Management of Unilateral Hearing Loss in the School-Aged Child

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ABSTRACT

Despite the increasing evidence that school-aged children with unilateral hearing loss (UHL) are at risk for functional difficulties, no gold standard guidelines for management of these children currently exists. Management of school-aged children with UHL is further complicated by the fact the types and severity of functional difficulties vary from case-to-case. For this reason, it is essential to screen and monitor school-aged children with UHL for a variety of functional problems. This paper details a child centered assessment plan that provides clinicians with a tool to help make informed decisions regarding management options for their school-aged patients with UHL.

INTRODUCTION

Unilateral hearing loss (UHL) is defined as normal hearing in one ear and a hearing loss in the opposite ear with a pure tone average at 500, 1000, and 2000 Hz greater than or equal to 20 dB or pure tone air thresholds greater than or equal to 25 dB at two or more frequencies above 2000 Hz (Centers for Disease Control and Prevention, 2005). Approximately one-third of children (0 to 21 years) with permanent hearing loss in the United States have UHL (Yoshinaga-Itano et al., 2008). Moreover, the estimated prevalence of UHL in school-aged children is 3% or approximately 1,380,000 children in the United States (Bess et al., 1998, Centers for Disease Control and Prevention, 2005).

Prior to the 1980s, the assumption was school-aged children with UHL did not need intervention because of normal hearing in the opposite ear. Over the last 30 plus years, research has shown this group of children is at risk for numerous functional difficulties. For example, school-aged children with UHL can experience academic difficulties, behavioral problems, speech and language deficits and problems understanding speech in adverse listening environments (Bess & Tharpe, 1984); however, every child with a UHL will not experience each of these functional difficulties (McKay et al., 2008). As a result, management of the school-aged child with UHL can be complex.

Children with UHL are at risk for academic difficulties. Research indicated 24-35% were at risk for grade failure (compared to 3% normal hearing peers), 12-41% required additional academic assistance, and up to 54% of children with UHL have Individualized Education Plans (IEP) (Lieu, 2013). Interestingly, Lieu (2013) noted the majority of school-aged children with UHL have an IEP for reasons other than their hearing loss. In addition, children with UHL may experience low self-esteem, anxiety, strained peer relations and decreased social support (Bess et al., 1998).

Recent research suggested listening-related fatigue and effort play a role in difficulties experienced by children with UHL. Bess et al. (2020) reported that children with UHL are at increased risk for listening-related fatigue. Moreover, the extent of fatigue approximates the fatigue children with bilateral hearing loss encounter (Bess et al., 2020). Similarly, Oosthuizen et al. (2021) examined listening-related effort in school-aged children with normal hearing and with UHL. Results indicated that children with UHL demonstrated more effort than their peers with normal hearing when was speech directed to the ear with hearing loss and noise was directed to the ear with normal hearing. The authors suggested the use of self-report questionnaires could be useful to document subjective report of listening effort and should be considered in management plans for children with UHL (Oosthuizen et al., 2021).

It is well documented that binaural listening offers advantages over monaural listening, especially in noisy conditions. The American Speech-Language-Hearing Association (2005) recommended a minimum signal to noise ratio of 15 dB in the classroom environment. Picard and Bradley (2001) reported noise levels in typical classrooms ranged from 41.9 dBA to 75 dBA and signal to noise ratios (SNR) were estimated to be in the 3 dB to 9.5 dB range. Both classroom noise levels and SNR seemed to improve as a function of grade. Moreover, there was no difference in comprehension performance between children with normal hearing and children with UHL in quiet or when the SNR was favorable (6 dB); however, children with UHL performed significantly worse than their normal hearing peers once the SNR was reduced (Picard & Bradley, 2001). In addition, children with UHL have poorer localization skills than their normal hearing peers (Bess et al., 1984; Humes et al., 1980), particularly in the younger population such as age 6-9 years (Johnstone et al., 2010).

The 2003 Pediatric Amplification Protocol of the American Academy of Audiology (AAA) specified that children with minimal hearing loss (UHL included) are candidates for various types of amplification and should make use of communication strategies; however, each child should be evaluated on a case-by-case basis. In 2013, AAA updated their guidelines to state "children with aidable unilateral hearing loss should be considered candidates for amplification in the impaired ear due to evidence for potential developmental and academic delays" (p. 12).

