Introduction to Diagnosing Childhood Apraxia of Speech (CAS)

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Disclosure Statement

Relevant financial and nonfinancial relationship(s)

- Breanna has the following relevant financial relationship(s) in the products or services described, reviewed, evaluated or compared in this presentation.
  - Receives a salary from Apraxia Dallas, PLLC (owner, employee)
- Breanna has the following relevant nonfinancial relationship(s) in the products or services described, reviewed, evaluated or compared in this presentation.
  - Volunteer employment at Apraxia Kids (Walk Coordinator for the North Texas Walk for Apraxia)
  - Graduate of the Apraxia Kids Intensive Training Institute

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Overview

- Definitions
- Assessment batteries
- Examples
- Q&A

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Why is diagnosis important?

Diagnosis determines treatment.

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Definitions

Speech Sound Disorders

- "any combination of difficulties with perception, motor production, and/or the phonological representation of speech sounds and speech segments (including phonotactic rules that govern syllable shape, structure, and stress, as well as prosody) that impact speech intelligibility" (http://www.asha.org/Practice-Portal/clinical-Topics/Articulation-and-Phonology/)

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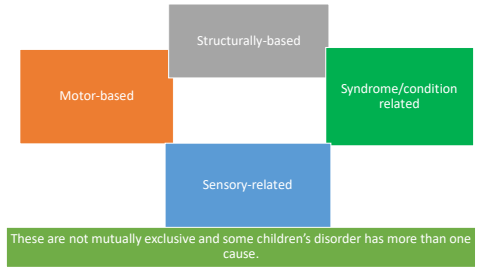
Speech sound disorders



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Phonological disorders

•"impairments in the phonological representation of speech sounds and speech segments—the system that generates and uses phonemes and phoneme rules and patterns within the context of spoken language" (http://www.asha.org/Practice-Portal/clinical-Topics/Articulation-and-Phonology/)

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Childhood Apraxia of Speech (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" (ASHA, 2007, emphasis added)

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Top 3 Characteristics

(ASHA, 2007)

- 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

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Childhood Apraxia of Speech (CAS)

CAS is a label used for a specific type of speech sound disorder in which the planning and/or programming of the movements to produce speech is inefficient. This results in a variety of speech characteristics.

Strand, 2016

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Pediatric Adaptation of the Mayo 10 (+1)

- Vowel distortions
- Distorted substitutions
- Difficulty with initial articulatory configurations/transitionary movement gestures
- Equal stress; lexical or phrasal stress errors
- Syllable or Word Segregation
- Groping or trial-and-error behavior
- Intrusive schwa
- Voicing errors
- Slow speech rate and/or slow DDK
- Increased difficulty with multisyllabic words
- Inconsistency on repeated trials of words/utterances

Adapted by Sue Caspari, M.A., CCC-SLP from: Shriberg, L.D., & Strand, E.A. (February, 2014). *A Diagnostic Marker to Discriminate Childhood Apraxia of Speech from Speech Delay*. Paper presented at the Seventeenth Biennial Conference on Motor Speech: Motor Speech Disorders & Speech Motor Control, Sarasota, FL.

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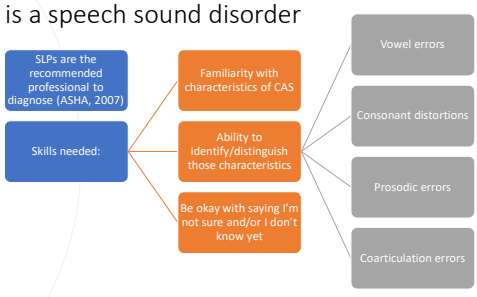
CAS is a speech sound disorder



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Differential Diagnosis

Determine the *relative* contributions of impairments in a child's disorder.

