Exploring Childhood Apraxia of Speech

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Definitions

Motor speech disorder due to delays or deviances in those processes involved in planning or programming movement sequences for speech. (Strand, 2006)

Disorder of phonological and articulatory output processes. (Groenen, Maassen, Crul, & Thoonen, 1996)

Disorder of hierarchical organization that manifests in many ways. The underlying source of the difficulty is problems with the on line programming of elements of the language/speech system into larger organizational patterns. (Velleman & Strand, 1994)

History

- 1891 W.B. Hadden
  - Described symptoms of three individuals that in today's terms could be characteristics associated with the diagnosis of CAS.
  - "fault in the central nervous system" although no diagnostic name was given (Hadden, 1891).

History

- 1950's
  - Viewed from motoric-based etiology.
- 1970's
  - Research began two different tracks:
    - Some discussed CAS as a motor disorder (Morley, Yoss & Darley, Crary, Hall, Robin and Jordan, Strand, Caruso)
    - Others proposed linguistic deficits as part of the disorder. (Aram & Nation, Shriberg et al., Velleman)

(Strand conference, 2006)

History

- Various Names for the disorder:
  - Developmental apraxia of speech (DAS)
  - Developmental verbal apraxia (DVA)
  - Developmental verbal dyspraxia (DVD)
  - Developmental dyspraxia
  - Articulatory apraxia

(Hall, 2000)

Incidence/Prevalence

- Difficult to determine due to lack of research.
- Estimated low incidence 3-5% of **speech-impaired** preschoolers.

www.apraxia-kids.org

Nature of the Disorder

Shriberg, 1997 suggests three possible classifications:

- Unitary entity: try to identify one characteristic that differentiates
- Syndrome: symptom cluster-list of symptoms
- Subtypes: are there different subtype severities that we have not identified?

Motor Perspective

- Strand, 2006: delays/deviances in processes involved in planning and programming movement sequences of speech.
- Hall, 1992: motor control problems as *related to speech production*
- Nijland et al, 2003: children with apraxia had more problems with clear compensation

Linguistic Perspective

- Ekelman and Aram: lexical, syntactic, and phonemic aspects are affected
- Shriberg:
  - allowing for linguistic aspects of the disorder compromises the nosological value
  - most children with apraxia also have language deficits
- Velleman: motor disorder affects language

Combination Perspective

- Motor planning and language learning is interactive
- Relation between the processes

Why CAS?

- Need diagnosis for children with irregular speech disorders
- Often present with severe, persistent speech difficulties
- Similarities to phonological disorders

Clinician Thoughts

- Survey by Forrest, 2003
- Varying opinions by speech-language pathologists
- 2 features seem to be presumed:
  - Different from children with developmental speech delay
  - Resemble the errors of adults with acquired apraxia of speech

Diagnostic Criteria

- Current clinicians work on what they know
- Lewis, 2004
  - Base on analysis of conversational speech-sound error patterns and observations of motor speech production
  - Suggestion due to differentiating between speech-sound and speech-language groups

Diagnostic Criteria

- Two important features
  - Variability of repeated productions in spontaneous speech
    - Segmental and syllable level (word shapes)
    - Vowel misarticulations: not found in children with other speech and language disorders
  - Suprasegmental abnormalities
- Davis compiled list of criteria

Davis, 1998

List by Davis, 1998

Speech production	Gender
Speech perception	Praxis
Language	Neurological
Cognitive	

Diagnostic Criteria

- Preassessment Considerations
- Oral mechanism and motor speech exam
- Communicative means
- Phonological assessment
- Language characteristics (not considered a diagnostic marker or part of apraxia by proponents of motor-based etiology)
- Literacy- (not considered a diagnostic marker or part of apraxia by proponents of motor-based etiology)
- Play characteristics- (not considered a diagnostic marker or part of apraxia by proponents of motor-based etiology)

Velleman, 2000

Preassessment Considerations

- Medical history
- Family history
- Psychosocial
- Feeding difficulties history

Oral Mechanism Exam

- Mandible
- Intelligibility
- Sequencing of movements
- Functional movements easier than imitation movements
- Poor coordination of feeding
- Resistance to certain foods due to texture, taste, temperature

Communicative Means

- Prelinguistic children
  - –vocal play
  - –appropriate babbling
- Use of gestures

Phonological Assessment

1. Phonotactic repertoire
2. Phonetic repertoire
3. Phonological processes
4. Prosody
5. Communicative effectiveness

Language Characteristics

(Language characteristics are considered part of the disorder by proponents of the linguistic and combination perspective. Considered concomitant by proponents of motor-based etiology.

- Receptive-Expressive language gap
- Language sample
  - – Mean Length of Utterance
  - – Word-sequencing errors
- Word finding difficulties: apparent semantic substitutions, actual phonemic substitutions, and actual semantic substitutions

Literacy

(Literacy skills are considered part of the disorder by proponents of the linguistic and combination perspective. Considered concomitant by proponents of motor-based etiology.

- *Areas for assessment*
  - – Rhyming
  - – Onset-rhyme tasks
  - – Coda tasks
  - – Letter sequencing
  - – Whole-part and part-whole reading and writing
- *Tasks for assessment*
  - – Basic segmenting and blending tasks
  - – Rhyming tasks
  - – Onset-rhyme tasks
  - – Coda tasks

Play

(Play behaviors are considered part of the disorder by proponents of the linguistic and combination perspective. Considered concomitant by proponents of motor-based etiology.

