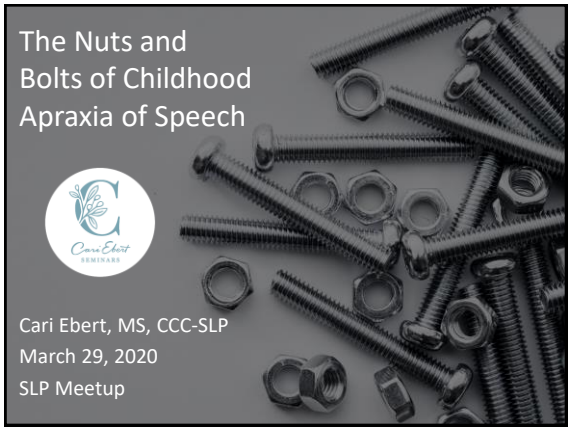
The Nuts and Bolts of Childhood Apraxia of Speech



Cari Ebert, MS, CCC-SLP
March 29, 2020
SLP Meetup

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Disclosures

Nonfinancial Disclosure: Cari has a son with autism and apraxia and shares personal experiences in her trainings.

Financial Disclosure: Cari Ebert is co-author of the book *The SLP's Guide to Treating Childhood Apraxia of Speech*. She is also the creator of *Cari's Silly Sounds* and *Animal Vowels* which she will reference in the training today. Cari receives royalties from all product sales.

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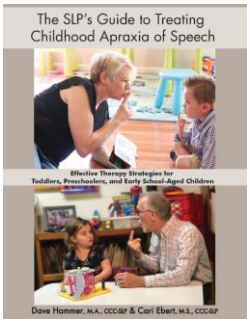

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Apraxia-Kid's Explanation of CAS

(www.apraxia-kids.org)

"Childhood apraxia of speech (CAS) is a motor speech disorder that makes it difficult for children to speak. Children with the diagnosis of apraxia of speech generally have a good understanding of language and know what they want to say. However, they have difficulty learning or carrying out the complex sequenced movements that are necessary for intelligible speech."

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Explanation for Parents and Non-SLPs

The child presents with speech motor planning difficulties—he knows what he wants to say, but he's struggling getting the message from his brain to his mouth. It's as though his brain says 'speak' but his mouth isn't responding.

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Clarifying the Terminology

- **Preverbal**: Term used to describe young children who are not talking *yet*.
- **Minimally Verbal**: Term used to describe children who have limited verbal output, when compared to same-age peers.
- **Nonverbal**: Term used to describe older children who are not verbal, despite years of speech therapy. It is not likely that these children will become verbal communicators. These children have complex communication needs.

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Resources for SLPs

- ASHA's 2007 Technical Report on CAS; ASHA's Practice Portal on CAS
- *Principles of Motor Learning in Treatment of Motor Speech Disorders* by Edwin Maas et. al, 2008
- *The SLP's Guide to Treating Childhood Apraxia of Speech* by Dave Hammer & Cari Ebert
- *Here's How to Treat Childhood Apraxia of Speech* by Margaret Fish
- Mayo Clinic/Dr. Edythe Strand (www.mayoclinic.org/diseases-conditions/childhood-apraxia-of-speech)
- Apraxia-Kids organization (www.apraxia-kids.org)
- Bjorem Speech & Graham Speech Therapy (and me!)

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Differentiating CAS from an Articulation Disorder

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Articulation Disorder

- Articulation errors are common in children who are just learning to speak.
- Articulation errors include substitutions, omissions, distortions, and additions (SODA).
- Most children outgrow articulation errors, but when errors continue beyond those of typical development, speech therapy may be warranted.
- An articulation disorder is the inability to form certain sounds correctly past a certain age.
- In speech therapy the child is taught how to correctly articulate consonant sounds.

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CAS/sCAS	Articulation Disorder
• Difficulty moving between sounds, syllables and words (coarticulation)	• Unable to correctly articulate certain consonant sounds
• Vowel errors are common	• Vowels are intact
• Inconsistent productions on repeated trials	• Consistent speech sound errors
• Effort associated with talking tasks	• Speech is not effortful
• Impaired prosody	• Prosody is intact
• Says a speech sound in one context, but not in others	• Unable to correctly produce the speech sound in any context

Coarticulation vs. Articulation

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Differentiating CAS from a Phonological Disorder

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Phonological Disorder

- A phonological disorder involves patterns of sound errors. It affects the way speech sounds (phonemes) function within a language.
- A child with a phonological disorder consistently makes the same errors, regardless of the speaking situation. In fact, familiar listeners can easily "decode" the child's speech because the error patterns are so consistent.
- Common phonological processes young children use: final consonant deletion, cluster reduction, gliding, fronting, stopping, deaffrication, and assimilation.

