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Current Best Practices in the Evaluation & Management of CAS: 
A Multidimensional Approach

Guest Editor: Kimberly Farinella, PhD, CCC-SLP

Part 3: Exploring Treatment Strategies Using Case Studies of School-Age Children with CAS

Margaret (Dee) Fish, M.S., CCC-SLP

Moderated by:
Amy Hansen, MA, CCC-SLP, Managing Editor, SpeechPathology.com
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EXPLORING TREATMENT STRATEGIES USING CASE STUDIES OF SCHOOL-AGE CHILDREN WITH CAS

Margaret (Dee) Fish, M.S., CCC-SLP
Northbrook, IL

SpeechPathology.com
January, 2018
ASHA FINANCIAL DISCLOSURE

FINANCIAL DISCLOSURE

I am the author of the book, *Here’s How to Treat Childhood Apraxia of Speech, Second Edition* (listed in handout) for which royalties are received.

NONFINANCIAL DISCLOSURE

I serve as a Topic Area Advisor for SpeechPathology.com. I do not receive financial reimbursement for my service.

FOLLOWING THIS WORKSHOP, PARTICIPANTS WILL BE ABLE TO:

- Describe at least 3 treatment strategies for establishing articulatory control of later developing phonemes and increasingly complex phoneme sequences.
- Describe 3 approaches for addressing language and motor speech goals simultaneously to maximize efficiency of treatment.
- List 4 treatment variables that can be manipulated in real time during treatment to keep children working at their optimum challenge point.
ONGOING SPEECH CHALLENGES IN SCHOOL-AGE CHILDREN WITH CAS

Difficulty with…

- Prosody – stress, intonation, rhythm
- Acquisition of challenging and later developing consonant phonemes (e.g., k, g, s, z, sh, ch, j, th, l, r)
- Suppression of phonological patterns
- Voicing contrasts
- Complex phoneme sequences
- Omissions – particularly sentence-level
- Generalization

OTHER POSSIBLE CHALLENGES

- Below age-level expressive language
- Receptive language challenges
- Literacy challenges – reading, writing, spelling
- Learning disabilities
- Cognitive impairment
- Social language difficulties
- Gross and fine motor difficulties
- Difficult with attention
- Etc…
CASE STUDY #1 - GEOFFREY

- Fewer than 10 words expressively
- Difficulty w/ imitation
- Limited Cs and Vs
- Syllable shapes: C, V, CV
- Passive in communication
- Receptive language and play significantly below age level

INITIAL GOALS FOR GEOFFREY

- **Improve imitation** of gestures and oral movements/postures including sequenced oral movements
- Facilitate **CV, CV’CV’ and VC** shapes
- Expand **phoneme repertoire**
- Expand **expressive vocabulary**
- Expand use of **functional phrases**
- **Reduce passivity** in communication
- Improve **receptive language** development
- Increase complexity of **play schemes**
OTHER CONSIDERATIONS FOR GEOFFREY
- *Counsel parents* to recognize broader challenges
- *Prioritize* flexibly
- *Establish AAC* in coordination w/ school

BIG TAKEAWAYS FROM GEOFFREY
- Regardless of incoming diagnoses, carefully *evaluate for yourself* and develop treatment plans that reflect the child’s needs

- *Counsel and guide parents in gentle and supportive ways* when giving unexpected news – the counseling will likely be ongoing

- In complex cases, look through *multiple lenses*

- Recognize the *benefits of AAC* and use when appropriate
CASE STUDY #2 - CLAIRE

- Talkative, rapid rate of speech
- Mild to moderate speech intelligibility
- Syllable gaps
- Difficulty w/ words of increased length and complexity
- FCD and Cluster Reduction errors impacting morphology – primarily alveolars
- Not yet stimulable for /r/

INITIAL GOALS FOR CLAIRE

- Increase awareness of impact of speaking rate on speech intelligibility and make adjustments as needed

- Increase inclusion of medial and final consonants

- Increase inclusion of final /s, z, t, d/ clusters

- Establishing /r/

- Improve morphology
MOVING FROM MOST TO LEAST FACILITATING CONTEXTS

He is/was singing a song

He is/was in there.

