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Current Issues in
Childhood Apraxia of Speech**

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**Childhood Apraxia of Speech:
An Overview and Assessment
Considerations**

Presented By:

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Moderated By:

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SpeechPathology.com**

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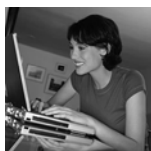
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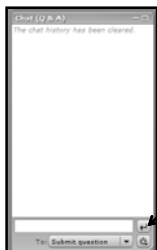
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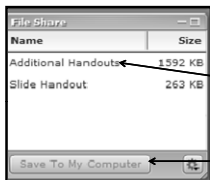


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CHILDHOOD APRAXIA OF SPEECH

An Overview and Assessment Considerations

Rebecca McCauley, Ph.D., CCC-SLP
Professor, The Ohio State University
Department of Speech & Hearing
Science



Content of this presentation

- The nature of Childhood Apraxia of Speech (CAS)
- Distinguishing CAS from other pediatric speech sound disorders (SSDs)
- Constructing protocols that are sensitive and specific for the diagnosis of CAS
- Incorporating informal assessments
 - ▣ Preschoolers
 - ▣ School-age children

Emerging view regarding CAS

- ▣ For many years, a controversial form of SSD: Previously referred to as Developmental Verbal Dyspraxia, Apraxia of Speech in Children
- ▣ Prevalence is unknown, but estimates range from .1% to 3to4% of children referred for speech sound disorders (Shriberg, Aram & Kwiatkowski, 1997a; Delaney & Kent, 2004)
- ▣ Increasingly considered an important topic for research and clinical attention, especially because long-standing oral and written language problems are not infrequent

ASHA 2007 Position Statement and Technical Report

- ▣ Prepared by an ad hoc Committee comprised of Larry Shriberg (Chair), Christina Neumann-Gildersleeve, David Hammer, Shelley Velleman and me
- ▣ Purposes
 - ▣ To provide a summary of existing literature for practicing clinicians based on a narrative review
 - ▣ To promote more common practices among researchers studying the disorder
 - ▣ To make recommendations regarding clinical practices, where possible

Definition of CAS

A neurological childhood (pediatric) speech sound disorder in which the precision and consistency of movements underlying speech are impaired in the absence of neuromuscular deficits (e.g., abnormal reflexes, abnormal tone). CAS may occur as a result of known neurological impairment, in association with complex neurobehavioral disorders of known or unknown origin, or as an idiopathic neurogenic speech sound disorder. **The core impairment in planning and/or programming spatiotemporal parameters of movement sequences results in errors in speech sound production and prosody.**

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ASHA, 2007, p.4

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p.4

3 presentations of CAS

- CAS proposed as a unifying cover term for "all presentations of apraxia of speech in childhood:
 - **Known neurologic etiologies**, such as intrauterine stroke, infections, trauma
 - Primary or secondary sign in children with **complex neurobehavioral disorders** of genetic or metabolic origins (e.g., Fragile X, Down Syndrome, Autism)
 - **Idiopathic neurogenic speech sound disorder"** (ASHA, p.)
- Term implies a shared core of speech and prosodic features, regardless of age of onset and specific etiology

Distinguishing CAS From other Speech sound disorders in children – Differential Diagnosis

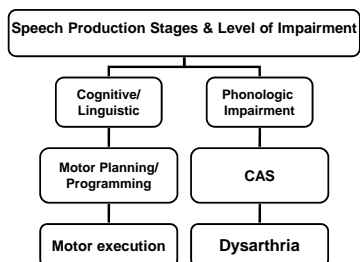
- Who diagnoses CAS?
- How is CAS different from other pediatric speech sound disorders in children?
- What methods are used to diagnose CAS?

Who should diagnose CAS?

- **Certified speech-language pathologists** with
 - Specialized knowledge in motor learning theory
 - Skills in differential diagnosis of motor speech disorders in children
 - Experience with a variety of intervention techniques that may include augmentative/alternative communication and assistive technology
- *Not* neurologists or other medical practitioners

ASHA, 2007

A theoretical basis for differential diagnosis



Problems in diagnosis

- ❑ Changes in symptoms/signs with age
- ❑ Changes in ability to cooperate with "testing" with age
- ❑ Presence of co-occurring/etiologically related problems at different levels of impairment
 - ❑ Almost always Phonological Impairment as well as CAS
 - ❑ Sometimes CAS and Dysarthria
 - ❑ Language and literacy problems are frequently co-occurring

A practical basis for diagnosing CAS based on errors consistent with problems in speech motor planning/programming

