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Evidence-Based Treatment Strategies for Childhood Apraxia of Speech

Presenter:
Christina Gildersleeve-Neumann, Ph.D., CCC-SLP

Moderated by:
Amy Hansen, M.A., CCC-SLP, Managing Editor, SpeechPathology.com

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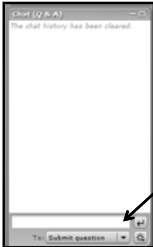
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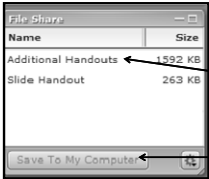
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**Evidence-Based Treatment Strategies
for Childhood Apraxia of Speech**

Christina Gildersleeve-Neumann, Ph.D., CCC-SLP
Speech and Hearing Sciences Department
Portland State University
cegn@pdx.edu




Introduction to CAS



Some Names You May Have Heard


- Current ASHA term
 - **Childhood Apraxia of Speech (CAS)**
- Previous
 - Developmental apraxia of speech
 - Articulatory apraxia
 - Developmental articulatory dyspraxia
 - Childhood verbal apraxia
 - Developmental verbal dyspraxia



AOS* vs. CAS


- Both assumed to be difficulty with motor planning/programming.
- Important distinction:
 - CAS affects DEVELOPMENT of higher level phonological and linguistic levels (Maassen, 2002)
 - Levels intact and lost in individuals with AOS

*Acquired Apraxia of Speech



CAS Current Diagnosis


- Behavioral
 - Based on speech production
 - Symptoms that exclude it from functional speech disorder or delay



Childhood Apraxia of Speech: April 2007


- Core impairment is in planning or programming the movements necessary to produce speech sounds
 - in the absence of known neurological impairment that would result in the programming difficulty
- 3 Subtypes of Causes
 - Idiopathic Neurogenic Speech Sound Disorder
 - Neurological Etiologies
 - Complex Neurobehavioral Disorders

ASHA (2007). ASHA Position Statement on CAS.




3 Differential Signs (ASHA, 2007)

1. Segmental
 - Inconsistent consonant and vowel errors in repeated productions of words;
 - Independent motor planning of words
 - For vowels, not only developmental errors
2. Syllable- or Word-Level
 - Lengthened and disrupted articulatory transitions
 - Difficulty with articulatory sequencing
 - Difficulty with words as they get longer
 - Breaks between consonants & vowels
3. Suprasegmental
 - Excess equal stress
 - Monotone
 - Difficulties regulating rate, nasality, loudness, pitch




Frequent Non-Differential Characteristics

- Limited vocal output
- Groping
- Gestural instead of verbal communication
- Low intelligibility
- More simple word and syllable structures (CV, CVCV)
- More early sounds (b, d, m, n, j, w...)




Target Selection

- Difficulties in CAS
 - Motor programming
 - Consonants, Vowels, Suprasegmentals
 - Sequencing
 - Generalization
- Want to consider adding new information, generalizing what child can already do




Things to Consider:

- Increasing phonetic inventory
 - Establish new consonants, vowels, and/or word shapes
 - Expand place, expand manner, or both
 - Small steps
 - Sounds they have, use in more complex word shape
 - Add a new word shape using sounds they have
- Decreasing errors
 - Consonants
 - Vowels
 - Word shapes
- Improving suprasegmentals




Use Developmental Norms for Goals

- For very young and/or very severe children, consider using:
 - Consonants: /p, b, t, d, m, n, w, j/
 - Add new place or manner as appropriate
 - Work on small steps, not baby steps (don't just add voicing contrast)
 - Vowels: /i, I, e, ε, ə, a, æ/
 - Word shapes: CV, CVCV, CVC




Other Thoughts on Goals

- Meaningful stimuli
- Relevant to child's world
- Appropriate phonetic complexity
- Building
 - Automaticity
 - Flexibility




Motor-Based Treatment Approaches for CAS



Overall Treatment Goal


- Facilitation of overall communication
- Likely includes
 - Intense speech sound treatment
 - Augmented or alternative communication to increase language development
- ASHA (2007)



