

Integral Stimulation Treatment for Children with Childhood Apraxia of Speech (CAS)

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Childhood Apraxia of Speech

- ASHA defines CAS as 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” (2007).

Location

- According to ASHA it is recognized that CAS is neurologic in origin, regardless of differing beliefs of which structures and circuits are affected.
- Typically in the Left hemisphere, depending on handedness.

Prevalence

- 1 – 2 per 1,000

- Shriberg, Aram, and Kwiatrkowski, 1997

- Mayo Clinic Data (1987-2001) state the most common disorders in clinical practice is dysarthrias and AOS making up 58% of diagnosis.

- 10,444 patients

- Andrianopoulos, M. V. (2008)

3 Segmental and Suprasegmental Features Consistent with CAS:

- A variety of articulation errors affecting consonants and vowels in the production of syllables or words.
 - These errors vary across productions
- Difficulties producing sounds which are affected by co-articulation at the sound and syllable levels.
- Inappropriate prosody.

Diagnostic Features

- According to ASHA there is no definitive list of concomitant features which affect individuals with CAS.

Speech and Non-Speech Characteristics

■ Speech

- Limited phonetic inventory
- Frequent and inconsistent errors on vowels and consonants
- Varying suprasegmental features
- Increased errors during longer and more complex utterances
- Small steps toward progress during treatment

■ Non-Speech

- Decreased AMRs
- Fine and gross motor skills are impaired
- Typically developing receptive language
- Expressive language deficits

-Duffy 2005

Treatment Guidelines for CAS

- Individualized and intensive
- Provide numerous opportunities
- Provide visual stimuli
- Provide functional activities designed to facilitate production of targeted sounds.
- Utilize activities supported by evidence based practice
- Avoid oral motor exercises of non-speech origin (i.e. blowing bubbles, whistles).

Integral Stimulation Method

- Is based on cognitive motor learning with emphasis on cognitive-motor programming necessary for speech production.
- Involves “bottom-up” approach
- Often referred to as the “watch me, listen, do as I do” approach.
- Focuses on the use of varies modalities of presentation, but stress auditory and visual modes.

-Gildersleeve-Neumann 2007

History

- The term Integral stimulation was introduced in 1954 by Milisen, who utilized it as a program for treating articulatory disorders.
- In the 70's Rosenbek suggested use of integral stimulation to treat dysarthria and acquired AOS.
- More recently, intergral stimulation methods were then applied by Strand to children with CAS (or developmental apraxia of speech).

Rationale for Integral Stimulation Methods

- Establish a motor plan and engrain neural pathways necessary for producing speech sounds.

- Strand 1999

Application of Integral Stimulation

■ Treatment Planning

- Determine prognosis for the child's functional expressive communication

■ Setting Goals

- Improve the child's ability to plan and execute sequential movements for the production of speech.
 - Using repeated opportunities
 - First with maximal cueing then systematically withdrawing support so the child takes on increasing responsibilities for his/her motor planning and movements.

-Strand 1999

Sessions

- Frequency
 - Should be frequent
- Length
 - Long enough to allow many repetitions of practice
- Type of treatment
 - Meaningful and relevant to the child's needs
- Stimuli
 - Decide on size of stimuli set for each session
 - Phonetic context for stimuli set

Procedures

- Repetitive Practice
 - Need repeated opportunities to learn motor skill/movement.
- Distributing Practice of Targets
 - Mass vs. Distributed
- Shaping
- Feedback
 - Extrinsic
 - Knowledge of results
 - Knowledge of performance
 - Intrinsic
 - Tactile and proprioceptive

-Strand 1999

Efficacy and Evidence Based Practice

- Treatment efficacy research is minimal in the area of CAS therapy.
- Strand and Debertine (2000) used the integral stimulation approach on a 5 yr old female with CAS to evaluate the effectiveness of this particular approach.

Results of Efficacy study

- Baseline performance was at zero before treatment
- Rapid change began following the implementation of treatment
- The child was able to consistently exhibit improved articulation over 134 sessions.

Compelling Evidence

- Strand and Debertine support that the integral stimulation approach has efficacy due to the fact that the child had previous therapy (with a different approach) and had no consistent intelligible utterances.

Application of Integral Stimulation

- C was a 5 year 9 month female referred to Edythe Strand.
- Used 3 to 5 word utterances with 10% intelligibility to an unfamiliar listening partner.
- Grammatical development and language comprehension were age appropriate
- Displayed difficulties shifting from nasal to non-nasal sounds
- Had no sibilants or velars.
- Vowels were inconsistently distorted

Case of C continued....

- Motor speech examine revealed
 - She was able to simulatenously produce vowels with little distortion (but did so with extreme effort)
 - All imitated CV were in error
 - Was able to independently produce some CV and CVC; however, placed in longer utterances resulted in articulatory errors.

Case of C continued....

- Treatment plan was devised by C's mother, School SLP and a private SLP.
- Important to everyone that C establish core utterances that all communication partners could understand (because she was entering kindergarten)
- Decided on a core list of utterances and intergral stimulation therapy was then implemented.

C's Therapy

- Four ½ hour sessions a week
 - 2 private practice
 - 2 at school
- 20 functional phrases were set
 - 5 of which were identified for intensive work
- Varied temporal relationship between stimulus and response.
- Rate started slow and progressed to normal as she improved motor planning.

C's Progress

- 4 months in to therapy
 - Vowels were consistently more accurate
 - Targeted phrases were being mastered
 - Nasality decreased
- 2 years after initial session
 - Intelligibility estimated to be 50% to an unfamiliar communication partner
 - Stimulus increased to 9
 - Allowed say in therapy

-Caruso & Strand (1999).

Conclusion

- Integral stimulation case studies have shown significant gains in the motor planning and programming abilities of individuals with CAS.
- Further research

References

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