3 discriminative characteristics

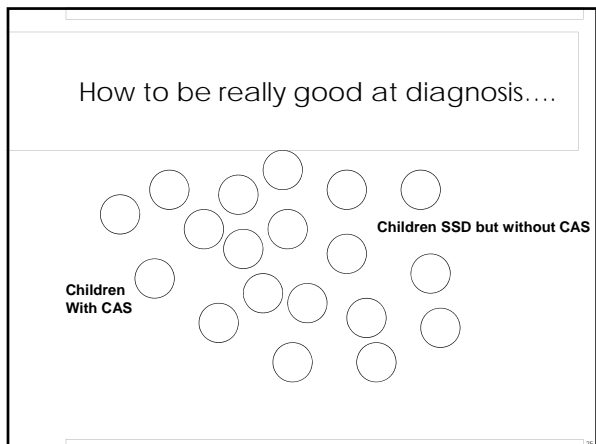
1. Inconsistent errors on Cs and Vs in repeated productions of syllables or words
2. Lengthened and disrupted coarticulatory transitions between sounds and syllables
3. Inappropriate prosody, especially in the realization of lexical or phrase stress

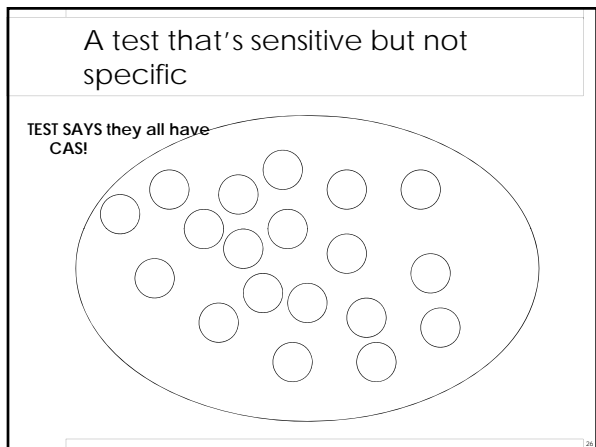
(ASHA, 2007, p.2).

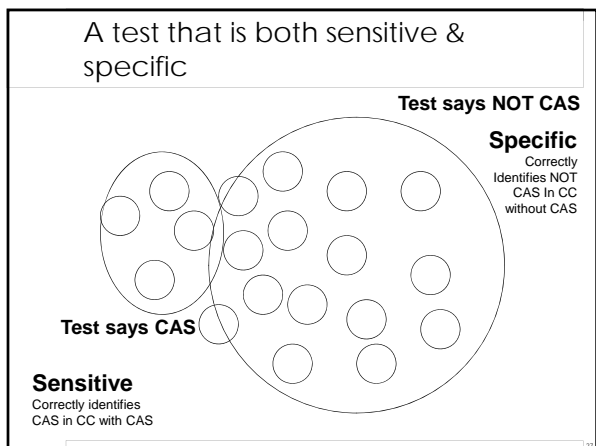
May be useful in diagnosis because they are sensitive and specific

What does it mean for a characteristic to be sensitive and specific?

- **Sensitivity** - Proportion of people *with* the disorder/condition who test **positive** on the test
= correct identification of people with the disorder
- **Specificity** - Proportion of people *without* the disorder/condition who test **negative** on the test
= correct identification of people without the disorder







Were there any tests for CAS that were recommended by the ASHA ad hoc Committee?

Relevant tests that have been formally critiqued "have been found lacking in terms of important psychometric standards." (ASHA, 2007, p.54)

Therefore, informal probes, components of motor speech examinations, and some test subtests are frequently used to examine these 3 discriminative characteristics

3 discriminative characteristics

1. Inconsistent errors on Cs and Vs in repeated productions of syllables or words
2. Lengthened and disrupted coarticulatory transitions between sounds and syllables
3. Inappropriate prosody, especially in the realization of lexical or phrase stress

(ASHA, 2007, p.2)

1. Inconsistent errors on Cs and Vs in repeated productions of syllables or words

What you might expect to see:

- kangaroo [tæpæwʊ], [tæpæku], [tæpæwʊk]
 - elephant [ɛnɛnt], [ɛləðɪnk], [ɛlestnk]
 - dinosaur [daɪnəsɔ], [hɛləɛəsɔ], [daɪnəsɔ]
 - teeth [tɪf], [tɪs], [tɪt], [tɛf], [tæf]
 - umbrella [ʌmbɛdə], [ʌnbɛlə], [ʌmbædə]
- (Dodd, 1995)