Types of Treatment for CAS

- **Articulatory (Motor-based)**
 - Focus on production of sounds
 - Types
 - Integral stimulation, touch cues, PROMPT*, etc.
- *Prompts for Restructuring Oral Muscular Phonetic Targets*
- **Prosodic**
 - Focus on suprasegmentals to increase speech production
 - Types
 - Melodic intonation therapy, Suprasegmental, etc
- **Gestural**
 - Sign language, home signs, etc.
- **Augmented Communication System**

*



Treatment for CAS (ASHA, 2007)


- Support for need of 3-5 sessions per week of intense treatment when severity of involvement high
- Individual rather than group therapy
- Naturalistic environment
 - Support carryover and generalization
- AAC devices may be used to increase functional communication
- Non-speech oral motor therapy not necessary nor sufficient for improved speech



Oral Motor Therapy Not Appropriate


Difficulty planning purposeful speech movements

- Work on sounds in syllables & words, not in isolation
- Movement must be specific to speech, not haphazard
- Neuromuscular system intact
- However
 - May need sensory awareness warmup
 - Do with speech sounds?




Speech as a Motor Skill

- **Other motor skills we must learn**
 - Walking, writing, climbing stairs, etc
- **If you want more and better *speech*, then work on *speech*.**




General Treatment Framework

- Use articulatory approach (integral stimulation, etc.)
 - Most solid evidence for treatment effectiveness
 - Increase motor planning for speech by practicing speech
 - Hierarchical approach
 - Simple forms to complex sequences
 - Greater emphasis on movement sequences and syllabic integrity than individual speech sounds
- Guide treatment based on child's entry-level skills.
 - Build on skills they have
- Choose highly *functional* words and phrases




Cognitive Motor Learning Principles

Important for CAS AND OTHER SPEECH SOUND DISORDERS




Cognitive Motor Learning

- Occurs after
 - Practice
 - Experience
- That lead to
 - Relatively permanent changes in the capability for responding



Movement Types Child Must Learn


- Discrete movements
 - Brief action,
 - Well-defined beginning and end
 - *Examples:*
 - Hitting a ball, snapping fingers.
 - Single syllable
- Continuous
 - Action unfolds without beginning and end
 - Repetitive
 - *Examples:*
 - Walking, riding a bike
- Serial
 - Composed of many discrete movements
 - Order is crucial
 - Often learned in pieces, but also need to master the whole
 - *Examples:*
 - Gymnastics routine
 - Speech



Open vs. Closed Skill Task?


- Closed
 - Predictable & stable environmental state
 - Little decision-making in matching movement to environment
 - In learning closed skill, performer has increased consistency.
 - *Examples:*
 - Lap swimming, playing with a ball alone, gymnastics routine, indoor archery
- Open
 - Unpredictability, instability of environment
 - Movement in motion
 - Can't prepare in advance
 - In learning open skill, learner must show increased diversification of movement to meet situational demands.
 - *Examples:*
 - Skiing, playing a ball game against unknown opponents.

• Schmidt & Lee, 2005




Ask yourself:

- If I want to affect learning of a new skill,
 - How can I make sure that my therapy maximizes practice conditions?




Motor Performance vs. Motor Learning

- Performance
 - Production accuracy within a session
- ****Learning ****
 - Retention and generalization across sessions




Ways We Temporarily Affect Performance

- Energizing Effects
 - Interest, Motivation
- Guidance Effects
 - Feedback as crutch
- Degrading Effects
 - Boredom, Fatigue
- Randomization
 - Temporarily lower performance



Ways to Determine Learning


- Delay testing
 - Ensure enough time so transfer effects gone
- Transfer Test
 - Give new test, observe topic in new environment



Cognitive Motor Learning


- Occurs as a result of experience and practice
- Attention must be on intent to learn movement
- Need ample opportunities
- Choose best # and type of stimuli to facilitate motor performance & motor learning

- Biggest Key to Cognitive Motor Learning?
 - PRACTICE




Integral Stimulation

Founded on Principles of Cognitive Motor Learning



Integral Stimulation Approach


- Articulatory
- Intense
- “Watch me & listen”
- By any means necessary
 - Tactile, kinesthetic, visual, auditory, prosodic, gestural.
- From Rosenbek for Acquired Apraxia of Speech (AOS)



Hierarchy of Supports – Most to Least


Example of Hierarchy

- Watch & listen. Simultaneous production
- Clinician model, client repeat/clinician mouth
- Clinician model, client repeat with cues
- Clinician model, client repeat, no cues.
- Clinician asks question, client responds spontaneously with target
- Target utterances in role-play or games.




