



LOSSES & CONDITIONS

Section 7

Auditory Neuropathy/ Dyssynchrony Spectrum Disorder (ANSD)

What is ANSD?

In ANSD, children have normal hair cells in the cochlea, but the hearing nerve is dyssynchronous (not synchronous). This means that instead of a smooth flow of information from the ear to the brain, the signals are not synchronized - and information will not be relayed to the brain in a consistent way. The amount of dyssynchrony can vary from person to person and can fluctuate over time.

An Analogy

You are driving between two cities a considerable distance apart. You have a talk radio station playing on the FM radio. As you leave the range of the radio station behind, the signal develops static. You can still hear the speech, but it is much harder to understand. Turning up the radio volume does little to improve your understanding of the speech presented on the talk radio station. For children with ANSD, the amount of dyssynchrony, can be relatively stable (about the same at all times) or can vary greatly from day to day.

How is ANSD Diagnosed?

In ANSD, the otoacoustic emissions (OAEs) test are usually normal. OAEs are sounds given off by the inner ear when the cochlea is stimulated by a sound. This test looks for a response to sound by the outer hair cells of the cochlea. See the section *Evaluating Hearing* in this toolkit for more information on OAEs.

In contrast, even a mild hearing loss would result in an absent OAE. A child may have ANSD and hearing loss.

However, children with ANSD exhibit no Auditory Brainstem Response (ABR). The ABR is performed by pasting electrodes on the head - similar to electrodes placed around the heart when an electrocardiogram is run - and recording brain wave activity in response to sound.

To summarize: in ANSD, a normal OAEs are usually present but the ABR will be abnormal.

Are there Risk Factors or any History Information that can Help in Identifying Children Who Potentially have ANSD?

Yes, but many children who have ANSD do not have any risk factors. The following risk factors are associated with ANSD: (1) hyperbilirubinemia (high level of bilirubin in the blood), (2) prematurity (25 – 36 weeks gestational age), and (3) perinatal asphyxia (baby's brain and other organs do not get enough oxygen during birth). ANSD can also run in families.

ANSD may be suspected when a child has high-quality hearing aids and still does not progress in speech and language development, despite wearing the hearing aids consistently.

How can Children with ANSD Vary in their Ability to use Hearing?

If you've seen one child with ANSD, you've seen one child with ANSD. There is wide variation in how well children with ANSD hear and understand. Most people with ANSD have both ears affected; however, some people have ANSD only on one side. Hearing levels vary from typical hearing to profound hearing loss.

Auditory abilities can be unpredictable and variable over time. **All children with ANSD have difficulty if any background noise is present.**

Some children with ANSD do not progress in speech and language development despite good intervention and wearing their hearing aids consistently. In this case, they may have better results with cochlear implants. Children who are not progressing and who do not receive cochlear implants may need to learn language through visual means (i.e., sign language, cued speech). Some children actually show a worsening of dyssynchrony symptoms over time. Other children seem to improve in their awareness of sound, but continue to have difficulty in noise and delayed language development.

Although hearing aids have been found to be helpful in quiet environments, it is apparent that even if a little background noise is present, children with ANSD have great difficulty understanding. Assistive technology, such as FM or DM technology, is *essential* in the classroom.

How can Cochlear Implants Benefit People with ANSD?

Research has found that cochlear implantation is a viable treatment option for children who are not making progress with hearing aids. Researchers believe that it is possible that electrical stimulation, like that from a cochlear implant, can help to synchronize activity in the brain. Even for children who receive implants, it is important to allow them to gradually move from a visual language system to an auditory language. Abrupt removal of the communication system that a child has depended upon prior to receiving a cochlear implant is not recommended and could interrupt language development.

Are there any Communication Methods that Facilitate Development of Speech and Language in Children with ANSD?

Learning speech and language through the auditory channel exclusively is very difficult for some children with ANSD. This is because it is difficult or impossible to achieve a clear and consistent auditory signal (unless the person has a cochlear implant) in a dyssynchronous auditory system. Research shows that the use of a visual communication system, such as sign language or cued speech, is recommended to develop language. Auditory-Verbal therapy by itself, before cochlear implantation, has not been observed to work as the sole method of teaching language to ANSD children.

