



Childhood Apraxia of Speech (CAS)

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Background & Interest

- **Once Upon A Time Foundation**
 - Intro to CAS, *Dr. Edythe Strand* (FREE .15 CEUS)
 - Diagnosis & Treatment of CAS Using DTTC, *Dr. Edythe Strand* (FREE .45 CEUS)
- **ASHA Connect 2020**
 - Assessing for CAS in the schools, *Jennie Bjorem*
 - Treatment for CAS in the schools, *Jennie Bjorem*
 - CAS Diagnosis & Treatment, *Jenya Iuzzuni-Seigel*
- **TO COME in 2021**
 - Clinical Thinking in the Management of CAS: Advanced Course (FREE w/ qualification 1.3 CEUS), RUSH University





Definition & Fast Apraxia Facts

Differential Diagnosis of CAS

Differentiating from SSD, Dysarthria

BRIEF treatment overview

FUN STUFF

NEXT TIME: Deep dive into treatment

PRAXIS

- Greek for doing an action
- Apraxia refers to an inability to perform an action
 - Can affect oral and/or limb movements as well as speech



ASHA's Definition (2007)

- A “neurological childhood 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 or tone)” (ASHA, 2007)

Apraxia of speech is a SPEECH LABEL for difficulty with planning and programming movement for speech.

Our brains plan and program the movements needed for speech including the tongue, lips, jaw, palate, vocal folds, and diaphragm. Our brains also must judge WHEN to move, at WHAT speed, in WHAT direction and distance for the movement, with HOW MUCH muscle contraction....ALL AT THE SAME TIME.

CAS is when there is a disconnect in the ability to plan and program these movements, impacting the movement for speech production and prosody. (Jennie Bjorem)

Causes of CAS

- Complex Neuro developmental disorders – Secondary characteristics of other disorders such as ASD, Down syndrome or genetic differences.
- Neurological Impairment due to infection, illness or injury
- Idiopathic Speech Disorders – unknown origin

Fast Apraxia Facts

1-2 children per 1000 are affected by CAS.

Since CAS is a problem with **motor planning** the precise movements needed for speech, a **motor-based approach** for therapy is needed.

CAS was only **first** recognized by ASHA in 2007.

CAS is a **lifelong** neurological disorder that cannot be cured, only overcome

Children w/ apraxia frequently have **additional comorbidities** such as dyspraxia, reading disorders, & language disorders.

The only evidence-based treatment for apraxia is **intensive** and **frequent** speech therapy.

A SLP with **training and expertise in CAS** is the **most appropriate person** to diagnose Apraxia.



