Incorporating Phonemic & Phonological Awareness in Speech Therapy

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CAS DEFINITION (ASHA, 2007)

- Childhood apraxia of speech is 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. (p. 3-4)
**CORE CHARACTERISTICS (ASHA, 2007)**

1. Inconsistent errors on consonants and vowels in repeated productions of syllables or words.
2. Lengthened and disrupted coarticulatory transitions between sounds and syllables.
3. Inappropriate prosody, especially in the realization of lexical or phrasal stress.

**CAS- IMPACTS OTHER AREAS**

- The presence of a motor deficit influences the development of phonology and other language processes.
  - Therefore, children with motor planning and programming deficits may exhibit phonologic and other linguistic deficits.
- Also, delays in speech development may occur because of concomitant delays or deviances in both phonologic and motor processing (Caruso & E. Strand, 1999).
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

A FEW POTENTIAL UNDERLYING DEFICIT THEORIES

- The linguistic integrity of underlying phonological structures may be compromised.
- Dissolution of the neural substrates representing the phonologic framework of the child’s speech motor programming performance (Marquardt, Sussman & Snow, 1998).
“speech motor output would be severely handicapped as the phonological targets driving articulation may be totally missing or in various states of marginal operational integrity” (Marion et al., 1993).

Vocal tract image from: http://www.dukemagazine.duke.edu/issues/050608/images/050608-lg-figure1purves.jpg

There is an interdependence of perception and production (Groenen, Maassen, Crul, and Thoonen, 1996; 2003). In other words, if the child doesn’t hear the word correctly, he/she won’t produce it correctly.

- Although children with CAS did not have difficulty identifying the place of articulation of a consonant, they did have difficulty discriminating consonants with subtle acoustic differences associated with place of articulation.
- They also had difficulty with ID and discrimination of vowels.
Impaired ability to generate and utilize frames, which would otherwise provide the mechanisms for analyzing, organizing, and utilizing information from their motor, sensory, and linguistic systems for the production of spoken language (Velleman & K. Strand, 1994).

**TERMS RELATING TO PHONOLOGICAL AWARENESS**

- Modified from Gillon, 2004, p. 10, fig. 1.3

- **Phonological processing abilities**
  - Storing phonological information
  - Retrieving phonological information

- **Phonological awareness**
  - Syllable awareness
  - Onset-rime awareness
  - *Phoneme awareness*

- **Metalinguistic Awareness**
  - Semantic, syntactic, pragmatic, morphological awareness
PHONOLOGICAL AWARENESS

- “Refers to an individual’s awareness of the sound structure, or phonological structure of a spoken word” (Gillon, 2007, p.2)
- An awareness that spoken words can be broken down into smaller parts
- Tasks
  - Syllable awareness
  - Onset-rime awareness
  - Phoneme awareness

PHONEMIC AWARENESS

- The ability to hear, identify, and manipulate individual sounds in spoken words (Armbruster, Lehr, and Osborn, 2001)
- An understanding that words are made up of individual sounds.
- Examples:
  - Sound and word discrimination
  - Rhyming
  - Blending
  - Segmentation
  - Deletion
  - Phoneme manipulation
OTHER CONSTRUCTS IMPORTANT TO READING

- Coding phonological information in working memory
- Retrieving phonological information from long-term memory

WHAT DO WE KNOW ABOUT CAS AND LITERACY DEVELOPMENT?

- Children with impaired phonological output are at greater risk for impaired phonological awareness skills.
- Children with persisting speech difficulties such as CAS, with no obvious medical etiology such as cleft palate, are at risk for related and specific literacy problems (Stackhouse, 1997).
WHAT DO WE KNOW ABOUT CAS AND LITERACY DEVELOPMENT?

- Output phonological representations play an important role in learning to read (Snowling, Goulandris, and Stackhouse, 1994)

- Lewis, Freebairn, Hansen, Iyengar, & Taylor (2004) found the majority of children with CAS later had difficulties with reading and writing even after their motor speech skills had improved.