Information was adapted from Karen Anderson's excerpt of Hood, L. J. (2002). Auditory neuropathy/auditory dyssynchrony: New insights. The Hearing Journal (March). Posted to Supporting Success for Children with Hearing Loss Jan 2015. <http://successforkidswithhearingloss.com/ansd>

References

Additional articles also available from the Alberta Hands & Voices lending library:

Hands & Voices: Auditory Neuropathy

http://www.handsandvoices.org/comcon/articles/aud_neuropathy.htm

National Institute on Deafness and Other Communication Disorders (NIDCD)

<http://www.nidcd.nih.gov/health/hearing/pages/neuropathy.aspx>

Yahoo Groups: Support to Parents of Children Diagnosed with ANSD

<https://groups.yahoo.com/neo/groups/AuditoryNeuropathy/info>

Deaf Plus: Education of Deaf Children with Multiple Challenges

“Deaf/HH Plus is meant to be a positive term, not in any way negative or insensitive to the child who has medical issues along with hearing loss. In fact, I see it as an “A+” or “B+,” meaning the child carries additional positive qualities, but it is a gift that needs to be carefully unwrapped. And it may not appear to be a gift when you first receive it. Time helps you appreciate, understand, and unfold the possibilities. And the “Plus” most often means the child and family has added responsibilities and requires additional expertise.”

-From Children Who are Deaf/Hard of Hearing PLUS, NCHAM E-book: A Resource Guide for Early Hearing Detection and Intervention

The term **“Deaf Plus”** refers to children who have a hearing loss in addition to other conditions that affect them medically, physically, emotionally, educationally, or socially. This can include:

- intellectual/cognitive disabilities
- emotional and behavioural disabilities
- learning disabilities
- ADD/ADHD
- visual impairment
- cerebral palsy
- autism
- orthopedic involvement, or
- other physical disabilities.

The presence of hearing loss may make it more difficult to diagnose other disabilities. Hearing loss and the other disabilities may interact in such a way as to make it very difficult to tease out exactly what is happening. Conversely, the other disabilities may mask the hearing loss, particularly if these other disabilities are also associated with delays in communication and language development.

It is important to understand how hearing loss interfaces with a child's other challenges in order to facilitate language acquisition and communication. A child who is Deaf Plus may demonstrate significant gaps that impact development and learning. Often a parent is the person who best understands a child's unique needs; this is especially true of some of the less common aetiologies and syndromes.

Consequently, educational needs will vary significantly depending upon the nature of the disability. A child who is Deaf or Hard of Hearing on the autism spectrum will have very different needs than one with a severe emotional disorder. In both cases, the low incidence of children who are Deaf or Hard of Hearing with such disabilities and the need to prioritize language access pose unique challenges for educational decision-making.

What We Know and What We Don't Know

Here's what we know:

- When special education services are needed, finding an appropriate placement and supports is dependent upon first obtaining a reliable evaluation of the child's abilities and needs.
- When a child has a complex profile with multiple disabilities, the evaluation becomes more critical.
- Finding qualified evaluators can be extremely difficult.

Evaluations must be done by qualified and licensed professionals who understand the nature of the child's disabilities, the impact of those disabilities on learning, and the implications for educational placement. What makes the assessment of a child who is Deaf or Hard of Hearing unique is something often taken for granted in other situations: the evaluator must be able to communicate fluently and effectively with the child.

Full language access is essential. A child whose primary language is American Sign Language (ASL) must be evaluated by someone who is fluent in that language. The evaluator must also understand how being Deaf or Hard of Hearing shapes that child's cultural and social experiences. For children who do not sign, the evaluator must understand the child's language abilities and limitations, and the potential impact on the validity of test results. Evaluators must also be aware that a child's English language skills cannot be considered indicative of his cognitive abilities.

The evaluation is essential but cannot stand alone. An evaluator cannot know firsthand how a child responds over time. Parents, other caregivers, and educators offer a rich perspective of the child's abilities and needs that cannot be obtained through testing.

Once an appropriate evaluation is completed and the team has met to discuss parent/caregiver assessment of needs and review the child's history, the question then becomes "How does one find the school placement or supports to meet those needs?" Language access is a prerequisite to learning, but while this must be the first consideration, the child's cognitive, behavioural, emotional, and medical/physical needs must also be addressed through specialized educational programming. Placing a child with significant disabilities in a classroom without the structure or supports that child needs will compromise the education of all children in that class.

In addition to language access, one must consider:

- The nature and severity of the disability.

- The child's age, prior education, and current functioning.
- The child's ability to work independently and in groups.
- Support services needed – speech and language, mobility, occupational and/or physical therapy, behavioural support, mental health services, etc.

Materials & Strategies Used with Children Who are Deaf Plus

No single specific educational technique is appropriate for all children who are Deaf Plus since each child has unique needs. Characteristics of a successful program should include:

- a high level of structure
- specific, clearly stated objectives
- a focus on the individual needs of each child
- instruction that is step-by-step in nature
- practical experiences in natural environments
- consistent routines
- age-appropriate materials are important
- a focus on motivating the child
- provision of successful experiences
- an emphasis on the student's skills in given situations, not his limitations
- over-learning (going over a skill after it seems to be mastered) may be necessary
- planning for the transfer of instruction to real life situations

There may be specialized programs and services available locally for some children who are Deaf Plus. Coordinating services across many different providers, and with the school, can require considerable effort.

