Assessing Children with Autism Spectrum Disorder
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AUDIOLOGICAL EVALUATION
• Audiological evaluation of children with autism spectrum disorders (ASD) is a critical component of a multi-disciplinary assessment
• Should be completed prior to any other professional evaluation
• Children on the spectrum are often referred for an audiologic evaluation prior to receiving a diagnosis due to suspicions of hearing loss

AUDIOLOGICAL EVALUATION
❖ Audiologists may be the first evaluation the child has, and therefore, we need to be knowledgeable about normal child development
❖ Audiological evaluation must be completed to confirm that a speech and language delay is not caused by a hearing problem, but by the autistic disorder itself or a co-existing medical disorder
Assessing Children with Autism Spectrum Disorder Web Seminar
Recorded August 21, 2013

TEAM-APPROACH
The team of specialists involved in diagnosing a child may include:

• Child psychologists
• Child psychiatrists
• Speech pathologists
• Developmental pediatricians
• Pediatric neurologists
• Audiologists
• Physical therapists
• Special education teachers
• Occupational therapists

WHY IS AUDIOLOGICAL EVALUATION IMPORTANT?

Differential Diagnosis of ASD

CHILDREN w/ inadequate language development may include those with:

- Hearing loss
- Mental impairment
- Developmental language disorder
- Autism
AUTISM/SPECTRUM DEFINED...

AUTISM/SPECTRUM DEFINED...

AUTISM/ Defined...

AUTISM: A group of developmental brain disorders

SPECTRUM: Wide range of symptoms, skills, levels of impairment or disability

AUTISM + SPECTRUM

DEFINED

AUTISM AND ASSOCIATIONS

Autism is associated with different developmental delays and co-existing medical conditions

Speech and language delays and hearing problems (such as SNHL, hypersensitivity to sound, OM) are a few examples of associations connected to autism (Davis & Stiegler, 2010)
DSM-5

- Diagnostic and Statistical Manual of Mental Disorders, fifth edition
- DSM-5 criteria requires individuals with ASD to show symptoms from early childhood, even if they are not recognized until later
- Encourages earlier diagnosis of ASD

DEVELOPMENTAL SURVEILLANCE AND SCREENING

American Academy of Pediatrics:
- Recommends developmental surveillance be incorporated at every well-child preventive care visit
- Any concerns raised should be addressed promptly with standardized developmental screening tests
- In addition, screening tests should be administered regularly at the 9-, 18-, and 24- or 30-month visits

American Academy of Neurology and the Child Neurology Society
- Developmental surveillance should be performed at all well-child visits from infancy through school age, and at any age thereafter if concerns are raised about social acceptance, learning, or behavior
- Laboratory investigations, including audiologic assessment and lead screening, are recommended for any child with developmental delay and/or autism
American Academy of Neurology and the Child Neurology Society

- Early referral for a formal audiologic assessment should include behavioral audiometric measures, assessment of middle ear function, and electrophysiologic procedures using experienced pediatric audiologists with current audioling testing methods and technologies.

- Some children with auditory neuropathy/dys-synchrony may act as if they are on the spectrum.

CLINICAL PRACTICE RECOMMENDATIONS
American Academy of Neurology, Child Neurology Society

Genetic Testing
- High-resolution chromosome studies (karyotype) and DNA analysis for Fragile X should be performed in the presence of intellectual disability (or if intellectual disability cannot be excluded), if there is a family history of Fragile X or undiagnosed intellectual disability, or if dysmorphic features are present.

NOTE: Little likelihood of positive karyotype or Fragile X testing in the presence of high-functioning autism.

PREVALENCE OF AUTISM

- Incidence: 1 in 88 children has been identified with an autism spectrum disorder (ASD).

ASDs are almost 5 times more common among boys (1 in 54) than among girls (1 in 252).

Studies in Asia, Europe and North America have identified individuals with an ASD with an average prevalence of about 1%.

