



Hear and Say Centre

for children who are deaf/hearing impaired
and their families

Bilateral Cochlear Implants

**Experiences in an
Auditory-Verbal Program**

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Outline of Presentation

- History of the Hear and Say Centre
- Beginnings of Bilateral Cochlear Implants
- The First Three Children
- Audiological Considerations
 - Older Children
 - Babies
- Auditory-Verbal Therapy Post-Implant
 - Older Children
 - Babies

The Hear and Say Centre

- An Early Intervention Centre
- Auditory-Verbal Therapy
- Cochlear implant program began 1992
- 119 children with cochlear implants

Bilateral Beginnings

- Currently 20 children with bilateral cochlear implants
- Began end 2005 with three children
- First three implanted due to parental request and clinical history

The First Three Children

1. MA

- Parental research and request
- Mild CP –balance issues when trying to localise sounds
- 4 yrs 9 months between implants (2.0yrs and 6.9yrs)
- No benefit from a hearing aid in non-implant ear

2. JM

- Parental research and request
- Auditory-Neuropathy/Dysynchrony
- Difficulties processing in the classroom situation
- 5 years 1 month between implants (2.7yrs and 7.8yrs)
- Did not benefit from the bimodal condition

3. JW

- Parental research and request
- Indication of Auditory Dysynchrony
- 4 years 8 months between implants (1.9yrs and 6.5yrs)
- Minimal benefit from hearing aid in non-implant ear

Audiological Considerations

- Minimal or no benefit in the bimodal condition
- Consistent user of initial implant
- No medical contra-indications
- Meningitis
- Realistic expectations

Time Lapse Between Two Cochlear Implants

- Children currently with bilateral CIs have had from 3 months to 12 years between implants
- Pre-implant assessment and post-implant therapy requirements differ depending on amount of time between implants

Pre-Implant Assessment – Older Children

- Hearing Aid trial if not in bimodal condition
- Audiological tests/assessments:
 - Audiogram
 - ABR/ ASSR/ CM/ OAEs
 - Acoustic Immittance
 - Speech Perception
- Counselling
 - Realistic outcome expectations- parents and child
 - Preparation for sound quality/perception at switch-on
- Medical and Psychology review
- Team meeting

Post Implant MAPping – Older Children

- Switch-on over 2 days
- Weekly MAPs for first 4-6 weeks
- Monthly for 6-12 months
- 3 monthly in second year and then 6 monthly
- Speech perception assessments 6 monthly for first two years and then annually

Pre-Implant Assessment - Babies

- < 12 months between implants
- Limited repeat audiological assessments
- Medical review
- Psychology review and team meeting only if necessary
- Expectation counselling

Post Implant MAPping - Babies

- Switch-on over 2 days
- MAPped weekly for 4-6 weeks*
- Monthly for 6-12 months
- 3 monthly in second year then 6 monthly
- 6 monthly assessments for first two years and then annual assessments

*Need to be flexible with MAPping schedule because infants tire quickly of MAPping routine

A-V Therapy for Second CI – Older Children

- Commence therapy immediately after switch-on
- Encourage wearing of second CI all waking hours (i.e. wear both CIs)
- Some time each day with new implant alone
- Initially, explain the activity to the child with both CIs on, then switch off/remove first CI*

*Drop this step as soon as possible – just start the lesson with only second CI switched on. If necessary, completely remove first CI rather than just switch it off

A-V Therapy for Second CI (cont)

- Conduct at least part of each lesson with the child wearing new implant only
- Aim to have complete lesson with new implant only, as soon as possible
- **TEACH** not test (try to minimize failure)
- Follow the hierarchy of IEP GOAL Writer
- Parents to follow through with therapy each day at home

A-V Therapy for Second CI (cont)

- Start at the beginning (use IEP GOAL Writer)
 - Detection, then identification of Ling Sounds
 - Learning to Listen Sounds
 - Songs/Rhymes
 - Phrase Cards
 - One item direction and selection
 - Two item direction and selection (and so on)
 - Descriptives
 - Continue through hierarchical audition goals
 - Include more open set conversation naturally
 - “What did you hear?” – Auditory Feedback

IEP for Second Implant

- Write an IEP for Audition only
- Suggest family looks after recognition of environmental/home sounds
- Concentrate on child's processing of spoken language tasks
- Aim to accelerate progress

How Long Does AVT Continue?