RECENT RESEARCH ON PHONOLOGICAL AWARENESS/LITERACY AND CAS

- Skinder-Meredith (2003) found that the severity of CAS correlated with how well children did on the Phonological Awareness Skills Program Test (PASPT) (Rossner, 1999).

- Skinder-Meredith and LaCoursierre (2005) found in a follow-up study that the majority of parents had concerns about their child’s reading and writing skills in the 1st through 4th grades.
  - Using the NCEE standards, 47% of the children were showing a delay in reading and 67% were showing a delay in writing.
SPEECH SOUND DISORDERS AND LITERACY

- 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
  - Results showed:
    - 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 were additive risk factors for deficits in pre-literacy skills
- Rvachew & Grawburg (2006): Children with SSD and poor speech perception abilities and/or relatively poor receptive vocabulary were at greater risk of delayed phonological awareness skills than children with only SSD.

MY HOPE

- 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
    - Compensate for spatial temporal awareness deficits
    - Strengthen sequencing skills
    - Build a bridge from the motor conceptualization of phonemes as represented by graphemes to sequence of movements for speech.
  - Improve literacy
**PHONOLOGICAL AND PHONEMIC AWARENESS SKILL DEVELOPMENT**  
(Goldsworthy, 2001; Rosin, 2003)

**AT 3 YEARS OLD KIDS USUALLY CAN:**

- Recognize two words that rhyme (emerging)
- Recognize alliteration (i.e., when words begin with the same first sounds)
- Recite familiar rhymes, such as “Jack and Jill”
- Produce rhyme by pattern. If you have them say the word ‘hat’, they could rhyme it with ‘cat’.
At 4 years old kids usually can:

- Spontaneously use rhyming word combinations
- Produce multisyllabic words while separating the syllables
- Segment syllables; e.g., they know there are two parts to the word ‘cowboy.’
- 50% can count the number of syllables in words

At 5 years old kids usually can:

- Count the number of syllables in a word
- Less than 50% can count phonemes (sounds) within words
COMMON CORE STANDARDS FOR PHONOLOGIC AWARENESS-KINDERGARTEN

- Demonstrate understanding of spoken words, syllables, and sounds (phonemes).
  - Recognize and produce rhyming words.
  - Count, pronounce, blend, and segment syllables in spoken words.
  - Blend and segment onsets and rimes of single-syllable spoken words.
  - Isolate and pronounce the initial, medial vowel, and final sounds (phonemes) in three-phoneme (consonant-vowel-consonant, or CVC) words.* (This does not include CVCs ending with /l/, /r/, or /x/.)
  - Add or substitute individual sounds (phonemes) in simple, one-syllable words to make new words.

COMMON CORE STANDARDS FOR PHONICS AND WORD RECOGNITION-KINDERGARTEN

- Know and apply grade-level phonics and word analysis skills in decoding words.
  - Demonstrate basic knowledge of one-to-one letter-sound correspondences by producing the primary sound or many of the most frequent sounds for each consonant.
  - Associate the long and short sounds with common spellings (graphemes) for the five major vowels.
  - Read common high-frequency words by sight (e.g., the, of, to, you, she, my, is, are, do, does).
  - Distinguish between similarly spelled words by identifying the sounds of the letters that differ.
COMMON CORE STANDARDS FOR PHONOLOGIC AWARENESS-1ST GRADE

- Demonstrate understanding of spoken words, syllables, and sounds (phonemes).
  - Distinguish long from short vowel sounds in spoken single-syllable words.
  - Orally produce single-syllable words by blending sounds (phonemes), including consonant blends.
  - Isolate and pronounce initial, medial vowel, and final sounds (phonemes) in spoken single-syllable words.
  - Segment spoken single-syllable words into their complete sequence of individual sounds (phonemes).

