Childhood Apraxia of Speech

Moving from unintelligible to understandable

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Learning Objectives

1. Differentiate between various sound-based disorders including: apraxia, phonological disorder, articulation disorder/delay, developmental errors
2. Identify characteristics/diagnostic criteria of apraxia
3. Develop treatment plan for individuals with apraxia including appropriate, measurable goals
4. Identify and understand specific best practices, research-based strategies for increasing intelligibility in the child with apraxia including: frequency of therapy, length of therapy, sensory/movement integration, and cued speech
5. Identify resources for improved client outcomes including: team approach, classroom strategies and supports, web sites, apraxia support groups, and home programming

Distinguishing speech sound disorders--VIDEOS

• Your assignment: Assign a disorder to each video. Disorders may be repeated
Distinguishing speech sound disorders--VIDEOS

Defining the Disorders
- Articulation Disorder: “[A]lpraxical production of speech sounds...that may interfere with intelligibility.” (ASHA, 1993)
- Phonological Disorder: “A mental operation that applies in speech to substitute for a class of sounds or sound sequences preventing a common difficulty to the speech capacity...an alternative class identical by lacking the difficult property.” (Edwards & Schriberg, 1983)
- Apraxia: “In speech, a non-linguistic sensorimotor disorder of articulation characterized by impaired capacity to program position of speech musculature and the sequencing of muscle movements (respiratory, laryngeal, and oral) for the volitional production of phonemes.” (Nicholosi, Harryman, Kresheck, 1996)

Apraxia: Also known as...
- Apraxia
- Dyspraxia
- Verbal Apraxia of Speech (VAS)
- Childhood Apraxia of Speech (CAS)
- Developmental Apraxia
- Not using the term “developmental” as in “outgrow”
Causes

- Genetic Disorder
- Stroke
- TBI
- Unknown

Characteristics of Apraxia

Early Possible Indicators

- Decreased babbling/cooing in infancy
- Late acquisition of first words
- Avoidance of first words (grunts/points)
- One syllable words favored beyond age 2
- Limited consonant/vowel repertoire noted (compared to developmental expectations)
- Open mouth posturing prominent
Characteristics of Apraxia

- Disordered movement and coordination of the oral structures
- Automatic movement (i.e., chewing, blowing kisses) more accurate than intentional or imitated movements
- Presence of limb apraxia
- Presence of a preferential sound patterns to which the child defaults

- Difficulty coordinating and sequencing oral movements
  - Positioning, voicing, airflow
  - Diadochokineti activities are typically difficult

- Groping and posturing motions to achieve placement
Characteristics of Apraxia

- Weak placement
  - Poor labial pressure
  - Insufficient lip rounding
  - Poor lingua-dental contact

Characteristics of Apraxia

- Vowel distortions
- Verbal perseveration may occur on target phonemes, words, carrier phrases, etc.
  - Atypical voice quality, resonance and intonation
  - Hyper/hypo-nasal
  - Flat affect to speech
  - Most utterances are slower in rate
  - Presence of prolonged pauses between words or syllables
  - Limited prosody and intonation
    - Equalized stress across syllables and word

Characteristics of Apraxia

- Poor oral awareness
- Inconsistent errors
  - More accuracy in isolation
  - Atypical development of sounds
  - May have inconsistent word productions over repetitive trials
Characteristics of Apraxia

• Not unusual for child to plateau
• Typically, receptive language is higher than expressive language in children with apraxia.

★ Apraxia can be co-morbid with other disorders.
  • Autism, Down Syndrome, Flaccid Dysarthria, etc.
  • “Pure apraxia” instances are relatively low.

Defining Disorders (Con’t.)

ASSESSING APRAXIA
Assessing Apraxia

- "...[a] differential diagnosis of CAS in very young children and in the context of neurological and complex neurobehavioral disorders may require provisional diagnostic classification, such as CAS cannot be ruled out, signs are consistent CAS, or have CAS." ASHA Position Statement, Childhood Apraxia of Speech, 2007

- Oral mech. exam
  - Document types of motor patterns you see
  - Professional Judgement
  - Measurable Articulation Assessment
    - Standardized/norm-referenced assessments
      - GFTA, SPAT-D, Arizona, S-CAT
  - Apraxia Batteries
    - Kaufman, Apraxia Profile

What does Oral- Mechanism/ Motor Exam include?