Even in the best of circumstances, we cannot know with certainty what will work for a child with a unique profile of complex needs. We must continually observe, assess, review progress and be prepared to make changes if needed.

Successful strategies for children who are Deaf Plus are future-oriented - the goal being to prepare students to participate in society as fully as they desire once they leave school.

Adapted from:

-[Communication Considerations: Deaf Plus, Hands & Voices](#)
-[Judy Vreeland, Educating Deaf Children with Multiple Challenges](#)
-[Deaf Students with Disabilities, Laurent Clerc National Deaf Education Center](#)

Additional Resources

Deaf Students with Disabilities Network, Laurent Clerc National Deaf Education Center, Gallaudet University - <http://deafwdisabilities.grou.ps/home>

- This on-line network is designed to provide resources, tools, and information to parents and professionals who have or work with Deaf and Hard of Hearing students with disabilities. The site includes discussion forums designed to promote information sharing and ongoing opportunities to engage with others living and working with Deaf and Hard of Hearing students with disabilities.

NCHAM E-book: A Resource Guide for Early Hearing Detection and Intervention: Chapter 9: Children Who are Deaf/Hard of Hearing PLUS
http://www.infanthearing.org/ehdi-ebook/2015_ebook/9-Chapter9ChildrenPLUS2015.pdf

Mild Hearing Loss

Mild hearing loss can be easy to miss. It might not be obvious until a child starts school, when background noise in the classroom makes it difficult to hear. A teacher might be the first one to express concern. Sometimes mild hearing loss is discovered at school hearing screenings and parents may be surprised by this new information.

How Does a Mild Hearing Loss Affect a Child?

With mild hearing loss, it takes more effort to listen. A child with mild hearing loss will have to pay closer attention when listening than a child with typical hearing. This means that they have to use more of their cognitive (brain) resources to listen. If children have to use more resources to listen, it makes sense that they will have less energy for other things.

A child who has mild hearing loss may be more tired at the end of a school day than their siblings or friends. In a typical school, 65% of the day is spent listening. As a result, fatigue can have a significant impact on their learning, development, and well-being.

The impact of mild hearing loss varies widely. Some children experience little or no difficulties as a result of their hearing loss. Other children may be affected in a number of ways. Some of these ways are:

- **Soft voices may be unclear**
Voices may seem unclear, especially if the speaker has a soft voice or is some distance away.
- **Difficulty hearing in noisy environments**
Hearing in noisy conditions can be more difficult with a mild hearing loss than with typical hearing. This may impact how well a child hears in the classroom, such as following group discussions.
- **Delayed speech and language development**
Mild hearing loss may result in a delay in development of speech and

language (according to research, the average delay, when it is present, is 1-2 years).

➤ **Academic difficulty**

School-aged children with mild hearing loss have a higher risk for educational difficulties and academic delays.¹ Incidental learning (learning by overhearing) may be reduced. For children with typical hearing, incidental learning is the main way to learn about new vocabulary and language. See the *Incidental Learning* article in this toolkit for more information.

➤ **Effects on self-esteem**

Research shows that some children with mild hearing loss have lower self-esteem than children with typical hearing.

➤ **May be accused of having “selective hearing”**

Teachers may think that the child is not paying attention or choosing to not follow directions. Children with mild hearing loss may also develop problems getting along easily with others for this same reason.

Will a Mild Hearing Loss Affect a Child’s Speech and Language Development?

Mild hearing loss means that a child just starts to hear sounds when they are at a loudness level of 25 to 40 dB HL. For reference, typical hearing is defined as being able to hear sounds at loudness levels of 20 dB HL or less. Although we call 25-40 dB HL hearing loss “mild,” the impact of the hearing loss in the life of a child can range from minimal to significant. Speech and language challenges can be reduced if a child with mild hearing loss receives appropriate early intervention services.

For speech and language to develop, babies and children need to hear clear speech. Babies with mild hearing loss may turn to look for voices and sounds; they may babble and begin to say words, and they may follow directions if the room is quiet and the person speaking is relatively close by. However, without

hearing aids, babies and children with mild hearing loss may miss speech sounds.

For example, in the words “sign”, “time” and “fine” a child with mild hearing loss may not hear the “s”, “t”, and “f.” They don’t yet have a language base in their brain that they can use to “fill in the gaps.” As a result, they may miss fragments, leading to misunderstanding. In addition, children with mild hearing loss often experience difficulty learning early reading skills such as letter/sound associations.

Will Mild Hearing Loss Affect a Child’s Academic Performance?

Children with mild hearing loss typically have difficulty understanding spoken communication in any sub-optimal listening situation, for example even with a little bit of background noise.