Despite the increasing evidence that school-aged children with UHL are at risk for functional difficulties, no gold standard guidelines for management of these children currently exists. Management of school-aged children with UHL is further complicated by the fact the types and severity of functional difficulties vary from case to case. For this reason, it is essential to screen and monitor all children with UHL for a variety of functional problems. Although audiologists may use a "wait and see" approach or a "trial period" with amplification, neither of these approaches captures the entire picture of the child with UHL in order to determine a plan of action for success. Thus, the purpose of this paper is to detail a child centered assessment plan that provides clinicians with a tool to help make informed decisions regarding management options for their school-aged patients with UHL.

Unilateral Hearing Loss Assessment Plan

The Unilateral Hearing Loss Assessment Plan (UHLAP) (Table 1) is designed for children 5 years of age and older and incorporates four assessment areas to assist in determining management/treatment plans for each case: 1) parental support, 2) a speech-language evaluation, 3) the Screening Instrument for Targeting Educational Risk (SIFTER) (Anderson, 1989), and 4) an audiological evaluation. The first area is parental support. This is an informal assessment conducted by the audiologist during the chart review and case history. Lieu (2013) found that maternal educational level, age and baseline cognitive abilities were factors in a child's cognitive development, academic achievement and oral language development. Thus, young parents with limited education (i.e. did not finish high school) may need additional support to monitor the child's development and needs. In this case, this area is noted as "needs support" and follow-up appointments are scheduled on a more frequent basis to assist in monitoring the child's progress.

Children with UHL are referred for a speech-language evaluation. The speech-language evaluation examines a broad range of areas selected by the speech-language pathologist based on the age of the child. The speech-language evaluation typically examines areas of receptive and expressive language such as syntax, semantics, pragmatics, morphology, phonology, interaction, gesture, and nonverbal communication skills. The evaluation also assesses functional listening skills such as auditory awareness, discrimination, identification, comprehension, listening in noise and at distances, and auditory only skills. Tests that may be used to assess functional listening skills include but are not limited to the following: Functional Listening Test Options, Auditory Skills Checklist, Integrated Scales of Development, Track a Listening Child, Meaningful Auditory Integration Scale, LittlEARS Auditory Questionnaire, and the Test of Auditory Perceptual Skills-Revised. Speech sound production and literacy skills are also examined.

The SIFTER is used with the classroom teacher to identify academic risk. The SIFTER has been recommended for use with children with UHL or bilateral hearing loss up to 40 dB HL. In addition, Tharpe (2007) suggested the use of the SIFTER for children with minimal hearing loss (including UHL) as an assessment of functional auditory skills. The SIFTER consists of 15 questions within five areas: academics, attention, communication, class participation and social behavior. Teachers evaluate the child's behavior on a 1-5 scale and the total score for each content area is calculated to determine if each area is a pass, marginal, or fail. SIFTER areas scored as marginal or fail are considered "at risk." Identifying potential areas of risk is a very important part of managing school-aged children with UHL as failure to do so may have detrimental effects. For example, if a child's underlying problem is social behavioral and a hearing aid trial approach is used, it is possible the behavioral issues may worsen because the

UHL was not the primary concern. The SIFTER is a screening tool, thus, additional testing by an educational psychologist is needed should an area be deemed "at risk (Tharpe 2007).

