Development of Instrument Identification Abilities in Children with Cochlear Implants and Normal Hearing

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Support

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Evaluation of Performance with the MED-EL Cochlear Implant

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Sound of Hope
Children’s Hearing Loss Program
Disclosures

- Runge
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  - Research consultant, Novartis Corp

- Friedland
  - Surgical Advisory Board, MED-EL Corp
Introduction

• Adult cochlear implant users have difficulties with music perception and enjoyment
• Post-lingually implanted adults develop music perception acoustically then adapt to electric hearing
• Would music perception be better if it was exclusively developed with electric hearing?
Purpose

• Measure instrument identification skills for implanted compared to normal-hearing children across ages

• Hypothesis: Implanted children will be able to identify instruments as well as normal-hearing children
Subjects

• NH children n=65
  – Age range 5-17y (avg 8.8y)
• CI children n=24
  – Congenital severe-profound hearing loss
  – Age range 5-17y (avg 10.2y)
  – Age of implantation avg 2.5y
  – AB=6; Cochlear=10; MED-EL=6
• CI adults n=57
  – AB=10; Cochlear=32; MED-EL=15
Stimuli

- Octave scales of 6 instruments
  - Flute, clarinet, trumpet, organ, alto sax, violin
- Presented in soundfield at 65 dBA
- Administered using the Mu.S.I.C. Perception Test software (H&D Fitzgerald; Brockmeier et al., 2011)
Procedures

- Closed-set identification task
- 35 randomized instrument scale presentations
- Scored as percent correct
Results – All Instruments

NH $r = 0.78$, $p < 0.001$

CI $r = 0.25$, $p = 0.23$

Instrument Identification (% correct)

Chronological Age at Test (years)
Instrument Identification Summary

• NH children showed significant improvement with increased age
• CI children showed little improvement with increased age
• Best performance of all groups with violin
  – Only stringed instrument in test
Conclusions

• Despite almost exclusive development with electrical hearing, prelingually-deafened implanted children performed similarly to postlingually-deafened adults.

• Results indicate need for improved representation of musical qualities in CI sound processing.