Effect of sign language exposure on speech perception and intelligibility in children with cochlear implants

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Should all deaf children learn sign language?

- The benefits of learning sign language clearly outweigh the risks.
- For parents and families who are willing and able, this approach seems clearly preferable to an approach that focuses solely on oral communication.
- Early and continued exposure to sign language may provide a framework for early spoken language development.

Research questions

• Does the use of sign language following cochlear implantation provide advantages for speech perception or speech intelligibility?

• Does the use of sign language interfere with development of speech perception or intelligible speech?
Research Design

• Children in the CDaCI sample with speech intelligibility scores at 4-5 and 6-7 years post implant
Participants ($n = 122$)

<table>
<thead>
<tr>
<th></th>
<th>No sign exposure $n = 42$</th>
<th>Early sign exposure $n = 36$</th>
<th>Continued sign exposure $n = 44$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age at CI activation</td>
<td>27.60 (15.95)</td>
<td>28.64 (14.24)</td>
<td>29.07 (14.32)</td>
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<tr>
<td>Mean IT-MAIS, Baseline</td>
<td>32.14 (28.46)</td>
<td>22.71 (23.88)</td>
<td>16.25 (18.54)</td>
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$p = .007$

- *Early sign* = Baseline and/or 1 year post-CI
- *Continued sign* = 1-3 years post-CI
Speech perception

• Speech Recognition Index in Quiet (SRI-Q)
  – Cumulative index (0-600)
  – Combines results across tests in quiet
  – Sensitive to change over time

• 12, 24, and 36 months post-implant

Wang et al., 2008.
DIGITAL RECORDINGS, McGARR STIMULI
Listener hears a child or sentence once

WRITTEN WORD-LEVEL JUDGMENTS
3 naive adult listeners with normal hearing

SPEECH INTELLIGIBILITY (%) CALCULATED
Key word identification
Results – Speech perception

Speech Recognition Index - Quiet

Duration of CI experience

12 months  24 months  36 months

No Sign  Early Sign  Continued Sign

HINT-C  PBK  M/LNT  PSI  ESP  IT/MAIS

p < .05

p < .01

p < .001


Results – Speech intelligibility

- Speech Intelligibility
  - Duration of CI experience
    - 48-60 months
      - No Sign: 0%
      - Early Sign: 25%
      - Continued Sign: 50%
    - 72-84 months
      - No Sign: 25%
      - Early Sign: 50%
      - Continued Sign: 75%

- p < .01
- p < .001

Duration of CI experience:
- No Sign
- Early Sign
- Continued Sign
• Continued use of sign language was associated with poorer auditory speech perception over the first 3 years of device use.

• Continued sign language exposure corresponded with lower speech intelligibility at 6-7 years post-CI.

• Early exposure to sign (pre-implant and/or year 1) did not interfere with either speech perception or speech intelligibility.
Discussion

• Sign language exposure does not benefit and may interfere with speech perception and speech intelligibility.

• Future work will focus on the effect of sign language exposure on spoken language, academic, and social skills.
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