Most children will have impairments in more than one area – but which one is contributing the most to the child's disorder *at this time*? (Because it will change over time with treatment)

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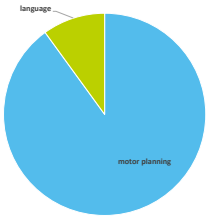
Relative contributions to a communication disorder



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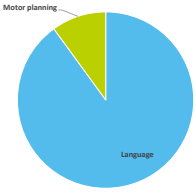
Relative contributions to a communication disorder



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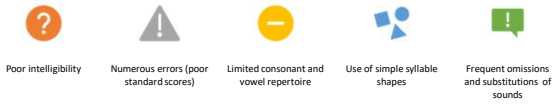
Children with a speech sound disorder may have:



Poor intelligibility

Numerous errors (poor standard scores)

Limited consonant and vowel repertoire

Use of simple syllable shapes

Frequent omissions and substitutions of sounds

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Children with CAS do NOT have:

- Weakness, in coordination or paralysis of speech musculature
- Difficulty with involuntary motor control for chewing, swallowing, etc.
- Issues with vocal quality
- Involuntary and random changes in pitch and loudness
- BUT - children can have more than one disorder

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Most discriminative characteristics are:

- Difficulty moving from one articulatory configuration to another
- Vowel **distortions** (not substitutions)
- Groping and/or trial and error behavior, especially in elicited versus spontaneous utterances
- Prosodic errors (lexical and phrasal stress, segmentation)
- Inconsistent voicing errors making it difficult to distinguish voiced/unvoiced phonemes likely due to mistiming of voice onset time

Strand, 2016

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More frequent in CAS and *less common* in Phonological

- Well-rehearsed, "automatic" speech better than "on demand" speech
- ✕ Inconsistencies in articulation errors – words may be produced different ways with different types of errors rather than errors following a consistent pattern

Strand, 2016

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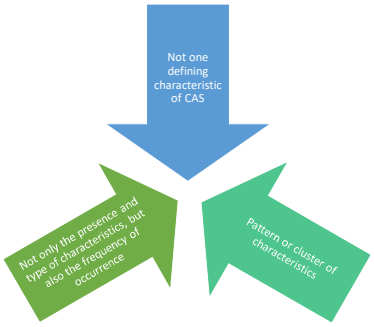
CAS is a Pattern



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4 Signs in > 3 Speech Tasks = CAS	Repeat 1 syllable words	Repeat 2 syllable words	Repeat 3 syllable words	Articulation Test	Conversational Speech Sample	DDK	Phonology test	Stress Task	Other	☑
Vowel Distortions										
Distorted Substitutions										
Initial articulatory configurations/transitionary movement gestures difficulties										
Equal Stress; lexical or phrasalstress errors										
Syllable or Word Segregation										
Groping or Trial-and-error Behavior										
Intrusive Schwa										
Voicing Errors										
Slow Speech Rate and/or slow DDK										
Increased difficulty w/multisyllabic words										
Inconsistency on repeated trials of words/utterances										

Adapted by Sue Caspari, M.A., CCC-SLP from: Shriberg, L.D., & Strand, E.A. (February, 2014). *A Diagnostic Marker to Discriminate Childhood Apraxia of Speech from Speech Delay.* Paper presented at the Seventeenth Biennial Conference on Motor Speech: Motor Speech Disorders & Speech Motor Control, Sarasota, FL.

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Important Note: Characteristics of CAS based on English phonology

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Evaluating Multilingual Children

Look at errors with consideration for both languages

Characteristics to still look for:

- Inconsistent consonant and vowel distortions in repeated productions of words
- Prosodic errors not due to other language influence
- Excess equal stress, monotone
- Lengthened and disrupted articulatory transitions
- Breaks between consonants and vowels
- Difficulty with articulatory sequencing

Gildersleeve-Neumann, 2015.

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Assessment Components

- Case history (screen for early signs)
- Language sample
- Articulation and/or phonology test
- Oral mechanism exam
- Motor speech exam with dynamic assessment
- Pediatric Adaptation of the Mayo 10 +1

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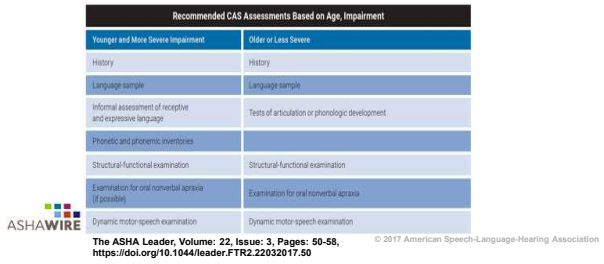
Appraising Apraxia