Diagnostic Evaluation of Articulation and Phonology (Dodd, Hua, Crosbie, Holm, & Ozanne, 2006)

- ❑ Recently developed tool that may help one probe for consistency
- ❑ Includes several screening tools, including for oral motor performance for children 3 years to 8,11
- ❑ 2 versions –
 - ❑ Word inconsistency screen (10 words, produced twice);
 - ❑ Word inconsistency assessment (25 words, produced 3 times)
- ❑ Word listed repeated 3 times with other tasks intervening, or at least short breaks
- ❑ Reported as % score

Another, informal procedure to assess consistency (Shriberg, Aram & Kwiatkowski, 1997)

What to do	What you can expect to see
<ul style="list-style-type: none"> ❑ Use words selected from a standard articulation test, particularly multisyllabic words ❑ Obtain 2 spontaneous and 2 imitated tokens 	<ul style="list-style-type: none"> ❑ Children without CAS will usually improve across trials and with model ❑ Children with CAS are more likely to show degraded performance across trials

What about younger children?

- ❑ Observations of speech samples will more often be available for judging than elicited productions
- ❑ However, inconsistent errors may show up even among very young children and children with little speech
 - ❑ That is, even if the child's word shapes are largely V, CV, CVCV
- ❑ Vowel errors will become particularly valuable to note given the generally early age at which these are acquired
 - ❑ Of course this is where the error is not simply an expected and regularly used dialectal variant (e.g., a monophthong regularly used where a diphthong might be used in other dialects; e.g., for the word "hi" /ha/ for /hai/)











2. Lengthened and disrupted coarticulatory transitions

- ❑ These characteristics probably contribute to perceptions of stress and other prosodic abnormalities
- ❑ Based on literature that makes use of acoustic analyses in addition to perceptual ones
- ❑ Clinically depends on observations during "difficult speaking conditions," such as
 - ❑ Multisyllabic word production
 - ❑ Connected speech
 - ❑ Motor speech examinations in which a hierarchy of phonetically more complex stimuli are used (e.g., mom, mommy, hi, mom; hi, mommy)
 - ❑ May be related to observations of "groping"

3. Inappropriate prosody, especially in the realization of lexical or phrase stress

- ❑ Recall that prosody relates to characteristics of speech affecting multiple segments. It includes phenomena such as phrasing, rate, and stress
- ❑ Most commonly observed abnormality: Equal-excessive stress (Shriberg, Aram, & Kwiatkowski, 1997)
- ❑ Frequently assessment is relatively subjective, and would be based on examination of connected speech and/or multisyllabic words

Graphic representation of equal, excessive stress

	'banana'			'puppy'	
Correct Stress	 buh	 nae	 nuh	 puh	 pi
Excessive Equal Stress	 buh	 nae	 nuh	 puh	 pi

What does this mean for your testing protocol for children with suspected SSD?

<p>Continue to use</p> <ul style="list-style-type: none"> ❑ Sound inventory test ❑ Standardized procedures for phonological processes ❑ Oral Structural Functional Examination (especially useful for looking for the presence of dysarthria & oral apraxia) ❑ Speech samples 	<p>Add</p> <ul style="list-style-type: none"> ❑ Probes/subtests to examine for inconsistent errors, especially using multisyllabic words for older children ❑ Observations regarding <ul style="list-style-type: none"> ❑ Vowel accuracy/consistency ❑ Lengthened or disrupted transitions across sounds and syllables
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What do you need to do next?

- ❑ Continue to track the literature on CAS
- ❑ Numerous tools are being developed to address some of the problems involved in diagnosis but *increasing quality of measures* will depend on *increasing clinician demands* for excellence
- ❑ Investigate ongoing developments related to more comprehensive description of CAS, its diagnosis *and, of course*, its treatment

Conference Schedule

Monday: *Childhood Apraxia of Speech: An Overview and Assessment Considerations* - Rebecca McCauley, Ph.D., CCC-SLP

Tuesday: *Medical Management of Children with Childhood Apraxia of Speech* - Amy Newmeyer, M.D.

Wednesday: *Principles for Childhood Apraxia of Speech Across Childhood* – Shelley L. Velleman, Ph.D., CCC-SLP

Thursday: *Genetic and Neurological Correlates of Childhood Apraxia of Speech* – Barbara A. Lewis, Ph.D., CCC-SLP

Friday: *Current Issues in CAS: Round-Table Discussion* – Rebecca McCauley, Ph.D., CCC-SLP, Amy Newmeyer, M.D., Shelley Velleman, Ph.D., CCC-SLP, Barbara Lewis, Ph.D., CCC-SLP

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