



Research Request – Childhood Speech Apraxia

Brief	Best practice treatment of childhood speech apraxia
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Please note:

The research and literature reviews collated by our TAB Research Team are not to be shared external to the Branch. These are for internal TAB use only and are intended to assist our advisors with their reasonable and necessary decision making.

Delegates have access to a wide variety of comprehensive guidance material. If Delegates require further information on access or planning matters they are to call the TAPS line for advice.

The Research Team are unable to ensure that the information listed below provides an accurate & up-to-date snapshot of these matters

What is childhood speech apraxia?

Childhood apraxia of speech (CAS) is a developmental disorder of speech motor planning and/or programming. It is a rare condition, affecting only 0.1% of the general population. ¹ The consensus based core features of CAS include: ²

- 1) Inconsistent errors on consonants and vowels in repeated productions of syllables or words
- 2) Lengthened and disrupted co-articulatory transitions between sounds and syllables
- 3) Inappropriate prosody, especially in the realisation of verbal or linguistic stress

The long term functioning of people with CAS is largely unreported. Available longitudinal research suggests that CAS is a persistent disorder that requires therapy. Children with CAS are at risk for literacy, academic, social and vocational difficulties. ¹

Treatment Approaches

Treatment selection depends on factors such as the severity of the disorder and the communication needs of the child. Because symptoms typically vary both from child to child and within the same child with age, ^{3,4} multiple approaches may be appropriate at a given time or over time. The most common approaches include motor programming, linguistic, prosodic facilitation and augmentative and alternative communication (AAC). ⁵

At present, treatment approaches' for CAS have not been investigated using high quality randomised controlled trials (RCTs). A Cochrane Systematic review ¹ was only able to locate one RCT which compared two motor programming approaches' (Nuffield Dyspraxia Programme-3 and the Rapid Syllable Transitions Treatment). ⁶ Both approaches demonstrated improvement at one month post treatment for accuracy of production on treated words, speech production consistency and accuracy of connected speech. An earlier systematic review which included non-RCTs concluded that Dynamic Temporal and Tactile Cueing has the strongest evidence base, with replicated evidence of efficacy from several well-controlled single-case experimental design studies from different independent research group. ⁷

A brief overview conducted by the American Speech-Language-Hearing Association (ASHA) of common motor programming (best evidence to date), linguistic, prosodic facilitation and AAC approaches is provided below. ⁵

Motor Programming Approaches

Motor programming approaches are based on motor programming/planning principles. These approaches:

- provide frequent and intensive practice of speech targets;
 - focus on accurate speech movement;
 - include external sensory input for speech production (e.g., auditory, visual, tactile, and cognitive cues);
 - carefully consider the conditions of practice (e.g., random vs. blocked practice of targets);
- and

- provide appropriate types and schedules of feedback regarding performance (Maas et al.,

Examples of motor programming approaches include the following:

- **Dynamic Temporal and Tactile Cueing (DTTC)** is an integral stimulation ("look, listen, do what I do") method that uses a cueing hierarchy (auditory, visual, and tactile) and systematically decreases supports as the child achieves success at each level of the cueing hierarchy.^{8,9} Movement gestures are shaped, beginning with direct imitation, moving to simultaneous production with tactile or gestural cues if direct imitation was unsuccessful, and then fading the simultaneous cue and again moving to direct imitation. The key element of this approach is that the clinician is constantly adding or fading auditory, visual, and tactile cues as needed after each practice trial. It is suggested for very young children with severe CAS.
- **Nuffield Dyspraxia Program (NDP3®)** is a motor skills learning approach that emphasizes motor programming skills and focuses on speech output. It is described as a "bottom-up" approach in which the aim is to "build" accurate speech from core units of single speech sounds (phonemes) and simple syllables. New motor programs are established using cues and feedback and through frequent practice and repetitive sequencing exercises. Phonological skills are incorporated into the treatment approach through the use of minimal word pairs.¹⁰
- **Rapid Syllable Transitions (ReST)** is a method that involves repetition of varied sequences of real or nonsense syllables to train motor planning flexibility.^{11,12} It uses intensive practice in producing multisyllabic, phonotactically permissible pseudo-words to improve accuracy of speech sound production, rapid and fluent transitioning from one sound or syllable to the next, and control of syllable stress within words. Pseudo-words are used to allow the development and practice of new speech patterns without interference from existing error speech patterns.^{13,14}

Linguistic Approaches

Linguistic approaches for treating CAS emphasize linguistic and phonological components of speech as well as flexible, functional communication.¹¹ These approaches focus on speech function. They target speech sounds and groups of sounds with similar patterns of error in an effort to help the child internalize phonological rules. It is important to note that linguistic approaches to CAS are intended as a complement to motor approaches, not as a replacement for them.

Examples of linguistic approaches include the following:

- **The Cycles approach** is a linguistic approach that targets phonological pattern errors.¹⁵ It is designed for children whose speech is highly unintelligible and who have extensive omissions, some substitutions, and a restricted use of consonants. The goal is to increase intelligibility within a short period of time. Treatment is scheduled in cycles ranging from 5

to 16 weeks. During each cycle, the SLP targets one or more phonological patterns. After each cycle is completed, another cycle begins that targets one or more different phonological patterns. Recycling of phonological patterns continues until the targeted patterns are present in the child's spontaneous speech.¹⁶ The goal is to approximate the gradual typical phonological development process. There is no predetermined level of mastery of phonemes or phoneme patterns within each cycle; cycles are used to stimulate the emergence of a specific sound or pattern, not produce mastery of it.

- **Integrated Phonological Awareness (IPA)** is designed to simultaneously facilitate phonological awareness, letter–sound knowledge, and speech production in preschool and young school-age children with speech and language impairment. Specific approaches to facilitate the development of phonological awareness include (a) developing knowledge that positively influences phonological awareness development (e.g., teaching nursery rhymes and focusing on sound properties of spoken language) and (b) integrating phonological awareness activities into treatment sessions (e.g., phoneme awareness and letter game activities).^{17, 18}

Prosodic Facilitation

Prosodic facilitation treatment methods use intonation patterns (melody, rhythm, and stress) to improve functional speech production. **Melodic intonation therapy (MIT)**¹⁹ is a prosodic facilitation approach that uses singing, rhythmic speech, and rhythmic hand tapping to train functional phrases and sentences. Using these techniques, the clinician guides the individual through a gradual progression of steps that increase the length of utterances, decrease dependence on the clinician, and decrease reliance on intonation.²⁰

Augmentative and Alternative Communication (AAC)

AAC involves supplementing or replacing natural speech or writing with aided symbols (e.g., picture communication, line drawings, Blissymbols, speech-generating devices, and tangible objects) or unaided symbols (e.g., manual signs, gestures, and finger spelling).⁵ Whereas aided symbols require some type of transmission device, production of unaided symbols requires only body movements.

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