



UNILATERAL HEARING LOSS: A MULTI-DISCIPLINARY APPROACH TO EARLY INTERVENTION

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Unilateral Hearing Loss

Unilateral hearing loss is defined as normal hearing sensitivity in one ear and any degree of hearing loss in the opposite ear.

Sensorineural Hearing Loss:

- **Aidable hearing thresholds**
 - Mild to moderately-severe hearing loss thresholds
- **Limited usable hearing unilaterally (LUHU)/Single Sided Deafness (SSD)**
 - Severe to profound thresholds
 - Limited word understanding

Conductive Hearing Loss:

- **Congenital conductive hearing loss**
 - Microtia/atresia
 - Ossicular abnormalities
- **Acquired conductive hearing loss**
 - Chronic ear infections
 - Surgeries
 - Trauma



Incidence of Unilateral Hearing Loss

- Hearing loss occurs in 1-3 per 1000 births
- 30-40% of all cases of hearing loss are unilateral hearing loss cases
- 3-8.3% of the general population
- 50% of children with UHL showed progression in one or both ears over time



Is One Ear Enough?


- Misconception that 1 typically hearing ear is sufficient and will not cause delays
- Many children present with no delays or difficulties

**Does this mean intervention is unnecessary?
Or should be implemented when delays are present?**




Impacts of UHL Audiological

- Spatial hearing/localization
 - Relies on binaural cues
- Speech in noise
- Listening from a distance
- Possibility of progression of other hearing ear
- Unilateral tinnitus
- Listening fatigue





Impacts of UHL Education

- Sound location can create issues with following classroom academic conversations among teacher and students
 - At risk for lower grades and increased school level interventions
 - 10 times more likely to be retained
 - Issues with cognitive load and complexity of tasks
 - Task completion and attention to task difficulties causing academic issues
 - Lower test scores due to listening comprehension tasks
- 



Impacts of UHL Speech and Language

- Delays in word development causing delays in language acquisition
 - Issues with incidental language learning
 - Delays in sound articulation
 - Delays in pragmatic language development
 - Poor oral language development skills
- 




Impacts of UHL Socioemotional Risks

- Social isolation
- Low-self esteem
- Increased behavioral issues
- Lack of focus
- Lower level of frustration tolerance
- Delays in learning social and pragmatic cues

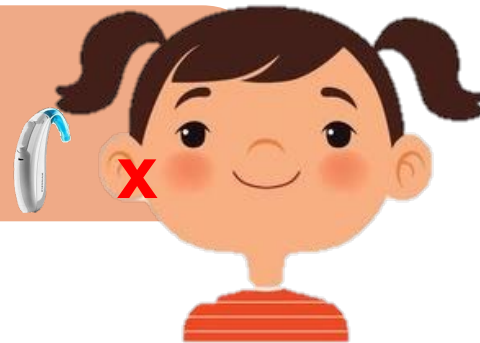


Misconceptions

- Delays are often attributed to something other than their hearing loss
 - There are a number of potential contributing stressors for children, including
 - lack of early identification
 - lack of early and consistent intervention
 - adverse listening conditions
 - increased listening effort and subsequent fatigue
- 

Treatment Options

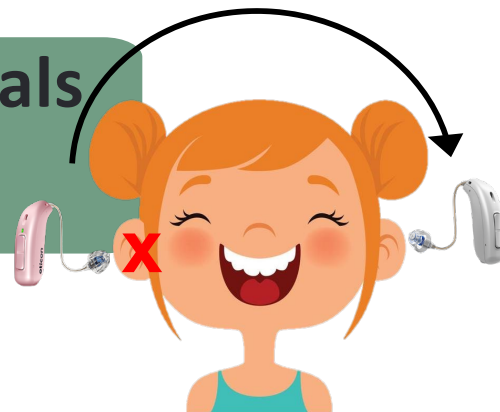
Air Conduction Hearing Aid



Bone Conduction Device



Contralateral Routing of Signals
(CROS)



Cochlear Implant



Hearing Assistive Technology



No device

Monitoring is Imperative!