Hearing aids can help ensure that speech and spoken language development can develop more readily. One study found that children with 25 dB hearing loss (who did not wear hearing aids) were delayed in language by 1.2 years and those with 27-40 dB hearing loss were delayed by 2 years.² Children with mild hearing loss have difficulty hearing distant speech, for example when someone is talking from more than 2-3 feet away. Much of what babies and children learn is through “overhearing” the conversations of others. This overhearing requires the ability to hear and understand speech over a distance of more than a few feet. As a result, a child with mild hearing loss might need to focus more of her energy on listening instead of learning new concepts. Hearing aids can help children with mild hearing loss “overhear” more often. Regardless of whether or not the child is wearing hearing aids, please review the *Communication Strategies* section in this article to learn how children with mild hearing loss can be helped in their learning environments.

What is the Psychosocial Impact of Mild Hearing Loss?

If a child is accused of "hearing when he wants to," "daydreaming," or "not paying attention," it may have a negative impact on his self-esteem. He may believe he is less capable due to understanding difficulties in the classroom. He will also be more fatigued because of the increased effort needed to listen. Children struggling with undiagnosed hearing loss often exhibit similar behavioural characteristics as those with Attention Deficit/Hyperactivity Disorder (ADHD).

Similarities Between Mild Hearing Loss and ADHD

Mild Hearing Loss	ADHD
inappropriate responses	blurting out answers before questions are completed
difficulty following directions	difficulty following through on instructions and organizing tasks
difficulty sustaining attention during oral presentations	difficulty listening to others without being distracted or interrupting
impulsive	acts on the spur of the moment
frequently asks for repetition	focuses only with frequent reinforcement or under very strict control
academic difficulty	multiple problems with schoolwork and social activities
poor self-concept	isolated and low self-esteem
doesn't complete assignments	frequently fails to finish schoolwork or works carelessly
doesn't seem to listen	"can't sit still and listen!"

The people involved in the child's life should be informed of his mild hearing loss and possible communication, safety, and psychosocial issues. The list of communication strategies should also be shared with these individuals to provide support to the child with mild hearing loss and reduce the potential occurrence of negative behavior in response to the adverse listening environment.

What are some Special Considerations for a Child with Mild Hearing Loss?

People involved in the child's life should be informed in order to support communication, safety and psychosocial development.

When a child has hearing loss, even when the hearing loss is mild, some of the speech signal is reduced, distorted, or eliminated. If limited sound information is coming in, nerve pathways in the brain develop differently and this can limit the brain's ability to use sound for understanding.

We are learning more about the impact of mild hearing loss on long term development. The difficulty with mild hearing loss is that sometimes it's hard to see the impact of the hearing loss and benefit from hearing aids when children are very young - yet, this is the time that is most important for language development. Hearing is critical for the development of speech and language, and well-developed speech and language skills are the foundation for learning to read and write.

Children with mild hearing loss should have regular hearing evaluations to monitor their hearing. Some hearing losses can get worse over time.

Can a Child with Mild Hearing Loss Benefit from Amplification?

Except in rare circumstances, children with mild hearing loss should use hearing aids to support normal speech and language development. Even if it's difficult to see a difference with the hearing aids when children are very young, a difference is happening in brain development, language development and understanding. Children with mild hearing loss should wear their hearing aids during all waking hours. Infants and children need a great amount of listening experience to develop solid speech and language skills. In other words, children need to hear clear speech all day long so that they can learn about their world.

When a child only uses the hearing aids 2-3 hours a day, he or she is only hearing all the sounds of speech 2-3 hours a day.

Hearing aids will also help your child to hear quiet sounds and sounds coming from a distance. This could make it easier for your child to:

- Learn from overhearing when other people are talking and interacting with each other.
- Hear soft environmental sounds, to get more information about what's happening around them.
- Hear soft speech sounds (for example, 'f', 's', 'th') more easily. This will help them understand speech more easily and to learn to make these sounds in their own speech.
- Listen to and understand conversations with less effort.

Your audiologist may also use parent, teacher or child questionnaires to help understand exactly how and when the hearing loss is affecting your child. You will be able to discuss the benefits and limitations of various device options.

What Communication Strategies are Helpful for a Child with Mild Hearing Loss?

Strategies to use at home

- Gain your child's attention before speaking. Try to make sure that she is focused on listening before speaking to her.
- Face your child when speaking. Ensure your child can see your face clearly. Don't speak to your child from another room or at a distance. Keep your hands away from your face when speaking, so that your child can see your facial expression as well as the speech sounds that are visible on the face and lips (see the article on *Speechreading* in this toolkit for more information). Encourage your child to look at you while you are speaking.

