CLINICAL BOTTOM LINE: In children with CAS, integral stimulation treatment can improve speech production. It is unclear whether a random practice or blocked practice schedule is more effective for children with CAS.

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


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)

- A two-phase alternating treatments design, with multiple baselines across behaviours
- 4 children with diagnosis of CAS, all received 3x week, individual therapy sessions administered by a SP. Each session consisted of both random and blocked practice conditions
- Two Treatment Phases: Each phase lasted 4 weeks and was followed by a 2 week maintenance period. Each child received both random and blocked practice conditions in each session, order of the conditions was counterbalanced across sessions
- Individual speech targets were selected for each child, with different targets for the blocked vs random conditions. For each condition, there were 3 target words selected. Attempted to select targets with comparable difficulty between conditions and independent of each other to minimize cross-contamination between conditions. Different targets were selected for each phase (see table 2, pg 565)
- The therapy sessions were administered using DTTC and involved intensive drills on the treatment target words using index cards. There were 30 cards per condition in each phase (10 examples of each of the 3 treatment targets). For blocked practice: 10 repetitions of 1 target, followed by 10 repetitions of the next target etc. For random practice: items were randomized.
- A separate probe for each child was used to measure progress with target words and generalization to untreated words. The probe was administered three times during the baseline phase (first 1-2 weeks of treatment) and then once a week. A follow-up probe was done 1 month after the last treatment session. The probe remained the same throughout treatment – it consisted of the child’s target words for both phases, a list of transfer items (similar but untreated words) and several control lists.
- All data for each child was analysed by 1 analyst (blinded to the condition). A variable number of random sessions for each child was scored by a second blinded analyst

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

Four monolingual English children with a primary diagnosis of CAS. Referred from a clinic at University of Arizona or from local schools. Diagnosis of CAS was confirmed by a SP experienced in motor speech disorders based on the presence of specific characteristics suggested by ASHA (2007). Children ranged in age from 5;0 – 7;9 years. No hearing difficulties, no medical/neurological diagnosis. Severity of CAS ranged from moderate-severe. 1 child also had mild unilateral upper motor neuron Dysarthria and another had moderate spastic-flaccid Dysarthria. Language abilities varied from mild-mod receptive delay – WNL & ‘not testable’ expressive language – severe expressive language delay.
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)

3 of the 4 children showed improvement for treated targets, however the children differed in terms of which practice schedule was more effective.
- 1 child demonstrated a consistent advantage with random practice
- 2 children had inconsistent practice schedule effects (ie blocked practice was more effective in one phase and random practice was more effective in the other phase). The net (combined) results for both phases indicated a benefit for blocked practice
- The 4th child did not show any significant improvement during the treatment, however any gains made were in the blocked practice condition
- Transfer to untreated items varied, with 2 children demonstrating transfer to untrained clusters and multisyllabic words. Overall, transfer was limited

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

Quality of Evidence: ☐ Rated ☐ Not Rated

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 be 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 accommodation limitations in clinical practice?)
- Participants were felt to similar to typical CAS clients on a community caseload
- The frequency of therapy (3x a week) may be possible in private SP but unlikely in community health
- Replication of DTTC in everyday clinical practice may be possible using the description in the study, however further knowledge/skills would be needed to select adequate targets and provide adequate level of prompting and feedback
- It is unclear whether random or blocked practice schedules are more effective from this study, however the SP in everyday clinical practice could consider experimenting with different schedules and see which is more effective for particular types of children

Additional comments (e.g., limitations of the study, need for further research addressing a specific issue)
Strengths: The primary data analyst was blinded to conditions. A variable number of probes for each child were also scored by a 2nd blinded analyst. Reliability was judged as acceptable to high with mean interrater reliability ranging from 79-87%
Attempts to examine several aspects of the treatment protocol for fidelity
Many attempts to minimize cross-contamination of condition effects eg. Order of conditions was counterbalanced across sessions, targets chosen were similar in difficulty for each condition and attempted to match lists in terms of word frequency and phonotactic probability. A reversal of condition-target pairing occurred in phase 2 to ensure target complexity did not alter results.
Weaknesses: Small sample size and no control group.
Uncertain whether the treatment effects were due to the condition effects (eg. Random vs blocked practice) or due to item-specific effects (eg. Certain targets were easier/harder to learn than others).
Length of treatment was very short
Future studies needed to examine how dosage and participant factors affect outcomes in DTTC

Appraised By: EBP Paediatric Speech Group

Date: May 2012