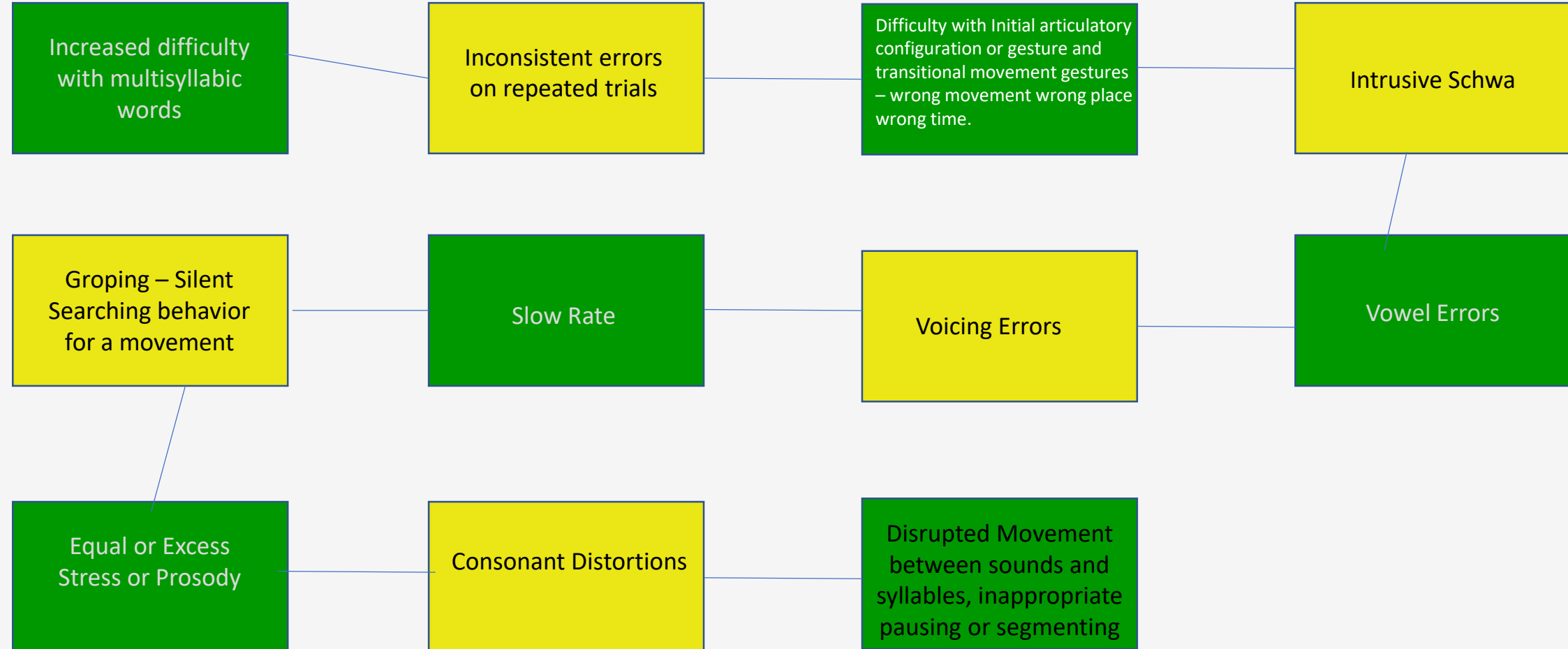
KEY CHARACTERISTICS: according to the ASHA Position Statement

- Inconsistencies in production of consonants and vowels over multiple attempts of syllables or words
- Longer transitions or disrupted movements between sounds and syllables and difficulty with initial articulatory configurations
- Prosody differences- robot sounding, difficulty with intonation, rhythm, lack of variation in vocal pitch, ability to control or decipher loudness (lexical and stress errors)

BUT...THERE IS MORE!!!!

Key Characteristics according to Mayo Clinic – 10 +1

ASHA (2007); Jacks & Marquardt (2005); Iuzzuni-Seigel (2015), Shriberg and Strand (2014)

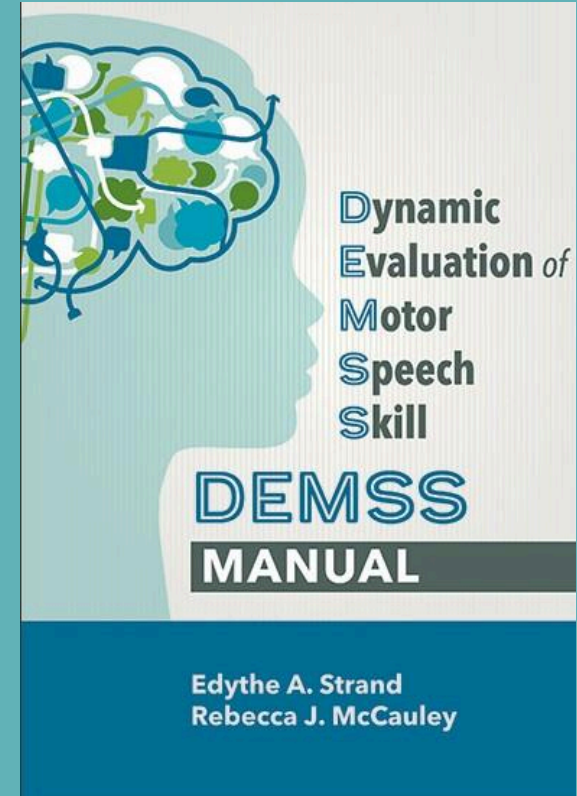


Differential Diagnosis of CAS

- Case History
- Non-Speech Oral Motor Exam
- Speech Task Probe Motor Speech Exam – 3 speech tasks (DEMSS)
- Informal Evaluation
- Sound Inventory
- Core Word Inventory – what CAN they say?
- Cue Assessment – **GOAL** of CAS assessment is to get a correct sound..make sure you mark what cueing you used to get it (DYNAMIC ASSESSMENT!)

