Is early intervention necessary for children with partial hearing?

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Disclosure

Kate Hanvey – None
Katherine Wilson – None
# Acknowledgements

<table>
<thead>
<tr>
<th>Midlands Hearing Implant Programme</th>
<th>St Thomas’ Hearing Implant Centre</th>
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<tbody>
<tr>
<td>Konstance Tzifa</td>
<td>Alice Montgomery</td>
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<tr>
<td>Marette Ambler</td>
<td>Marsha Jenkins</td>
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<tr>
<td>Justine Maggs</td>
<td>Carolina Leal</td>
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<tr>
<td>Richard Irving</td>
<td>Ashok Waghe</td>
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<tr>
<td>Anita Pretorius</td>
<td>Tisa Thomas</td>
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<tr>
<td>Sadia Zoolfqar</td>
<td>Kirsty Moorish</td>
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<tr>
<td>Hannah Ager</td>
<td>Sandra Driver</td>
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<tr>
<td>Lynette Pienaar</td>
<td>Kath Webb</td>
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<td>Chris Dipple</td>
<td>Hazel Walters</td>
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<tr>
<td>Sahira Saeed</td>
<td>Dan Jiang</td>
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<td>Rachel Mason</td>
<td>Irumee Pai</td>
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<td>Jo Williams</td>
<td>Gavin Morrison</td>
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<td>Sophie Harris</td>
<td>Heather Crofts</td>
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<td>Catharine Clarkson</td>
<td>Linda Baxter</td>
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<td></td>
<td>Jo Garvey</td>
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<td>Jeanette Martin</td>
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Children are not small adults

Children do not fill in the gaps

Children need all the help they can get to acquire language
<table>
<thead>
<tr>
<th>Adult with progressive or acquired high frequency loss</th>
<th>Child with pre / peri-lingual high frequency loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Established oral communication: Vocabulary, Syntax, Morphology</td>
<td>Vocabulary, Syntax, and limited Morphology</td>
</tr>
<tr>
<td>Established conversational repair strategies; Established Theory of Mind</td>
<td>Limited conversational repair strategies; At risk of pragmatic impairment and difficulty with ToM</td>
</tr>
<tr>
<td>Aware that they are missing part of the message</td>
<td>Unaware they are missing the message or completely missing part of the message</td>
</tr>
<tr>
<td>Established Literacy</td>
<td></td>
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**Ability to use Top-Down Processing using established knowledge**

**Widening of language gap – “Gap Openers” (Yoshinaga-Itano et al. 2010)**

Children do not fill in the gaps

Children need all the help they can get to acquire language
Data from Birmingham Children’s Hospital and St Thomas’ Hospital

<table>
<thead>
<tr>
<th></th>
<th>Number of patients</th>
<th>Age at op Mean</th>
<th>Length of implant use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>47</td>
<td>1.2yrs – 17.7yrs</td>
<td>1m – 9.11yrs</td>
</tr>
<tr>
<td>Number of ears</td>
<td>74 (35 EAS)</td>
<td>7.2yrs</td>
<td></td>
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</tbody>
</table>

- Children implanted 2008-2017
- Partial hearing $\leq$ 65dBHL at one or more low/mid frequencies
- Implanted with AB, Cochlear, Med EL
Surgery

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of Children</th>
</tr>
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<tbody>
<tr>
<td>Bilateral (Simultaneous)</td>
<td>22</td>
</tr>
<tr>
<td>Unilateral</td>
<td>25</td>
</tr>
<tr>
<td>Bilateral (Sequential)</td>
<td>10</td>
</tr>
<tr>
<td>Total Bilateral (sim and seq)</td>
<td>32</td>
</tr>
<tr>
<td>Total Unilateral</td>
<td>15</td>
</tr>
</tbody>
</table>
Hearing Preservation

**Number of Ears**

- **Activation**
  - Complete
  - Partial
  - Minimal
  - Total Loss
  - N = 62

- **1-8 yrs Post Activation**
  - Complete
  - Partial
  - Minimal
  - Total Loss
  - N = 53

HEARRING calculation template – Skarzynski et al 2015
Aetiology/Disorder

- CMV
- Meningo-encephalitis
- Waardenburg's
- Genetic
- Rogers Syndrome
- Unknown
- EVA
- ANSD

Guy's and St Thomas' NHS Foundation Trust

Birmingham Women's and Children's NHS Foundation Trust
Hearing Preservation and Aetiology

- **EVA**
  - Complete: 4
  - Partial: 2
  - Minimal: 4
  - Total Loss: 2
  - No Results: 3

- **ANSD**
  - Complete: 4
  - Partial: 2
  - Minimal: 1
  - Total Loss: 14

- **All Others**
  - Complete: 6
  - Partial: 14
  - Minimal: 5
  - Total Loss: 21
  - No Results: 10

Ears: 0% 20% 40% 60% 80% 100%
CAP Rating Pre-implant vs post-implant

Number of children

CAP Score

n=48

n=42

Pre-implant

Post-implant

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Language Delay

**Pre-Implant**
- normal: 5
- mild: 15
- moderate: 10
- severe: 10
- n=46

**Post-Implant**
- normal: 7
- mild: 10
- moderate: 8
- severe: 7
- n=42
The Younger the Better!

Age vs Progress

<table>
<thead>
<tr>
<th>Percentage of Children</th>
<th>Progress</th>
<th>No Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 4</td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td>4 to 7</td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td>8+</td>
<td></td>
<td>0%</td>
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n=37

Speech Intelligibility

“Progress”: child has moved up ≥ 1 level in SIR

“No Progress”: child has not moved up any levels in SIR

Birmingham Women’s and Children’s NHS Foundation Trust

Guy’s and St Thomas’ NHS Foundation Trust
Staged vs. Simultaneous Bilateral Surgery: Parental Perceptions Questionnaire

- ALL parents reported that their child’s implant(s) outperformed their hearing aids:
  - regardless of staged (sequential) or simultaneous surgery
  - regardless of level of preservation of hearing

J Maggs
Staged vs. Simultaneous Bilateral Surgery: Parental Perceptions - Questionnaire

- Mismatch between pre-implant concerns and reality:
  - 73% of the staged group IMAGINED that they would NOT have coped easily without hearing between surgery and fitting – they perceived difficulties
  - 75% of simultaneous bilateral children were reported to have coped easily

J Maggs
Staged vs. Simultaneous Bilateral Surgery: Parental Perceptions - Questionnaire

• If staged not an option, 96% would choose Simultaneous Bilateral

For parents of young children with partial hearing, the reality of Simultaneous Bilateral surgery DOES seem to be better than the envisioned one!

J Maggs
Summary

Our data set for children with partial hearing shows:

- Bilateral implants > Unilateral implants
- Long-term preservation of hearing is possible (8 yrs)
- Substantial functional benefit on post-implant CAP and language scores
- Improvements in speech intelligibility is age-dependent
- Parental feedback, regardless of staged vs. simultaneous bilateral surgery, is positive
Conclusion

Potential

Learn

and

Speech

and

Language

Listen

and

Process

Efficiently

Listen

Language

Speech

Speech

Speech

Language

Speech

Speech

Speech

Language

Speech

Speech

Speech

Language

Listen

Listen

Listen

Listen

Listen

Listen

Listen

Listen

Audible

Signal

Audible

Signal

Audible

Signal

Audible

Signal

Audible

Signal
Children are not small adults!
Thank you for listening

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