Recommended CAS Assessments Based on Age, Impairment	
Younger and More Severe Impairment	Older or Less Severe
History	History
Language sample	Language sample
Informal assessment of receptive and expressive language	Tests of articulation or phonologic development
Phonetic and phonemic inventories	
Structural-functional examination	Structural-functional examination
Examination for oral nonverbal apraxia (if possible)	Examination for oral nonverbal apraxia
Dynamic motor-speech examination	Dynamic motor-speech examination

ASHAWIRE

The ASHA Leader, Volume: 22, Issue: 3, Pages: 50-58, https://doi.org/10.1044/leader.FTR2.22032017.50

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Case History

Early Communication Development:

- Limited vocalizations with little babbling history during first two years of life
- Lack of a consonant sound by first birthday
- Fewer than three consonant sounds by 16 months of age
- Less than five consonants by second birthday
- Limited use of velars by two years of age
- Favoritism of stops (/p,b,d,t/ and nasals (/m, n/) while missing other consonants in the first two years.
- Use of primarily vowels between 13-18 months with little use of simple consonant-vowel sequences or more complex syllable structures

Overby et al, 2019

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Dynamic Evaluation of Motor Speech Skill (DEMSS)

- Developed by Dr. Edythe Strand and Dr. Rebecca McCauley
- Standardized, criterion-referenced dynamic assessment
- Developed to differentially diagnose speech sound disorders in children over 3 years of age
- Child asked to imitate words beginning with simple phonotactic shapes (CVs) and progressing to advanced phonotactic shapes (three syllable words)
- Vowel accuracy and articulatory accuracy scored
- If a word is not accurate, child is provided with cueing to improve accuracy, then the word is elicited in imitation again
- Once all of the productions for an item are completed, the child is scored for consistency
- Two and three syllable words are scored for prosodic accuracy
- Available from Brooks Publishing

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Components for Child Inconsistently Imitating Speech

- Can not diagnose at this stage!
- But can start tailoring treatment
- Parent interview/history
- Language sample (includes non-verbal)
- Phonetic and phonemic repertoires
- Structural/functional examination, as much as possible
- Screen for oral nonverbal apraxia, as much as possible
- Informal dynamic motor speech assessment
  - Part of DEMSS or other
- Start Mayo 10+1

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Components for Child Imitating at Word-Level

- Parent interview/history
- Language sample (includes non-verbal)
- Phonetic and phonemic repertoires (probably can't do articulation/phonology tests)
- Structural/functional examination
- Screen for oral nonverbal apraxia
- DEMSS
- Mayo 10+1

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Components for Child Using Phrases and/or Short Sentences

- Parent interview/history
- Language sample (includes non-verbal)
- Articulation and Phonology tests
  - DEAP, including inconsistency portion
- Structural/functional examination
- Screen for oral nonverbal apraxia
- DEMSS if level of breakdown at 3 syllables or less
- Informal dynamic motor speech exam using challenging words and/or phrases if breakdown above 3 syllables
- Buy Bobby a Puppy (if able)
- Mayo 10+1

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Components for Child Using Longer Sentences

- Parent interview/history
- Language sample (includes non-verbal)
- Articulation and Phonology tests
  - DEAP, including inconsistency portion
- Structural/functional examination
- Screen for oral nonverbal apraxia
- Informal dynamic motor speech exam using challenging words and/or phrases if breakdown above 3 syllables
- Syllable Repetition Task (SRT)
- Buy Bobby a Puppy
- Mayo 10+1

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Resources for Diagnosing CAS

- Appraising Apraxia – article by Dr. Edythe Strand in the ASHA Leader https://leader.pubs.asha.org/doi/10.1044/leader.FTR2.22032017.50
- Apraxia Kids – www.apraxia-kids.org
- Buy Bobby a Puppy - https://campsite.bio/marquette_cml_lab
- Child Apraxia Treatment – www.childapraxiatreatment.org/continuing-education
- Differential Diagnosis of Childhood Apraxia of Speech Compared to Other Speech Sound Disorders: A Systematic Review by Murray, Iuzzini-Seigel, Maas, Terband, and Ballard
- Dynamic Evaluation of Motor Speech Skills (DEMSS) – available from Brooks Publishing

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Examples

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Example 1 – "J" Evaluation

- **Age**: 2 years, 5 months
- **History**: No significant medical history; motor and communication delays; began speech therapy and physical therapy 1 year prior, at 17 months. Progressed in language skills but little progress in speech; using a few words inconsistently.
- **Language sample**: Used nonverbal communication (e.g. eye contact, joint referencing, gestures), sound effects, words and word approximations. Words and word approximations were all inconsistent.

