

Speech Assessment in Children With Childhood Apraxia of Speech

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This article uses the International Classification of Functioning (ICF) framework to outline the assessment needs of children with apraxia of speech. Specifically, the level of breakdown for children with apraxia of speech—that of motor planning and programming at the level of body functions—is delineated using operationally defined criteria for greater diagnostic transparency.

Speech Assessment in Children With Childhood Apraxia of Speech

There are numerous challenges to being a pediatric speech pathologist. One of the more daunting issues relates to the difficulty in making a confident differential diagnosis between childhood apraxia of speech (CAS) and other speech sound disorders (e.g., phonological disorder).

Issues in Assessment and Diagnosis of CAS

There are no overt physical markers of CAS. Although there are genetic and neurological markers associated with CAS, these are not yet considered diagnostic. Consequently, perceptual assessment of core features by a speech-language pathologist (SLP) is considered the current gold standard in diagnosis



In 2007, ASHA reported that three primary features had gained consensus in the field for contributing to the differential diagnosis of CAS and other speech sound disorders

- inconsistent errors on consonants and vowels in repeated productions of syllables or words,
- lengthened and disrupted coarticulatory transitions between sounds and syllables,
- inappropriate prosody, especially in the realization of lexical or phrasal stress.

Body Structure and Function

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Body structures and function represent the underlying impairments of a disorder. “Body structures” refer to the anatomy (e.g., the mouth, teeth, lip, tongue, pharynx, and larynx), where “body functions” refer to the physiology of the body. Idiopathic CAS is associated with intact oral structures for speech and appropriate oral muscle tone (ASHA,2007).

Operational Definitions and Brief Review of Features Commonly Associated With CAS Vowel Error (Articulatory Subsystem)

A vowel production error in which the vowel is substituted for another vowel or in which the vowel is recognizable as a specific vowel but it is not produced accurately ([aka distorted] e.g., not a prototypical production, may sound like it's in between two vowels). It is not considered an error if the vowel is substituted with another phoneme that is consistent with an adult-like model

Stress Errors (Prosodic Subsystem)

An error in which appropriate stress is not produced correctly at the lexical (i.e., word) or sentence levels. For example: desERT (wS, verb) and DESert (Sw, noun) have different stress patterns. It is considered an error if the stress is inappropriately equalized across syllables, or is shifted onto the wrong syllable.

Syllable Segregation (Prosodic Subsystem)

Brief or lengthy pause between sounds, syllables, or words, such that they are segregated from one another and lacking appropriately smooth transitions. Speech may also be described as having a choppy or staccato-like quality. Syllable segregation may result from equalization of stress, duration, intensity, and pitch across syllables; specifically, prosodic features of stressed-weak and weak-stressed syllables may not vary appropriately.

Groping (Articulatory Subsystem)

Groping may refer to prevocalic (silent) articulatory searching prior to onset of phonation, possibly in an effort to improve the accuracy of the production (i.e., articulatory groping). Groping may also refer to extraneous oral movements during nonspeech oral motor tasks (i.e., nonspeech oral motor groping), such as during an oral mechanism exam

Voicing Error (Articulatory Subsystem)

In addition, this could also describe productions that appear to be between voicing categories (i.e., blurring of voicing boundaries). In typically developing children, the voicing contrast usually develops between the ages of 1;3–3;11. Before they have stability of this contrast, children may produce one primary voicing category for voiced and voiceless targets—typically, they will produce voiced productions for voice.

Slow Rate (Articulatory & Prosodic Subsystems)

Speech rate is atypically slow. Slow production of syllables, whole words, or phrases in children with CAS may occur so that children with CAS have a greater opportunity to make use of auditory feedback to improve the precision of their speech production (Iuzzini-Seigel et al., 2015; Rosenthal, 1994; Terband & Maassen, 2010).

Increased Difficulty With Multisyllabic Words (Articulatory & Prosodic Subsystems)

A disproportionately increased number of errors as the number of syllables increases, as compared to number of error monosyllabic words (Iuzzini-Seigel et al., 2017). This feature is commonly associated with CAS but can be difficult to assess objectively without careful consideration.

Resonance or Nasality Disturbance (Articulatory & Resonatory Subsystems)

Resonance sounds either hyponasal, in which there is not enough airflow out of nose such that the child sound “stuffy” or hypernasal in which there is too much airflow out of nose for non-nasal phonemes such as plosives (e.g., ASHA, 2007; Iuzzini-Seigel, 2017).

Difficulty Achieving Initial Articulatory Configurations or Transitional Movement Gestures (Articulatory Subsystem)

Initiation of utterance or initial speech sound may be difficult for child to produce and may sound lengthened or uncoordinated. Also, child may evidence lengthened or disrupted coarticulatory gestures or movement transitions from one sound to the next”

Speech Sound Inconsistency (Articulatory Subsystem)

Previous research on preschool-aged children shows that phonemic inconsistency—inconsistency of speech sounds across multiple opportunities within and across word position—differentiates children with suspected CAS and phonological disorder.

Environmental Factors

Environmental factors may positively or negatively impact function, activities, and participation (McCormack et al., 2010). Such factors can include technology and services that are available to facilitate a child's communication.

Personal Factors

Pertinent personal factors can include presence of other comorbidities such as cognitivelinguistic and motor impairments. Likewise, the age of differential diagnosis, a family's access to therapeutic resources, as well as a child's cooperation in therapy and motivation to improve may also impact progress.

Conclusions

Many researchers are working on the differential diagnosis of CAS compared to other SSDs. Clinicians are often confident in determining impaired versus non-impaired speech, however discriminating between the different SSDs is more difficult. This article used the ICF framework to outline the assessment needs of children with CAS. Specifically, the level of breakdown for children with CAS—that of motor planning and programming at the level of body functions—was delineated using Iuzzini-Seigel et al.'s (2017) criteria for greater diagnostic transparency. Children with CAS—if correctly identified and treated—can likely improve their functional verbal communication and accurate diagnosis is the first step in this journey.