- Assessment of structures at rest and in motion of external and internal structures:
  - Teeth, hard and soft palate, tongue, face, nose, mouth, and musculature associated with structures
  - Imitate single movements: open mouth, close mouth, smile, pucker
  - Imitate/sequence multiple movements: open AND close mouth, smile AND pucker

Kaufman (KSPT)

- Normed for 24mo.-72mo.
- 4 parts are standardized separately
- Part 1: Oral Movement
- Part 2: Simple Phonemic/Syllabic level
- Part 3: Complex Phonemic/Syllabic level
- Part 4: Spontaneous Length and Complexity
Other Secondary Measures (non-standardized nor normed)

- Criterion referenced checklist
- List of words ___ out of ____ are intelligible, etc.
- Evaluate sound errors with phonological processes
- Language sample with intelligibility rating
- Informal observation
- Professional clinical opinion statement
Are we ready to treat apraxia?

• Consider the factor that negatively impacts the child’s communication the MOST.
• Oral motor weakness or dysarthria should not be the most influential factor. If it is, address this first before moving into apraxia-based therapy.
• The child should be able to verbally imitate.
  • What if he/she doesn’t?
  • The child should be able to attend for short periods and respond to reinforcers.

Treatment Plan

• LONG TERM GOALS
  • Increase intelligibility to ___% with familiar and/or unfamiliar listener
  • Increase phonemic repertoire by ___ number of phonemes
  • Increase a raw/standard score by ____ points/percentage

• SHORT TERM GOALS
  • Syllable shape goal (non-phoneme specific): CV, VC CVC, etc.
  • Phoneme specific goal (isolation, initial, final position)
    • You may have more accuracy in the final position of utterance!

• LONG TERM GOALS (ORAL-MOTOR BASED)
  • Will execute a sequence of ___ postures with ___% accuracy (for speech purposes)
  • Decrease groping by immediately executing ___ positions

• SHORT TERM GOALS
  • Target specific oral postures to client’s needs (Ex: child will open/ close, smile/pucker, lip rounding, etc.)
  • Child will imitate ____ position ____ out of ____ times.
Treatment Plan

• LONG TERM GOALS (FOCUS ON VOICE/RESONANCE/RATE)
  • Increase volume by ___ %
  • Increase overall intelligibility based on rating scale (can be personalized)

• SHORT TERM GOAL
  • Will imitate sentences with rising/falling intonation with ___ % accuracy.
  • Will spontaneously ask questions with appropriate intonation/prosody ___ times per session
  • In spontaneous sentences, increase rate to ___ number of syllables 10 second period.
  • Imitate and/or spontaneously use appropriate stress on stressed syllable in multi-syllabic utterances with ____ % accuracy.

• SHORT TERM GOALS
  • Increase expressive language above baseline or ____ score on ____
  • Increase receptive language above baseline or ____ score on ____

Treatment Plan

• LONG TERM GOALS (LANGUAGE BASED)
  • Increase expressive language above baseline or ____ score on ____
  • Increase receptive language above baseline or ____ score on ____

• SHORT TERM GOALS
  • ID vocabulary with ____ % accuracy
  • Use grammatically correct forms of ____ in spontaneous sentences with ____ % accuracy
  • Increase sentence length to ____ avg. words in spont. speech
  • Make requests using appropriate carrier phrase ____ x in therapy session
  • Answer Wh questions with ____ % accuracy

Best Practices
Go to your happy place. If you need one, borrow one of ours!

BEST PRACTICES

- **Frequency**
  - 3-4 times a week: Direct/indirect
  - 2-3x per week for direct; 1-2x for indirect
  - Indirect can be: parent volunteer, teacher’s assistant, independent work (if old enough)
  - “Research shows the children with CAS have more success when they receive frequent (3-5 times per week) and intensive treatment.” — ASHA Position Statement, Childhood Apraxia of Speech, 2007
  - “The frequency of professional speech assistance is critical in the habilitation of children with developmental apraxia of speech. This disability calls for all-out attention and deserves serious instruction to the limits of the child’s attention and motivation.” — Current Therapy of Communication Disorders, Dysarthria and Apraxia, William H Perkins, 1984

- **Length of session**
  - 45 minutes if you can only see child 2x week
  - Typically 30 minute sessions
  - “We recommend therapy as intensively and as often as possible. Five short sessions (e.g. 30 minutes) a week is better than two 90 minute sessions. Regression will occur if therapy is discontinued for a long time (e.g over the summer).” — Shelley Velleman
Best Practices