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Example 1 – "J" Evaluation

Structural Functional Exam

•Oral structures observed at rest, while producing speech, and while eating.

•Ability to open mouth on command mildly limited

•Ability to retract lips (smile) WNL

•Not able to move tongue on command, but frequently stuck tongue out to lips (always to left side)

•Appeared to aspirate while eating; mother reports it happens every couple of weeks

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Example 1 – "J" Evaluation

Nonverbal oral apraxia screener (Darley, 1978)

- Able to produce two of the nine movements (smack your lips and smile) in imitation with accuracy
- Able to cough in imitation, but slowly produced
- Attempted to click tongue; after a lot of effort, moved jaw
- When asked to blow, expelled air but did not round lips
- Not able to puff cheeks, bite lower lip or stick out tongue

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Example 1 – "J" Evaluation

Target	Independent (spontaneous)			Relational (elicited)		
	Initial	Medial	Final	Initial	Medial	Final
/h/	---	---		---	---	
/w/	---	---		---	---	
/j/	---	---		---	---	
/p/	---	---	---	---	---	---
/b/	/b/	---	---	/b/	---	---
/m/	---	---	---	/j/, /m/, /b/	---	---
/t/	---	---	---	---	---	/t/
/d/	/d/	---	---	/d/, /b/	/b/	---
/n/	---	---	---	---	---	---
/ŋ/		---	---		---	---
/k/	---	---	---	/d/	---	---
/g/	---	---	---	---	---	---
/f/	---	---	---	---	---	---
/v/	---	---	---	---	---	---
/θ/	---	---	---	---	---	---
/ð/	---	---	---	---	---	---
/s/	---	---	---	/s/, /d/	---	---
/z/	---	---	---	---	---	---
/ʃ/	---	---	---	---	---	---
/ʒ/	---	---	---	---	---	---
/ʃ/	---	---	---	/s/, /ʃ/	---	---
/ʧ/	---	---	---	---	---	---
/r/	---	---	---	---	---	---
/l/	---	---	---	---	---	---

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Example 1 – "J" Evaluation

Mayo 10 +1	Repeat 1-syllable words	Repeat 2-syllable words	Spontaneous speech sample	Total
Vowel Distortions	1			1
Distorted Substitutions	1			1
Difficulty with initial articulation configurations or transitionary movement gestures	1			1
Equal Stress, lexical or phrasal stress errors				0
Syllable segregation or word segregation				0
Groping	1		1	2
Intrusive Schwa				0
Voicing Errors	1			1
Slow speech rate and/or DDK				0
Increased difficulty with multi-syllabic words		1		1
Inconsistency on repeated trials of words/utterances	1		1	2
			Total characteristics in at least 3 speech tasks:	0

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Example 1 – "J" Recommendations

1. Formal language testing
2. Feeding evaluation
3. Continue speech/language therapy with a focus on AAC
4. Add additional therapy session(s) to begin incorporating principles of motor learning to address speech targets
   a. Include goals to work towards being able to do motor planning therapy

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Example 2 – "D" Evaluation

- **Age**: 4 years, 10 months
- **History**: 2 days in NICU with low blood sugar; rare genetic syndrome; communication and motor delays; developmental coordination disorder and receptive/expressive language delay.
- **Language sample**: Used a variety of signs and words and word approximations, including a few phrases. Also used nonverbal communication (joint referencing and attention, gestures, eye contact) appropriately.