- Limit excessive distracting background noise where possible. Turn off loud appliances (e.g., dishwasher, washing machine, dryer, TV, radio, etc.) when speaking or when she is working or focusing on schoolwork.
- Turn off the television to promote communication. Research tells us that when the TV is on, there is less talking and conversation between parents and their children who are Hard of Hearing.
- Place thick curtains on the windows.
- Place carpet on the floors and sound-absorbing textiles on the walls.
- Change light bulbs or fixtures if they are buzzing.
- Ensure that the room has good lighting and is free of reflective materials and glares so that a child with mild hearing loss can see all visual cues.

Strategies to Use at School

- Information about mild hearing loss should be shared with the child's intervention or educational team. The team should be informed of the potential impact of mild hearing loss on development and behaviour, as well as the listening challenges she may experience in learning environments. Continual communication with the team will ensure that she is receiving appropriate and effective accommodations in her learning environment in order to succeed academically. Other personnel, more specifically an educational audiologist, should be included in the management of mild hearing loss.
- Preferential seating is critical. A child with mild hearing loss should be seated near the teacher, away from noise sources such as fans, media equipment, windows, and doorways. He should be able to easily turn and face his peers during discussions. Keep in mind that ideal seating may need to change depending upon the activity.
- Implement the buddy system. For example, older children with mild hearing loss should be allowed to copy class notes from another classmate. A younger child may benefit from a peer who can guide him or her through daily activities.

- Whenever possible, auditory (sound) information should be supplemented with visual aids (e.g., pictures, an overhead projector, or a whiteboard/SMART board) and written materials to help reinforce concepts or directions.
- Small group or individual instruction time in a quiet environment may be beneficial.
- Reduce background noise in the environment.
 - Cover the legs of chairs and desks with felt, tennis balls, or HushUps.
 - Keep the windows and hallway doors closed.
 - Change light bulbs or fixtures if they are buzzing.
 - Turn off loud equipment (e.g., overhead projectors, computers, etc.) in the room when not in use.
 - Ensure that the room has good lighting and is free of reflective materials and glares so that a child with mild hearing loss can see all visual cues.

Strategies to Use in all Settings

- Maintain eye contact. Be aware of your rate of speech; do not speak too fast or so slowly that your words are over-exaggerated.
- Ensure that you have the child's attention before speaking. Use a cue or a signal, such as a tap on the shoulder, to signify that she needs to focus on what will be said.
- Give information/instructions in short, concise steps.
- Check for understanding regularly by asking the child to summarize what was said.
- If your message was not understood, do not keep repeating it verbatim. Instead, rephrase it.
- Turn on captioning when watching TV or movies.

- If hearing aids or assistive technology (FM or DM technology) have been recommended, encourage its routine use.
- The importance of self-advocacy should be emphasized early on. A child with mild hearing loss should be encouraged to ask for clarification if she does not understand or misses what was said. She should also be encouraged to tell the teacher if her hearing aids or assistive technology are not functioning appropriately. See the *Encouraging Your Child to Self-Advocate* article in this toolkit.
- Those involved closely in the child's life should make efforts to optimize the child's listening environment by using the strategies in the previous lists.

Additional Resources

Other articles also available from the Alberta Hands & Voices Lending Library.

Accommodations for Students with Hearing Loss, Supporting Success for Children with Hearing Loss

<http://successforkidswithhearingloss.com/relationship-hl-listen-learn/accommodations>

Mild Hearing Loss and Learning, Supporting Success for Children with Hearing Loss

<http://successforkidswithhearingloss.com/mild-hl>

References

¹Bess FH, Dodd-Murphy J, Parker RA (1998) Children with minimal sensorineural hearing loss: prevalence, educational performance and functional status. *Ear & Hearing*, 1998 October 19(5): 339 – 54

²Tharpe, A.M. (2008). Unilateral and mild bilateral hearing loss in children: Past and current perspectives. *Trends in Amplification*, 12(1), 7-15.

Adapted from:

- [Kristy Knight, Unilateral and Mild Hearing in Children: Are Hearing Aids Necessary?](#)
- [Phonic Ear](#)
- [Unilateral Hearing Loss in Children, Best Practice Guidelines for Professionals, University of Wisconsin](#)
- [Your Child Has a Mild Hearing Loss – What’s the Next Step, Aussie Deaf Kids](#)

Unilateral Hearing Loss in Children

What is Unilateral Hearing Loss (UHL)?

Unilateral hearing loss (UHL) is hearing loss in one ear only, ranging from mild to profound in degree, while the hearing in the opposite ear is normal. If the hearing loss is profound in either ear, the hearing loss is named Single Sided Deafness (SSD).

What are some Causes and Types of UHL?

A hearing evaluation will specify the type (i.e., conductive, sensorineural, or mixed) and degree of the hearing loss. The exact cause of UHL varies among children and depends upon the medical/case history. Children can be born with a UHL (congenital) or acquire a UHL later in life. For more information about types and causes of hearing loss, see articles on this topic in this toolkit.

How does UHL affect a Child?



