Speech perception, production and language outcomes for children who receive cochlear implants under 12 months: A multi-centre study

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Decreasing age at implant over time, N=802

Data from Cochlear Implant Program, Melbourne, VIC, Australia

Age at first implant operation from 1985 to 2014

First CI < 12 mo
Data from three databases

All three centres have:

- Prospective assessment protocols
- Paediatric databases
- Assessment at similar time points post implant
  - School entry (5 years of age)
  - 8 to 10 years of age
1. What is the influence of age at implant on speech perception, language and speech production?

<table>
<thead>
<tr>
<th>Group</th>
<th>Age range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>younger than 12 mo at first CI</td>
</tr>
<tr>
<td>2</td>
<td>between 13 and 18 mo</td>
</tr>
<tr>
<td>3</td>
<td>between 19 and 24 mo</td>
</tr>
<tr>
<td>4</td>
<td>between 25 and 42 mo</td>
</tr>
<tr>
<td>5</td>
<td>between 43 and 72 mo</td>
</tr>
</tbody>
</table>

2. Do more children who received CI(s) younger than 12 months demonstrate language that is with the same range as hearing peers?
Participants

- Congenital, bilateral, stable profound hearing loss
  (excluded progressive and acquired hearing loss)

- Cognitive skills ranging from low average - average – accelerated
  (excluded mild/moderate/severe learning delay/disability)

- Used a range of communication approaches, bilateral and unilateral CIs
Speech Perception Results

Language Results

Speech Production Results
Speech Perception: \( n=125 \) at 5 years of age/school entry (audition alone word, phoneme and sentence understanding)

1,2,3 > 4,5

Speech Perception: n=81 at age 8 to 10 years of age (audition alone word, phoneme and sentence understanding)

Language Outcomes: PLS-4&5, n=95 at school entry

64% within the normal range

Language Outcomes: PPVT, n=207 at school entry

80% within the normal range

Language Outcomes: CELF n=122

58% within the normal range

Speech Production Results

Speech Perception Results

Language Results

Speech Production Results
Speech Production: DEAP n=76 at school entry

Conclusions

Provision of cochlear implants

- Younger than 24 months: to optimise speech perception
- Younger than 12 months: to facilitate speech production
- Younger than 12 months: to enable language acquisition to be in the same range as normally hearing peers
Conclusions

Provision of cochlear implants

- Younger than 24 months: to optimise speech perception
- Younger than 12 months: to facilitate speech production
- Younger than 12 months: 80% of children who received CIs younger than 12 months demonstrated receptive vocabulary within the normal range by school entry
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Collaborative Partners

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