

Effects of Integral Stimulation Therapy for a Child with Childhood Apraxia of Speech

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INTRODUCTION

Childhood Apraxia of Speech

CAS is characterized by difficulty planning and programming voluntary speech movement sequences. It is likely neurologically-based (Crary, 1993) and the result of a motor processing level impairment not attributable to impairment or limitations of the articulatory, phonatory, or resonatory systems (Caruso & Strand, 1999).

Integral Stimulation

Integral stimulation is one approach used to treat limb apraxia and adult apraxia of speech. Based on cognitive motor learning, or "a set of processes associated with the practice or experience leading to relatively permanent changes in the capability for responding" (Schmidt, 1988, p. 346), integral stimulation adheres to four principles: *precursors to motor learning, conditions of practice, knowledge of performance vs. knowledge of results, and influence of rate*. Hierarchical in design, Integral Stimulation elicits the maximum number of repetitions per session, and emphasizes self-monitoring, slower rate of speech, and provides specific feedback on what the client is doing in speech production. Most importantly, *integral stimulation accounts for the learning of speech targets and generalization*.

Statement of the Problem

Clinicians must employ evidence-based practices when treating all disorders, including CAS. To date, efficacy studies on treatment of CAS are very limited (exceptions: Caruso & Strand, 1992; Strand & Debertine, 2000). Existing research and current literature suggest that effective treatment of CAS can be conducted utilizing the principles of cognitive motor learning. More scientific evidence is needed to determine which treatment approaches best meet the needs of motor planning and processing deficits such as CAS.

PURPOSE OF STUDY

Assess the effectiveness of integral stimulation as a treatment approach used in therapy with a child with CAS.

RESEARCH HYPOTHESIS

As a result of participation in treatment based on the Integral Stimulation approach, increases would occur in:

1. Overall speech accuracy;
2. Frequency of self-correction of speech errors; and
3. Number of correctly produced target phonemes.

METHOD

Study Design

- Single-subject, A-B-A study design
- 3 phases for data collection
 - Baseline (4 sessions)
 - Treatment (24 sessions)
 - Post-treatment 2 sessions)

- Comparisons of pre- and post- speech samples for overall consonant and vowel accuracy.

Participant

- One male child, MA. 10:3, diagnosed with CAS
 - Had received speech therapy for 7 years prior to study.

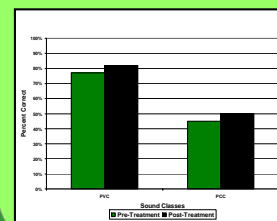
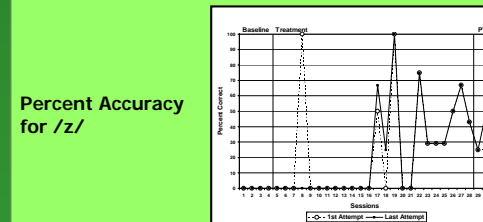
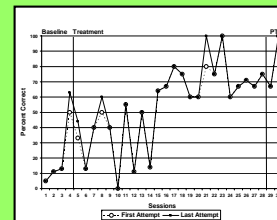
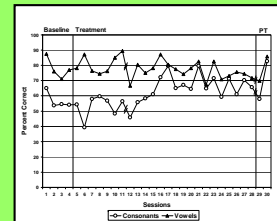
Procedures

- Phonetic and phonemic inventories determined from 100 utterance spontaneous speech sample.
- Target sounds /s, z/ tracked
- Continued focus on previous target sounds /f, v/, final consonant production
- Pre-generated sentence speech probes loaded with target sounds randomly selected
- Audio & video recording

Analysis

- Sentence probes phonetically transcribed
- Phonemes 10-110 of each session computer analyzed (LIPP, Oller, 2000).
- Speech accuracy measured by % of correct production of all consonants (PCC), vowels (PVC) in each speech probe
- Progress indicated by an increase in % of correct productions of targets and overall.

RESULTS



DISCUSSION

Data support hypothesis that Integral Stimulation effectively improved MA's overall speech accuracy. These changes were observed over 5 months, even after 7 years of therapy!

Findings suggest that increased cognitive motor learning occurred through the following:

- Programmatic elicitation of **maximum repetitions** (hundreds) at each therapy session allowed for greater automaticity of speech movements (conditions of practice)
- Increased self-corrections was result of **specific, routine feedback that described what occurred** when sounds were correctly/incorrectly produced (knowledge of performance)
- Treatment objective during each session to **reduce rate of speech** during speech tasks enhanced awareness of and allowed processing of difficult speech movements (influences of rate)

Factors to consider regarding variable performance on speech probes:

- Inconsistent speech production and slow response to treatment are hallmarks of CAS
- Varying length of speech probes may have contributed to breakdown in speech production for longer utterances
- Level of motivation and focused attention on speech tasks may result in improved or degraded speech performance

RESEARCH & CLINICAL IMPLICATIONS

The speech of many individuals with CAS are profoundly affected by CAS, and experience frustration or resignation when some measure of success is not achieved after years of speech therapy. Speech clinicians are commonly frustrated by the perplexing nature of the disorder and seek answers to long-standing questions regarding best practices for treatment.

Continued research in this area is greatly needed to define efficacious treatment for CAS. Qualitative research will provide more objective perspective on treatment efficacy of CAS; longitudinal research will provide a broader base from which to interpret results.