Academic outcomes for early-implanted mid-elementary school children with unilateral and bilateral cochlear implants

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• Little objective evidence worldwide re academic outcomes for children with CIs
• Difficult to directly compare performance of children with CIs to that of typically developing children with normal hearing
• Significant perceptual benefits for children with bilateral CIs, but the effect of bilateral CIs on academic outcomes has not yet been examined.
Background

5-year longitudinal study (2009-2014):

• To investigate whether bilateral CIs at a young age give children a greater ability to learn than children with unilateral CIs.
• To provide some of the first data worldwide comparing the effects of two CIs on language, social & academic outcomes.

• Do children with two implants have
  – better language outcomes?
  – better social outcomes?
  – better academic outcomes?
  – less disability, in terms of functional listening skills in daily life?
• How do academic outcomes compare with the normative means?
• Is there a significant difference in academic outcomes for children with unilateral and bilateral cochlear CIs?
• What are the predictive factors for academic outcomes?
  – N = 106, aged 8 years
  – 83 bilateral CIs
  – 23 unilateral CIs
• Wechsler Individual Academic Achievement Test
• Broad range of academic skills in 4 composite areas:
  – Maths
  – Written Language
  – Oral Language
  – Reading
• Age-based standard scores
• 1.5 - 2 hours
Overall academic achievement at 7-8 years

N = 106
Unilateral vs bilateral academic achievement at 7-8 years

N = 106 (83 bilaterals, 23 unilaterals)
Predictive factors

- Bilateral CIs
- Younger age at CI2
- Hearing aid use after CI1
- More time reading
- Higher IQ
- Parent participation
- Earlier birth order
- 40-53% of variance accounted for
Effect sizes

- Girls benefit more from bilateral CIs than boys, except with Maths.
- Age at CI2 effect sizes are small.
- HA use after CI1 makes a considerable difference.
- Parent participation still important for older school-aged children.
- Parent tertiary education makes a small contribution to language outcomes.
Conclusions

• Children with CIs can achieve academic outcomes close to those of their normal hearing peers
• Bilateral CIs facilitate significantly better results
• Practical findings of clinical relevance include the importance of parenting practices:
  – Parent involvement
  – Reinforcing reading
  – Use of hearing aids
• Hearing aid use after the first CI is still important