- Frequency/Duration Continued...
  - "Daily practice is critical for consistent progress. Children with apraxia have difficulty locking in the motor sequencing for speech. Frequent, short practice sessions are very important. Consistent and frequent therapy sessions are recommended. The intensity and duration of each session will depend on the child. At least three sessions per week are recommended for the child to make consistent progress." Easy Does It for Apraxia, Prechool, Strode and Chamberlain
  - "[Apraxia] is often characterized as being resistant to traditional methods of treatment. It may be that traditional methods are not to blame as much as...sessions are too infrequent to allow sufficient motor practice." Childhood Motor Speech Disorder Treatment, Edythe Strand

Individual vs. Group

- Overwhelming body of evidence supports individual therapy to achieve best results
  - "People with apraxia of speech usually need frequent and intensive one on one therapy." (National Institute of Health)
  - "The type of treatment appeared to influence whether patients improved, more patients improved and improvement was greater in group A [individual treatment] than in group B [group treatment]. These results imply the way to treat apraxia is to treat it aggressively by direct manipulation and not by general group discussion." (Rosenbek)

Individual vs. Group

- "The type of treatment appeared to influence whether improvement occurred or not. Four of the five patients who did not improve received group treatment with no manipulation of their motor speech deficit." (Apraxia of Speech: Physiology, Acoustics, Linguistics Management. Rosenbek, et.al, 1984)
  - "Early stages of treatment need to be carried out on a one to one basis for it is only in this way that the patient can learn to develop his own particular strengths and adopt compensatory measures for weaknesses." (Disorders of Articulation, Aspects of Dysarthria and Verbal Apraxia. Margaret Edwards, 1984)
Children must be seen one on one at least in the early stages of treatment.” —Nancy Kaufman

“Children seen alone for treatment tend to do better than children seen in groups.” ASHA Position Statement, Childhood Apraxia of Speech, 2007

It is interesting to note that when a child is receiving early intervention services in the home, therapy is one on one. It is interesting to note that children as young as six months of age have received one on one services. Every apraxic child is different, with a diagnosis of severe apraxia the child would benefit from one on one data. What data is the school SLP presenting indicating that the age of age of 5 is too young for one on one services.” —Cheryl Bennet-Johnson

“It group therapy is provided, it will not help unless the other children in the group have the same diagnosis and are at the same level phonologically. Adequate services cannot be provided in whole-classroom activities.” —Shelley Velleman

Best Practices--Therapy

- Any word can be broken down to the point of success (Kaufman, 2010)
- Place focus on syllable structure, rather than a specific sound
- Syllables should be the basic unit (Moving Across Syllables)
- Intentional phonological processes
- Overemphasis of sound, even to the point of incorrect placement
- Standard hierarchy of cues
- Chaining
- Auditory contrast (“dada” “daddy”)
## Vowels, Vowels Everywhere!

- Vowels influence shape, origin, meaning, and intention of words.
- You may need to assess vowel stimuliability and be knowledgeable of vowel repertoire present in child’s speech.
- Elongating the vowel can enhance auditory awareness and give child a prolonged visual cue.
- Diphthongs can be broken down into their stressed/unstressed components.

## Syllable Hierarchy (Kaufman Speech Praxis Kit)

### Simple Phonemic/Syllabic Level:
- V simple vowels in isolation: /a, i, e, ə, ɒ, ʌ, ɑ, ɔ, ɐ, ʊ, ʊ/1
- VV vowel to vowel (diphthongs): /ai, œu, øe, ui, si/2
- C simple consonant in isolation: /m, p, b, h, d, n/3
- CV CVV repetitive syllables (reduplication): /mama/, /baba/, /brbr/
- CV consonant to vowel: /ba/, /ma/, /na/
- VCV vowel to consonant to vowel: /ape/, /beo/
- CVVCV repetitive syllables with vowel change: /baba/ (bubble), /mami/ (mummy), /bape/ (baby)
- CVC simple monosyllables with assimilation: /pop/, /mom/, /dad/, /tot/
- CVC simple consonant synthesis: /man/, /bat/, /hut/, /hoo/, /mag/
- CVICV simple bisyllabics with consonant and vowel change: /happy/, /tummy/, /muddy/

### Complex Phonemic/Syllabic Level:
1. Complex Consonant Production: /k, g, f, v, w, j, l, r, z, j, s, ss, ʃ, θ/4
2. Blend Synthesis CCVC-: /s/ blends—swing, stop, smell; /r/ blends—green, truck, frog; /l/ blends—black, slip, clean
3. Front to Back and Back to Front Synthesis: duck, take, dig, cat, get
4. CVVCVC complex bisyllabics: wagon, chicken, machine
5. CVVCCVV polysyllabic synthesis/sequencing: banana, tomato, umbrella, /pətə kuθ/6
6. Length and complexity

