



Critically Appraised Paper: TREATMENT (CAP-T)

CLINICAL BOTTOM LINE: In children with Childhood Apraxia of Speech (CAS), high dose (referred to in this paper as frequency) practice of consonant targets may result in more accurate in-session productions and greater generalisation than could be achieved with moderate dose (frequency) practice.

Clinical Question: In children with CAS does intervention (e.g., DTTC, Integrated Phonological Awareness Approach, AAC, Combined Melodic Intonation Therapy + Multimodal approach, +/-use of PML principles) improve speech (+/- literacy, overall communication skill) when compared to no intervention?

Citation: Edeal, D.M. & Gildersleeve-Neumann, C.E. (2011). The importance of production frequency in therapy for childhood apraxia of speech. *American Journal of Speech-Language Pathology*, 20, 95-110.

Method: Design and Procedure (e.g., note type of research design, comment on randomization, summarize treatment intensity as appropriate, such as dose (trials) per session, session length, frequency, total treatment duration, summarize general procedure, resources / materials required)

Design:

- Single case study with alternating AB design
- Pre-treatment, baseline, treatment and post-treatment sessions

Procedure:

- Pre-treatment assessments consisted of GFTA-2, receptive language assessment (CELF-P or PLS-4) and continuous speech sample. Measures included phonetic inventory, error patterns, word shapes and PCC.
- Speech targets were selected for each child based on pre-treatment assessments and stimulability, with the goal of expanding each child's consonant inventory. Targets were randomly assigned to the high frequency (HiF) or moderate frequency (ModF) condition
- Moderate-frequency (ModF): targets were elicited 30-40 times in each treatment session
- High-frequency (HiF): targets were elicited 100-150 times every 15 minutes of treatment
 - o Jamie: Targets selected were 't' and 'd' (Mod F) & 'f' and 'v' (HiF)
 - o Felix: Targets selected were 'f' and 'v' (Mod F) & 'p', 'b', 'm' (HiF)
- Baseline sessions were conducted over 3 sessions until stability or a decrease in accuracy was noted for each speech target
- Treatment consisted of integral stimulation, imitation, choral speaking, cueing techniques and principles of motor learning
 - o Jamie: Received 3 baseline and a total of 32 treatment sessions (3 times/week for 11 weeks)
 - o Felix: Received 3 baseline and a total of 9 treatment sessions (twice a week for 5 weeks)
- The % of correct productions of within session target productions (performance) and % correct productions during probe (learning) was recorded for both conditions
- Post-testing was conducted after a 2 week break from treatment

Method: Participants (where relevant note number of participants, inclusion/exclusionary criteria, characteristics of participants in experimental group and control group/s):

Inclusionary Criteria:

- diagnosed with CAS

Exclusionary Criteria:

- none listed

Participants:

- 2 participants recruited from the university clinic
- Participant 1, Jamie: 6;2 years, male, adopted from China at 2;2 years. History of repaired cleft lip (prior to adoption) and palate (at 2;3 years). Extensive history of speech pathology between 2;2 - 4;6 years. At age 5 had expressive vocabulary of less than 10 words, limited consonant inventory, PCC 25%. Severe receptive language delay on CELF-P.
- Participant 2, Felix: 3;4 years, male, attended early intervention since 18 months of age. Diagnosed with CAS. Limited phonetic inventory, used mainly single-word utterances and some two-word combinations, PCC 21%. Receptive language WNL on PLS-4.

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Results: (briefly summarize the results, note whether the outcome was evaluated with/without blinding, note how many (if any) of the participants 'dropped out' of the study, note if **effect size** was reported)

- Participant 1, Jamie: was more accurate and stable for the targets in the HiF condition than in the ModF condition for within-session productions (large effect size $d = 1.59$) and non-targeted probe generalisations (moderate effect size $d = 0.71$). At post-treatment, accuracy for the Mod F treatment probe was 15% (a 5% decline over the two-week break) and accuracy for the Hi F treatment probe was 45% (a 10% increase over the two-week break). The authors suggested that motor learning had therefore occurred following the High F condition. Jamie produced thirty 3-5 word utterances and PCC increased from 28% - 73%
- Participant 2, Felix: showed greater accuracy and stability for sounds treated in HiF condition than in ModF condition. Effect size was large for both within-session productions ($d = 1.62$) and non-targeted probe generalizations ($d = 1.73$). At post-treatment, accuracy for the Mod F probe was at 0% (decreased in accuracy from 15%) and accuracy for the HiF probe was at 50% (showed an increase from 30%). Increase in 2-word utterances and PCC increased from 21-32%

Level of Evidence (NHMRC, 2009) Circle one I II III-1 III-2 III-3 **IV**

Quality of Evidence: ☒ Rated ☐ Not Rated

(i) rating system (e.g., PEDRo, SCED Scale from SpeechBITE) _____ PEDRo _____

(ii) score 4

Nature of Evidence: ☐ feasibility ☐ efficacy study ☒ effectiveness study

Relevance to practice (e.g., were the participants and/or treatment context similar/different to everyday clinical practice?

Is replication possible in clinical practice? What barriers might prevent the results from being applied to everyday clinical practice? What could be done to address barriers? If barriers can't be modified, how could the procedure be modified to accommodate limitations in clinical practice?)

- Structure of each session is reproducible in clinical practice, although more time would need to be spent educating/training parents in eliciting higher number of productions at home
- Children with poor attention or behaviour difficulties may find high frequency (dose) practice more challenging and may not be able to achieve the same number of productions as those children in the study
- The frequency of treatment sessions (2-3 times per week) is not always achievable in community health settings

Additional comments (e.g., limitations of the study, need for further research addressing a specific issue)

- Only two participants were included in the study. A larger sample size is needed.
- Variability in the number of sessions and time-frame of treatment between the two subjects
- Practice environments were not consistent between participants (i.e. home, clinic, school)
- Inclusion and exclusion criteria were not clear. Participant 1 had a complex medical and social history including cleft lip and palate (repaired), adopted, bilingual history, severe receptive language delay. This child was also attending weekly language-based intervention with AAC device.

Appraised By: EBP Paediatric Speech Group

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