The audiological evaluation includes the following standard procedures: otoscopy, tympanometry, acoustic reflex threshold testing, otoacoustic emission testing, pure tone audiometry (air and bone conduction), and speech audiometry (speech recognition thresholds and speech recognition in quiet). Speech recognition in noise and spatial hearing are also assessed. Speech recognition testing in noise is completed using the Bamford-Kowal-Bench Sentences in Noise test (Etymotic Research, 2005). The BKB-SIN is appropriate for the pediatric population as the sentences were derived from language samples from young children (Bench et al, 1979) and normative data is available for a variety of young age groupings. The BKB-SIN is administered in the sound field using a single speaker at zero degrees azimuth at 60 dB HL which is representative of average conversational speech and is recommended in the BKB-SIN manual for children (50 – 70 dB HL). A SNR-50 is calculated and compared to age appropriate normative data in the manual to determine if performance is below or at/above average and to establish a baseline SNR-50 value for the child. The BKB-SIN is repeated with the speech and noise directed towards the normal hearing ear (direct) then towards the impaired ear (indirect). The SNR-50 values for the direct and indirect conditions are compared to the baseline value using the critical difference for comparisons table in the BKB-SIN manual (table 5) to determine if either condition is significantly different from the baseline. We opted to use the standard BKB-SIN presentation mode instead of the split track option as most audiologists should have access to at least one loudspeaker; however, the use of the split track option that allows speech and noise to be routed to different loudspeakers may be useful when evaluating the effectiveness of treatment options (Picou et al., 2020; Oosthuizen et al., 2021). This protocol assists in determining if the child is a candidate for amplification or not. For example, if the difference between the baseline and indirect SNR-50 values are not greater than the 95% confidence interval, the differences are not significant and the child may not benefit from amplification. Conversely, if the difference between the baseline and indirect SNR-50 values are greater than the 95% confidence interval, the difference is significant and the child may be a candidate for amplification.

Sound localization is determined from differences in time and loudness of signals arriving separately at each ear. Normal hearing children age four to five can lateralize sound on the basis of time and loudness difference (Litovsky, 1997). For children with UHL, these skills can be significantly reduced. The ability to correctly localize is an important skill for safety. The Speech, Spatial, and Qualities of Hearing Questionnaire (SSQ) (Gatehouse & Noble, 2004) was developed to assess listening difficulties across a wide range of situations with adults who are hard of hearing. The scale has been adapted for use in children who use cochlear implants (Galvin et al., 2007) and has been used to assess parental ratings of auditory skills in children who are hard of hearing (McCreery et al., 2015). Each subscale consists of multiple questions regarding specific listening situations/behaviors. The SSQ for Parents asks parents to evaluate their child's abilities in four dimensions: speech, spatial hearing, qualities of hearing, and conversational uses of hearing. An 11-point scale is used and ranges from zero (minimal ability) to 10 (maximal ability). Responses to the items are averaged for each subscale and overall; however, the spatial hearing subscale is of primary importance. SSQ for Parents scores may serve as a baseline for pre and post amplification or for monitoring ability over time. In addition, comparison of the BKB-SIN values from baseline condition (zero degrees azimuth) to the direct and indirect conditions provides information regarding the impact of the speech source moving from the front to either side on the child. For example, children with significantly reduced performance during the indirect condition may be at greater risk for spatial hearing difficulties as well.

Outcomes & Recommendation Options

Once all assessment areas of the UHLAP are completed, outcomes are evaluated and a management plan is developed. Outcomes may result in no additional concerns, speech-language concerns, psycho-educational concerns, audiological concerns, or concerns in multiple areas. Based on the pattern of outcomes, the management plan developed includes appropriate referrals and recommendations on a case-by-case basis.

No additional areas of concern

Children with no additional areas of concern beyond hearing are recommended to return for repeat evaluations and monitoring. The frequency of the repeat evaluations is based on the need for additional parental support and the age of the child (every 6 months until age 6, 9 months until age 9, and annually for age 12 and older). In cases where parental support was the only additional concern, the recommendation is to return for evaluations and monitoring every 3 months. In both situations, accommodation options for the classroom may include preferential seating, reducing auditory fatigue, repeating directions, and gaining attention prior to speaking. While each of these accommodations may be beneficial, the least restrictive would be recommend as additional options can be added as needed. The least restrictive environment is determined during the Individualized Education Program meeting with the multidisciplinary team. The team can develop a continuum where minimal supports and services are in place and as needed move through the continuum to increase these.

Speech-Language & Psycho-Educational Concerns

If the speech-language evaluation identified areas of concern, the recommendations of the speech-language pathologist would be integrated into the management plan. Similarly, if the SIFTER revealed concern in attention, academics, participation, or social behavior, the child may be referred to an educational psychologist and the recommendations of the psychologist would be integrated into the management plan.

