Alternative methods of testing hearing in children

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The presenters have no relevant financial or nonfinancial relationships in the products or services described, reviewed, evaluated or compared in this presentation.

Subject consent was obtained for all photographs used in this presentation.
Outline

• V-VRA vs A-VRA in Children with ASD or other DD
• VRA in the Home
• Reaching for Sound
• Early Childhood Hearing Outreach (ECHO)
• Out of Hospital (OOH) Hearing Clinics
Visual Reinforcement Audiometry Versus Video Visual Reinforcement Audiometry in Children with Autism Spectrum Disorder or Other Developmental Disabilities

Jon C. Douglas, Au.D.
Megan Costanzo, B.A., Audiology Extern
VRA Set-Up
V-VRA Set-Up
Participants

• Inclusion criteria
  • Children referred to the Waisman Center with ASD or other developmental disabilities
  • Children from 6 mos. to 6 years of age who can be assessed through VRA

• Exclusion criteria
  • Children who cannot be reliably tested through VRA
Response Consistency

Comparison of method VRA V-VRA

p = 0.940
Response Consistency Comparison

Current Study

Lowery, von Hapsburg, Plyler, and Johnstone[7]
Summary of Findings

- No significant difference between VRA and V-VRA
  - Number of head turns
  - Hit rate
- No child reacted negatively to V-VRA
- V-VRA viable option for testing hearing in children with ASD or other developmental disabilities
Visual Reinforcement Audiometry in the Home

Bridget Shanahan, B.S.
Jon C. Douglas, Au.D.
Purpose

• This study will examine the effectiveness of screening children ages 6 months to 3 years old using portable visual reinforced audiometry (VRA) in soundfield in their homes.

• If proven successful, portable VRA can screen children with developmental delays and/or various disabilities in a least restrictive environment (which could be the home). It can also service families and children in rural communities that are unable to get to an Audiology Clinic.
Participants

• Children ages 6 months to 2.5/3 years old
• Present OAEs in both ears
Equipment

• Testing with a portable VRA system can be completed by using the appropriate equipment. This includes a
  • loudspeaker,
  • a reinforcement toy or animated picture,
  • an external computer monitor (to display the animated pictures), and
  • a laptop that runs the audiometer software - the audiometer should still follow the ANSI audiometer standard of presenting the correct signal level in the patient’s location.

• There are no standards for dimensions of the room, test stimuli, determination of soundfield type, or loudspeaker design. Ideal test conditions should have speakers strategically placed around the center point of the room.
Reaching For Sound

Amy Hartman, Au.D.
Kaitlin O’Brien, B.S.
Purpose

• Current methods – VRA
  • Limited number of responses
  • Simple reinforcers used
  • Some kids just don’t like VRA!
Background

Reaching Tasks

• Evaluating localization skills
  Perris & Clifton, 1988, Hillier, Hewitt, & Morrongiello, 1992

• Novel reaching for sound method
  Litovsky, Ehlers, Hess, & Harris, 2013
Methods

• Participants
  • Children between the ages of 24-47 months
  • Typically developing, native English speakers with no known hearing loss, and have no prior knowledge of the experiment

• Auditory thresholds will be established using both the traditional VRA and the RFS method in a sound booth
Reaching for sound set up
Testing
Preliminary Results
Discussion

• Need more data!
• Requires three testers
• Requires an apparatus
• Requires more tangible reinforcers

• May be a good step before referring for ABR
ECHO Initiative: Improving the Identification of Hearing Loss in the Birth to Three Population

Amy Hartman, Au.D.; Krista Sershen, B.S.
Head Start

• § 1308.6 Assessment of children
  • “Grantees must provide for developmental, hearing and vision screenings of all Early Head Start and Head Start children within 45 days of the child's entry into the program.” (U.S. Department of Health and Human Services, 2008)

• Manner of screening is not specified
  • Parent/physician report
  • Subjective observation
  • Newborn hearing screening

(Eiserman et al., 2007)
Wisconsin Early Childhood Hearing Screening Survey

Indicate all hearing screening that your program conducts.

n= 39 total respondents

- Objective Screening (i.e. OAE screening)
- Parent/Provider Report regarding child's hearing status
- Hospital Screening (i.e. at-birth screening)
- No Current Screening

Number of Responses

Hearing Screening Method

15
16
14
1
Wisconsin Early Childhood Hearing Screening Survey
When are hearing screenings performed?
n= 19 total respondents

- Upon Enrollment Only: 4 responses
- Upon Enrollment and Annually Thereafter: 11 responses
- Once Per Year: 2 responses
- Only when a Hearing Problem is Suspected: 2 responses
Screening Methods

- Participants
  - Children ages 0-3

- Equipment
  - Otodynamics Otocheck DPOAE system
  - Maico easyTymp
  - Bubbles and stickers!!
Overall Screening Results

- Screened a total of 248 children
- 198 passed on initial screening
- 50 referred on initial screening
Overall Secondary Screening Results

• Screened a total of 30 children
• 12 passed on secondary screening
• 17 referred on secondary screening
  • 15 medically referred
  • 3 referred for further testing
Loss to Follow Up Methods

- Children who participated were cross-checked using the Wisconsin Early Hearing Detection and Intervention (EHDI) Tracking and Referral Coordination system (WE-TRAC) to determine loss to follow up rates.

Loss to Follow Up Results

- Looked up 161 children on WE-TRAC
  - 13 children could not be found
  - 144 children passed newborn hearing screen
  - 4 children referred on newborn hearing screen
    - All passed the follow-up screening or sought audiologic care
Future Directions

• Early Head Starts in both Dane and Green County now fund the ECHO program themselves
• Continue to train, educate, and offer support to children’s families and Head Start staff

Image from: http://www.kibois.org/hs_about.html
Out of hospital birth population

• Primarily the Amish and Mennonite communities
  • Both the Amish and Mennonite population in Wisconsin has dramatically increased and continues to increase
  • Often deliver in their homes or the home of the midwife
  • The care providers most often used are: licensed midwives, traditional birth attendants, clinics/birth centers that serve the Amish/Mennonite population
OOH Services

• Otoscopy
• Tympanometry
• Acoustic Reflexes
• Audiometric Testing
• Screening OAEs and ABRs
• Diagnostic OAEs and ABRs
• Hearing aid fittings with 6 month loan period
• Cerumen solution
• Resources for families
Out of Hospital Clinics

• In-home screening to OOH families
• 44 babies screened
  • 1 diagnosed with bilateral permanent hearing loss
• 87 children & 47 adults
Number of Babies Never Screened by Total and OOH
(does not include refused/deceased)
Questions?
References


References


• Early Childhood Hearing Outreach. (2014). Recommended otoacoustic emissions (OAE) screening and follow-up protocol (education setting). National Center for Hearing Assessment and Management. Utah State University, Logan, UT.


