WSLHA Disclosure statement

Amy Skinder-Meredith is a member of WSLHA and has no financial or non-financial relationships with WSLHA.

Nancy Potter is a member of WSLHA and has no financial or non-financial relationships with WSLHA.

We CAN learn to talk and read!

Treating Motor Speech Disorders and Reading Disabilities in Children

Speech sound disorder (SSD) classification system (Shriberg et al. 2010)

Speech Delay/Disorder
- Phonological disorder
- Articulation disorder

Motor Speech Disorder (MSD)
- Childhood apraxia of speech (CAS)
- Dysarthria (DYS)
- Speech motor impairment (SMI) or MSD-NOS

Neurologic (brain) involvement
Quick!
Write the characteristics you use to diagnose:

CAS  DYS

What is Childhood Apraxia of Speech (CAS)?
Inconsistent errors on consonants and vowels
- /fish/, /pit/, pits/
Lengthened/disrupted co-articulation
- It’s hard to do
Inappropriate prosody
- Unusual stress patterns
- Word or sentence level
In the absence of neuromuscular deficits

7 Additional characteristics often observed in CAS
1. Syllable segregation (ma_ma/mama)
2. Groping
3. Intrusive schwa (g*een/green)
4. Voicing errors
5. Slow rate
6. Slow diadochokinetic rates (slow DDK)
7. Increased difficulty with longer or more phonetically complex words
10 Proposed characteristics – DYS
Strand in Yorkston et al. (2010)
1. Scanning speech (pause between syllables)
2. Equal stress
3. Sound distortions
4. Irregular diadochokinetic rate (ataxia)
5. Slow rate

10 Proposed features – DYS
6. Reduced range of motion
7. Reduced strength of articulatory contacts
8. Reduced respiratory support or respiratory incoordination
9. Strained or breathy phonatory quality
10. Adventitious movement

Metalinguistic and Literacy Characteristics of children with CAS
(ASHA Technical Report, 2007)
At risk for phonological awareness deficits
(important for literacy development)
Deficits in:
- rhyming (producing rhymes)
- word attack, word identification, and spelling
- phonological perception
- phonological discrimination
- phonological memory
Welcome to camp!

Camp Candoo is an intensive speech therapy and early literacy summer camp for children ages 4-8 with childhood apraxia of speech (CAS) and other severe speech disorders held at the WSU Spokane campus.

We work hard and have a lot of fun!

First Day Assessment

- Hearing Screening
- Phonological Awareness Literacy Screening (PALS)
- Phonologic and Print Awareness (PPA)
- Language Sample
Assessment

Motor Speech evaluation
Structural Functional Exam
Articulation assessment with analysis of speech error patterns
- Errors consistent with as well as different than phonological processes
  - Lip rounding
  - Jaw stability

MOTOR SPEECH EXAMINATION

Examine ability to sequence phonetic segments in various contexts.
- V, CV, VC, CVC, CVCV (using various vowels)
- monosyllabic word repetition
- multisyllabic word repetition
- phrase repetition
- repetition of sentences of increasing length
Compare automatic speech (e.g., counting) to novel utterances.

Motor Speech Evaluation

Examine ability to produce particular phonetic sequences while varying the temporal relationship between stimulus and response
  1st try immediate repetition
  2nd try simultaneous production
  3rd add tactile cues
*Keep in mind that this is just a tool to help in diagnosis, treatment planning, and treatment.
**Dynamic Evaluation of Motor Speech Skill**

(Strand, et al., 2013)

DEMSS—Assessment currently being developed to assess CAS in young children with CAS:
- Words and phrases of increasing length with varying temporal and tactile parameters
- Consistency of errors
- Vowel errors
- Lexical stress errors

---

**DEMSS scoring**

Strand, et al., 2013, p. 508, Table 2

- **Overall articulatory accuracy**: 5-point multidimensional scoring
  - 0 = correct on first attempt
  - 1 = consistent developmental substitution error (e.g., /t/ for /k/; /w/ for /r/) without slowness or distortion of movement gestures
  - 2 = correct after first cued attempt
  - 3 = correct after two or three additional cued attempts
  - 4 = not correct after all cued attempts

- **Vowel accuracy**: 3-point multidimensional scoring
  - 0 = correct
  - 1 = mild distortion
  - 2 = frank distortion