DEMSS – Dynamic Evaluation of Motor Speech Skill

- Standardized, criterion-referenced assessment for ages 3 and up or severely speech impaired, even children considered minimally or non-verbal.
- Focus – movements for speech
- Guide the clinician in observations of speech characteristics
- Help with judgments of severity and prognosis
- Tool for facilitating treatment planning and target selection
- Overall articulatory accuracy, vowel accuracy, prosodic accuracy and consistency are scored.



Informal Motor Speech Exam

- Assess a minimum of 3 speech tasks
 - Articulation test – dynamic assessment
 - Speech sample
 - Dynamic assessment of syllable shapes, CV, VC, CVCV, CVC multi-syllabic words

GOAL: to cue and practice 5x to help the child get the target production. Take a video to reference later! Be sure to take notes of the cues that helped the child reach accuracy (important for treatment)

The “5-3-3” Rule

- How often and in how many contexts should a child demonstrate these features to contribute to a CAS diagnosis?

FOLLOW THE RULE OF 5-3-3

- 5 or more features
- 3 times each
- 3 different contexts

CAS DECISION GUIDE

CHILD NAME: C.D. DOB: 05/29/2017
 DATE: 05/29/2020 THERAPIST: Jamie Bjorn

Speech Probe	Inconsistent errors	Vowel Distortion or Substitution	Transitional Gestures Initial Audio Configuration	Inappropriate Prosody or Stress Errors	Groping	Slow Speech Rate	Difficulty with multisyllabic words	Inappropriate pausing or segmenting	Intrusive Schwa	Voicing Errors	Consonant Distortions
	IE	VD	TG	P	G	SS	M	S	IS	V	C
#1	1 Syllable - CV										
	X	X			X			X		X	
#2	2 Syllable - VC										
	X	X			X			X	X	X	
#3	3 Syllable - CVCV										
	X	X						X		X	
#4	4 Syllable										
#5	Articulation Test										
#6	Speech Sample										
Check pink box if each feature is observed in 3 or more speech probes	X	X						X		X	
Scoring	# of speech probes given (minimum 3) <u>3</u> ≥ 3 # features observed (add up X in pink boxes) <u>4</u> ≥ 4 ≥ 4 features and ≥ 3 speech probes = CAS+ <u>+/</u>										

IE - inconsistent errors VD - vowel distortion TG - transitional gestures P - prosody errors
 G - groping SS - slow rate M - difficulty with multisyllabic words S - segmenting
 IS - intrusive schwa V - voicing errors C - consonant distortion

Adapted from Overby, M.S., Caspari, S.S., & Schreiber, J. (2016). Validity, consonant emergence, and syllable structure in infants and toddlers later diagnosed with childhood apraxia of speech, speech sound disorder, and typical development: A retrospective video analysis. *Journal of Speech, Language, and Hearing Research*, 59, 1514-1528. doi: 10.1044/2015-JSLHR-S-15-0046

A diagnostic marker to discriminate childhood apraxia of speech from Speech Delay "Diagnosis of CAS was confirmed using a version of the pediatric adaptation of the Mayo Clinic assessment for motor speech disorders (CMAS-P) (Buckwalter & Smith, 2010; Smith, 2010; Smith, Buckwalter, Smith, & Johnson, 2010).

INFORMAL MOTOR SPEECH ASSESSMENT - CV & VC

©bjornspeech

Directions: Video the assessment for your reference. Ask the child to repeat target words as you model. Assess each target at least twice, mark + if correct and consistent, if incorrect use cues (simultaneous production, slowing rate, visual cues, backward/forward chaining, etc.). to try to get the correct production, try 5 times then score CC (correct with cues) or O (incorrect) and note cues that helped with correct production. In notes document features of CAS using the abbreviations at the bottom of each page. Vowels should be scored + or O on first production. Circle incorrect stress if noted.

