Unilateral Hearing Loss in Infants

Why one ear is not enough

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Diagnosis of UHL - the impact

• UHL is diagnosed in the UNHS programs in Australia
• WHO guidelines for screening (Wilson’s Criteria 1968)
  1. The condition should be an important health problem.
  2. There should be a treatment for the condition.
  3. Facilities for diagnosis and treatment should be available.
Problems with one ear/device

- May be harder to listen in quiet (no redundancy)
- Increased difficulty in background noise
- Increased difficulty listening to signal on the poor side/noise on the better side
- Loss of binaural advantage: binaural summation, head shadow, localisation, spatial release from masking

The reasons we advocate for 2 hearing devices are the same reasons we should consider improving access to sound for someone with unilateral hearing

The evidence supporting binaural/bilateral access to sound for people using 1 HA/1 CI is the same evidence supporting us providing improved access to sound with unilateral hearing
The impact for children’s listening

- 35% of children repeated one grade at school
- 13% needed special assistance at school
- Recommended preferential seating but little impact
- Syllable identification poorer than matched controls in various noise levels
- Poorer listening in noise when signal on the side of the poorer ear
- Demonstrated difficulty with sound localisation
- Poorer speech and language scores than sibling controls

The impact for the brain

- f-MRI study investigating differences in auditory listening and executive functioning images between children with unilateral hearing loss and age matched normal hearing siblings
- Some brain areas showed different function with UHL
- Evidence of compromised development of executive functioning
- Observed impact on auditory function AND cognitive function


Demographics at The Shepherd Centre

Distribution of children with bilateral vs. unilateral HL
n=240 children <6 years

- Bilateral: 83%
- Unilateral: 17%

Incidence of unilateral hearing loss in infants approximately 1:10,000 (ASHA)
Amplification choices n=53

- HA 23%
- CI 21%
- Baha 2%
- BC 22%
- no device 32%

Age at fitting: ranges between 3 mths-5 years

- Unilateral SNHL 38
- Unilateral Conductive 7
- Unilateral Mixed 2
- Unilateral ANSD 6
ENT/medical considerations

- 7 permanent conductive: microtia + atresia (counselling needs)
- 3 with possible progressive or hearing that has further progressed to significant bilateral HI
- 2 with head injury/fracture through cochlea
- 13/28 (46%) children with profound UHL have significant cochlear/auditory nerve anomalies (not all children have had MRI)
Unilateral Hearing loss:
Last Standard Language Assessment (n = 32)

We need to consider measurements beyond standardised assessment of language and speech.

What gaps are we seeing?
Theory of Mind skills
Receptive/expressive gaps
Delayed auditory progress

Need to consider the population we have in EI.
Unilateral Hearing Loss: Auditory Comprehension and Expressive Communication

WHOLE GROUP
Expect Auditory Comprehension to be higher than Expressive Communication in typical development

Auditory Comprehension | Expressive Communication

0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160

19/32 (59%) have an auditory comprehension standard score the same, or below, their expressive communication standard score.
Unilateral Hearing Loss: Listening Progress

The Shepherd Centre Auditory Hierarchy © 2013
Early Intervention model

• Children may attend weekly/fortnightly/monthly AVT sessions with audiology & Family Counselling support
• Progress to 1/mth for monitoring (centre-based/remote)
• Early MRI scan to support family future choices
• Hearing devices & CI evaluation as required
• Children using their listening deserve an opportunity to access binaural listening if possible
• Research evidence supports diagnosis, thorough investigation and access to EI and educational support
• The available choices may change over time
• The right solution may change over time
Consulting with literature

School continued to be a challenge, too. When I was in grade school I had tested my way into the “gifted and talented” track. At the start of junior high I was once again placed with the gifted children. I wouldn’t have made it on the basis of my grades—I was never a good student. But entrance to the gifted track was gauged purely on some sort of intelligence test. While my IQ apparently qualified me, I remained at the bottom of the class. I was the one they scratched their heads about—I guess they thought I didn’t want to learn. What they failed to realize was that my ear put me at a terrible disadvantage. I simply couldn’t hear a lot of what was said in class. And if I missed a sentence, I was lost. Once I got lost, I surrendered. I gave up because I’d lost the thread.

At parent-teacher conferences the teachers always told my parents the same things: “He’s bright but he doesn’t apply himself,” or,
# The Shepherd Centre team

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“Thanks for listening this much!”