Table 1. Unilateral Hearing Loss Assessment Plan document

Unilateral Hearing Loss Assessment Plan

Name: _____ Date: _____

Parental Support	**Outcomes**	**Return to Center**
good	no concerns	age-based
needs support	at risk	3-month intervals
Speech-Language Evaluation	**Outcomes**	**Recommendation Options**
within normal limits	no concerns	re-evaluate as recommended
abnormal	at risk	therapy initiated
SIFTER	**Outcomes**	**Recommendation Options**
communication	pass marginal fail	none refer to SLP
academics	pass marginal fail	none refer to Psyc.
attention	pass marginal fail	none refer to Psyc.
participation	pass marginal fail	none refer to Psyc.
social behavior	pass marginal fail	none refer to Psyc.
Audiological Evaluation	**Outcomes**	**Recommendation Options**
audiogram	SSD	CROS osseso RM none
	aidable ear	HA RM none
BKB-SIN 50—baseline		
at/above average	no concerns	monitor over time
below average	at risk	HA CROS osseso RM none
BKB-SIN 50—direct		
not significant	no concerns	monitor over time
significant	at risk	HA CROS osseso RM none
BKB_SIN—indirect		
not significant	no concerns	monitor over time
significant	at risk	HA CROS osseso RM none
SSQ for Parents		
speech	base stable improved reduced	HA CROS osseso RM none
spatial hearing	base stable improved reduced	HA CROS osseso RM none
qualities of hearing	base stable improved reduced	HA CROS osseso RM none
conv. uses of hearing	base stable improved reduced	HA CROS osseso RM none
composite	base stable improved reduced	HA CROS osseso RM none
Classroom Accommodations	**Outcomes**	**Recommendation Options**
	preferential seating	yes no
	limit auditory fatigue/effort*	yes no
	repeated directions	yes no
	gain attention	yes no

* difficult classes should be scheduled in the morning with auditory breaks throughout the day.

Audiological Concerns

The audiological evaluation assesses the degree of unilateral hearing loss, the child's ability to understand speech in noise (BKB-SIN), and spatial hearing ability (SSQ for Parents). If the hearing loss is severe-to-profound, it is marked as single sided deafness (SSD). A hearing loss in the mild to moderately-severe range is noted as aidable hearing. Thus, the degree of UHL impacts the management options (Table 1). If the UHLAP indicated below average on the BKB-SIN or a significant deficit for the direct and/or indirect conditions, a management plan based on the degree of hearing loss can be followed, which includes amplification options. Similarly, if spatial hearing ability is of concern or has degraded over time, amplification options should be considered. Thus, the impact the UHL has on the performance of the child determines if amplification should be explored or not. When no additional audiological concerns are evident, the audiologist should collaborate with the speech-language pathologist and educational psychologist to determine if any deficits and/or behaviors may be attributed to the UHL. Using this multidisciplinary approach may result in the recommendation for amplification despite no additional audiological performance concerns. However, it is especially important to understand the advantages and disadvantages of amplification options for children with UHL.

Management options for children with SSD include contralateral routing of signal (CROS) hearing aids, osseointegrated devices, cochlear implantation, remote microphone systems (RM), and classroom accommodations. Ossesointegrated devices may improve speech recognition in monaural indirect situations by minimizing the head shadow (Bosman et al., 2003; Hol et al., 2005). Alternatively, a cochlear implant may improve speech understanding in noise and offer the potential for bilateral hearing (Arndt et al., 2015; Hassepass et al., 2013). For children and families that are not surgical candidates or who do not choose surgery, the CROS or RM systems combined with classroom accommodations are the available management options. The Pediatric Amplification Protocol of the AAA (2013) states that for children with severe or profound unilateral hearing losses and normal hearing in the other ear, CROS devices may be considered depending on the child's age and ability to control their environment (p. 12). Moreover, RM systems may be the preferred choice for children with SSD in classrooms as RM systems provide more consistent speech recognition benefit whereas CROS devices may reduce speech recognition in dynamic listening situations. This problem is exaggerated when the child is not mature enough to orient themselves in space to the signal of interest (AAA, 2013; Lieu, 2015; McKay et al., 2008).