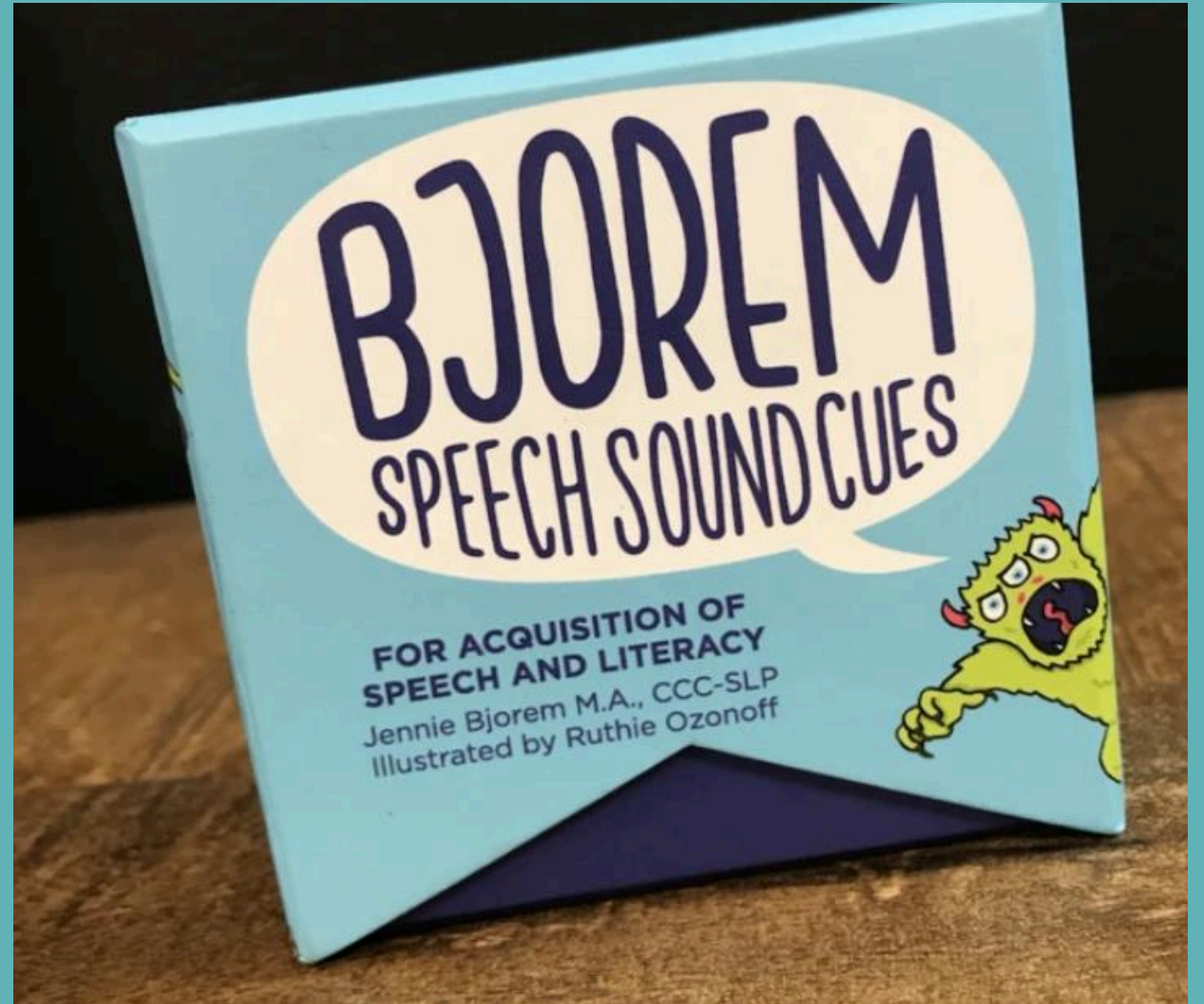
TARGET	Transcription	Production (+, CC, O)	Vowel (+, O)	Stress	Features Noted
CV					• VD • IE • V • S • G
boo	/bu/	bu pu cc	O		VD, IE, V
me	/mi/	mi +	+		
no	/nu/	nn dn dnna O	O		VD, IE, IS, G, S, C
pay	/pe/	be be m o	O		VD, IE, V
key	/ki/	t-i tik tgi O	+		S, IE, G
tie	/ti/	di di + (whisper)	O		V
VC					• VP • IE • V • S • G • IS
at	/æt/	edn et id O	O		VD, IE, G, V
in	/ɪn/	en nn	O		VD, G, S, IE
up	/ʌp/	up up +	+		
off	/ɔt/	vbn ob om O	O		IS, C, IE, VD
out	/aʊt/	et edn ed +	O		VD, IS, G, V
ice	/aɪs/	e e-s	O		VD, S
eat	/i/	eat eat +	+		

