TWO IS BETTER THAN ONE AND ONE IS BETTER THAN TWO

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1. The University of Melbourne
2. The HEARing CRC
3. The Cochlear Implant Clinic
Royal Victorian Eye and Ear Hospital
EARs ARE

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TWO IS BETTER THAN ONE AND
ONE YEAR OF AGE IS BETTER THAN TWO

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DISCLOSURES

The University of Melbourne is a member organisation of the HEARing Cooperative Research Centre.

The Department of Audiology and Speech Pathology at The University of Melbourne received research funding in the past from Cochlear Limited.
BEFORE ONE (YEAR OF AGE) IS BETTER THAN TWO
HEARing Co-operative Research Centres

**LANGUAGE RESULTS: PPVT**

**PPVT n=207 at school entry**

Results consistent when tested with PLS & CELF also

TWO \( \text{EÅRs} \) ARE BETTER THAN ONE: BILATERAL VS UNILATERAL

- Localisation
- Head shadow effect
- Listening in noise

In paediatric CI users
- Logistics...parental reports...having a ‘back-up’
  (less brain/auditory deprivation if one side is off for repair)
- Speech perception benefits
- Language benefits
RESEARCH QUESTIONS

1. TWO (EARS) ARE BETTER THAN ONE.
   The relative influence of unilateral, bilateral sequential, bilateral simultaneous implants in addition to other child and family covariates will be explored.

2. BEFORE ONE (YEAR OF AGE) IS BETTER THAN TWO.
   Children who received CIs younger than 12 months will demonstrate optimum language and speech perception outcomes compared to groups of children who receive their CI(s) later.
PARTICIPANTS

CIC Paediatric Database N=1200+

Included: data regarding age-at-implant n=994 and unilateral-sequential-simultaneous n=951

Divided into four decades
1980-1989 n=22
1990-1999 n=175
2000-2009 n=387
2010-2019 n=367
Decade
2010-2019
2000-2009
1990-1999
1980-1989

CI type as percentage of total surgeries

Bilateral Simultaneous
Bilateral Sequential
Unilateral

N=22
N=175
N=387
N=367

Pearson Chi-Square = 179.5
DF = 6, p < 0.001
A SNAP-SHOT OF SOME LANGUAGE RESULTS

BUT HISTORY PLAYS A ROLE (!)

age-at-first-implant for

unilateral

bilateral sequential

bilateral simultaneous
BUT !! THERE ARE COMPLEX ASSOCIATIONS

**Historical**

- Those with Unilateral CI
  - tended to be older at CI (back in the day)
  - had used old technology (e.g., sprint/spectra/3G from switch on and for the first 12 months of use)

**Environmental and Device Associations**

- those with poorer hearing (higher PTA) tended to go ahead with CIs earlier ($p=0.002$)
- children with additional special needs (diagnosed delay/disorder in cognitive function) tended to come from families with lower relative socio-economic advantage ($p<0.001$)
If we examine **most recent data** - those who received CIs younger have greater device experience

- If we set an **age at test** (e.g. 5 years of age) - those who received CIs older have less device experience

- If we set a **duration post-implant** (e.g., all 2 years post-CI) - those who received CIs older will be more mature (more able to do the tests?)
METHOD

CIC Paediatric Database N=994

**Excluded:** progressive hearing loss

**Included:** age of implant 0.3 to 3;6 years, results at school entry (aged 4 to 7 years of age)

**Language:** RITLS, CDI, PLS, PPVT (CLIP)

**Speech Perception:** Open-set Words, Phonemes, Sentences (CAPI)
LANGUAGE RESULTS:
TWO (EARS) ARE BETTER THAN ONE
SPEECH PERCEPTION RESULTS: TWO (EARS) ARE BETTER THAN ONE
LANGUAGE RESULTS:
BEFORE ONE (YEAR OF AGE) IS BETTER THAN TWO
Speech Perception Results: Before One (Year of Age) is Better Than Two

- 24-42 months (n=113)
- 13-24 months (n=114)
- 3-12 months (n=45)

Open-set Words (Audition Alone) % Correct Phonemes

Age at First CI (years)
CONCLUSIONS:
UNILATERAL
BILATERAL SEQUENTIAL
BILATERAL SIMULTANEOUS

a history lesson
and
a statistics lesson
THANK YOU

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