Recent study in South Korea reported a prevalence of 2.6%.
AGE OF IDENTIFICATION

* There is earlier identification in patients with documented impairments in nonverbal communication, pretend play, inflexible routines, repetitive motor behaviors

* There is later identification in patients with documented impairments with peer relations, conversational ability, and idiosyncratic speech

RESEARCH IN THE UK

- Research into ASDs and hearing impairment is a very specialized area, so not many studies have been carried out to date
- HI tends to be diagnosed a couple of years earlier than autism (Jure, Rapin and Tuchman, 1991)
  - As this is an older study, hopefully this has changed!
- According to a study of children with pervasive developmental disorders, 9 out of 35 children (25%) had hearing loss (Psillas and Danilidis, 2003)
- In a study of 500 children with autism, 13% of the children aged between 11 and 13 years old presented with auditory disorders (Gayda and Saleh, 2004)

RESEARCH IN THE U.S.

- Hearing loss is variable across children with autism and has been found to range from 0-100% prevalence
- The risk of overestimating the prevalence of hearing loss is high, due to inability to receive accurate thresholds with behavioral testing

Rosenhall et al. (1990)
RESEARCH IN THE U.S.

- Conductive or sensorineural hearing loss not uncommon
- Tympanometry usually demonstrates greater fluctuating negative pressure in the middle ear in children with ASDs

Rosenhall et al. (1999)
Rabidoux, P. (2005)

RESEARCH IN THE U.S.

- Study by Rosenhall et al 1999
  - 199 children with autism and varying severities of cognitive disorders were studied
  - More otitis media due to low-set ears causing Eustachian tube dysfunction and conductive losses
  - Found low percentage with hearing loss (5.3%), however, numbers higher than general pop.
  - Hyperacusis (oversensitivity to sound) was more common in children with autism when compared to the typically developing group (18% and 0%, respectively)

RESEARCH OVERALL

- Unfortunately, there is not a lot of research and evidence-based practice of auditory behaviors in children and adolescents with ASDs (U.S. or U.K.)
- BUT – there is a common anecdote is that children with autism are difficult to test via behavioral audiometry

Downs et al (2005)
RESEARCH OVERALL

- As a result, many audiologists assess children with ASDs using objective methods such as OAEs and EPs.
- Test results of auditory brainstem response (ABR) testing were equivalent to typically developing matches, while half showed behavioral thresholds outside of the normal limit.

How Should We Test?

- When it comes to testing this special population, literature, textbooks and word-of-mouth often report children with ASDs cannot be tested using behavioral means.
- Survey of U.S. audiologists revealed that respondents preferred not to use behavioral methods of testing hearing when testing children with ASDs.

_Dittman & Brueggeman, 2003_

However...

- Downs, Schmidt, & Stephens (2005) found that 87% of children with Asperger syndrome and 100% of children diagnosed with pervasive developmental disorder NOS were tested successfully via traditional behavioral methods.
- Of the cohort of children in the study with an ASD diagnosis, 69% could be tested successfully via traditional behavioral methods using earphones.
SO, AGAIN, HOW SHOULD WE TEST?

- More recently, Gravel, Dunn, Lee, & Ellis, 2006 and Tharpe et al., 2006 investigated behavioral hearing sensitivity and test measures used for assessment of children with ASDs
- They reported growing evidence of the behavioral audiometric screening and test results we can expect to obtain when working with children with ASDs

TESTING STRATEGIES/CONSIDERATIONS

HOW TO TEST?

WHAT CAN MAKE A CHILD WITH ASD DIFFICULT TO TEST AUDIOLOGICALLY

- Increased/decreased sensitivity
- Hyperactivity
- Cognitive dysfunction
- Inattentiveness
- Language comprehension differences
- Difficulty adapting to new situations
- Do not like their ears being touched
- Increased false positive and false negative responses
- Increased anxiety
- Habituate to stimuli very slowly/quickly
- Often do not tolerate headphones/inserts

Rosenhall et al. (1999)
POSSIBLE AUDITORY “SYMPTOMS” IN CHILDREN WITH ASDs:

- Hyper-/hyposensitivity to sound
- Difficulty listening in background noise
- Difficulty maintaining focus to auditory information
- Unresponsiveness to certain sounds (e.g., verbal commands, environmental sounds)
- Middle ear problems


IMPOSSIBLE TO DESCRIBE A “TYPICAL” CHILD

- Complex neurological condition that may manifest a large range of behavioral, communicative, and cognitive abilities

- A few common characteristics, however, in children with autism can create unique obstacles during behavioral hearing assessment (Davis & Stiegler, 2005)

TESTING CONSIDERATIONS...

