Prologue

Evidence-Based Practices and Outcomes for Children with Mild and Unilateral Hearing Loss

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Purpose: This forum provides an overview of current research and clinical practice for children with mild bilateral or unilateral hearing loss. Historically, there has been ambiguity surrounding the need for intervention in this population. Our goal is to explore the literature on outcomes and treatment so that audiologists, speech-language pathologists, teachers, physicians, and families can be confident in the clinical decision-making process when working with these children. To that end, topics include (a) progression of mild hearing loss in children; (b) the impact of mild or unilateral

hearing loss on language, listening, and cognitive abilities; (c) research and reviews on intervention approaches; and (d) listening effort and fatigue in unilateral hearing loss.

Conclusion: Uncertainty about outcomes and treatment approaches for children with mild or unilateral hearing loss leads to inconsistent intervention and increased developmental risk. We hope that this forum will generate productive discussion among researchers and clinicians to ensure that all children with hearing loss reach their full potential.

The purpose of this forum is to provide audiologists and speech-language pathologists with a broad overview of current research and clinical practice for children with mild bilateral hearing loss or unilateral hearing loss. Children with mild or unilateral hearing loss make up around 40%–50% of children with permanent hearing loss (Fitzpatrick, Durieux-Smith, & Whittingham, 2010; Russ et al., 2003). They usually rely on spoken language to communicate and are enrolled in regular education classrooms. Historically, there was an assumption that these children did not need early diagnosis or intervention because they had substantial residual hearing. In the last 30 years, however, we have seen a growing body of evidence that children with so-called “minimal hearing loss” are at risk for academic difficulties, behavioral problems, and language and listening deficits (Bess, Dodd-Murphy, & Parker, 1998; Bess, Tharpe, & Gibler, 1986; Davis, Elfenbein, Schum, & Bentler, 1986). Despite this evidence,

these children continue to present special challenges to audiologists and speech-language pathologists for several reasons. First, most newborn hearing screening programs are not intended to identify degrees of hearing loss less than 35–40 dB HL (Gravel et al., 2005; Norton et al., 2000), complicating early diagnosis. Second, there is a lack of consensus among researchers and clinicians on optimal intervention strategies for mild or unilateral hearing loss because (a) not all children will experience delays and (b) there is insufficient evidence that hearing assistive technology or early intervention will lead to better outcomes if there are delays.

My experience on the topic of mild or unilateral hearing loss came about during my time on a 10-year longitudinal study of children with mild to severe hearing loss, the Outcomes of Children with Hearing Loss (OCHL) study (Moeller & Tomblin, 2015). As the research audiologist at one of the test sites, I interacted with families on a daily basis. Although the study included children with more moderate and severe degrees of hearing loss, the parents of children in the mild hearing loss range were often the ones that voiced the most dissatisfaction with the diagnostic and intervention process. During parent interviews, they would report that service providers and physicians told them not to worry about their child because it was “just a mild hearing loss.” One parent reported going to parent support groups for children with hearing loss and feeling

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unwelcome because her child was not “deaf enough.” Parents also indicated they were unsure of whether their child was benefitting from intervention or hearing aids. The OCHL study did not include children with unilateral hearing loss, but I would field phone calls from parents of these children who would express frustration due to limited resources. Research by Fitzpatrick et al. (2016) supports these anecdotal reports. They conducted a qualitative study of parent perspectives on mild or unilateral hearing loss in Canada. Parents stated that professionals minimized the importance of mild or unilateral hearing loss during the diagnostic process, even describing some clinicians as “dismissive.” They also reported indecision regarding the need for amplification, often because the audiologist and otolaryngologist would express contradictory opinions about the benefits of hearing aids. This apparent contradiction, and accompanying need for clear clinical guidelines and protocols, is what motivated my co-editor Dawna E. Lewis and I to bring together experts in the fields of audiology and speech-language pathology to create this forum.

We have included 10 articles (including a prologue and epilogue) that provide a comprehensive view of the contemporary issues surrounding pediatric mild or unilateral hearing loss. In the research literature, children with mild bilateral hearing loss, high-frequency hearing loss, or unilateral hearing loss are often combined under the umbrella term of *minimal hearing loss*. We find this term to be a misnomer, as it conveys the sense that any problems that these children encounter at home or school are insignificant. It is also counterproductive to combine children with mild or unilateral hearing loss into one group for research purposes because their cumulative auditory experiences are different. Therefore, potential benefit from interventions will vary. Specifically, children with mild hearing loss miss out on soft speech sounds, which can be improved through amplification. On the other hand, children with unilateral hearing loss miss binaural hearing cues, and the restoration of audibility via amplification may not be sufficient for resolving the loss of binaural cues. Thus, we have sought to consider these two groups separately when discussing outcomes and management options in this forum.

