The impact of the Speech Systems Approach on intelligibility for children with cerebral palsy: a secondary analysis

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Primary conflict of interest: Stuart Cunningham is a named inventor of speech recognition technology which is licensed by the co-owner of the intellectual property, The University of Sheffield to Therapy Box Ltd. Therapy Box Ltd are developers of software for speech and language therapy, communication and education.

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Plain language summary

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Plain language summary

Some children with cerebral palsy have speech that sounds weak, slurred and difficult to understand, which seriously impacts their social life and education. We developed a therapy programme to help children control their breathing and how fast they speak. Having more breath should make children's voices stronger. Speaking at a steady rate should give enough time for children to move their jaw, tongue and lips to produce each sound more precisely. Children's speech was easier to understand after the therapy. This study aimed to find out if the therapy worked by helping children to say consonant sounds more clearly.

We used recordings made in previous research to work out which consonants listeners heard correctly. We also looked at waveforms, which showed children's speech as moving pictures, to find out how speech changed.

After therapy, when children spoke in single words, listeners heard almost all types of consonant sounds at the start and end of words more clearly. No particular type of consonant sounds, such as 's' in 'so' or 't' in 'tar', led to better speech clarity. Waveforms showed that some children produced stronger speech sounds, some slowed their speech, and some did both.

Listeners heard some children more clearly after therapy when they spoke in phrases, but found others more difficult to understand. Few consonants were easier to understand after therapy. We saw no clear patterns of change in speech waveforms.

Overall, children produced stronger, more precise speech in single words, but not all transferred this skill to speaking in phrases. Children differed in how they achieved clearer speech.

We used the findings to refine the therapy to focus on phrases early in the programme and to personalise instructions to children's individual speech patterns. We will use waveforms to find where children have most difficulty and to measure improvement.

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