- Comfort with sameness and an aversion to disruption
- Unfamiliar, unexpected, or feared sensory input can elicit strong, negative behavioral responses
- Communication differences that present obstacles to precise auditory assessment
TESTING CONSIDERATIONS...

- Northern and Downs outlined general suggestions for behavioral assessment of pediatric patients and difficult-to-test (DTT) patients (2002)
  - Audiology should apply these principles when testing children with ASD

NORTHERN AND DOWNS 2002

- Persistence—Multiple sessions may be needed to obtain complete, reliable results.
- Adaptability—Changes in the needs of a client within a session should be accommodated
- Cross-check principle—The results of a single test should be cross-checked by another independent test measure, particularly when reliability is a concern (Jerger & Hayes, 1976)

TESTING CONSIDERATIONS...

- Knowing and using the child’s interests also can benefit the audiologist
  - The child’s favorite song, toy, video used to comfort, motivate or reward during testing
10 Tips

- Develop a social story for your specific hearing screening routine.
- Help a child with tactile oversensitivity and related anxiety become at ease.
- So... do you want this or that?
- Use first/then concepts and language to establish routines and expectations.
- Be fun, goofy, and inviting to help reduce fear.
- Incorporate preferred interests and videos into testing.
- Practice with the child the appropriate motor movements to make in response to sound.
- Find out what is reinforcing to the child.
- Use a picture schedule when appropriate so children can anticipate the test routine.
- Tap into and use the child’s primary/preferred language form.

OUR PROTOCOL – CCMC

- All children 4 and under, or those known with a developmental delay such as ASD or Down Syndrome, are assigned 2 examiners
- The child is greeted at the waiting room door and called by name
- While discussion with the caregivers is taking place, the child is given a small toy or allowed to watch a movie
- Ask family/caregiver how we can make the child feel safe and comfortable

CCMC Protocol Cont’d

- Slowly easing into otoscopy and immittance, and only after rapport between the child and the audiologist has been made, and family input is provided
- Be on the same level with the child – if they are in a chair, the audiologist should be on eye-level, etc.
CCMC

- Provide opportunity for patient to explore and touch equipment—let the child feel the end of the probe tip for immittance, hold otoscope, insert probes with assistance

- When necessary, caregivers may have to hold the child against them in order to obtain results

CCMC

- If the child is becoming too upset too early in the appointment, otoscopy and immittance are foregone in an attempt to obtain information regarding hearing via behavioral methods

CCMC

- If immittance is completed, OAE testing is attempted
- Often, this is where a video/movie is introduced
- Sensory toys are offered— the 2nd examiner is in charge of showing the toys and interacting with child
CCMC

- If the child is protesting, OAEs will likely not be obtained. This can be attempted again after behavioral assessment
- If the child has accepted immittance probe tips and OAEs, insert earphones are utilized
- Dependent upon developmental age, either VRA or CPA will be used to obtain responses
- If the child is not accepting of insert earphones, SF testing will be completed

CCMC

- When attempting to obtain speech information, helpful to sing a song that the child likes, or speak familiar words to the child
  - Where is Mommy?
  - Do you like Spiderman?

SO WHERE ARE WE NOW?

- Fetch 2009 survey results
  - Behavioral audiometry overwhelmingly most effective test to try FIRST
  - Speakers used most often, then headphones, then insert earphones
  - Audiologists said that they could obtain accurate test results in more than 75% of the children with developmental disorders
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SENSORY TOYS

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SENSORY TOYS
BEST $$ YOU CAN SPEND.....

TOYS FOR CHILDREN WITH AUTISM

• http://www.buzzle.com/articles/toys/


• http://www.fatbraintoys.com/special_needs/autism.cfm


• http://www.nationalautismresources.com/sensorytoys.html

Questions?

To ask a question, please type your question into the chat box in the lower left corner of the screen and click on the "Send" button located right below the box.
References

- www.uconnuccdd.org/lend/powerpoint/cohort1/fetch.ppt
- http://www.cdc.gov/ncbddd/autism/data.htm

REFERENCES


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- www.autism.org.uk/autismdata