Recent research examined the effectiveness of RM systems and CROS devices in children with SSD. Picou et al. (2020) evaluated the effects of each option on speech recognition and comprehension in 20 children with SSD in a laboratory setting. Speech was presented from the midline, monaural direct, or monaural indirect location while noise was presented to loudspeakers surrounding the participant. Results indicated no speech recognition benefit relative to unaided with either option for speech presented from front or monaural direct locations. For monaural indirect, however, CROS improved speech recognition whereas the RM system degraded performance. In addition, comprehension improved using the CROS. These findings suggested CROS systems may improve performance for children with SSD, particularly if a single microphone location is used with an RM system (Picou et al., 2020).

The effects of CROS devices and RM systems on speech recognition and listening effort were also evaluated in 19 children with SSD (Oosthuizen et al., 2021). Speech was presented from the midline, monaural direct or monaural indirect location while the noise was presented from +/- 90 degrees azimuth for the midline condition and towards the poorer ear for monaural direct and towards the better ear for monaural indirect conditions. Results indicated the RM system improved speech recognition across speaker conditions and reduced response times in the midline and monaural indirect conditions; however, the CROS improved speech recognition and listening effort only for the indirect listening situation. Participants also indicated the RM system produced an easier listening condition. These findings suggested the use of RM systems could be beneficial for children with SSD (Oosthuizen et al., 2021).

Other factors to consider include the location of the child's seat in the classroom, the configuration of the classroom, and the location of the talkers of interest (Picou et al., 2020). While it may seem logical to assume the speaker of interest is the teacher located in the front of the classroom, research indicates this is not necessarily the case. Ricketts et al. (2010) evaluated the position of talkers of interest as well as noise sources in typical mainstream classrooms of children with normal and impaired hearing. Interestingly, the talker of interest was in front of the classroom 40% of the time while multiple talkers of interest in various locations in the classroom also occurred 40% of the time. In addition, the dominant noise source surrounded the student 72% of the time whereas noise originating from a single side occurred less than 10% of the time. As a result, the dynamic nature of the speaker of interest combined with the seat location of the student results in some situations where a CROS is preferable and other situations where a RM system is preferable. Currently, there is not one optimal recommendation for all scenarios (Picou et al., 2020).

A child that has a hearing loss in the mild-to-moderately-severe range is considered an "aidable" patient. If amplification is chosen, children with aidable hearing should be fit using the Pediatric Amplification Protocol of the AAA (2013). The use of an RM system with the hearing aid may provide additional benefit in the classroom setting; therefore, benefit with an RM system should be assessed with the BKB-SIN if possible. The American Academy of Audiology (2011) provides details regarding the assessment of RM systems. Although research has shown that approximately 50% of the children with UHL do not accept the hearing aid (Davis

et al., 2001), the acceptance rate is the poorest for the children with a severe-profound hearing loss in the impaired ear (Kiese-Himmel, 2002). Consequently, children with severe-to-profound hearing loss are better candidates for the CROS and/or RM devices.

Children receiving amplification should be assessed prior to and after the fitting (approximately 30 days) to determine if the intervention improved their auditory behaviors. The assessment tools should be completed with/by the teacher, family, and/or child if possible. Two examples include the Children's Home Inventory of Listening Difficulties (CHILD) (Anderson & Smaldino, 2000) and the Listening Inventory of Education-Revised (LIFE-R) (Anderson et al., 2012). The CHILD measures the child's communication needs and listening skills in the home whereas the LIFE-R identifies classroom listening situations and school listening situations that are challenging. Follow-up testing may also include the BKB-SIN and SSQ for Parents. The reader is encouraged to see McCreery and Walker (2017, Chapter 6) for additional options and details.

Case Scenarios

Below are two hypothetical cases that illustrate use of the UHLAP.

Kevin

Kevin is a 7-year-old boy that was diagnosed with a mild-to-moderate sensorineural hearing loss. He was referred to our clinic to evaluate his need for amplification (Table 2). A case history was completed with the family. The family was able to effectively communicate information about Kevin's birth history, development and academic milestones. Kevin's mother noted her main concern was his behavior. Kevin continually misbehaves at school and his teacher mentioned she must repeat herself numerous times before Kevin will follow directions.

