Effectiveness of computerised rehabilitation for long-term aphasia: a case series study

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SUMMARY
Seven participants with long-standing aphasia following cerebrovascular accident were serially recruited to a case series study where language therapy was delivered at home and monitored via the Internet. All participants improved in word finding, and four improved in general communication.
Keywords: *aphasia; speech therapy; rehabilitation; computer rehabilitation; Internet.*

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Introduction

THE prevalence of persisting speech and language disorder at 6 months following stroke is judged to be 50 per 100 000.[1] On average three persons with long-standing (chronic) aphasia following stroke will be on a general practice list of 2000 patients. The conventional wisdom is that this profoundly disabling language disorder is resistant to change after 3 months have elapsed. Previous studies have shown mixed findings with regard to the efficacy of targeted speech and language therapy.[2,3]

Negative therapy outcomes have been linked to a range of factors.[4] The availability of therapy for persons with aphasia has declined during the last decade and the period over which this treatment is available has also reduced.[5,6] Yet people with aphasia report frustration at their level of disability and many are motivated to continue work on speech and language many years post stroke.[7]

We examined the efficacy of targeted speech and language for word-retrieval difficulties in long-term aphasia. All participants were 2 or more years post onset. Therapy delivery was novel in that all activities were on computer for home practice, and were updated via the Internet. No face-to-face therapy took place.

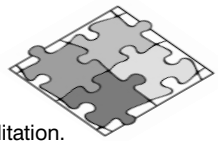
Informed written consent was obtained from all participants following verbal and written information detailing the treatment and assessment procedures. However, no ethics committee approval was sought.

Method

Seven participants meeting specific criteria (including premorbid literacy, willingness to participate, and intact cognition) were recruited serially from the community. This case series methodology allowed therapy to be targeted to the individual language impairment[8,9] and enabled the key components of this novel treatment to be explored appropriate for the research modelling phase (phase 1) as defined by the Medical Research Council (MRC) framework for complex interventions.[10] Participants ranged from 2–12 years post stroke, with a median of 3 years post stroke across the group. They acted as their own controls with a no treatment baseline included in the design. Treatment tasks included spoken and written word-to-picture matching, written naming, spoken naming, and repetition tasks — all commonly used to improve word retrieval. The novelty here was that tasks were delivered via computer.

Baseline competence was established by assessing participants on referral (pre-treatment 1) and after 6 weeks (pre-treatment 2). No treatment was given between these two points. Change in skills was investigated by reassessing after 6 months' treatment (post-treatment 1). Stability of effect was investigated by further assessment 6 weeks fol-

HOW THIS FITS IN



What do we know?

Chronic aphasia following stroke is disabling and receives little or no rehabilitation.

What does this paper add?

Some participants with chronic aphasia improved following computerised therapy delivered through the Internet. These results contradict the argument that rehabilitation 24 months or more after stroke brings little benefit.

lowing completion of treatment (post-treatment 2). Assessments included a test of naming 162 object pictures and a standardised test of spoken comprehension (a control task not expected to show change as a result of therapy). In-depth semistructured interviews with participants and carers exploring their experience of the therapy were carried out by a researcher who was not involved in therapy.

Results

The results of the picture-naming assessment (Table 1) show an average change of 24.2 (95% confidence interval [CI] = 15.6 to 32.7) between pre-treatment 2 and intermediate post-treatment levels.

Significance was maintained for measures taken 6 weeks after treatment withdrawal (average change 27.4%, 95% CI = 16.8 to 38.0). These changes are well in excess of the variability of the data prior to treatment (difference pre-treatment 1 to pre-treatment 2 of 5.3%)

During in-depth interviews, four participants reported satisfaction with specific improvements in everyday communication (for example, the ability to call family members by name, initiating conversation with strangers, using the telephone, less dependence on carers to mediate in communication). A fifth reported benefit to reading skills, evidence that could not be corroborated. All participants reported increased confidence and a higher level of participation in communication.

Discussion

These results indicate not only improvement for all participants in tasks targeted in therapy, but evidence of benefit to functional communication for at least four of the seven participants. These results contradict the argument that rehabilitation 24 months or more after stroke brings little benefit. As it was delivered to participants in their own homes using the Internet, this approach may not only be beneficial but also cost-effective.

Table 1. Percentage score of seven participants on naming 162 pictures objects.

	Participant							
	1	2	3	4	5	6	7	Mean
Years post onset	2	2	3	9	12	2	5	
Pre-treatment 1	26	36	52	44	40	31	26	36.4
Pre-treatment 2	30	48	55	42	47	37	33	41.7
Post-treatment 1	73	72	81	64	67	50	54	65.9
Post-treatment 2	81	77	82	66	61	62	55	69.1

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