Articulation Treatment in a Child with Cerebral Palsy (CP): Case Study

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Background

Current status of speech treatment for children with CP

•Physiological approaches targeting specific subsystems (e.g., respiration) have resulted in only short-term improvements in intelligibility [1]
•Clinical reports indicate neurodevelopmental treatment (NDT) maximizes motor skills through optimization of posture and reduction/inhibition of reflex activity; missing are empirical reports and evidence for maintenance and generalization [2]
•No evidence to support efficacy of non-speech oral motor procedures that purport to influence posture and movement of the articulators, and the laryngeal and respiratory structures [e.g., 3]
•Questionable outcomes reported for treatments that focus on improving communication with AAC and AT support and/or training communication partners to use an interactive style that supports communication [e.g., 4]
•Training for adult-like articulation of speech sounds is deemed unrealistic for children with CP given the underlying neurological impairment [e.g., 5]; missing from the literature are reports of outcomes for articulation training

Methods

Participant

•C, female, 5;5 when treatment began, has bilateral spastic CP; dysarthria; chronic drooling
•Additional challenges: highly distractible, variable energy level, easily fatigued, frequently ill
•Participates in a 4-year longitudinal study [6]; data at 7th 6-month reassessment (CA: 5;4) included:
-language comprehension (*TACL-3*) above CA
-hearing within normal limits
-severe articulation impairment (*Arizona Articulation Proficiency Scale*)
-limited consonant inventory: /m, w/, 'y', /p, b, k, g, h/; production often weak and imprecise
-errors include: deletion of syllables and consonants in clusters; backing of alveolar nasal and stops, as well as fricatives and affricates; production of replacement sounds is often weak and imprecise
-communicates via combination of speech, gestures, body language, and low/high-tech AAC systems
-recommended treatment: AAC to facilitate development of functional communication/participation in daily living

Treatment

Frequency

•Seen for treatment at a university clinic for nineteen 75-minute sessions, once per week, over two university semesters

Objectives

•Clear talking—to include talking slow, making big mouth movements, saying all parts of words—to increase intelligibility
•Consistent, precise production of sounds in consonant inventory
•Shape sounds that were never produced; initial position /f/ and /s/ (singleton and cluster) were targeted

Procedures

•Used focused drill-practice in the context of meaningful activities during what on the surface appeared to be an ongoing verbal interchange that served to maintain C's interest and attention
•Shaped sounds from behaviors C could produce (e.g., /s/ from symmetric smile); practices focused on word-level production using multiple cues as needed and varied in duration based on difficultly of target, attention/effort
•Consistently encouraged/supported gentle sound production; immediately discouraged exaggerated placement and excessive production effort
•Heavy use of tangible reinforcement during practices; C also earned a prize for completion of the session's tasks
•Included C's evaluation of the SLP's correct/incorrect productions; later added self-evaluation and prompting for self-correction without a model
•Involved C's mother in active observation and home practice:
-initially, parent participated in a clear talking activity at end of session; repeated same activity at home; practice of clear talking in natural communication contexts was added later
-when C was producing /f/ and /s/, trained parent to judge production and provide supports/feedback consistent with the SLP's
-beginning with session 13, SLP provided several activities for 15-20 minute 5-day per week home-practice; SLP began/modeled each activity; parent completed at home

Results

Progress for /f/ and /s/ during treatment tasks

•Data were obtained during sessions 14–19 for each first-try attempt to produce a different targeted word in each session
•Prior to session 14, C needed extensive shaping with verbal, visual, tactile and auditory cues before each attempt to produce a targeted word
•Beginning with session 14—the first session following daily home-practice—C no longer required shaping prior to most first-try attempts, maintained production for repeated trials and corrected identified errors

Results, continued

Generalization of /f/ in initial position to spontaneous conversational speech

•Generalization was at 0% prior to session 14; beginning with session 14—the first session following daily home-practice—generalization was at 33%, increased to 71% in session 16, and to 100% in session 19
•By session 16, production of /f/ was beginning to generalize to the cognate /v/ in initial and final positions
•By session 18, /f/ replaced C's use of a velar stop for the voiceless 'th' in the word 'three'
•By session 19, /f/ had begun to generalize to medial and final positions

Generalization of /s/ in initial position to conversational speech

•Generalization was at 0% prior to session 14; beginning with session 14—the first session following daily home-practice—generalization for singletons and clusters was at 33%, increased to 75% in session 17, and to 83% in session 19
•By session 16, /s/ (singleton) had begun to generalize to the medial and final positions
•By session 18, /s/ was beginning to replace C's use of a velar stop for the fricative 'sh'

Outcomes and Observations

•As shown in the results, once the motor behaviors for /f/ and /s/ were learned, C demonstrated predictable generalization patterns for the targeted sounds to non-targeted word positions, to cognates and for typical developmental errors.
•Critical elements for success during articulation treatment for C appeared to be a highly motivated and creative clinician, a parent who had the potential to function as a skilled clinician and was willing to work on sound production with C, as well as a child who had demonstrated behaviors from which target sounds could be shaped and who was motivated to work to please both the clinician and her mother.
•Reported progress and generalization data represent C's best performance; her performance continued to vary in each session depending on her attention, effort, health and energy level.
•During breaks from treatment/home-practice, C lost skills; while she did not return to her velar replacements for /f/ and /s/, she produced the targets with exaggerated placement and excessive effort. This suggests that ongoing challenges to training correct articulation in children with spastic CP lie in (1) permanently establishing the appropriate placement and amount of effort that are necessary and sufficient for production of each targeted sound so that performance is neither weak and imprecise nor tense and exaggerated, and (2) maintaining the effects of treatment over time.

References

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