



Unilateral (Hearing Loss in One Ear) Hearing Loss Guidance

Indiana's Early Hearing Detection and Intervention Program

Before universal newborn hearing screening, most children with unilateral hearing loss (UHL) were not identified until they were school-aged. Although not all children with UHL will be identified as a newborn, recent data supports that approximately 45% of diagnosed babies in Indiana were identified with unilateral hearing loss.

Amplification should be considered for children with unilateral hearing loss who have residual hearing in the affected ear as measured by ABR and behavioral testing. Written medical clearance for amplification use from an otologist, pediatric otolaryngologist, or a general otolaryngologist needs to be obtained before fitting of the hearing aid.

Many children with unilateral hearing loss may become challenged as listening demands increase. Early identification of a unilateral loss may reduce the odds that the child will experience language delays or fail a grade in school. By appropriate management and awareness of the loss in one ear, many children with unilateral loss may be successful in acquiring speech and language skills and having good academic success.

Definition and Facts about Unilateral Hearing Loss

- Unilateral hearing loss refers to a hearing loss in one ear, whether mild or profound, congenital or acquired
- Parents should know and understand their child's hearing level for each ear
- Depending on the etiology of the unilateral loss, there may be associated medical conditions that require further medical attention and management
- Children with a unilateral hearing loss are at risk for progressive and/or bilateral hearing loss
- Without proper support and monitoring children with unilateral hearing loss may:
 - Have delays in speech and language development
 - Have difficulty localizing sounds
 - Have difficulty understanding in noisy situations
 - Have difficulty in hearing from a distance
 - Have behavior and/or social problems
 - Have difficulty with following directions
 - Be at risk for failing a grade in school
 - Be distractible and inattentive
 - Show signs of fatigue as the day progresses
 - Benefit from assistive listening devices in the classroom

- **Types of Evaluations for Children with UHL**
 - Hearing (Audiology) tests should be conducted routinely to monitor for any changes in either ear
 - Ear, Nose and Throat (ENT) examination to rule out other medical issues and obtain medical clearance if a hearing aid is indicated
 - Vision tests should be conducted to determine the status of the child's vision. However eye and vision disorders that affect both vision and hearing are more often seen in children with bilateral hearing loss.
 - Genetics consultation for children with permanent hearing loss should be offered to families to help determine the cause of the loss and to check the child for other medical problems
 - Speech and Language consultation should be completed to evaluate and monitor the child's speech and language development
 - Intervention should be considered at any time if the child is having difficulty in listening. Early intervention for children younger than 3 years of age is available through First Steps. For children older than 3 years of age, the local school district should be contacted for intervention services.
 - Multi-disciplinary assessment should be considered if difficulties persist
 - If the child with unilateral loss is not making progress, parents should return to the Primary Care Provider for evaluation of other possible underlying issues.

- **Recommended Guidelines**

Children with a unilateral hearing loss should receive:

 - Routine audiologic evaluations at three to six-month intervals to monitor for progressive or delayed-onset hearing loss (less often as they get older)
 - Ear specific behavioral testing should be obtained as soon as possible
 - Prompt medical management of middle ear disorders
 - Functional auditory measures to track on-going auditory abilities of the child with UHL (parental questionnaires, LittleEARS, PEACH, Auditory Developmental Scale, SIFTER)
 - Speech and language assessments to monitor development (at ~ 12 months of age and then at least annually)
 - Referral to early intervention services for developmental evaluation
 - Noise protection counseling to protect the "good ear"

- **Candidacy for Amplification**
 - Candidacy should be addressed with the family on a case by case basis
 - Waiting to fit until after a child is 6-12 months of age allows the audiologist to obtain potentially more information via Visual Reinforcement Audiometry (VRA). Other factors to consider are:
 - Younger children are considered candidates for amplification only when ear and frequency-specific threshold information is available

- Before 6 months, the proximity of parent to infant allows for a greater signal-to-noise (S/N) ratio
 - After 6 months, when a baby is sitting and crawling, that the S/N ratio may become less optimal
 - Allows time to evaluate middle ear status and possibly treat middle ear pathology
 - In general, amplification should be considered for children 6-12 months of age or older with mild to moderately severe (25 to 65 dB HL) sensory or permanent conductive hearing loss in one ear
 - FM systems should be considered for all children with UHL including those with severe to profound hearing loss or poor word recognition abilities
 - Bone conduction and CROS (contra-lateral routing of signal) systems are not standard recommendations, but may be considered on a case-by-case basis if deemed appropriate.
- **Technology**
 - Conventional Hearing Aid- Limited studies have been completed regarding the efficacy of amplification on children with unilateral hearing loss. The use of a hearing aid in the ear with residual hearing to the moderate-severe range has met with some success.
 - Usually recommended if there is some usable hearing (25-65dB Not typically recommended for severe or profound loss)
 - Typically will be a behind-the-ear type of hearing aid
 - Frequency Modulating System (FM)
 - Allows speech to be heard at a level that is louder than the background noise
 - Speaker (i.e. teacher) wears a microphone and the child has a receiver (headset, desk speaker, receiver coupled to or integrated into their hearing aid if he/she is using one.)
 - FM systems should be considered for all children with UHL including those with severe to profound hearing loss or poor word recognition abilities.
 - Benefits have been well documented in studies with school aged children
 - Children may benefit from a classroom sound field system. Many children (from 3-8th grade) prefer a sound field FM system as it lessens the attention on them. In almost all cases, teachers and students like having Soundfield FM in the classroom as it lessens strain on everyone in the room.
 - Bone Conduction Amplification (including Osseointegrated Auditory Device (Bone anchored hearing aids – BAHA, Oticon Ponto))
 - Primarily used for children with conductive loss
 - Children with bilateral atresia may benefit greatly
 - Children with unilateral atresia may benefit, but parents should be counseled regarding the limitations and lack of good studies documenting outcomes