Individualized Supports

- Cues
- Level
- Fluid
 - May need a lot one day, few the next
 - If break down, go back to maximal cues, then attempt again with minimal cues




Base Treatment on Four Principles of Cognitive Motor Learning

- Keys to Integral Stimulation
 1. Precursors to motor learning
 2. Conditions of practice
 3. Knowledge of results
 4. Influence of rate




**Principle 1:
Precursors to Motor Learning**

- Child-Specific
 - Motivation
 - Focused attention
 - Age
 - Support
- Therapist
 - Prepractice
 - Teach how articulators move to produce a sound
 - Talk about movement without actually doing it
 - Includes
 - visualization of movement
 - direct observation of modeling movement




Principle 2: Conditions of Practice

- Initially
 - Repetitive motor drill
 - Learn motor skill through practice
 - Quality of practice important
 - Focused attention, scheduling, feedback
- Progressing Towards
 - More natural settings
 - More natural targets




Principle 2: Conditions of Practice

- Mass to Distributed Practice
 - Mass
 - Practice for longer periods of time
 - Distributed
 - Practice more frequently, for shorter times
 - Mass: Better performance in session
 - Distributed: Better generalization




Achieving Distributed Practice

- Shorter, more frequent sessions
 - Phone calls
 - Outside class
- Working with other professionals
- Homework
 - Ask me...
 - In car
 - Split between members
 - Bath time, reading, play routine
 - Speech buddy
 - Leaving phone messages




Blocked vs. Random Treatment

- Blocked
 - Practice same target repeatedly within one block of time
- Random
 - Practice multiple targets throughout a block of time




Random Results in Learning

- Block
 - Can always anticipate what is coming next
- Random
 - Change mental & physical activity from task to task
- Elaboration Hypothesis
 - When practice random order, forces client to discriminate between tasks, developing more elaborate representations
- Forgetting Hypothesis
 - In random treatment, forget solution that just happened
 - Forces task reconstruction
 - Contribute to memory strength
- Want to force learning into situation that requires new generation of answer




Principle 3: Feedback

- Types of Feedback
 - Knowledge of Results
 - Provide comments about production accuracy
 - Knowledge of Performance
 - Specific information on actual production
 - Suggest how to do movements
- *Need both for cognitive motor learning*




Ways to Decrease Feedback Dependence

- Summary Feedback
- Reduced feedback frequency
- Bandwidth Feedback
- Delayed feedback
 - Instantaneous feedback stops client's evaluation process




Principle 4: Rate

- A slow model
 - will facilitate accuracy of child's speech in imitation
- Having child slow own productions
 - will increase accuracy
 - more planning time
 - more feedback time




Maximize Use of Multimodal Inputs

- Build speech patterns **AUTOMATICITY**
- Use a drill-type treatment approach (or drill play), but vary
 - Feedback
 - # of cues provided in a session
 - Types of cues presented
 - Settings
- Move to generalization, **FLEXIBILITY**



Increase Number of Target Productions in Therapy


- Multiple opportunities
 - Play or drill activities
- Repetitions in a variety of meaningful contexts



Importance of Practice Frequency


- Compared 30 to 100 productions of treatment target goal
 - No other difference in treatment
- Higher frequency target
 - Higher rates of accuracy
 - More rapid generalization
 - Greater maintenance of treatment effects

(Edeal & Gildersleeve-Neumann, 2011)




Self-Monitoring, Tracking

- Introduce early self-monitoring skills for self correction early on
 - Think motor learning more than motor performance.




Final Caution

- Articulatory approaches
 - Focus on production
 - Improve speech through intense speech practice
 - Principles of cognitive motor learning
 - (Maas, et al, 2008)
 - Example approaches
 - Integral Stimulation, Touch Cues, Prompt
- Ensure treatment meeting child's primary communication needs



Motor Learning Approaches Assume:

- Communicative intent
- Primary disorder is in motor planning, motor execution
- Core difficulty not cognitive or language-based
 - May supplement treatment for primary disorder with treatment for CAS



Monitor Progress

- Continually re-evaluate your treatment approach and methods; be willing to change
- No one treatment works for every child
- Be sure your treatment is evidence-based



THANK YOU!

Additional questions, please contact me:
cegn@pdx.edu
