LANGUAGE FREE ASSESSMENT TOOL FOR CHILDHOOD APRAXIA OF SPEECH IN DIFFCULT TO TEST POPULATIONS

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Structured Abstract

Introduction:

The concept of Childhood Apraxia of Speech (CAS) is controversial at several levels right from how to define the disorder. The commonly reported signs and symptoms of CAS are not exclusive to the disorder but may overlap with symptoms of other developmental speech and language disorders. Problems that may normally co-occur with CAS are language problems, academic problems, motor skills problems, dysarthria, and chewing and swallowing difficulties (Hall, 2000c).

While several researchers (Berkeley et al., 2001) have reported imitation problems in children with autism, Jones and Prior (1985) sought an association between imitation problems and soft neurological signs in children with autism, suggesting the presence of dyspraxia. Mostofsky, Dubey, Jerath, Jansiewicz, Goldberg, and Denckla (2006) observed poor performance on imitation tasks, tasks on command and actual tool use in children with ASD, revealing that autism is associated with a generalized praxis deficit, rather than a deficit specific to imitation. This possibility of a more basic problem in motor speech programming/planning and/or sensory-motor integration in this population has been raised by many researchers (Green et al. 2002; Rogers et al. 2003; Velleman et al. 2009).

Need for the present study and specific aims of the study:

It is important to determine whether or not young children with autism and other developmental disorders have symptoms of CAS or other motor speech disorders; this will facilitate early intervention for children in these difficult-to-test populations. This necessitates development of sensitive tools to identify / diagnose variant motor speech behaviors. Although there are various standardized measures, they cannot be used with very young, very delayed, or very uncooperative children. Furthermore, it is not possible to use these in contexts such as India, where several languages and dialects are in use. This warrants the need to develop a tool which is not language specific and be sensitive in identifying motor programming deficits in young children.

We have developed a language-free assessment battery intended to identify motor speech disorders, especially motor planning deficits, in very young children, especially those with co-occurring disorders that make testing difficult, such as autism and other developmental disorders. Data have been collected to evaluate the effectiveness of this tool for this purpose and to explore the presence of motor speech symptoms in these populations. The test will answer two research questions: Does the language free test serve as an effective tool in differential diagnosis of motor speech disorders? And Do children with ASD exhibit motor programming deficits similar to those observed in children with CAS?

Method:

Participants:

Five typically developing children between three to five years of age from four ethnic groups (Caucasian, African American, North Asian & South Asian) were recorded as models for five children each with autism and with language delays for other reasons (e.g., prematurity, various syndromes) in the age range of two to four years. Inclusionary criteria for delayed participants included vocabularies of at least 10-50 oral words; ability to imitate around 10 oral words; no structural or craniofacial differences; no uncorrected auditory or visual deficits; no recent history of injurious behavior. Informed consent was obtained from parents / caregivers.

Procedures:

The test stimuli were developed based on measures used for assessing less severe children (Verbal Motor Production Assessment for Children, Hayden & Square, 1999; Early Motor Control Scales, Hayden, Wetherby, Cleary & Prizant, in press) and on the features of CAS highlighted by research studies in the literature and by ASHA (2007). The items were specifically designed to meet the needs of younger children in the age range of 2 to 4 years. The test tool included two types of tasks: Single functions and Sequential functions. Single and sequential functions were further divided into speech and non-speech tasks. Speech and non-speech tasks comprise both observational and task based items. The speech stimuli for the imitation tasks included basic, frequent vowels, continuants, consonants, and syllables common to English, all Indian languages, and most other languages; imitation of single pitches and ranges of pitches. In assessing non-speech oral motor skills, the range and accuracy of lip, tongue and jaw positions and movements were assessed.

Samples of the typically developing children performing the assessment tasks were digitally video recorded and edited to serve as models for the children with ASD and the other young speech-language delayed children. The model video samples were played via computer during testing as part of the assessment protocol. This is a unique feature of this assessment tool.

Responses were scored using the testing protocol, which includes rating scales to quantify the more subjective perceptual attributes of some of the target measures. The target features chosen for analysis included: consonant repertoire, vowel repertoire, syllable shape repertoire; ability to imitate sounds, syllables, oral gestures, manual gestures; and different kinds of pretend functions of oral, manual and facial types.

Results:

Results to date show that children with ASD respond better to imitation tasks based on child-model video samples than when requested for direct imitation by adult clinicians. In addition, children with ASD have more difficulty in performing both speech and non-speech sequential functions when compared to single functions, than other delayed children. Sequencing difficulty is considered a predominant diagnostic feature in children with CAS. These findings suggest that children with

ASD are affected by motor speech deficits. Thus, it is critical to assess motor speech prior to intervention planning for this population.

Discussion:

Prizant (1996) reported that oral motor problems affecting motor planning, motor programming, and motor speech may be a factor in the speech and language deficits of individuals with autism. Similar to participants with CAS, children with ASD also demonstrated poor oral motor and oral praxis skills. This trend suggests the co-occurrence of motor programming deficits in participants with ASD. Velleman (ASHA, 2007) reports that approximately 10% of children with autism have primarily dysarthric component and co-existing symptoms of both apraxia and dysarthria in 37.5% of children with autism. The results of Marili et al (2004) support a probable underlying motor-related problem consistent with apraxia of speech in a subset of individuals with Pervasive Developmental Disorder. Children with ASD show least scores on Sequential Motor Scores (SMS) which measures the sequence maintenance ability. In addition, it is reported that increase in complexity of tasks results in increased errors in children with praxis deficits. Since sequential tasks are more complex and requires precise motor control compared to isolated tasks, they are more sensitive in identifying praxis deficits (Velleman, 2003). Sequencing errors are typical indicators of praxis breakdown at a higher level. The findings of this study with respect to oral motor programming deficits in children with ASD supports the findings of earlier studies (Velleman, 1996; Kjelgaard & Tager-Flusberg 2001; Shriberg et al., 2001; Mostofsky et al., 2006).

Conclusion:

The consensus is that the signs and symptoms of CAS are not exclusive to the disorder but may overlap with symptoms of other speech and language disorders. Till date, very few attempts are made to test young children having other concomitant language & motor problems. This test would serve as an effective tool in early identification of CAS in children who are difficult to test which in turn will help in differential diagnosis and setting goals for therapeutic management. As this test is language free, it can be used universally.