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CAS/sCAS	**Phonological Disorder**
• Motorically based	• Linguistically based
• Limited number of vowels and diphthongs	• Vowels are typically intact
• Inconsistent speech errors on vowels and consonants	• Consistent patterns of errors that can be grouped into categories
• Effortful speech	• Speech is not effortful
• Prosody is impaired	• Prosody is intact
• On-demand speech most difficult	• Verbal success is not situationally dependent
• Therapy focuses on movement patterns	• Therapy focuses on sound patterns

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Differentiating CAS from a Speech/Language Delay

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Speech/Language Delay
(late talker)

- While all children develop skills at different ages, the most important factor is that the prelinguistic milestones are acquired in a typical or sequential manner.
  - *Delay*: prelinguistic milestones achieved late, but they are acquired in the correct developmental sequence
  - *Disorder*: prelinguistic milestones are achieved in an atypical manner/out of sequence (scattered skills)

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CAS/sCAS	**Speech/Language Delay**
• Makes slow, inconsistent progress in therapy	• Makes more rapid, consistent progress in therapy
• Limited babbling history	• More typical babbling history
• Disruption in the normal sequence of speech development	• Mild lag in development; speaks like a child who is chronologically younger
• Speech therapy based on the principles of motor learning will be necessary for intelligible speech to develop	• Increasing ambient language exposure will enhance speech and language development

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CAS/sCAS	Speech/Language Delay
• Limited # of speech sounds in repertoire	• Wider variety of speech sounds in repertoire
• Over-use of the neutral vowels “uh, eh, ah”	• Relies on the grunt to communicate
• Limited or absent verbal imitation skills (child is not a communication risk taker)	• Verbal imitation skills improve when addressed in therapy
• Prosody is impaired	• Prosody is intact
• Not consistently adding words to expressive vocabulary (history of pop-out words)	• Adds words to expressive vocabulary when in a language-rich environment

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Tentative Guidelines for Identifying CAS at Age 2

Overby, Caspari & Schreiber, 2019

sCAS

- Limited vocalizations in the first 2 years of life
- Lack of a consonant by 12 months of age
- Use of fewer than 3 consonants by 16 months of age
- Use of fewer than 5 consonants by 24 months of age
- Limited to no velar (/k/, /g/) productions
- Favoritism of stops (/p/, /b/, /d/, /t/) and nasals (/m/, /n/) over other consonants
- Productions from 13-18 months are largely vowels, with little use of other syllable shapes

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Therapy Solutions for CAS/sCAS

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Getting Parents Involved

- Lots of practice is needed for motor learning to occur, so we must find ways to embed speech targets into the child’s daily routines.
- Practice cannot only occur during the speech therapy sessions.
- We must understand the difference between **motor performance** (changes obtained in the therapy session) vs. **motor learning** (generalization of skills outside of therapy).

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Therapy and Intervention

- Follow-through by families, caregivers, and teachers is critical
- Be sure to explain the important difference between therapy and intervention

  Therapy is the time spent in contact with the child each week; it is provided by the SLP

  Intervention is what occurs the rest of the time between therapy sessions; it is provided by parents, caregivers and teachers

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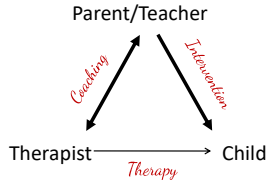
Support-Based Services Model

Triadic, not dyadic



Adapted from R.A. McWilliam

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Prognostic Indicators for a Child with CAS

- Severity
- Cognitive skills
- Child's personality/temperament and willingness to take risks
- Age at which therapy was initiated
- Co-existing conditions
- Family involvement/home practice*
- Motivation*
- Appropriateness/effectiveness of the therapy*

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Appropriateness of the Therapy

- Increasing ambient language exposure will not be enough to build the flexibility and reliability of the child's speech motor planning system.
- When play and language are the focus of therapy, the receptive/expressive language gap will likely continue to widen, while speech skills remain static.
- SLPs can do play-based therapy…but the SLP needs to embed strategies based on the principles of motor learning into the play. Apraxia therapy should look and sound different than traditional speech-language therapy.