He is/was here.

He is/was not there.

He is/was by the door. He is/was cold.

I rode a bus Saturday.
The bus almost made it.

I rode a bus yesterday. The bus waited for me.
The bus never made it?

Where did the bus boy go? Why did the bus go?

SCAFFOLDING

Say “zin”
Say “uhzin”
Say “wuhzin”
Say “wuhzin there”
Say “He wuhzin there.”

Focus on SMOOTH coarticulatory transitions

100% or 0%??
MOST TO LEAST FACILITATING

cats
hearts
boats
shops
cups
grapes

Put the _____ on the table.
Are the _____ yours?
Are the _____ wet?
The _____ need to go here.
Should I put the _____ down?
I set the _____ by the window.
Did the _____ melt?
He took the_____ from me.

ADDRESSING COMPLEX PHONEME SEQUENCES: CLUSTERS

- **Address**:  
  - **All** word positions  
  - **Doubles** and **triplets** (e.g., *spring*, *asks*)  
  - Targets w/ **multiple clusters** (e.g., *accomplished*, *consequence*, *equivalent*, *frustrated*, *suspense*, *splashed*)  
  - Targets w/in **curriculum materials**  
  - *Morphological markers*
ADDRESSING CHALLENGING & LATER-DEVELOPING PHONEMES

Visual Biofeedback
- Ultrasound biofeedback
- Electropalatography (e.g., Smart Palate)
- Acoustic Wave Forms - Spectral biofeedback

Tactile Biofeedback
- Speech Buddies
- PROMPT

Big Takeaways from Claire
- Choose target utterances carefully
  - Don’t spend time working on unnecessary targets
  - Thorough speech analysis is essential
  - Move from most to least facilitating contexts of phonemes
  - When addressing final consonants, consider the preceding vowels
- It may be beneficial at times to encourage the child to think of phonemes/sounds, not letters
- Combine articulation and morphology goals when appropriate
- Mind the gap!
CASE STUDY #3 - JACK

- Severe challenges with speech intelligibility
- Specific phonemes late to develop: /k, g, tʃ, dʒ, l, r/ and continue to be inconsistent
- Frequent FCD
- Errors increase w/ increase in rate, sentence length, word complexity, and decrease in cueing and structure
- Easily fatigued and frustrated
- Limited awareness of errors

CONSIDERATIONS FOR JACK

- Review challenging phonemes frequently
- Establish high level of accuracy – vary the context and adjust levels of complexity, feedback, and cueing accordingly
- Establish increased accuracy of functional and frequently used phrases
- Keep activities fresh, interesting, and motivating
- Heighten his awareness of his progress
RECOMMENDATIONS FOR JACK

- Improve overall intelligibility by *reducing rate* of production and *increasing awareness* of communicative partner’s reaction
- **Increase persistence**
- Improve receptive/expressive *language*
  - Following directions
  - Story comprehension
  - Syntax
  - Morphology
  - Narrative development

OPTIMUM CHALLENGE POINT

The *constantly moving point in treatment* when the task is neither too easy nor too challenging.

Child should be reasonably challenged w/out being frustrated.

*(Guadagnoli & Lee, 2004; Rvachew & Brosseau-Lapre, 2012)*
OPTIMUM CHALLENGE POINT

Achieving optimum challenge point requires manipulation of these four variables in real time...