Because children with UHL have one ear with normal hearing, they typically hear the more clearly when in close proximity to the person speaking, and in a quiet environment. In less than ideal listening situations, children with UHL experience greater hearing difficulty than children with binaural (two ears) hearing.

Unilateral hearing loss (UHL) is having hearing loss in one ear only. Hearing in the opposite ear is normal.

A child with UHL may experience difficulties with the following tasks:

- Locating the source of a sound.
 - With one-sided hearing, children hear sounds in their better ear. Therefore, the child perceives that the sound is coming from the direction of the ear with normal hearing. As a result, the child might have to scan the environment visually to find the location of the sound source. This difficulty with locating (i.e., localizing) the sound source poses a safety risk for children with UHL. For example, children with UHL are unable to determine the direction of approaching cars that are out of their visual field. For that reason, children with UHL should be equipped with mirrors on their bicycles and taught the importance of using them.
- Understanding distant or soft-spoken speech.
- Listening within noisy or reverberant (echo-y) environments.
 - In these conditions, a child with UHL may have difficulty paying attention or following directions.
- Hearing and understanding speech directed towards the ear with hearing loss.
 - Due to this difficulty, the child should be seated appropriately in relation to the person speaking. The child's better hearing ear should be towards the talker.

Will UHL Affect a Child's Speech and Language Development?

The impact of UHL varies widely. Some children with UHL develop speech and language as expected. At the stage of language development where children start to put two words together (around two years of age), some children start to experience challenges.¹ Additionally, they may experience particular challenges in expressive and receptive language.² Receptive language means the ability to understand or comprehend language heard or read. Expressive

language means being able to put thoughts into words and sentences. Early intervention services for UHL may help reduce these challenges.

Will UHL Affect a Child’s Academic Performance?

Many children with UHL do well academically. However, children with UHL typically have more difficulties in language-based subjects, such as reading, writing, and spelling, in comparison to their peers with typical hearing.³ Children with UHL are more likely to repeat a grade level. In addition, a typical learning environment is challenging for children with UHL. Parts of what the teacher says may be missed because of background noise and distance. As a result, a child with UHL might need to focus more of his or her energy on listening instead of learning the concept. Please review the *Communication Strategies* section in this article to learn how children with UHL can be helped in their learning environments.

What is the Psychosocial Impact of UHL?

People involved in the child’s life should be informed of the UHL to provide communication, safety and psychosocial support.

UHL can be deceptive. Children with UHL generally hear well in quiet situations when in close proximity to the talker. In adverse listening conditions, however, they experience greater difficulties than their peers with typical hearing. As a result, children with UHL may be accused of *selective hearing* (only hearing/listening to what he or she wants to hear). In reality, it is because their ability to hear well is situational - in other words, it depends on the situation (i.e., noisy vs. quiet environment, distant vs. close speech, etc.). Children with UHL must place more energy on listening, which becomes tiring. Their fatigue can be mistaken for being uncooperative, inattentive, or unmotivated.⁴ Furthermore, a child with UHL might exhibit other behavioural issues (i.e., “act out”) due to the frustration that she experiences in adverse listening conditions.⁵ The people involved in the child’s life should be informed of her UHL and these possible psychosocial issues. The list of

communication strategies should also be shared with these individuals so that those involved in the child can also put the effort in to help the child hear more readily, just as the child must put additional effort in to hear in challenging listening environments.

What are some Special Considerations for a Child with UHL?

Anyone with UHL should use hearing protection in environments with high noise levels, such as music concerts or when operating loud machinery. Hearing protection is especially crucial for a child with UHL in order to prevent additional hearing loss. An audiologist can recommend appropriate hearing protection devices for a child with UHL.

Another factor to consider is middle ear fluid and/or infections (i.e., otitis media), which can result in a temporary reduction of hearing. Middle ear fluid and/or infections should be aggressively managed to reduce the impact on a child's UHL. The child's primary care physician should be consulted if middle ear fluid is suspected in the child's ears.

Can a Child with UHL Benefit from Amplification?



A child with UHL may benefit from using one of the following devices. An audiologist and/or ENT will discuss which option will be the most appropriate for a child with UHL, if any.

Discuss your child's amplification options with your ENT and audiologist.

- **Hearing Aid** - Depending on the type and degree of UHL, a hearing aid may be appropriate. A hearing aid might help a child with UHL hear environmental sounds and understand speech in her impaired ear. If a child has SSD, a CROS (contralateral routing of signal) hearing aid may be an option. With a CROS, a transmitter on the deaf ear send signals to a hearing aid worn on the hearing ear. Please refer to your audiologist for more information on this technology.