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Motor Planning Therapy vs. Traditional Speech Therapy

- Speech motor planning therapy addresses movement patterns (coarticulation) between sounds, syllables, and words, progressing from simple to complex. AAC is often indicated until the child's speech motor planning system "kicks in."
- Therapy for a phonological disorder involves establishing correct sound patterns (by eliminating incorrect sound patterns such as FCD, velar fronting, cluster reduction, etc. using cycles or minimal pairs).
- Articulation therapy is designed to help the child learn to produce specific consonant sounds correctly.

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A child may have a **mixed speech sound disorder** that requires different treatment approaches and goals!

One child may have a combination of:

Motor speech goals

Phonological goals

and

Articulation goals

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Principles of Motor Learning in Treatment of Motor Speech Disorders

(Maas et al 2008)

Motor learning is related to several factors:

1. **Pre-practice** (proper motivation, understanding the task/clear learning targets, references of correctness, stimulability to avoid frustration)
2. **Structure of practice** (large # of trials, variable practice, distributed practice)
3. **Stimulus selection** (high frequency speech targets that are relevant and meaningful; targets not necessarily based on developmental norms)
4. **Nature of feedback** (type, frequency, timing)

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Treatment Approaches for CAS

(ASHA.org)

For children who can attempt verbal imitation, the two motor programming approaches that have the most evidence include:

1. Dynamic Temporal and Tactile Cueing (DTTC): This is a "look, listen, do what I do" method that uses a cueing hierarchy. (Developed by Dr. Edythe Strand)
2. Rapid Syllable transitions (ReST): This method involves repetition of varied sequences of nonsense syllables to train motor planning flexibility. (Developed by Dr. Patricia McCabe)

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When working with minimally verbal children who don't yet attempt verbal imitation, the SLP will need to establish communication risk taking skills first.

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Thinking About CAS Therapy

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Tools for Success with CAS/sCAS

- For children with apraxia, repetitive motor-speech practice is the key to becoming functionally verbal; but repetitive speech practice isn't exactly fun.
- What do we do to make something intrinsically not fun, fun? This is the SLP's superpower!
- Just remember that all therapy goals and activities should focus on the MOVEMENT between sounds, syllables, and words.
- Use multisensory cueing to support speech motor planning skills!

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Look for games with multiple, identical pieces. The # of pieces = the number of potential repetitions!

Mighty Monkey Pegs, Connect Four and Pop-Up Pirate are awesome! Have the child say the target word/phrase each time a piece is placed.

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With a large foam die like this one, have the child touch each dot as the speech target is practiced

This abacus provides 40 repetitions of the target words/phrases

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Visual Cues

- Sit face to face with the child (this is why teletherapy can work for these kiddos!)
- Cari's Silly Sounds cards
- Animal Vowels
- Bjorem Speech Sound Cues
- Signs
- Graphic Cues

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Targeted Motor Speech Goals

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Motor Planning Goal Examples

- Child will accurately plan and sequence simple syllable shapes including CV, VC, and $C_1V_1C_1V_1$ using sounds in his phonetic inventory with no more than 2 cues from the SLP, to produce 20 functional words.
- Child will produce accurate vowel sounds in 50 target words, with no more than one cue from the SLP.
- Child will accurately plan and sequence simple syllable shapes comprised of sounds in his repertoire to produce 20 functional phrases, with no more than 2 cues from the SLP.

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- Child will produce accurate vowel sounds in 25 pairs of rhyming words with no more than 2 cues provided by the SLP.
- Child will produce accurate vowel sounds in 25 pairs of rhyming words, with no more than one visual or verbal cue.
- Child will accurately plan and sequence 20 different 2-word phrases that are intelligible to a familiar listener, when provided with no more than 1 cue from the adult.
- Child will accurately plan and sequence 20 different 2-word phrases that are intelligible to an unfamiliar listener, with no cues provided from the adult.

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- Child will produce 3- to 5-word intelligible utterances, accurately planning and sequencing all syllables when provided with no more than one visual or verbal cue.
- Child will produce CCVC syllable shapes at the word and phrase level, when provided with no more than one visual or verbal cue.
- Child will produce 3- to 5-word intelligible utterances, accurately planning and sequencing all syllables in a high-demand context.
- Child will self-correct utterances on 20 target words following *Knowledge of Results* feedback from the adult listener.

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In Conclusion…

- Children with CAS/sCAS need to have specific motor speech goals that address the core impairment.
- Because CAS rarely occurs in isolation, there will need to be other goals written to address the comorbid issues.
- Children with motor planning struggles can and do make progress…when treatment is based on the principles of motor learning.

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Thanks for joining me today!

I'll "*see*" you on social media!

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