- Ideally, therapy should continue until child is:
 - Wearing both CIs all waking hours
 - Willing to wear only second CI for therapy and for some time at home each day
 - Achieving closed set auditory tasks with only second implant at a similar level to that achieved with first implant
 - Following some open-set conversation with second cochlear implant only

Example of Progress

2 months post switch-on:

- Identification of Ling Sounds at 3 metres
- Multi-element closed set directions
- Identify from descriptives
- Some open set comprehension
- Auditory Feedback developing
- Wears only second implant for full hour
- Wearing both cochlear implants all day

Conclusion

- It must be **FUN**
- Each child is different
- Some children take longer to get moving
- Some children may not reach the same level of auditory skills as achieved with first implant
- Come to a decision with the parents when regular therapy should cease

General Observations

- Hard work for all concerned at beginning
- Followed Auditory Development hierarchy from IEP GOAL Writer
- Parents encouraged to conduct specific therapy lessons at home, second CI only, immediately following switch-on
- Parents continue to conduct at least one short activity, each day, with second implant only, for some time
- Child to wear only second CI for short periods

Speech Perception Results

JM: 5.1yrs between implants (2.7yrs and 7.8yrs)

9 months post **right** bilateral implant

▪ BKB Sentences Live Voice (Quiet)

- **88% (R)** 98% (L)

▪ CNC Words Live Voice (Quiet)

- Word Score: **56% (R)** 68% (L)
- Phoneme Score: **80% (R)** 89% (L)
- Vowel Score: **84% (R)** 100% (L)
- Consonant Score: **78% (R)** 84% (L)

Speech Perception Results

MA: 4.9yrs between implants (2.0yrs and 6.9yrs)
6 months post **left** bilateral implant

▪ CNC Words Live Voice (Quiet)

- | | | |
|--------------------|----------------|---------|
| • Word Score: | 8% (L) | 76% (R) |
| • Phoneme Score: | 43% (L) | 91% (R) |
| • Vowel Score: | 48% (L) | 92% (R) |
| • Consonant Score: | 40% (L) | 90% (R) |

Speech Perception Results

JW: 4.8yrs between implants (1.9yrs and 6.5yrs)
7.5 months post **right** bilateral implant

- BKB Sentences Live Voice (Quiet)
 - **87%(R)** 100%(L)

- Manchester Junior Words Recorded (Quiet)
 - Word Score: **70%(R)** 80%(L)
 - Phoneme Score: **85%(R)** 90%(L)

Speech Perception Results

MR: 11.7yrs between implants (3.0yrs & 14.7yrs)

6 months post **left** bilateral implant

▪ BKB Sentences Recorded 65dBA (Quiet)

- **66%(L)** **100%(R)**

▪ CNC Words Recorded 65dBA + 10dB SNR

- Word: **4%(L)** 32%(R) **72% both**
- Phoneme: **13%(L)** 67%(R) **90% both**
- Vowel: **20%(L)** 76%(R) **96% both**
- Consonant: **10%(L)** 58%(R) **84% both**

A-V Therapy Post Second CI - Babies

- Wear both CIs immediately after switch-on
- Conduct part of each therapy lesson with new implant only
- Aim for auditory skills on second side to reach level of skills on first side ASAP
- Continue to do Ling Sounds separate ears

Observations

- The closer together the two switch-ons, the less time needed conducting therapy separate sides
- Often takes just a few weeks until the second side reaches the auditory level of the first side
- Parents report child locating sound soon after second implant (child was 12 months and 14 months of age at switch-ons)

Factors Affecting Progress (Anecdotal)

- Age at first and second cochlear implant
- Time lapse between two cochlear implants
- Whether or not hearing aid is worn in the years prior to second implant (nothing conclusive)
- Consistent wearing of second implant
- Regular MAPping of both cochlear implants
- Some time wearing new implant alone in the weeks following second switch-on
- Wearing second implant all the time