- **Osseointegrated Auditory Device** - This device, more commonly known as a BAHA (Bone Anchored Hearing Aid), is either worn on a soft headband or surgically implanted in the bone behind the impaired ear. The microphone on the BAHA collects incoming sound. The processor then transmits the information to the child's inner ear(s) by vibrating the skull bone (i.e. bone conduction). BAHA candidates include children with conductive or mixed hearing losses or single sided deafness (SSD). Effectiveness of a BAHA for SSD in children in some cases (i.e. profound, sensorineural UHL or SSD) is unclear. Please refer to your audiologist for more information.
- **Remote Microphone Hearing Assistance Technology (RM-HAT)** - RM-HAT might help a child with UHL overcome the difficulties experienced in challenging listening environments, such as excessive background noise, reverberation (echo) and lack of proximity to the speaker. See the *Assistive Technology (AT)* section of this toolkit for more information.

What Communication Strategies are Helpful?

Strategies to use at Home

- Be mindful of the position of a child with UHL when you are conversing with her, such as at the dinner table or when riding in the car. Ensure that her better ear is towards the speaker and away from sources of noise (e.g., dishwasher, radio, TV, open windows, fans, etc.).
- Do not talk to a child with UHL from a different room (move closer!).
- Reduce the amount of background noise in the home.
- Reduce loud environmental noises whenever possible. Turn off loud appliances (e.g., dishwasher, washing machine, dryer, TV, radio, etc.) when speaking to a child with UHL or when she is working or focusing on schoolwork.

- Place thick curtains on the windows (to absorb sound and reduce the 'echo' in the room).
- Place carpet on the floors and sound-absorbing textiles on the walls.
- Change light bulbs or fixtures if they are buzzing.
- Ensure that the room has good lighting and is free of reflective materials and glare so that a child with UHL can see all visual cues.

Strategies to use at School

- Information about UHL should be shared with the child's intervention or educational team. The team should be informed of the potential impact of UHL on development and behaviour, as well as the listening challenges she may experience in learning environments. Continual communication with the team will ensure that she is receiving appropriate and effective accommodations in her learning environment in order to succeed academically. Materials are available from Alberta Hands & Voices' lending library, including presentation materials on UHL to share with your child's team.
- Preferential seating is critical. A child with UHL should be seated near the teacher, with his good ear directed towards the teacher at all times. The child should be seated away from noise sources such as fans, media equipment, windows, and doorways. He should be able to easily turn and face his peers during discussions. Keep in mind that ideal seating may need to change depending on the activity.
- Implement the buddy system. For example, older children with UHL should be allowed to copy class notes from another classmate. A younger child may benefit from a peer who can guide him or her through daily activities.
- Whenever possible, auditory (sound) information should be supplemented with visual aids (e.g., pictures, an overhead projector, or a whiteboard/SMART board) and written materials to help reinforce concepts or directions.

- Small group or individual instruction time in a quiet environment may be beneficial.
- Reduce background noise in the environment.
 - Cover the legs of chairs and desks with felt, tennis balls, or HushUps.
 - Keep the windows and hallway doors closed.
 - Change light bulbs or fixtures if they are buzzing.
 - Turn off loud equipment (e.g., overhead projectors, computers, etc.) in the room when not in use.
 - Ensure that the room has good lighting and is free of reflective materials and glares so that a child with UHL can see all visual cues.

Strategies to use in all Settings

- Be aware that a child with UHL may have difficulty locating the source of a sound. She may not be able to tell from which side of the room someone is speaking unless she can see the speaker.
- Maintain eye contact. Be aware of your rate of speech; do not speak too fast or so slowly that your words are over-exaggerated.
- Ensure that you have the child's attention before speaking. Use a cue or a signal, such as a tap on the shoulder, to signify that she needs to focus on what will be said.
- Give information/instructions in short, concise steps.
- Check for understanding regularly by asking the child to summarize what was said.
- If your message was not understood, do not keep repeating it verbatim. Instead, rephrase it.
- Turn on captioning when watching TV or movies.

- If a hearing aid and/or assistive technology (FM or DM technology) has been recommended, encourage its routine use.
- The importance of self-advocacy should be emphasized early on. A child with UHL should be encouraged to ask for clarification if she does not understand or misses what was said. She should also be encouraged to tell the teacher if her hearing aid or assistive technology is not functioning appropriately. See the *Encouraging Your Child to Self-Advocate* article in this toolkit.
- Those involved closely in the child's life should make efforts to optimize the child's listening environment by using the strategies in the previous lists.

Additional Resources

Other articles also available from the Alberta Hands & Voices Lending Library

Accommodations for Students with Hearing Loss, Supporting Success for Children with Hearing Loss

<http://successforkidswithhearingloss.com/relationship-hl-listen-learn/accommodations>

References

¹ Kiese-Himmel, C. (2002). Unilateral sensorineural hearing impairment in childhood: Analysis of 31 consecutive cases. *International Journal of Audiology*, 41, 57-63.