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Sound Inventory

- Sound & Syllable
- Core & Power words



Apraxia

- Inconsistent errors
- No error patterns
- Vowel errors
- Errors increases w/ complexity of words
- 'Automatic' speech is easier than 'on demand'
- Vowel & voicing distortions common
- Rate, rhythm and stress are impacted

Phonological Disorder

- Consistent
- Phonological Processes
- Few vowel errors
- Appropriate prosody, rate, rhythm

Dysarthria

- Consistent errors
- Weak respiratory support
- Decreased strength and coordination
- Difficulty w/ motor control for chewing, swallowing, etc.
- No difference based off of the situation
- Monotone & hoarse, harsh vocal quality



You have diagnosed a client with CAS or sCAS....but now what?

TARGET SELECTION

TARGET SELECTION DEPENDS ON :

- **sound inventory**
- **Syllable shape**
- **Core & power words**
- **Functional & Natural**

Target Selection Practice

- Child has the following sounds in his repertoire

Consonants: /p/ /b/ /m/ /t/ /d/ /n/ /h/ /w/ /s/ /g/

Vowels: long a, e, i, o, u short: a, o, u

- Child is at the CV, VC, VCV, CVCV and CVC
- Core Words: go, no, bye
- Power Words: mama, dada – on parents list to learn
- Come up with 10 FUNCTIONAL targets
- You should be able to answer, “WHY did you choose that target?”

The background of the slide is a dense, colorful pile of various LEGO bricks in shades of red, blue, yellow, green, and white. A semi-transparent grey rectangle is overlaid on the center of the image, containing the title and list.

How to approach treatment

- More frequent therapy
- Approach focused on improving motor skills
- Incorporate Principals of Motor Learning
- Maximize Response trials per session
- Give frequent, specific feedback first, moving to less specific as accuracy improves
 - Look at my face
 - Rather than games, use quick reinforcers

TRUE or FALSE

Childhood Apraxia of Speech often occurs with comorbid language impairment and fine/gross motor deficits.

TRUE or FALSE

**Childhood Apraxia of Speech is due
to muscle weakness.**

TRUE or FALSE

**There is likely to be 1 child with CAS
in each elementary school of 500
kids.**

TRUE or FALSE

I should apply the 5-3-3 rule to support differential diagnosis of CAS and severe phonological disorder.

@slpmommyofapraxia

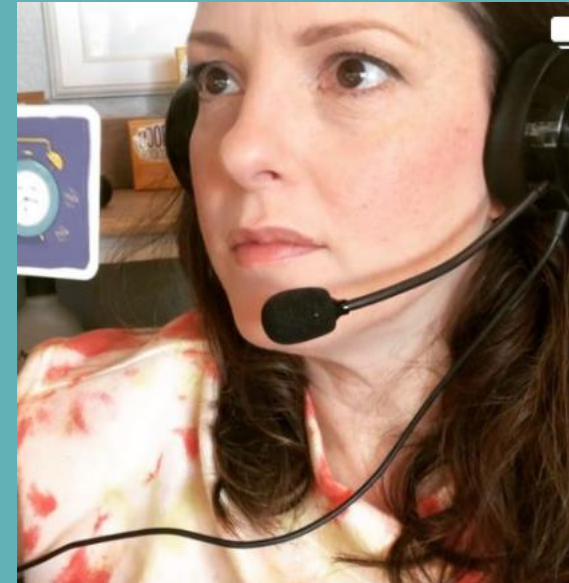
Individuals with apraxia may expressively say things they didn't mean to say. This has implications for school.

- May name a color/number/letter incorrectly but can point to them correctly when asked.
- May default to just saying, "I don't know" when they DO know.
- May answer yes when they mean no, or no when they mean yes.

@bjoremspeech



@grahamspeechtherapy



@jordapraxia



Next time....

- **Treatment approaches**
- **Principles of Motor Learning**



Works Cited:

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