The impact of augmentative and alternative communication intervention on the speech production of individuals with developmental disabilities: a research review

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CRD summary
This review assessed augmentative and alternative communication (AAC) interventions in developmentally disabled individuals with impaired communication. The authors concluded that further research is needed to assess the impact of AAC interventions and speech production over a wider range of participants and AAC interventions. The review had numerous methodological and reporting issues but the cautious conclusions are likely to be a reliable reflection of the limited evidence base.

Authors' objectives
To determine the effect of augmentative and alternative communication (AAC) on the speech production of people with developmental disability.

Searching
MEDLINE, PsycINFO and ERIC were searched. The search terms were reported, but not the dates of the searches. The contents of 46 journals were also searched, and the references of included studies were checked. Only studies published between 1975 and 2003 were eligible for inclusion.

Study selection
Studies of individuals with developmental disability and significant speech impairment, defined as speech not adequate to meet daily communication needs, were eligible for inclusion. Studies of individuals with a primary hearing impairment were excluded from the review, as were individuals with an acquired disability. Eligible studies assessed the implementation of AAC, defined as compensation for spoken or written communication through aided or unaided AAC systems, and documented progress in the acquisition of the AAC. Studies were required to report data for speech production, defined as oral expression of language including production of intelligible words or word approximations intelligible in context, before during and/or after acquisition of the AAC. Inclusion criteria for the study design were not reported. The majority of participants in the included studies had learning disabilities, Down syndrome or autism. Both adults and children were included in the studies. The included studies were case studies, pre-test, post-test designs, or variants of n=1 designs. Both aided and unaided interventions with and without speech output were assessed in the included studies.

The authors did not state how the studies were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The criteria used to assess validity were presence of experimental control, reliability of dependent variables and integrity of treatment. The studies were graded as 'conclusive evidence', 'preponderant evidence', 'suggestive evidence' or 'inconclusive evidence'.

One reviewer appears to have assessed validity, while a second reviewer independently assessed 20% of the studies.

Data extraction
Percentages of non-overlapping data (PND) were calculated for single-case studies and effect sizes for group designs. Speech outcomes were calculated as the amount of change (increase or decrease) in speech production during or following the intervention, compared with baseline.

One reviewer extracted the data, while a second reviewer independently data extracted 20% of the studies. Inter-rater reliability was assessed for each main category of data.
Methods of synthesis
The synthesis focused on studies which used research designs that established experimental control with respect to the relationship between the AAC intervention and speech production and were considered to provide the best evidence. The overall proportions of patients responding to treatment were calculated.

Results of the review
Twenty-three studies (n=67) were included in the review. The synthesis focused entirely on the 6 studies (n=17) that were considered to represent best evidence. Some participants were involved in more than one treatment condition; each involvement was considered separately, thus 27 cases were included in the synthesis.

Increases in speech production were observed in 24 of the 27 cases. In 19 of these 24 instances the gains were observed within 5 sessions of the intervention. In 10 of the 27 cases the PND was at least 90, indicating high levels of effectiveness of the intervention. A range of different measures of speech production were employed; where number of words or word approximations produced were assessed, the mean gain was 13 words (range: 1 to 52).

Authors' conclusions
Further research is needed to assess the impact of AAC interventions and speech production over a wider range of participants and AAC interventions.

CRD commentary
The review question and the inclusion criteria, with the exception of study design, were clearly defined. The authors searched a number of relevant databases and other sources, but the decision to limit the review to published studies might have increased the possibility that some relevant studies were not included in the review and raises the possibility of publication bias. The authors took some steps to minimise bias and error in the review process, but the duplication of processes for only 20% of the studies may not have adequately controlled for these possibilities. A validity assessment was undertaken, but the criteria used were poorly described and it is unclear how this contributed to the analysis of best evidence which was used to identify studies which were most pertinent to the review question. The use of double-counting of participants involved in more than one intervention was inappropriate. The simple summing of results without formal statistical pooling is always inappropriate. Although the review suffered from a number of limitations, the authors' cautious conclusions appear justified given the poor quality of the included studies.

Implications of the review for practice and research
Practice: The authors stated that clinicians and parents should not hesitate to introduce AAC interventions to individuals with developmental disabilities and speech inadequate for communication needs. They should also not be concerned if gains in speech production do not occur immediately following the introduction of the AAC intervention.

Research: Rigorously designed and reported studies should be undertaken to explore the relationship between AAC and speech production. Specifically, these should investigate the effects of different types of AAC systems; the effectiveness of AAC for individuals of different ages and degrees of disability; the factors which may moderate the effectiveness of AAC interventions; the generalisation of speech gains in real world situations; and the long-term effects of the interventions.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.