² The Colorado Home Intervention Program (2005). Services to children with unilateral hearing loss. Retrieved from http://www.csdb.org/Early%20Education/m_unilateral_loss.html.

³ Culbertson, J.L. & Gilbert, L.E. (1986). Children with unilateral sensorineural hearing loss: Cognitive, academic, and social development. *Ear and Hearing*, 7(1), 38-42.

⁴ Keller, W.D. & Bundy, R.S. (1980). Effects of unilateral hearing loss upon educational achievement. *Child Care Health Development*, 6, 93-100.

⁵Stein, D.M. (1983). Psychosocial characteristics of school-age children with unilateral hearing loss. *Journal of Academy of Rehabilitative Audiology*, 16, 12-22.

-Adapted from [*Unilateral Hearing Loss in Children, Best Practice Guidelines for Professionals, University of Wisconsin*](#)

When Your Child has Tinnitus

Tinnitus is a ringing or other noise that is not produced by an external source.

Tinnitus is a ringing or other noise that is not produced by an external source. The sound can be in one or both ears; can sound like a roar, hiss, buzz, or whine; and can be heard all the time or just some of the time. Tinnitus is a

fairly common condition that affects 10 to 15% of people. According to the [Canadian Academy of Audiology](#), over 360,000 Canadians have tinnitus.

There is not a single cause of tinnitus and sometimes it is present with no cause at all. However, sometimes tinnitus can be triggered by the following: sensorineural hearing loss, ear infections, exposure to loud noise, allergies, certain medications, diabetes, lack of sleep, head or neck injury, middle ear problems, anemia, or blood pressure abnormalities.

Tinnitus is not uncommon in children. Although children tend to have tinnitus as often as adults, children generally do not complain of tinnitus. Researchers believe that a child with tinnitus considers the noise in the ear to be normal, as it has usually been present for a long time.

Continuous tinnitus can be annoying and distracting. In severe cases, it can cause a child to be upset or bothered, and it can interfere with the ability to lead a normal life. The good news is that most children with tinnitus seem to eventually outgrow the symptom. It is unusual to see a child carry the problem into adulthood.



Related to tinnitus is **hyperacusis** and **misophonia**. *Hyperacusis* is the decreased tolerance of everyday sounds. *Misophonia* is extreme sensitivity to specific sounds, like chewing or breathing.

Hyperacusis is the decreased tolerance of everyday sounds.

With hyperacusis, children are often unable to properly describe what they are experiencing using words, and instead they use body or emotional gestures (crying, screaming, hitting, biting) to communicate. They may also simply try to 'get away.' Common signs include crying in noisy environments, clapping hands over the ears, fear of noise or noisy objects, self-harm when exposed to loud noise, e.g., vacuum cleaners, and reluctance to participate in noisy or loud activities, e.g., watch parades, birthday parties, musical presentations, etc.

Misophonia is extreme sensitivity to specific sounds.

If you think your child has tinnitus, hyperacusis or misophonia, first arrange an appointment with an audiologist. The audiologist will be able to test the child's hearing and auditory system as well as provide treatment. If the test results show that the child needs additional testing, the audiologist can then make additional referrals to family doctors or other medical specialists.

What Treatments may be Offered

Most people, including children, who are diagnosed with tinnitus or decreased sound tolerance find that there is no specific problem underlying their condition. However, audiologists suggest that the following steps be taken with the child diagnosed with tinnitus and/or decreased sound tolerance:

- 01.** Reassure the child. Explain that this condition is common and they are not alone. The audiologist can explain why the tinnitus or decreased sound tolerance exists in terms and images that a child can understand.
- 02.** Explain that she may feel less distressed by their tinnitus or decreased sound tolerance in the future. Many children find it helpful to have their tinnitus or decreased sound tolerance explained carefully and to know about ways to manage it. This is partly due to a medical concept known as neuroplasticity, where children are more able to change their response to all kinds of stimulation. If carefully managed, childhood tinnitus and decreased sound tolerance may not be a serious problem.

03. Use sound generators or provide background noise. Sound therapy, which makes tinnitus and bothersome sounds less noticeable, has been used to treat adults for some time, and can also be used with children. Sound therapy may help the child's brain adapt to the tinnitus. The sound can be environmental, such as a fan, or quiet background music.

04. A child with tinnitus or decreased sound tolerance and hearing loss may find that hearing aids can help improve the tinnitus and hyperacusis. Hearing aids can pick up sounds children may not normally hear, which in turn will help their brains filter out their tinnitus and bothersome sounds. It may also help them by taking the strain out of listening. Straining to hear can make your child's brain focus on the tinnitus or bothersome noises.

05. Finally, help your child relax. Sometimes tinnitus or sound tolerance gets worse under stress.

-Adapted from [*American Academy of Otolaryngology – Head and Neck Surgery*](#)