The speech-language evaluation indicated normal expressive and receptive language abilities, fair listening skills and age appropriate auditory memory and articulation. Therapy was not recommended at this time. The SIFTER was completed by Kevin's teacher and his scores were 12 (pass), nine (marginal), four (fail), five (fail), and three (fail) for the communication, academics, attention, participation, and social behavioral areas. The audiological evaluation confirmed a mild-to-moderate sensorineural hearing loss at the left ear. BKB-SIN results indicated a SNR-50 of -1 dB (baseline), -1 dB (direct), and 0 dB (indirect). The baseline BKB-SIN was better than the average value for a child Kevin's age (0.8 dB), did not change significantly during the direct or indirect conditions, and did not improve when tested with an RM system. The SSQ for Parents scores were seven, eight, seven, and nine for the speech, spatial hearing, qualities of hearing, and conversational uses of hearing dimensions. The composite SSQ for Parents score was 7.8 and will serve as Kevin's baseline for future evaluations.

In summary (Table 2), outcomes of Kevin's UHLAP indicated no concerns in the parental support, speech-language, or audiological assessment areas; however, SIFTER results were of concern in four of the five areas. Consequently, Kevin was referred to an Educational Psychologist. Following that assessment, Kevin was diagnosed with an attention deficit disorder and prescribed a daily medication. One-month post medication, the SIFTER was repeated with the teacher and each area improved to a passing score. The teacher noted that Kevin "was a different child". Further recommendations included returning in 6 months to monitor his status, preferential seating in the classroom, and repeating directions as needed. Hearing aids and an RM system were not recommended at this time.

Susie

Susie is a 10-year-old girl with a moderate-to-severe sensorineural hearing loss. She was referred to our center to evaluate her need for amplification (Table 3). A case history was completed with the mother. The mother did not know why Susie was referred to our clinic and stated, "the doctor told us to come". She also noted Susie was in the hospital following a premature birth but was unsure what support services she received at the time. The mother said Susie was in speech therapy when she was younger but not currently. Susie is reportedly "doing fine" in school and the mother noted no other health concerns.

The speech-language evaluation indicated age appropriate articulation, normal expressive language ability, delayed receptive language ability, delayed listening skills, and delayed auditory memory. Therapy was recommended. The SIFTER was completed by Susie's teacher and her scores were nine (marginal), eight (marginal), 13 (pass), 10 (pass), and 10 (pass) for the communication, academics, attention, participation, and social behavioral areas. The audiological evaluation confirmed a moderate-to-severe sensorineural hearing loss at the right ear. BKB-SIN results indicated a SNR-50 of 6 dB (baseline), 7 dB (direct), and 11 dB (indirect). The baseline BKB-SIN value was worse better than the average value for a child Susie's age (-0.9 dB). Moreover, Susie's performance was significantly poorer during the indirect condition but did not improve when tested with an RM system. The SSQ for Parents scores were eight, nine, nine, and ten for the speech, spatial hearing, qualities of hearing, and conversational uses of hearing dimensions. The composite SSQ for Parents score was 8.8 and will serve as Susie's baseline for future evaluations.

In summary (Table 3), outcomes of Susie's UHLAP indicated concerns in the parental support, speech-language, and audiological assessment areas as well as two of the five SIFTER assessment areas. Consequently, amplification and speech therapy were initiated. Prior to the hearing aid fitting, the LIFE-R indicated that classroom listening situations were "mostly difficult" the majority of the time for Susie. Following the 30-day trial period with amplification and classroom accommodations, Susie indicated the classroom listening situations were "mostly easy" the majority of the time on the LIFE-R. Susie's aided BKB-SIN results improved to a SNR-50 of 2 dB (baseline), 3 (direct) and 4 (indirect). The aided baseline BKB-SIN value remained