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Example 2 – "D" Evaluation

Structural Functional Exam

- Oral structures observed at rest, while producing speech, and while eating
- WNL for jaw opening and closing and tongue elevation and protrusion
- Right and left lateral tongue movements after groping/trial-and-error behavior
- Able to pucker lips but not close them all of the way while doing so
- Hard palate WNL
- Soft palate not visualized but produced a sustained "ah" and staccato "ah-ah-ah"
- While chewing, tongue lateralization to both sides was noted, with a preference for the right side

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Example 2 – "D" Evaluation

Oral Nonverbal Apraxia Screener (Darly 1978)

- Able to produce three of the movements (cough, click your tongue and blow) in imitation with accuracy
- Able to smack lips, smile, bite lower lip and stick out tongue after trial-and-error movements
- Not able to lick lips or puff cheeks accurately

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Example 2 – "D" Evaluation

- Dynamic Evaluation of Motor Speech Skills (DEMSS)

Vowel Accuracy	Prosodic Accuracy	Overall Accuracy	Consistency	Overall Total Score
48 (out of 120)	**7** (out of 24)	**47** (out of 240)	**9** (out of 42)	**111**

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Example 2 – "D" Evaluation

Target	Independent (spontaneous)			Relational (elicited)		
	Initial	Medial	Final	Initial	Medial	Final
/h/	---	---		/h/	---	
/w/	---	---		---	---	
/j/	---	---		/j/	---	
/p/	---	---	---	/p/	/p/	/p/
/b/	---	---	---	/b/	---	---
/m/	---	---	---	---	---	/m/
/t/	---	---	---	---	---	/t/
/d/	---	---	---	/d/	/d/	---
/n/	/n/	---	---	---	/n/	/n/
/n/		---	---		---	---
/k/	---	---	---	/k/, /g/	O	---
/g/	/g/	---	---	/g/	---	---
/f/	---	---	---	---	---	/f/
/v/	---	---	---	---	---	---
/θ/	---	---	---	---	---	---
/ð/	---	---	---	---	---	---
/s/	---	---	---	/f/	---	---
/z/	---	---	---	---	---	---
/ʤ/	---	---	---	---	---	---
/ʃ/		---	---		---	---
/ʃ/	---	---	---	---	---	---
/ʧ/	---	---	---	---	---	---
/r/	---	---	---	---	---	---
/ɹ/	---	---	---	---	---	---

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Example 2 – "D" Evaluation

Mayo 10+1	Repeat 1-syllable Words	Repeat 2-syllable words	Repeat 3+ syllable words	Spontaneous speech sample	Total
Vowel Distortions	1	1	1		3
Distorted Substitutions					0
Difficulty with initial articulation configurations or transitionary movement gestures	1	1	1		3
Equal Stress, lexical or phrasal stress errors		1	1		2
Syllable segregation or word segregation	1	1	1		3
Groping		1			1
Intrusive Schwa					0
Voicing Errors	1				1
Slow speech rate and/or DDK	1	1	1		3
Increased difficulty with multi-syllabic words		1	1		2
Inconsistency on repeated trials of words/utterances	1	1	1	1	4
Total Characteristics Demonstrated in at least 3 speech tasks: 5					

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Example 2 – "D" Recommendations

1. Continue speech/language therapy with a focus on AAC
2. Add additional therapy session(s) to start Dynamic Temporal and Tactile Cueing (DTTC) for speech targets

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Example 3 – "C" Evaluation

- **Age**: 4 years, 2 months
- **History**: Drug exposed in utero; born at 37 weeks; first 10 days in NICU; feeding issues, motor and communication delays; received OT and ST since 6 months of age; history of pneumonia
- **Language sample**: Communicated in sentences. Omitted articles and helping verbs. Poor intelligibility. Lots of phonological patterns.

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Example 3 – "C" Evaluation

Structural Functional Exam

- (WNL) for jaw opening, closing, lip retraction, tongue protrusion, right and left lateral tongue movements
- Ability to pucker lips mildly to moderately limited
- Soft palate and uvula appeared symmetrical at rest and during movement of sustained and staccato "ah."
- Hard palate appeared slightly elevated
- Immature chewing pattern, mostly favoring front teeth to chew, using lip muscles to compensate for lack of movement of tongue
- Favored right side when chewing and moved whole head when trying to lateralize tongue to move food to left side
- Scattered food on tongue, pocketing, and using finger to compensate for lack of tongue movement noted

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Example 3 – "C" Evaluation

Oral Nonverbal Apraxia (Darley 1978)

- Able to accurately, immediately and effortlessly perform five of nine movements in imitation: blow, smile, smack lips, lick lips, and stick out tongue
- Accurate but slowly produced movements for four movements in imitation: cough, click your tongue, puff cheeks, and bite lower lip
- Able to accurately and effortlessly sequence seven of the nine two-step movements in imitation