- Young children
  - Area for assessment
  - Combinatorial play
  - Sequenced or embedded play routines

Variability by Age

- Characteristics of the disorder vary by age
  - – Shriberg, 1997
    - Developmental period for speech acquisition
    - Spontaneous improvement
  - – Hall, 1992
    - Effect of maturation can never be determined
  - – Stackhouse, 1992

Treatment

"Regardless of the controversy regarding the etiology, diagnostic criteria, or characteristics, children who appear to have different phonological, articulation, or speech-sound disorders continue to appear on our caseloads."

(Hall, 1992)

Recording progress

- Keep detailed records of both speech and non-speech tasks
- Document progress in order to aid in diagnostic criteria and progress in therapy

(Bernthal & Bankson, 2004)

The basics …

- "An established set of therapeutic approaches for the treatment of DAS does not exist."

  (Bauman-Waengler, 2004)
  - Intensive services
  - Hierarchies of task difficulty
  - Consider knowledge of results or knowledge of performance
  - Consider random vs. blocked practice of targets
  - Stress sequences of movements
  - Many repetitions of speech movements
  - Need for auditory discrimination tasks?
  - Emphasize self monitoring
  - Input from multiple modalities
  - Manipulate prosodic features
  - If necessary, teach compensatory strategies
  - Experience success!

Low pressure verbal activities

- Songs
- Poems
- Verbal routines
- Repetitive books
- Daily routines
- Make up little sayings or poems that you say every time you do the same thing
- Label instead of counting objects in counting books
- Verbalize repetitive activities

(Velleman, 2006)

Supportive Environments

- Provide a supportive environment your client
- A communication board or signing may supplement speech temporarily.
- Never say to your client, "You can't do something/have something until you say it first." This puts too much pressure on the child.

(Velleman, 2006)

Phonological Awareness

- "Children with CAS presented with comorbid reading, spelling, and academic difficulties at school age."
  - Consider training phonological awareness and other pre-reading and spelling skills as a component of therapy
  - The targets of a therapy session should be a balance of phonological awareness, language, motor planning/sequencing, etc.. based on the client's needs.

(Lewis, 2004)

Therapeutic Approaches

- Traditional
- Dynamic Motor
- Linguistic

Traditional Approaches

- Emphasize movement sequences
- Intensive, systematic drill play with many repetitions
- Limited number of stimuli per goal and per session
- Use visual, rhythmic, prosodic, and motor cues
- Begin with imitation; sustained vowels and consonants are often suggested as a start point

(Velleman, 2000)

Traditional Approaches

- Use carrier phrases
- Encourage self monitoring and slowed rate
- Use tactile cues to increase articulatory and oral awareness
- Use a phonetic hierarchy of treatment targets. (do not work on sounds in isolation)
- Select some easily attainable objectives
- Introduce a core vocabulary of functional words

(Velleman, 2000)

Dynamic Motor Approaches

Integral stimulation treatment

- Goal of session: practice movements
- Provide opportunities for early success
- Use varied body positions, prosodic contours, and props to maintain attention
- Severe case: mass practice- many repetitions of a few targets
- Moderate cases: distributed practice- repetitions of more targets

(Velleman, 2000)

Integral Stimulation Treatment, continued

- Direct imitation of a word at a slowed rate
  - Child experiences success
    - Continue direct imitation until the child can imitate accurately at a normal speech rate, with varying prosody.
    - Add a gradually increasing delay after the model.
  - Child does not experience success
    - Provide simultaneous productions
    - Go back to direct imitation
    - Still not successful?
      - » Add tactile cues and an even slower rate

(Velleman, 2000)

Dynamic Motor Approaches

- Facilitation of phonetic contexts
  - Stabilize vowels and consonants
  - Select additional targets from early developing sounds that have visible articulation
  - Select contrasting pairs
  - Use phonetic context to facilitate production
  - Use multimodal (visual, tactile) inputs
  - Use movement sequences

(Velleman, 2000)

Dynamic Motor Approaches

- Prompts for Restructuring Oral Muscular Phonetic Targets
  - Provide cues and support to the oral musculature
  - Establish postural support for trunk, neck, and head control
  - Suppress abnormal oral-motor reflexes
  - Voice for two to three seconds
  - Retain control of the jaw, lips, and tongue for longer streams of speech.
  - Retain control of the jaw, lips, and tongue while normalizing rate and intonation.

(Velleman, 2000)

Restructuring Oral Muscular Phonetic Targets, continued

- Establish control of vertical jaw movement, inhibit horizontal and anterior-posterior movements
- Establish control over grading of jaw movements, different degrees of opening for different vowels
- Establish symmetrical, coordinated movements of the upper and lower lips for rounding and retraction
- Establish control of coordinated movements of the tongue, including anterior- posterior movements, raising-lowering movements, and contraction

(Velleman, 2000)

Linguistic Approach

- Automaticity- functional core vocabulary
- Flexibility- the ability to plan and carry out novel sequences
- Drill is insufficient because it only addresses automaticity
- Main focus: syllable structure control and organization
- Practice under dissimilar circumstances
- Change should be carefully controlled

(Velleman, 2000)

Linguistic Approach

- Begin at syllable level
- Difficulty with syllables → use simple words or syllables composed of a vowel and a glottal consonant or a vowel and a glide
- If you must use isolated phonemes → use ones that carry meaning. (u: or o: to express surprise, m: to mean yummy, etc)
- Motor sequencing
  - Determining the order of the elements
  - Figuring out how to get from one to the other
- System fatigue

(Velleman, 2000)

Trial and Error

- Because there are many approaches to treating CAS, having a child with CAS on your case load can be overwhelming.
- Different approaches will work for different children, therefore therapy for CAS is a process of trial and error.

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Notes: Case Study