COMMON CORE STANDARDS FOR PHONICS AND WORD RECOGNITION- 1ST GRADE

- Know and apply grade-level phonics and word analysis skills in decoding words.
  - Know the spelling-sound correspondences for common consonant digraphs.
  - Decode regularly spelled one-syllable words.
  - Know final -e and common vowel team conventions for representing long vowel sounds.
  - Use knowledge that every syllable must have a vowel sound to determine the number of syllables in a printed word.
  - Decode two-syllable words following basic patterns by breaking the words into syllables.
  - Read words with inflectional endings.
  - Recognize and read grade-appropriate irregularly spelled words.
BREAK THE CODE TO READING

- What’s the ‘code’?
  - Getting the child from sound to letters (writing the correct letters to represent the correct sounds)
  - From auditory to visual (hearing what is said to read what is written)

- Teaching phonological awareness skills **plus** explicit reading strategies is what is needed to help a child learn to read (Stackhouse, 1997).

WHAT TO DO?

- For the child with CAS and poor phonological awareness skills, what do we do?
  - Treat motor speech skills to improve intelligibility?
  - Treat phonological awareness skills to improve literacy?
WHERE’S THE EVIDENCE?

- Dynamic Tactile and Temporal Cuing (DTTC) has been found to be effective in improving motor speech skills (Strand & Debertine, 2000; Strand, E., Stoeckel., R., & Baas, B., 2006)
  - Phonological awareness skills were not assessed.
- Moriarty and Gillon, 2007 showed improvement in both phonological awareness and speech skills when just working on phonological awareness skills.
  - They actually suggest that working on motor speech skills is not a good way to go.
  - However, measures of speech skills were limited in their studies.

USING BOTH

- Don’t throw out the baby with the bathwater!
- Applying motor learning principles and phonologic awareness skills are both important.
1. Therapist says utterance while child watches clinician’s face and child repeats
   • If child is unsuccessful, move to simultaneous production, adding tactile or gestural cues as necessary
   • Maintain auditory and visual stimuli for repetitions
   • Continue until child can easily produce the utterance with therapist
   • Fade cue by reducing volume, reducing tactile/gestural cues

2. Immediate repetition
   • Therapist says target utterance
   • Child repeats (therapist mouths utterance if additional support is needed, then fades)

3. Addition of delay
   • Therapist says target utterance
   • Insert 1-3 second delay before prompting imitative response
   • After child is successful in 2-3 second delay, prompt to repeat target several times without intervening stimuli
4. Elicit utterance spontaneously

The hierarchy is constantly changing as the therapist adds or fades cues, depending on the child’s responses

DTTC also emphasizes conditions of practice, such as intense practice, a balance of block and random practice, and distributed practice (Edeal & Gildersleeve-Neumann, 2011; Maas et al., 2008)

OTHER THERAPY TECHNIQUES FOR CAS

- *Prompts for Restructuring Oral Muscular Phonetic Targets (PROMPT)* (Debora Hayden)
- *Phonotactic Approach* by Shelley Velleman
- *Kaufman Approach* by Nancy Kaufman
# Adding Motor Speech to Phonological and Phonemic Awareness

- **Lindamood Phoneme Sequencing®**
  - For Phonemic Awareness, Reading and Spelling (LiPS®)
  - Use phoneme labels that describe the movement of the sound. (next slide)

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## Category label | Quiet brother | Noisy brother |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lip poppers</td>
<td>‘p’</td>
<td>‘b’</td>
</tr>
<tr>
<td>Tip tappers</td>
<td>‘t’</td>
<td>‘d’</td>
</tr>
<tr>
<td>Tongue scrapers</td>
<td>‘k’</td>
<td>‘g’</td>
</tr>
<tr>
<td>Lip coolers</td>
<td>‘f’</td>
<td>‘v’</td>
</tr>
<tr>
<td>Tongue coolers</td>
<td>Voiceless ‘th’</td>
<td>Voiced ‘th’</td>
</tr>
<tr>
<td>Skinny air</td>
<td>‘s’</td>
<td>‘z’</td>
</tr>
<tr>
<td>Fat air</td>
<td>‘sh’</td>
<td>C like in garage</td>
</tr>
<tr>
<td>Fat pushers</td>
<td>‘ch’</td>
<td>‘j’ as in jelly</td>
</tr>
</tbody>
</table>