- Osseointegrated Auditory Device
 - Recently being used for unilateral deafness
 - Little evidence to date on efficacy for children with severe to profound loss in one ear
 - Some adult studies have reported found benefit ranging from some improvement to no improvement.
 - More evidence needed regarding benefit to children
 - Soft band bone conduction system is available for use with children under 5 years of age
 - Surgically implanted devices only approved for older children (>5 yrs.)
 - Contralateral Routing of Signal (CROS)
 - Used for those with severe or profound unilateral loss
 - Microphone picks up sound on the side with hearing loss and sends it to the better hearing ear
 - May be helpful in quiet listening situations
 - Not recommended in noisy situations since the noise will also be directed to the better ear (May actually make it more difficult for the child to hear)
 - Not typically recommended for young children who cannot monitor their environment
 - Cochlear Implant
 - Not an option for unilateral hearing loss at this time
 - **Suggestions for discussion with families**
 - Hearing loss is invisible and often hard for family members and others to understand, especially at first. It is important that the family spend time understanding what it means for their child to have a unilateral hearing loss
 - Be aware of which direction the child's normal ear is facing and keep that ear facing the sound source (i.e. listening at the dinner table, in the car)
 - Make eye contact when speaking to the child
 - Talk about what you are doing all the time
 - Children with normal hearing in only one ear may miss early warnings (Don't touch it, it is hot!). Explain, explain, and explain
 - Use repetition and introduce new words to increase the child's vocabulary (say large or enormous rather than big)
 - The child's hearing *may* change. Explain the need for re-testing and monitoring the status of both ears
 - Ear infections- Fluctuating hearing loss occurs with ear infections and middle ear fluid. Because the child relies on one ear, this inconsistent hearing may have a much greater affect on their listening and eventual learning. This is especially true for school aged children. Encourage prompt medical care if an ear infection is suspected

- Monitor academic progress. Some studies indicate that as many as 30 % of children with UHL may fail a grade at school
- Monitor language development regularly
- Point out sounds around the house and discuss what they are and what they mean.
- Make sure to get the child's attention before talking to him
- Help the child locate the sound source if he/she seems to have difficulty
- Make the home a good place to listen by keeping noise to a minimum (Have carpet, keep the TV off or muted whenever active listening is happening, run appliances when the child is sleeping)
- Avoid exposure to high level noise. Prevention is very important. Keep the child away from noisy settings. Be sure that the child wears ear plugs/muffs in high noise levels (i.e., July 4th fireworks)
- If the child uses amplification, make sure it is in good working condition
- Older children should learn to advocate for themselves if a listening situation is difficult. (i.e. I can't understand you. Could you please repeat what you said?)
- With a unilateral hearing loss, background noise and distance are barriers to children hearing all the language that occurs around them. Children learn from "over-hearing" others.
- Safety concerns
 - Crossing busy streets and riding bicycles in traffic can be dangerous since children with unilateral hearing loss have difficulty telling where the sound is coming from. Use mirrors on bicycles and teach the child to use visual cues from the mirrors. Provide careful training in street crossing.

Unilateral hearing loss (American Academy of Audiology, 2004)

"Use of hearing aid amplification is indicated for some children with unilateral hearing losses.

The decision to fit a child with a unilateral hearing loss should be made on an individual basis, taking into consideration the child's or family's preference as well as audiologic, developmental, communication, and educational factors. Amplification options such as personal FM systems also should be considered. Use of communication strategies (noise reduction, positioning, etc.) may prove to be beneficial and easily accomplished for the infant or toddler with unilateral hearing impairment. The use of Contralateral Routing of Signal (CROS) amplification requires particular care. Its design is to overcome the problem caused by the head shadow effect. This could be especially helpful in a quiet environment and when the signal of interest originates from the direction of the non-functioning ear. However, one recent study indicated that CROS amplification may not be beneficial for children in a classroom setting, because of the introduction of additional noise to the normal-hearing ear."

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Amplification Considerations for Children with Minimal or Mild Bilateral Hearing Loss and Unilateral Hearing Loss, Trends in Amplification 2008 12:43

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