Bimodal Devices on Children: A Survey of Clinician Fitting Practices in North America

Lisa Davidson, PhD
Washington University School of Medicine, St. Louis, MO

Dave Gordey, PhD Candidate
Oticon A/S, Smørum, Denmark

Sheila Moodie, PhD
Western University, London, ON
Disclosures

- This project received financial support from Oticon A/S.

- Dave Gordey is an employee of Oticon A/S.
Contributor Acknowledgements

The KIPA Group
Introduction

- Innovations in hearing aid and cochlear implant technologies mean children with hearing loss have more access to auditory information and more opportunities to develop age appropriate spoken language (Cole & Flexer, 2007).

- There are evidence-based fitting protocols for air conduction hearing aids to provide optimal amplification to infants and young children (e.g. AAA, 2013, Bagatto et al., 2010).

- To our knowledge, there are no agreed upon evidence based fitting protocols for children using bimodal devices.
Study Objective

- Anecdotal evidence and published research suggests that clinicians feel the fitting and management process of bimodal devices to children is “uncertain.”

- A survey was developed to gather information regarding clinical management of bimodal devices for pediatric patients seen at clinics within North America.

- We were interested in what procedures and protocols were used to fit/program and verify the HA and the CI for bimodal devices.
What is Bimodal?
A combination of two technologies

Acoustic Hearing Instrument

Electrical Cochlear Implant
In general, adult and pediatric studies have demonstrated benefits of using a hearing aid in the non-implanted ear.

Benefits may include: speech perception in quiet and noise, localization, speech quality, music appreciation/recognition & ease of listening.

Benefits may vary across individuals and conditions.
Increase in Bimodal (Reyes, 2015)

- 2002: 10% were bimodal users (Tyler et al.)
- 2009: ~30% (Fitzpatrick et al.)
- 2010: >50% with aidable hearing in non-CI ear (Dorman & Gifford)
Survey Results

- A web-based survey was sent out to approximately 300 clinicians, and 85 responded.

- The survey was posted on the ACI blog; and distributed to pediatric clinics and hospitals identified from cochlear implant manufacturer websites and hearing aid manufacturers in the United States and Canada.

- Survey questions requested information about clinical practices when fitting cochlear implants, hearing aids and bimodal devices in children.
Which best describes your role in a bimodal fitting?

- Fit/Manage CI's only: 17.6%
- Fit/Manage HA's only: 27.9%
- Fit/Manage both CI's and HA's: 54.4%
Variability in mapping procedures for children with cochlear implants exist, likely due to CI manufacturer recommendations, and age of child. (i.e. one company may recommend measuring “T” levels, others may not).

A high percentage of participants reported using objective measures (NRT/NRI) across all age groups. This may reflect the desire to verify/support their behavioural measurements.

The use of loudness balancing and scaling were utilized for less than half of the children aged 4 to 10 years old, and almost never with children from birth to 3 years old. This may reflect clinician’s uncertainty with obtaining reliable measures with these test tools on younger children.
Verification Procedures for Cochlear Implants

- Compared to hearing aids, there are a lack of standardized verification procedures for cochlear implants.

- Other than speech discrimination testing, the use of verification/outcome testing was highly variable and measures were not age dependent.
A clear majority (80%) are using an evidence-based prescriptive method to fit hearing aids to children (e.g. DSL).

Verification (RECD, REAL EAR, Test Box) measures are age dependent, and relate to the cooperation of the child.

Outcome measures for children with hearing aids were variable, but used more with older children.
Fitting and Verification
Bimodal Devices

- There is considerable uncertainty regarding verification of bimodal fittings. This reflects the lack of standardized verification procedures for bimodal fittings.

- Participants reported using speech perception testing for older children as their primary method of verification and as an outcome measure.

- For those who manage CI only or HA only, some participants commented that they were reluctant to make or recommend adjustments to the device they did not fit.
Summary

- Compared to hearing aids, the verification and outcome measures used for cochlear implants are highly variable. Only half of the participants report that they fit both hearing aids and cochlear implants, which makes coordinated hearing care for children using bimodal devices challenging.

- We have confirmed that due to the lack of evidence-based fitting protocols for bimodal devices, the majority of clinicians are using their own, internally developed fitting protocol/guideline, or are not using a systematic protocol/guideline at all.
Future Directions

- Development of evidence-based clinical guidelines that can be translated into practical fitting strategies for clinicians working with bimodal devices and children. This could help establish recommendations for moving from bimodal devices to bilateral cochlear implants.

- Hearing industry software and fitting tools that are optimized for bimodal device fittings.

- Explore age related outcomes for children and bimodal fittings that help us understand what are acceptable fittings and exceptional fittings.