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Example 3 – "C" Evaluation

- DEAP Articulation

Error Score	Scaled Score	Scaled Score Points +/-	Confidence Interval (90% Level)	Percentile Rank
44	3	1	2 to 4	1

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Example 3 – "C" Evaluation

- DEAP Phonology

Score	Error/Raw Score	Scaled Score	Scaled Score Points +/-	Confidence Interval (95% Level)	Percentile Rank
Phonology	55	4	2	6 to 2	2
SW-CS Agreement	N/A	N/A	N/A	N/A	N/A

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Example 3 – "C" Evaluation

DEAP Oral Motor Screen

Raw Score	Criterion Score	Criterion
53	49	Meets

DEAP Word Inconsistency

Score	Criterion Score	Criterion
68%	<40%	Meets

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Example 3 – "C" Evaluation

Syllable Repetition Task

Number of syllables	Mean PCC	Standard Deviation	Mean +/- 1 SD (Average Range)	C's PCC
2	92	11	81 to 103	75
3	78	18	60 to 96	56
4	65	24	41 to 89	56
All	78	15	63 to 93	62

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Example 3 – "C" Evaluation

MAYO 10 + 1	Repeat 1-syllable Words	Repeat 2-syllable words	Repeat 3+ syllable words	Articulation Test	Phonology Test	Connected Speech Sample	DDK	SRT	Total
Vowel Distortions		1	1	1	1	1			5
Distorted Substitutions			1	1	1				3
Difficulty with initial articulation configurations or transitionary movement gestures									0
Equal Stress, lexical or phrasal stress errors		1	1						2
Syllable segregation or word segregation				1	1				2
Groping									0
Intrusive Schwa									0
Voicing Errors				1	1	1		1	4
Slow speech rate and/or DDK							1	1	0
Increased difficulty with multi-syllabic words		1	1	1	1	1		1	6
Inconsistency on repeated trials of words/utterances	1		1	1		1	1	1	6
Number of signs each exhibited in at least 3 speech tasks:									5

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Example 3 – "C" Recommendations

1. Formal language testing, if not previously conducted
2. Feeding evaluation

2. Continue language therapy, building receptive language and incorporating pre-literacy skills

3. Add additional therapy session(s) to target speech using principles of motor learning

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Example 4 – "K" Evaluation

- **Age**: 6 years, 8 months
- **History**: No significant medical concerns. Communication delays and started speech therapy at 2 years of age. Lack of progress led to multiple different speech therapists and diagnosed with CAS at age 4.
- **Language sample**: Communicated in sentences. Errors in morphology and syntax noted including incorrect use of negation, pronoun errors, inconsistent use of helping verbs and "ing" ending. 75% intelligible to familiar listener with context .

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Example 4 – "K" Evaluation

Structural Functional Exam

- WNL for all movements assessed, including jaw opening, closing, right and left lateral movements, lip puckering and retraction, tongue elevation, protrusion, right and left lateral movements

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Example 4 – "K" Evaluation

Oral Nonverbal Apraxia (Darley 1978)

- Able to adequately perform seven of the movements given the verbal command only
- Able to produce the remaining two movements adequately in imitation
- Able to perform five of the nine sequenced movements adequately given the verbal command
- Accurate but slowly or awkwardly produced movements for four of the nine movements

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Example 4 – "K" Evaluation | DEAP Articulation

Error Score	Scaled Score	Scaled Score Points +/-	Confidence Interval (95% Level)	Percentile Rank
10	1	1	0 to 2	0.1

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Example 4 – "K" Evaluation | DEAP Phonology

Score	Error/Raw Score	Scaled Score	Scaled Score Points +/-	Confidence Interval (95% Level)	Percentile Rank
Phonology	22	1	2	1 to 3	0.1
SW-CS Agreement	11	3	3	0 to 6	1

60

Example 4 – "K" Evaluation

DEAP Oral Motor Screen

Raw Score	Criterion Score	Criterion
56	52	Meets

DEAP Word Inconsistency

Score	Criterion Score	Criterion
8%	<40%	Does not meet

61

Example 4 – "K" Evaluation | Diadochokinetic Rate

Target	Mean Time (seconds)	Standard Deviation	Mean +/- 1 SD	K's Time
/pʌ/	4.8	0.8	4.0 to 5.6	8.29
/tʌ/	4.9	1.0	3.9 to 6.0	7.36
/kʌ/	5.5	0.9	4.6 to 6.4	6.22
/pʌtə/	7.3	2.0	5.3 to 9.3	8.84
/pʌkə/	7.9	2.1	5.8 to 10.0	6.71
/tʌkə/	7.8	1.8	6.0 to 9.6	7.47
/pʌtəkə/	10.3	3.1	7.2 to 13.4	8.93