- Motoric/linguistic challenge, complexity, & variability
- Cueing
- Feedback
- Context

For more detail see Rvachew & Brosseau-Lapre (2012)

MANIPULATING COMPLEXITY AND VARIABILITY

- Change word complexity by increasing/decreasing:
  - Syllable shape complexity
  - Number of syllables w/in the word
  - Complexity of specific phoneme sequences
- Linguistic complexity – sentence length, syntactic complexity, morphological complexity
- Prosodic variability
MANIPULATING CUEING AND CUE SALIENCY (AVTM)

- Fading, Adding, Bundling, and Unbundling cues
- Auditory, Visual, and Tactile cues
- Sample Metacognitive cues
  - Hand cues, manual signs
  - Graphic cues
  - Syllable awareness (tapping/clapping/blocks/chips)
  - Metaphors
  - Phonetic placement cues
  - Visual syllables/Rebus

MANIPULATING FEEDBACK

- Frequency
- Type
  - Extrinsic (KP or KR)
  - Instinsic
- Timing
MANIPULATING THE CONTEXT

- Familiarity of:
  - Setting
  - Communicative partners
  - Activity

- Competing Motor Tasks

FEATURES OF LITERATE LANGUAGE

- Conjunctions other than “and,” “then,” “and then”
  - Coordinating conjunctions (e.g., but, so, yet)
  - Subordinating conjunctions (e.g., because, before, after, while, until, if, although)

- Mental and linguistic verbs
  - Mental (e.g., decided, knew, thought, predict)
  - Linguistic (e.g., said, announced, yelled, grumbled, asked)
FEATURES OF LITERATE LANGUAGE

- Adverbs and adverbial clauses
  - (e.g., before work, quickly, by the door, every morning, extremely, so he wouldn’t be late for work)
- Elaborated noun phrases
  - Modifiers (e.g., big, red house)
  - Qualifiers (e.g., the house next to the park)

CHARTING PROGRESS EXAMPLE

<table>
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<th>Date 1</th>
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<td>Final /k/ 2-word phrases w/out model</td>
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</table>
BIG TAKEAWAYS FROM JACK

- Be cognizant of each child’s unique emotional makeup
  - Work at the child’s optimum challenge point
- Use the child’s interests to your advantage
- Find ways to help the child recognize/visualize their progress, even when progress is slow
- Support literate language through thoughtful selection of target utterances
- Establish functional phrases to work on at home/school/therapy

CASE STUDY #4 - DAVID

- Highly unintelligible; very late to speak; CAS/ASD/Dysarthria
- Full phoneme repertoire except /r/
- Habitual pitch is low and constant (no rising/falling inflections)
- Limited syllable stress and contrastive stress variations
- Prevocalic voicing - /p, t, k/
- Addition of schwa following many final consonants
- Many vowel errors w/ neutralization & simplification of diphthongs
- Many deletions: FCD, cluster reduction, syllable deletion
GOALS FOR DAVID

- Improve **vowels**: /i, o, u/; /a, æ, aɪ, ɛɪ, ɔɪ/
- Reduce **FCD** – /s, n/
- Reduce **cluster reduction** syllable final
- Reduce addition of **schwa** following FC
- Increase accuracy of initial /p, t, k/ (**reduce voicing**)
- Establish **contrastive stress**
- Establish **lexical stress** in 2-syllable and then in 3- and 4-syllable words

OTHER CONSIDERATIONS FOR DAVID

- Increase **vocal volume** and improve **respiratory control**
- In addition, address **social communication**
- Keep **targets** functional and of interest
ADDRESSING LEXICAL STRESS

Assessment Considerations

- Include multisyllabic words in word-level assessment

- Include words with different syllable stress patterns and note syllable stress errors or equal stress

  2 Syllable Word Examples
  - Sw – bully, early, narrow, final
  - wS – believe, forgot, subtract, mislead

  3 Syllable Word Examples
  - Sww – battery, victory, exercise, everyone
  - wSw – already, terrific, direction, pollution
  - wwS – engineer, volunteer, recommend, twenty one

  4 Syllable Word Examples
  - SwSw – calculator, multiplying, difficulty, exercising
  - wSww – experience, American, librarian, responsible
  - wwSw – California, epidemic, horizontal, scientific
ADDRESSING LEXICAL STRESS

- Note how the student handles derivational pairs
  - His address is on the package.
  - How did you address the package?
  - Did you inform your teacher?
  - Yes, I gave him all the information he needed.
  - Did you present the presents to the volunteers?