- **Prosodic accuracy**: Binary scoring
  - 0 = correct
  - 1 = incorrect

- **Consistency**: Binary scoring
  - 0 = consistent across all trials
  - 1 = inconsistent across any 2 or more trials

---

**Maximum Phonation Duration**

(Finnegan, 1984 data collapsed across gender)

<table>
<thead>
<tr>
<th>Age</th>
<th>Mean (secs.)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>7.1</td>
<td>1.78</td>
</tr>
<tr>
<td>4</td>
<td>9.35</td>
<td>2.18</td>
</tr>
<tr>
<td>5</td>
<td>10.3</td>
<td>2.81</td>
</tr>
<tr>
<td>6</td>
<td>13.9</td>
<td>3.31</td>
</tr>
<tr>
<td>7</td>
<td>14.2</td>
<td>2.63</td>
</tr>
<tr>
<td>8</td>
<td>17.0</td>
<td>4.57</td>
</tr>
<tr>
<td>9</td>
<td>15.7</td>
<td>4.93</td>
</tr>
<tr>
<td>10</td>
<td>19.05</td>
<td>5.37</td>
</tr>
</tbody>
</table>
**Treatment Plan**

Based on assessment results
- What is the relative contribution of motor planning to the overall communication skills of the child?

When determining phrases - consider:
- Academic communication needs
- Family & friend communication needs
- Sound repertoire
- Syllable shapes
- Syllable length
- Phrase length

**Treating CAS**

- Dynamic Tactile Temporal Cueing (DTTC) \(\text{(Strand et al., 2006)}\)
- Integral Stimulation Approach \(\text{(Rosenbek et al., 1973)}\)

- Originally designed for adults with acquired apraxia of speech
- Varies the temporal relationship between the clinician’s model of the utterance and the child’s response
- Allows the child to take increasing responsibility for assembling and retrieving motor plans while progressively decreasing the cueing

**Dynamic Tactile Temporal Cueing (DTTC)**

<table>
<thead>
<tr>
<th></th>
<th>Clinician</th>
<th>Client</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Produce target utterance simultaneously with client</td>
<td>Produce target utterance simultaneously with clinician</td>
</tr>
<tr>
<td>2</td>
<td>Produce target utterance, then mouth while client produces it</td>
<td>Produce target utterance after clinician, while clinician mouths it</td>
</tr>
<tr>
<td>3</td>
<td>Produce target utterance without other cues</td>
<td>Repeat clinician’s production - varying delay between model and response</td>
</tr>
<tr>
<td>4</td>
<td>Produce target utterance without other cues</td>
<td>Repeat clinician’s production several times - varying delay between model and response</td>
</tr>
<tr>
<td>5</td>
<td>Present written target utterance on a card</td>
<td>Read target utterance from card presented</td>
</tr>
<tr>
<td>6</td>
<td>Present written target utterance, then remove</td>
<td>Produce target utterance after card has been removed</td>
</tr>
<tr>
<td>7</td>
<td>Ask client question to prompt target utterance</td>
<td>Respond to question with target utterance</td>
</tr>
<tr>
<td>8</td>
<td>Incorporate target utterance into role-playing</td>
<td>Produce target utterance volitionally during role-play</td>
</tr>
</tbody>
</table>
A typical day includes:

60 minutes of individual therapy daily in two separate treatment sessions.
- Sessions target specific speech goals for each camper.
- Therapy is based on the Dynamic Tactile Temporal Cueing (DTTC) approach based on principles of motor learning.

Dynamic Tactile Temporal Cueing (DTTC)

Stimulus Selection
- Severe motor planning deficits
  5-6 words/utterances
- Moderate motor planning
  8-10 words/utterances
- Primarily phonological deficits
  10-15 words/utterances

Skinder, 1999)
Two Age/Skill Groups

Pre-K-Our morning group is geared toward pre-literacy skills and younger children.
Pre 1st and 2nd grade-Our afternoon group focuses on early literacy skills.
  • (new this year)

Small group therapy-campers

opportunities to practice their speech goals in different settings and work on early reading skills using Phonic Faces² tools.

Large group therapy

Campers practice their social communication goals and reinforce sound-letter awareness during
  • Snack
  • Crafts
  • Gross motor activities
Use of print and picture cues with Picture It software to improve language

Why add literacy?