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Example 4 – "K" Evaluation | Syllable Repetition Task

Number of syllables	Mean PCC	Standard Deviation	Mean +/- 1 SD	K's PCC
2	96.9	6.1	90.8 to 100	100
3	88.9	7.4	81.5 to 96.3	56
4	80.0	12.4	67.6 to 92.4	50
All	88.6	5.3	83.3 to 96.9	68

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Example 4 – "K" Evaluation

Prosody Voice Screening Profile

Parameter	Number of Coded as Inappropriate	Parameter of Concern (>20% of utterances coded as inappropriate)	Specific codes frequently used for each parameter
Rate	6 (13.6%)		-Slow Articulation/Pause Time (6x)
Stress	18 (40.9%)	X	-Excessive/Equal/Misplaced Stress (14x) -Reduced/Equal Stress (x3) -Multisyllabic Word Stress (x1)
Phrasing	6 (13.6%)		-Word repetition (3x) -Sound/Syllable and Word Repetition (1x) -Repetition and Revision (2x)

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Example 4 – "K" Evaluation

Dynamic Motor Speech Exam

- Informal, targeting improved prosody in multisyllabic words and in sentences
- With additional cueing, K was able to improve her stress in both connected speech and multisyllabic words. After several trials, cueing could be reduced (simultaneous speaking eliminated) although visual and verbal cues were still implemented in order for K to maintain the correct stress in her speech

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Example 4 – "K" Evaluation

Mayo 10 + 1	Repeat 1-syllable Words	Repeat 2-syllable words	Repeat 3+ syllable words	Articulation Test	Conversational speech sample	DDK	SRT	Total
Vowel Distortions			1	1	1		1	4
Distorted Substitutions								0
Difficulty with initial articulation configurations or transitionary movement gestures				1	1	1		3
Equal Stress, lexical or phrasal stress errors			1	1	1			3
Syllable segregation or word segregation								0
Groping								0
Intrusive Schwa								0
Voicing Errors					1			1
Slow speech rate and/or DDK					1		1	2
Increased difficulty with multi-syllabic words				1	1	1	1	4
Inconsistency on repeated trials of words/utterances		1	1	1		1	1	5
							Total Characteristics in at least 3 Tasks	5

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Example 4 – "K" Recommendations

1. Formal language testing
2. Language therapy, keeping motoric complexity in mind
3. Teach remaining movement gestures to target error sounds, using principles of motor learning
4. ReST for prosody and generalization of previously learned movement gestures for speech

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Key Points

1. Identify vowel and consonant distortions, prosodic errors, and coarticulation difficulties
2. Analyze data for characteristics of CAS listed on the Mayo 10 (+1)
   - Don't forget to consider age-appropriateness and second-language use!
3. Do a dynamic motor speech exam at a level appropriate for the child's speech abilities

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Remember why diagnosis is important.

Diagnosis determines treatment.

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Let's practice!

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Thank you!

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Childhood Apraxia of Speech (CAS) Clinical Assessment Worksheet

Speech Tasks

Modified Mayo Clinic System Signs (inconsistency added)

4 signs in ≥3 Speech Tasks = CAS	Repeat 1-Syll Words	Repeat 2-Syll Words	Repeat 3+ Syll Utts	Artic Test	Conv Speech Sample	DDK	Phona-tion Task	Stress Task	Other	☑
Vowel distortions										
Distorted substitutions										
Difficulty w/initial artic configs or transitionary movement gestures										
Equal Stress; lexical or phrasal stress errors										
Syllable segregation or word segregation										
Groping										
Intrusive Schwa										
Voicing Errors										
Slow speech rate and/or slow DDK										
Increased difficulty with multi-syllabic words										
Inconsistency on repeated trials of words/utterances										
☑										TOTAL SIGNS ≥4 / TOTAL TASKS ≥3

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