### Consonants - cousins
- **Nose sounds**: m, n, ng
- **Windy sounds**: w, wh, h
- **Tongue lifters**: l, r

### Vowels (vowel circle)
- **Smile vowels**: ee, i, e, ae, a, u
- **Open vowels**: o, au, aw (as in hot and Paul)
- **Round vowels**: oe, oo (as in book), oo (as in boot)
- **Sliders**: ie, ue, oi, oy, ou, ow
- **Crazy Rs**: er, ir, ur, ar, or
LiPS

- Use mouth pictures to go with the labels.
- Overlie mouth pictures with letter tiles.
- Later, spell with mouth pictures and then letter tiles.
- Demonstrate how when letters change, sounds change, which changes the word.

Later, the student can use colored blocks to represent more abstract thinking.

Colored blocks can be used to track syllable changes and work on demonstrating the following skills:

- **Omission** (taking away a block when the sound went away, e.g., changing 'vop' to 'op')
- **Substituting** (switching sounds, e.g., changing 'vop' to 'vip')
- **Addition** (adding a sound, e.g., changing 'vip' to 'vips')
- **Shifting sounds** (e.g., changing 'ip' to 'pi')
- **and repeating sounds** (e.g., change 'sop' to 'sops')
PROS AND CONS

○ Pros
  • A multi-modality approach
  • Systematic
  • Ability to build on this program with their other programs (e.g., Seeing Stars)
  • Guides the student as a collaborator and active problem solver
  • Peer reviewed journal articles have shown this program to be effective

○ Cons
  • May be difficult for a child with attention issues
  • Manipulatives may be distracting and too abstract

PHONIC FACES

○ “PHONIC FACES is a unique alphabet that enables children to SEE sounds!
○ The letters in the mouth look like the lips or tongue making the sound, a form of cued speech.
○ Phonic Faces make learning articulation, letter-sound correspondence, sounding out and spelling words, and learning phonic principles easier than any other program.”
○ http://www.elementory.com/index.html
**EXAMPLES OF PHONIC FACES**

- Introduce one sound at a time.
  - Each sound has a picture card, a story, and activities
- 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, g, i
  - Begin blending sounds into /cvc/: words big, pig, dig
  - Implement rhyming activities
  - Set of cards available with onsets and rhymes

**USING PHONIC FACES**
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.

ACTIVITY EXAMPLE

- Play dough
- Child uses these words in a carrier phrase or on their own:
  - I want to ______.
  - I can ________.
  - _______ the dough.
WHAT ABOUT PERFECT SPELLING?

- Initially, I don’t worry about perfect spelling with 4 to 5 year olds.
- However, there is a silent ‘e’ character in the Phonic Faces program so correct spelling can be addressed.

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.
INCORPORATE SIMPLE READING

- Usborne books have many phonetic, rhyming stories for ages three and up
  - *E.g.*, *Fox on a Box, Mouse Moves House, Frog on a Log, Shark in the Park, Hen's Pens, Goose on the Loose, Ted's Shed, Big Pig on a Dig, Toad Makes A Road, Ted in a Red Bed, Sam Sheep Can't Sleep, Fat Cat On A Mat.*

IS IT EVER TOO LATE?

Case: 17 y/o male
- Diagnosed with CAS at 4 y/o.
- Had difficulty with reading and spelling.
- Phonological awareness was at the first grade level.
- Speech was adequate but broke down on novel multisyllabic words
- Prosody was reduced
- He did a 6-week intensive program at a Lindamood Bell learning center
- Mother reported reading came up 6-7 years and speech was much better!
WHAT IF THE CHILD HAS ADHD?

- Internationally adopted 6 year old from Eastern Europe with questionable FAS and ADHD
  - Severe CAS
  - Deleted final consonants and had poor intelligibility
  - Focused more with Phonic Face stories
  - PCC and inclusion of final consonants improved when using CVC Phonic Face trains.