Fitzpatrick, Nassrallah, Vos, Whittingham, and Fitzpatrick (2020) start off the forum with a prospective research study that investigates the changes in hearing levels for children with mild bilateral hearing loss. Fitzpatrick and colleagues used population-based data collected in Canada over a 14-year period after the implementation of early hearing detection and intervention. They documented that one-half of these children showed a decrease in hearing sensitivity over time, and one-third progressed to moderate or worse hearing loss in both ears. These findings highlight the importance of early identification and careful monitoring in children with mild bilateral hearing loss.

Three articles explore listening, language, and cognitive outcomes in children with mild or unilateral hearing loss. Although the authors tested different groups of children and used diverse assessments, these three articles share a common theme: Children with mild or unilateral hearing

loss may struggle with higher level language comprehension and aspects of language form (i.e., morphology and phonological memory) compared to their hearing peers. Walker et al. (2020) establish that children with mild bilateral hearing loss are vulnerable in morphosyntax and language comprehension relative to age-matched hearing peers. These findings are of particular importance to speech-language pathologists who may be assessing and providing intervention in the schools. Griffin, Poissant, and Freyman (2020) provide original research about how unilateral hearing loss negatively impacts listening comprehension skills in background noise. Al-Salim, Moeller, and McGregor (2020) report on both children with mild hearing loss and with unilateral hearing loss, focusing on short-term phonological working memory. Children with unilateral hearing loss performed significantly worse than children with mild hearing loss or normal hearing and comparably to children with cochlear implants on an audiovisual non-word repetition task. All of these articles highlight the importance of moving beyond testing word recognition in quiet and including assessments of higher level listening skills, morphosyntax, and phonological memory to identify children with mild or unilateral hearing loss who are at risk for poor outcomes.

Despite the growing evidence that children with mild or unilateral hearing loss are at risk for delays, there is uncertainty about when and how to treat these children. This ambivalence results in inconsistent intervention practices that range from (a) a wait-and-see failure-based approach (Winiger, Alexander, & Diefendorf, 2016) to (b) a front-loading approach that provides amplification and speech-language intervention soon after confirmation of hearing loss (Fitzpatrick, Whittingham, & Durieux-Smith, 2014). Three articles in the forum cover current clinical practice guidelines and protocols for working with mild or unilateral hearing loss in children. McCreery et al. (2020) describe an audibility-based criterion for hearing aid candidacy in children with mild bilateral hearing loss. Of note for pediatric audiologists and otolaryngologists, they argue for the use of the unaided speech intelligibility index as an alternative to the dB HL audiogram when determining whether a child should be fit with hearing aids. Bagatto (2020) contributes a clinical focus article that separates out the evidence for diagnosis and audiological management of unilateral versus mild hearing loss, including discussions on air-conduction hearing aids, remote microphone systems, cochlear implants, bone-conduction hearing devices, and contralateral routing of signal systems. She advocates for involving the speech-language pathologist in the intervention process prior to the provision of hearing assistance technology. Picou, Davis, and Tharpe (2020) expand on the topic of nonsurgical interventions (i.e., preferential seating, contralateral routing of signal systems, or remote microphones) for children with severe-to-profound unilateral hearing loss. They make the important point that there is not one optimal recommendation for all students and provide several case scenarios to illustrate that point.

To ameliorate the difficulties that children with mild or unilateral hearing loss may face, it is important to understand the underlying factors that contribute to listening problems. Listening-related fatigue is one such factor that has gained recent interest in the research literature. Bess, Davis, Camarata, and Hornsby (2020) complete this forum with a comprehensive review article on the effects of unilateral and bilateral hearing loss on listening-related fatigue in children. They provide preliminary evidence that suggests that children with unilateral hearing loss are at increased risk for subjective fatigue. Moreover, the magnitude of fatigue is consistent with children with bilateral hearing loss. Given the association between listening-related fatigue and language and literacy deficits, future research in this area is warranted. In addition, school-based service providers (educational audiologists, teachers of the hearing impaired, and speech-language pathologists) should be aware of the symptoms and behaviors associated with listening-related fatigue and how to implement intervention and management strategies that minimize possible effects of fatigue in the classroom setting.

Conclusion

The researchers that contributed to this forum share a common goal: to reduce the lingering questions about clinical management for children with mild or unilateral hearing loss. Although not every child with mild or unilateral hearing loss will experience difficulties, there can be no doubt that uncertainty about treatment approaches leads to inconsistent intervention and increased developmental risk. After reading the articles in this forum, it is our hope that we will provide audiologists and speech-language pathologists with useful information when working with children with hearing loss. We also hope this forum will generate additional discussion about gaps in our knowledge and future directions for research to maximize developmental outcomes for all children with hearing loss.

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