• Output phonological representations play an important role in learning to read (Snowling, Goulandris, and Stackhouse, 1994)
• Raitano et al. (2004) examined pre-literacy skills in subgroups of children with speech sound disorders
  - Compared children with SSD with LI, SSD without LI, SSD normalized and control group
  - All children with SSD performed less well than controls on phonological awareness tasks and letter knowledge
  - Children with normalized SSD without LI were at greater risk for literacy difficulties
  - Persistent SSD and a comorbid LI increased risk
• The majority of children with CAS later had difficulties with reading and writing even after their motor speech skills had improved. (Lewis et al., 2004)

Adding Phonological Awareness

Supplement motor speech therapy with phonemic and phonologic awareness to:

• Improve the linguistic underpinnings that could help improve motor speech skills
• Strengthen neural substrates of phonemes (Burns, 2014)
• Compensate for spatial temporal awareness deficits
• Build a bridge from the motor conceptualization of phonemes as represented by graphemes to sequence of movements for speech.
• Improve literacy
• Also supported by the research (Moriarty & Gillon, 2006; McNeill et al., 2009; Murray et al., 2014)
Adding Phonological Awareness

Initial key elements to address:
- Grapheme to phoneme awareness
- Segmenting
- Blending
- Rhyming is fun too! Willaby Wallaby Wu
(McNeill, Gillon, & Dodd, 2009; Moriarty, B. Gillon, 2006)

Additional areas to address:
- Morphology
- Syntax
- Semantics
(Kirk & Gillon, 2009)

Tools Used for Incorporating Literacy

- Phonic Faces and Morpho Phonic Faces to improve sound letter awareness and morphology (elementary.com by Jan Norris)
- Picture It™ to provide pictured sentence strips to cue full sentences during snacks and activities. (available through Suncastle Technology)

Phonic Faces Alphabet …

Letter is associated with a sound your mouth produces
Picture is what your mouth does to make the sound
Letter looks like the associated sound
- k = tongue up, oblique lines pop sound out of mouth
- b = bottom lip bounces
- p = top lip pops
- a = mouth is open like a crying baby
Phonemic awareness is simultaneously taught b/c the alphabet teaches the skills visually
Using Phonic Faces

- Introduce one sound at a time.
  - Each sound has a picture card, a story, and activities
  - We introduced 2 consonants and one vowel with it's
two sounds a day (e.g., 'p', 'b', and short and long forms of 'a'
- After a group of sounds has been introduced,
you can start blending them. For example:
  - Introduce first group of sounds: p, b, k, and g, a, e, l
  - Blend sounds into /cvc/: words big, pig, dig
Using Phonic Faces

After phonic faces has been used to teach grapheme-phoneme relationships
- Fade out phonic face and just use traditional letters
- Use print to facilitate speech as an additional cue to tactile, visual and auditory.

Speech and Blending

- Helpful to
  - Demonstrate place of articulation for each grapheme/phoneme
  - Explicitly provide feedback on errors
    - E.g., you said ‘at.’ We forgot to put Ester’s ‘s’ here.
    - Demonstrate that when a sound changes the word changes
Pros and cons

Pros
- Fast and friendly way to teach grapheme-sound awareness
- Phonic faces gives a cue for articulatory placement
- Pictures and stories are engaging for children with attention issues

Cons
- Stories don’t always make sense
- Studies are showing positive results but have not been published in peer reviewed articles yet.

Data from Camp Candoo for changes in receptive letter name and sound awareness

*Client was distracted during post-testing and family reported gains at home.
“Miss A had a happy day.”

Amy Ann was sad.

After two weeks of intensive therapy, we see:

1. Intelligible functional words and phrases
2. Increased phonological awareness
3. Happy empowered parents
Empowered Jedi Warriors!

QUESTIONS?

Thank you!

Resources

- Phonological Awareness Literacy Screening: [https://pals.virginia.edu/tools-activities.html](https://pals.virginia.edu/tools-activities.html)
- Phonic Faces and Morphophonics Faces: [http://elementory.com/](http://elementory.com/)
- Picture It, Suncastle Technology: [https://www.suncastletech.com](https://www.suncastletech.com/)
References


