**Clinical Bottom Line:** An integrated phonological awareness programme was an effective method of simultaneously improving speech, phoneme awareness, word decoding and spelling ability for some children (aged 4-7 years) with CAS.

**Clinical Question [patient/problem, intervention, (comparison), outcome]:** 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?


**Design/Method:** Controlled multiple single-subject design with repeated measures, using an AB (baseline-intervention) format for each treatment goal.

**Participants:** 12 children (3 females and 9 males) aged 4-7 years with a positive CAS diagnosis from the researchers and no history of sensory, cognitive or neurological impairment. Monolingual speakers of New Zealand English and attended schools in middle socioeconomic status areas.

**Experimental Group:**
- Integrated phonological awareness approach: the approach incorporates targeted speech production practice into phonological awareness activities and uses letters and phonological cues to prompt speech production.
- Two 6-week intervention blocks (2 sessions per week for 45 minutes), separated by a 6-week withdrawal block.
- Battery of assessments: PPVT-III, BB TOP, DEAP, PROPH analysis and personal narrative language sampling to informally assess prosody, compare connected vs single-word contexts and presence of articulatory groping.
- Pre- and post-intervention measures: BB TOP, PCC, PVC, inconsistency, PIPA or TOPA, Burt Word Reading Test, informal non-word reading task and an informal spelling measure.
- One speech error pattern was chosen to be targeted in each intervention block of each child. The speech probes consisted of 10 trained words and 5 untrained words for each speech error pattern. A further speech error pattern was selected from the children’s PROPH analysis to act as a control probe.
- A phoneme segmentation probe was chosen for 5-7 year olds (10 trained and 5 untrained) and an initial phoneme identity probe was selected for 4 year olds (7 trained and 5 untrained). The words used in the phonological awareness activities were the children’s trained speech probe words.
- SLTs were required to elicit a minimum of 15 elicited productions of (any) trained speech target in each activity.
- If a speech production error occurred, the child was cued by drawing their attention to the phonological structure of the word and/or using a letter or coloured block as a visual prompt for speech production.

**Control Group:** Nil

**Results:** 9/12 children with CAS made significant gains in their production of target speech sounds and these demonstrated transfer of skills to connected speech for at least one speech target. 8/12 children showed significant gains in at least one target phoneme awareness skills, these children demonstrated transfer of skills to novel phoneme awareness tasks. As a group the children with CAS demonstrated improvements in phonological awareness, letter knowledge, word decoding and spelling ability.

**Comments:** Strengths: Controlled intervention design, independent reviewer used to verify the assessment data, treatment fidelity measures was 96.6%, content and materials used in intervention were standardised, SLTs and student SLTs watched (and had continued access to) a demonstration video. Weaknesses: The authors acknowledge the study is a first step. Further research is needed.

**Level of Evidence (NH&MRC):** IV

**Appraised By:** EBP Paediatric Speech Group

**Clinical Group:**

**Date:** 2013
Guidelines for completion of the CAP

Clinical Bottom Line
The consensus of the reviewers on implications of the paper on clinical practice. Whilst this may be somewhat subjective, it is hoped that robust discussion, the Level of Evidence and your comments on the design will enable you to produce a practical/realistic 'bottom line'. Many of the papers in Speech Pathology may have limitations, but the Clinical Bottom line should be aimed to help clinicians apply what evidence there is.

Clinical Question
This should ideally include four components:
- the patient or problem
- the intervention (or diagnostic test or prognostic factor)
- the comparison intervention or test (optional)
- the outcome

Design
Refer to pages 12 to 15 of the EBPIG Resource Package for guidance in reviewing the design used.

Comments on Design
Pages 12 to 15 of the Resource Manual should again assist here. You may also find it useful to refer to the forms 'Evaluating case studies/case series' and 'Critical appraisal sheet' adapted from Dr Lil Mikuletic's (see 'Critiquing/Appraising the Evidence).

Level of Evidence
It is recommended that the paper you are reviewing be rated against the NH&MRC Levels of Evidence, as reproduced here. The levels may be updated from time to time by the NH&MRC, but use of the ratings listed here will ensure consistency across CATs and groups. These levels are listed with comments on pages 15 and 16 of the Resource Package.

<table>
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<tr>
<th>LEVEL</th>
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<tr>
<td>I.</td>
<td>Evidence obtained from a systematic review of all relevant controlled trials</td>
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<tr>
<td>II.</td>
<td>Evidence obtained from at least one properly designed randomised controlled trial</td>
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<tr>
<td>III.</td>
<td>1 Evidence obtained from well-designed pseudo-randomised controlled trials (alternate allocation or some other method)</td>
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<td>2 Evidence obtained from comparative studies with concurrent controls and allocation not randomised (cohort studies), case-control studies, or interrupted time series with a control group</td>
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<td>3 Evidence obtained from comparative studies with historical control, two or more single-arm studies or interrupted time series without a parallel control group</td>
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<tr>
<td>IV.</td>
<td>Evidence obtained from case series, either post-test or pre-test and post-test</td>
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