STRESS in DERIVATIONAL PAIRS

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<td>repetition</td>
<td>repeat</td>
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ADDRESSING LEXICAL STRESS

- Provide visual supports as needed
- Teach basic idea of stressed syllable being louder and longer
- If possible, combine syllable stress goal with other goals (e.g., specific phoneme acquisition, multisyllabic words, vocabulary, syntax, grammar)

LEXICAL STRESS VISUAL CUES

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<td>FANTASTIC</td>
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SENTENCE LEVEL STRESS-CONTRASTIVE STRESS

Contrastive Stress (applying emphasis to specific word(s) in a sentence)… requires VARIABILITY!

- Prediction and review
- Statement-Question-Response
- Fix the sentence

Statement-Question-Response

S: The 19th Amendment gave women the right to vote.

Q: Who received the right to vote?
R: Women received the right to vote.

Q: What did women receive the right to do?
R: They received the right to vote.

Q: Which Amendment gave women the right to vote?
R: The 19th Amendment gave them the right to vote.

Fix the Sentence

Sentence: John prefers sausage pizza.
Incorrect: Alex prefers sausage pizza.
R: No, John prefers sausage pizza.
Incorrect: John prefers pepperoni pizza.
R: No, John prefers sausage pizza.
ADDRESSING PROSODY - Intonation

- Rising and Falling Intonation
  - Contrasted declarative sentence pairs (?) .

That's your book.

That's your book?

ADDRESSING VOICING ERRORS

**Intervention Sequence** for reducing Initial Consonant Voicing (e.g., "bee" for pea; "do" for two, "gow" for cow

1. Discrimination (if needed)
2. SW productions w/ prolonged aspiration- phhhea (pea)
3. SW productions w/progressively reduced aspiration- /phi/, /pʰi/
4. Contrast pairs- peas/bees, Terry/dairy, carrot/Garrett
5. Sentence-level productions- “He ate a carrot.”
6. Sentence-level w/ contrast pairs- “Garrett ate a carrot.”
### CONTRAST PAIRS

<table>
<thead>
<tr>
<th>/p/</th>
<th>/b/</th>
<th>/t/</th>
<th>/d/</th>
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<td>Den</td>
<td>Curl</td>
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<tr>
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<td>Bath</td>
<td>Tile</td>
<td>Dial</td>
<td>Could</td>
<td>Good</td>
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<tr>
<td>Pole</td>
<td>Bowl</td>
<td>Tear</td>
<td>Deer</td>
<td>Cold</td>
<td>Gold</td>
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### ADDRESSING COMPLEX PHONEME SEQUENCES

- *Rate reduction*
- Backward chaining
- Forward chaining
- Various **graphic** cues
- **Squeeze/Slide**
  
  Look to children’s *textbooks* for targets
### ADDRESSING COMPLEX PHONEME SEQUENCES - BACKWARD CHAINING

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### ADDRESSING COMPLEX PHONEME SEQUENCES - FORWARD CHAINING

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**VISUAL/TACTILE CUES – SLIDE/SQUEEZE**

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**BIG TAKEAWAYS FROM DAVID**

- Substantial progress can happen, even for *older clients*
- Don’t hesitate to go **back to basics** (e.g., CV) to establish better habits and articulatory patterns
- When possible, **prosody** goals can be addressed alongside **articulation/motor speech** goals
- **Prioritize** – determine what errors are impacting intelligibility the most and work on those areas first
- Addressing **prosody** can have big impact on **intelligibility**
- **Vowel errors** have huge impact on intelligibility
THANK YOU!

TIME
FOR
QUESTIONS