Ask the experts

What interventions can improve the speech intelligibility of children with cerebral palsy who have dysarthria?

Cerebral palsy (CP) is the most common neurological disorder of childhood, affecting approximately one in four hundred live births. In addition to the core disorder of posture and movement, cognitive and sensory impairments frequently co-exist. Around 35% of people with CP have dysarthria impacting on speech intelligibility. A further 20% are nonverbal. As a key predictor of wellbeing and participation in middle childhood and adolescence, the need to establish effective, independent communication is an important area of CP management.

Dysarthria affects all stages of speech production (respiration, phonation, resonance and articulation). Features include poor breath support, difficulties of voice onset and control, restricted or unusual pitch and volume modulation, hyper-nasality and imprecise articulation. Augmentative and alternative communication (AAC) can support independent communication and has become a key area of speech and language therapy intervention. However, for many families speech remains the primary method of communication (Cockerill et al, 2014) and it is not unusual for families of children with CP to ask if there are any ‘exercises’ that can be done to improve speech. Therefore, we will consider the evidence base for interventions in children who have some intelligible speech.

Research review

A review of the research evidence for interventions to improve the intelligibility of children with early acquired dysarthria, including children with cerebral palsy (Pennington, Miller and Robson, 2009) searched initially for randomised controlled trials and quasi-randomised studies, because they would provide the highest level of evidence for the treatment effectiveness.

The reviewers searched electronic databases available in English (Medline, PsychInfo, EMBASE, CINAHL, ERIC, DARE, LLBA, Web of Science, Scopus, Dissertation Abstracts) and hand-searched journals that published articles on voice, speech or cerebral palsy. They also used snowballing techniques to follow references cited in papers identified in searches; searched abstracts of speech and language therapy and developmental medicine conferences in UK, US and Australia/New Zealand; and contacted known authors for news of ongoing studies.

The review found no randomised trials or controlled group studies of any interventions that aimed to improve speech. It did, however, find lower level evidence from single case experimental designs and group before and after studies. Since the review there have been a handful of other studies published, perhaps suggesting a gathering of momentum in this area.

The interventions with the most evidence are motor learning therapies designed to increase control of respiratory effort and coordination of breathing with phonation to drive a stronger vocal signal. The clearer voice that results may be perceived as louder with increased pitch modulation, may support longer utterances and enable articulatory contrasts to be more easily perceived by listeners. These interventions have been associated with increases in speech intelligibility and improvements in acoustic measures associated with voice quality (Fox and Boliek, 2012; Miller et al, 2013; Pennington et al, 2010; Pennington et al, 2013) and have been judged as acceptable by children and their families. There is also emerging evidence of impact on children’s daily conversation (Pennington et al, 2013).

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“Studies of non-speech exercises indicate no improvement or have serious methodological flaws”
of a pragmatic controlled trial of the effectiveness of the interventions in clinical practice.

**Implications**

While speech systems interventions as described above have been adopted by some SLTs, non-speech oral-motor exercises, articulation therapy and phonological contrast therapies continue to be common practice in the UK (Watson and Pennington, 2015). It is not clear whether, in view of the lack of evidence, this is influenced by tradition, carer expectations, the marketing of training courses/treatment packages or other factors. Targeting non-speech oral-motor behaviours (NSOMBs) such as sucking, blowing, chewing and other oral movements, assumes these behaviours are precursors to speech: a theory that is challenged by neurophysiology research that has identified distinct patterns of muscle activation and control for speech and non-speech oral-motor behaviours (NSOMBs) such as sucking, blowing, chewing and other oral movements, assumes these behaviours are precursors to speech: a theory that is challenged by neurophysiology research that has identified distinct patterns of muscle activation and control for speech and non-speech oral-motor behaviours (NSOMBs) such as sucking, blowing, chewing and other oral movements.

Studies of non-speech exercises indicate no improvement or have serious methodological flaws in study design (eg, lack of blinding of assessors, indefinite intervention and measurement) (Pennington et al, 2009). In summary, the evidence for interventions to improve intelligibility of children with dysarthria associated with cerebral palsy is limited but growing. Therapies focusing on creating a clearer speech signal through controlled respiration and phonation have the most robust evidence but other interventions that use motor learning principles of repeated practice, random practice of target behaviours and fading of feedback are now being tested. Together, the studies could inform the development of some SLTs, with an attendant need to manage the expectations of families of children with CP.

References & resources