<table>
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<th>WA</th>
<th>甲状</th>
<th>walnut</th>
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<tbody>
<tr>
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<td>bicycle</td>
</tr>
<tr>
<td>BO</td>
<td>boat</td>
<td>bathroom</td>
</tr>
</tbody>
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### Spontaneous Length and Complexity
Choosing Words

- Favorites list
  - Notebook for parents/teachers
  - Words to request things or activities that the child prefers and are, therefore, a motivating communicative intent
- Automatic/Reflexive approximations
  - Reflexive automatic words (mama changed to form /ma/ and then /ma/)
- Easy motor movement
  - Words without initial consonants
  - Words without final consonants
  - Assimilation (beginning and ending with similar movements)
    - ex: pop, boom

Pivot Phrases

- I need ______.
- I want to ______.
- I want more ______.
- My ______.
- Put on ______.
- I (action) (noun).

Cueing Hierarchy

- Work from most to least (fade)
  1. Auditory bombardment cue with model and gesture
     - Hand gesture will typically match the shape of the oral structure or draw attention to the main structure/feature used.
  2. Model and gesture
  3. Imitation only
  4. Phonological or syllable cue
  5. Postural cue (isolated phoneme or duration of word/phrase)
  6. Errorless teaching (answer then ask)
  7. Auditory closure cue (Fill in the blank)
Intentional Phonological Processes

- Cluster reduction "top" for "stop"
- Final Consonant Deletion "tah" for "stop"
- Voicing/Devoicing "doh" for "stop"
- Stopping "sum" for "thumb"
- Syllable Reduction "rana" for "banana"
- Medial Consonant Deletion "widdow" for "window"
- Reduplication "wawa" for "water"
- Assimilation "puppy" for "happy"
- Fronting "sat" for "cat"
- Gliding "wide" for "ride"
- Initial Consonant Deletion "eye" for "my"
- Changing diphthong to a pure dominant vowel "don" for "down"; "ma" for "my"
- AND THEN WE SAY IT RIGHT!

Stop, Collaborate and Listen!

<table>
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<tr>
<th>potato</th>
<th>play</th>
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<tr>
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<tr>
<td>pillow</td>
<td>outside</td>
</tr>
<tr>
<td>sticker</td>
<td>snack</td>
</tr>
</tbody>
</table>

Overemphasis of sounds

- Even to the point of incorrect placement
- Interdentalized t,d,n,l
Chaining

- Word level or phrase level
- Forward: to ma to...mato, tomato
- Backward: nana...banana
- Phrase: I want, I want ball. ball, want ball, I want ball.

Auditory contrast

- Reduplicate then change the syllable

Sensory experience to promote motor planning

- Using conjunction with movement (using ‘weee’ while sliding down a slide)
- Rolling on ball while focusing on continuant sounds/phonation
- Motions to replicate what the oral structures are doing on a gross motor level (Sounds In Motion)
- Co-treatment with OT/PT sometimes helpful
- Music to address prosody (with varied rhythm)
- Sound effects with manipulatives
- Words paired with actions (i.e. “hi”, “bye”, “wow”)
- Words with distinctive pitch patterns (i.e. “oh no!”)
Resources

Websites
• CASANA
  • www.apraxia-kids.org
• ASHA
• www.kidspeech.com
• www.pammarshall.com
  • Blog with Q/A
• www.speechville.com
• www.nidcd.nih.gov/health/voice/apraxia

Articles of Parents
• “How Parents Can Help Their Child with Apraxia at Home” — Tim Burns
• “Parent Share How to Help Your Child with Speech Practice at Home” — apraxia-kids.org
• “Developmental Verbal Dyspraxia: General Information for Parent” — Shelley Vellemen
Text regarding Disorder

• Becoming Verbal with Childhood Apraxia–Pam Marshalla
• Apraxia Uncovered–Pam Marshalla
• Easy Does It for Apraxia–Preschool–Robin Strode and Catherine Chamerlain

Materials

• Kaufman Speech Praxis Kit 1 & 2
• Kaufman Speech Praxis Workout Book
• Articulation Cards
• Vocabulary Books (specific to child)
• K&K Sign to Talk
• Talk Tools
• Sarah Rosenfeld Johnson Oral Motor Programs
• Beckman Oral Motor Program

Do you know of any other resources/materials?
References


