice.

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