Table 2. Unilateral Hearing Loss Assessment Plan for Kevin

Unilateral Hearing Loss Assessment Plan

Name: _Kevin_____ Date: __9-12-2020____

Parental Support	**Outcomes**	**Return to Center**
good	no concerns	age-based
needs support	at risk	3-month intervals
Speech-Language Evaluation	**Outcomes**	**Recommendation Options**
within normal limits	no concerns	re-evaluate as recommended
abnormal	at risk	therapy initiated
SIFTER	**Outcomes**	**Recommendation Options**
communication	pass marginal fail	none refer to SLP
academics	pass marginal fail	none refer to Psyc.
attention	pass marginal fail	none refer to Psyc.
participation	pass marginal fail	none refer to Psyc.
social behavior	pass marginal fail	none refer to Psyc.
Audiological Evaluation	**Outcomes**	**Recommendation Options**
audiogram	SSD	CROS osseo RM none
	aidable ear	HA RM none
BKB-SIN 50—baseline		
at/above average	no concerns	monitor over time
below average	at risk	HA CROS osseo RM none
BKB-SIN 50—direct		
not significant	no concerns	monitor over time
significant	at risk	HA CROS osseo RM none
BKB_SIN—indirect		
not significant	no concerns	monitor over time
significant	at risk	HA CROS osseo RM none
SSQ for Parents		
speech	base stable improved reduced	HA CROS osseo RM none
spatial hearing	base stable improved reduced	HA CROS osseo RM none
qualities of hearing	base stable improved reduced	HA CROS osseo RM none
conv. uses of hearing	base stable improved reduced	HA CROS osseo RM none
composite	base stable improved reduced	HA CROS osseo RM none
Classroom Accommodations	**Outcomes**	**Recommendation Options**
	preferential seating	yes no
	limit auditory fatigue/effort*	yes no
	repeated directions	yes no
	gain attention	yes no

* difficult classes should be scheduled in the morning with auditory breaks throughout the day.

Table 3. Unilateral Hearing Loss Assessment Plan for Susie

Unilateral Hearing Loss Assessment Plan

Name: _Susie_____ Date: ___8-1-2020____

Parental Support	**Outcomes**	**Return to Center**
good	no concerns	age-based
needs support	at risk	3-month intervals
Speech-Language Evaluation	**Outcomes**	**Recommendation Options**
within normal limits	no concerns	re-evaluate as recommended
abnormal	at risk	therapy initiated
SIFTER	**Outcomes**	**Recommendation Options**
communication	pass marginal fail	none refer to SLP
academics	pass marginal fail	none refer to Psyc.
attention	pass marginal fail	none refer to Psyc.
participation	pass marginal fail	none refer to Psyc.
social behavior	pass marginal fail	none refer to Psyc.
Audiological Evaluation	**Outcomes**	**Recommendation Options**
audiogram	SSD	CROS osseso RM none
	aidable ear	HA RM none
BKB-SIN 50—baseline		
at/above average	no concerns	monitor over time
below average	at risk	HA CROS osseso RM none
BKB-SIN 50—direct		
not significant	no concerns	monitor over time
significant	at risk	HA CROS osseso RM none
BKB_SIN—indirect		
not significant	no concerns	monitor over time
significant	at risk	HA CROS osseso RM none
SSQ for Parents		
speech	base stable improved reduced	HA CROS osseso RM none
spatial hearing	base stable improved reduced	HA CROS osseso RM none
qualities of hearing	base stable improved reduced	HA CROS osseso RM none
conv. uses of hearing	base stable improved reduced	HA CROS osseso RM none
composite	base stable improved reduced	HA CROS osseso RM none
Classroom Accommodations	**Outcomes**	**Recommendation Options**
	preferential seating	yes no
	limit auditory fatigue/effort*	yes no
	repeated directions	yes no
	gain attention	yes no

* difficult classes should be scheduled in the morning with auditory breaks throughout the day.

poorer than the average value for a child Susie's age (-0.9 dB) but were no longer significantly reduced during the indirect condition. Susie's performance did not improve when tested with an RM system and her aided SSQ for Parents scores remained stable. In addition, Susie's teacher was asked to complete the LIFE-R pre and post amplification. Susie scored a 30 on the pre-assessment, indicating "often or regularly has listening challenge" and a 71 on the post-assessment, indicating "no listening challenges or very rare". Further recommendations included returning in 3 months to monitor her status, preferential seating in the classroom, repeating directions and gaining attention prior to speaking if necessary.

Conclusion

Despite the increasing evidence that school-aged children with UHL are at risk for functional difficulties, no gold standard guidelines for management of these children currently exists. Management of school-aged children with UHL is further complicated by the fact the types and severity of functional difficulties vary from case to case. By screening and monitoring each school-aged child with UHL for a variety of functional problems, clinicians may capture a broader picture of the child's abilities and limitations. The UHLAP provides clinicians with a tool to help make informed decisions regarding management options for their school-aged patients with UHL.

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