OTHER PROGRAMS

- Orton Gillingham Reading Program
- Road to Code
  - These have also been shown to be effective programs
- The key is that the program is:
  - Multi-modality/multi-sensory
  - Systematic
  - Provides explicit reading instruction
  - Research based
WHAT CAN PARENTS DO? (LEVAR, 1998)

Rhyme Awareness Activities
- General: Music, nursery rhymes, finger plays, poems, jingles
- Identification of rhyming vs. non-rhyming word pairs
- Identification of the two rhyming words among 3 or 4 words
- Generating a word to rhyme with a specified word
- Odd-one-out: Determine which word out of 3 or 4 that does not rhyme (Sweeney James, 2006)

PHONEME AWARENESS ACTIVITIES (LEVAR, 1998)

1. Identify words starting with the same sound.
   - Progress to identification of same ending sounds, and later same middle vowels.
2. Sort pictures by same sound at beginning, end, and middle.
PHONEME AWARENESS ACTIVITIES (LEVAR, 1998)

3. Generate words that start or end with a specified sound.
4. Segment and count phonemes (sounds) in a given word. In the beginning stages of this type of task, avoid words that have consonant blends.
5. Synthesize phonemes presented separately into a whole word.

6. Identify the sound that is missing.
   1. E.g., “Say mat. Now say at. What sound is missing?”
7. Say the word without a specified sound.
   1. E.g., “Say make. Now say it again but don’t say the /k/ sound.” Remember to say the letter sound, not the letter name.
PHONEME AWARENESS ACTIVITIES (LEVAR, 1998)

8. Manipulate the phonemes by substituting beginning or final sounds.
   - E.g., “Say make. Now say it again, but instead of saying /m/, say /t/.

9. Find a hidden sound in a word
   - E.g., “Say mess. Is there an /m/ in mess?”

   Note that these activities can be modified to be receptive tasks or expressive using pictures if the child is unable to articulate the correct sounds.

IPAD APPS – A WAY TO REINFORCE AND GET EXTRA PRACTICE

Examples:
- Syllable awareness - Tap it out
- Blending blastoff
- Sound matching
- Phonics and handwriting
- I like books
- Rhyming words
- Abc Pocket Phonics
- Word magic
- ABC Phonics Animals

   But be a careful consumer - See: “Selecting Apps for Therapy: A tutorial for SLPs on using an EBP model to assist with choosing intervention tools” by Wakefield, L. & Schaber, T. (SpeechPathology.com course #s 5123/5124/5138)
TOOL BOX

- Make sure all the tools are in your toolbox.
- Don’t throw away the wrench just because a hammer is what you need at the moment.
- You never know when you’ll spring a leak.

QUESTIONS?
Thank you!
## REFERENCES & RESOURCES


## REFERENCES & RESOURCES CONT.


REFERENCES & RESOURCES


REFERENCES & RESOURCES

- Sweeney James, S. Break the Code to Reading. Edwin Eddy Lecture Handout, Duluth, MN, April, 2006.
WEBSITES

- BBC Schools Ages 4-11
  http://www.bbc.co.uk/schools/websites/4_11/site/literacy.shtml
  (provides activities for teachers and parents)
- Big Ideas in Beginning Reading
  http://reading.uoregon.edu/big_ideas/pa/pa_sequence.php
- Common Core State Standards Initiative
  http://www.corestandards.org/
- Gillon Phonological Awareness and other Resources
  http://www.education.canterbury.ac.nz/people/gillon/resources.shtml
- iPad Apps for Teaching Kids to Read
  http://www.howstuffworks.com/tablets/10-ipad-apps-for-teaching-kids-to-read.htm#page=1
- Lindamood-Bell Learning Process
  http://www.lindamoodbell.com/
- Literacy Center.net http://www.literacycenter.net/ (offers help in English, Spanish, French, and German)

WEBSITES

- Orton Gillingham reading program http://www.orton-gillingham.com/
- Reading Rockets Problems Involving Phonological and Phonemic Awareness
  http://www.readingrockets.org/helping/target/phonologicalphonemic#do_parents
- Woodland’s Web Interactive English Games and Activities
  http://www.woodlands-junior.kent.sch.uk/interactive/#lit