Importance of a Multidisciplinary Approach

- Research suggests that multi-disciplinary practice or practices with a family centered approach demonstrate beneficial outcomes from children and families in several areas (e.g., parent involvement, social and emotional development) (Jackson, 2011)
- This is not a new idea in education, therapy or medicine we often create multidisciplinary teams within our scopes of practice

Children's **Hearing Program**

OUR TEAM



PSYCHOLOGY



SOCIAL WORK



FAMILY NAVIGATOR



DEAF EDUCATION



**AUDITORY VERBAL
THERAPY**



AUDIOLOGY





Audiology

- Audiologic Evaluations
- Device selection
 - Hearing aid evaluation
 - BAHA evaluation
- Device follow ups
- Cochlear implant remote checks



Auditory Verbal Therapy

- Initial evaluations
- Weekly therapy
- Modeling strategies for caregivers



Psychology

- Counseling sessions
- Device retention strategy sessions
- Behavioral concerns
- Educational assessments

Patient & Family



Social Work

- Needs assessments
- Insurance inquiries
- Transportation arrangement
- Community resources
- Coordination of care



Education

- IEP meetings
- Weekly sessions
- Student check ins
- School placement discussions
- Training and support for school



ENT

- Result review
- Initial intake
- Medical clearance
- ENT genetic consult



Case Study 1

- First seen at clinic at age 3
 - **RIGHT: mild conductive loss**
 - **LEFT: normal hearing sensitivity**
- Previously advised against amplification
- Hearing aid recommended at age 7
- Family is supportive of device use

- Receives speech and language support at school (30 minutes per week)
- Has some articulation errors
- Continue to show issues with receptive language development



Audiology



Auditory
Verbal Therapy

Case Study 1

- Followed by the clinic since age 3
- 7 surgeries on the right ear
 - Repeated PE tubes and cholesteatoma removal
 - **RIGHT:** mild conductive loss
- Underwent genetic testing for immune deficiency disorder but did not reveal any link to hearing loss
- Aided at age 7 with Phonak device
- Full time use of hearing aid



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Case Study 1

- Has had an IEP for speech and language since age 4 but DHH wasn't included until recently
- Bi-lingual: English and Hebrew
- Retained in Kindergarten for language difficulties
- Recent Functional Listening Evaluation demonstrate significant trouble with listening in noise and auditory fatigue
- Struggles with “feeling different” and will not ask for help
- Often labeled as distract or inattentive even received a diagnosis on ADHD inattentive type



Audiology



**Auditory
Verbal Therapy**



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Education



Psychology

Case Study 2

- First seen at our clinic at the age of 5
 - **LEFT:** normal hearing sensitivity
 - **RIGHT:** profound sensorineural hearing loss
- Recommended to pursue SSD evaluation
- Family elected to monitor

- Receives continuous speech therapy
- 1 year re-evaluation indicates:
 - A severe phonological and articulation delay and motor planning difficulties that need to be ruled out
 - A severe receptive and expressive language delay
 - Receptive and expressive vocabulary skills that are within the average range
 - Some instances of dysfluency (whole word repetitions)



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Case Study 2

- Seen at the age of 7 for an audiologic re-evaluation
- Decrease in better hearing ear
 - **LEFT:** Mild sensorineural hearing loss rising to normal limits
- Normal CT scan
- Genetic testing did not identify a causative DNA variant
- Begin hearing aid use and continues speech therapy
- Poor hearing aid use- DL: 1.6 hrs/day



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Case Study 2

- Developed vitiligo and dental issues
- Followed by neurology who recommends ruling out learning disability, ADHD- inattentive type
- Still not progressing
- Put it touch with other members of the team
 - Psychology for psychoeducational testing
 - Social work for insurance concerns
 - Education for concerns with lack of progress in school



Case Study 3

- First seen at our clinic at the age of 2
 - **LEFT:** maximum conductive hearing loss
 - **RIGHT:** normal hearing sensitivity
 - Hearing loss secondary to microtia/atresia
- Initial intervention was a soft band bone conduction device

- Received continuous family support
- Family had multiple barriers to care:
 - Transportation for appointments
 - Approval of devices recommended
 - Mental health issues for mom
 - Access to stable home environment



Audiology



Social Work

Case Study 3

- Device use was more than 10 hours daily
- Followed in partnership with craniofacial clinic
- Had rip graft ear re-construction in 2023 at neighboring children's hospital
 - Stage 1- required 3 surgeries due to infection
- OSIA device received in June 2024
- Speech and language milestones consistently met
 - Impacts of hearing loss typically have been dismissed



Audiology



Social Work



ENT



**Auditory
Verbal Therapy**

Case Study 3

- Issues with family dynamic: mental health issues (mom)
- Suffered traumatic event: mother passed away
- Early Steps was slow to follow up due to family's inconsistent living conditions
- Pre-K labelled child as a "problem" which followed him into Kindergarten
- Did not receive an IEP until first grade after initially determined to be ineligible
- Demonstrate struggles with coping strategies for both life events and hearing loss
- Functional Listening Evaluation demonstrated challenges in hearing in noise and distance



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Social Work



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Psychology



Education

Unilateral hearing loss cannot be
treated with a one size fits all
approach.

We need to look beyond the
otoscope.



Thank you!

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