Randomised Controlled Trial of Memory Rehabilitation Approaches Following Acquired Brain Injury

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Introduction

Memory problems are among the most common cognitive difficulties reported following an acquired brain injury (ABI)[1,2].

Two approaches have typically been used to rehabilitate memory: computerised cognitive training (CCT) and compensatory rehabilitation. There is no clear consensus as to which approach is more effective following an ABI.

Aims

To compare the impact of CCT and compensatory memory rehabilitation on memory functioning in individuals with ABI.

Methodology

Thirty-two adults with ABI (traumatic brain injury, stroke or hypoxic brain injury) and memory complaints were randomised into 1 of 3 groups (Table 1):

- Memory Skills Group (MSG): 6 week group program (2hr/week) focusing on practical training of compensatory memory strategies and education.
- CCT (Lumosity[TM]): Computer-based training designed to improve memory functioning. Participants completed 30 minute sessions, five times per week for 6 weeks.
- Waitlist control: No active intervention, however, participants continued to receive their regular rehabilitation input.

Assessments were completed at baseline, post intervention and 6 week follow-up.

Outcome measures: Goal Attainment Scaling (GAS)[3], Everyday Memory Questionnaire-Revised and cognitive measure of learning and prospective memory.

Table 1. Participant characteristics

	MSG (n=11)	CCT (n=10)	Waitlist (n=10)
Age	54.0 (20.25)	42.10 (18.00)	45.90 (17.67)
Gender (M/F)	8/3	7/3	9/1
Years of education	14.36 (3.17)	15.60 (4.63)	13.10 (3.75)
Months since injury	10.09 (9.62)	36.20 (48.58)	14.80 (23.04)

Results

Random effects regression revealed that all participants reported an improvement in their goals over time. Compared to the waitlist, the CCT group reported greater attainment of goals at follow-up, while, there was no difference between MSG and waitlist (Figure 1).
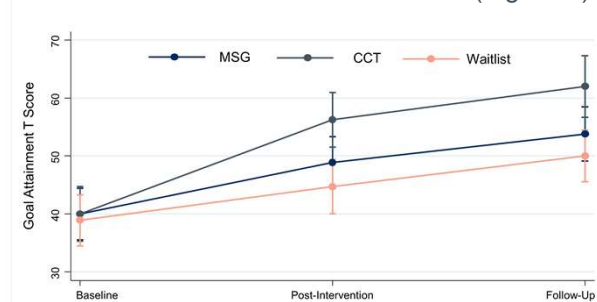

Fig 1. Estimated marginal means on GAS transformed to a T-score.

Planned comparisons revealed that MSG and CCT participants reported fewer memory complaints following their respective interventions (Figure 2). However, this effect was not maintained at follow-up.
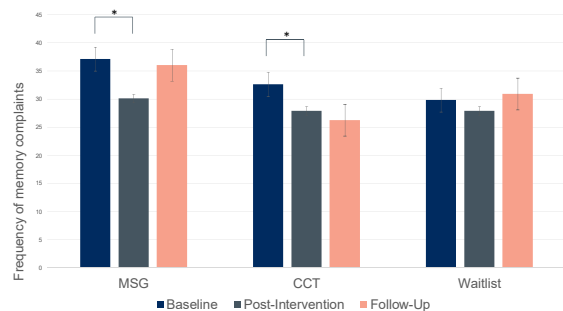

Fig 2. Means (±SE) on the Everyday Memory Questionnaire. * p <0.05

CCT participants also performed better on a prospective memory measure at post-intervention compared to baseline.

Conclusions

All participants improved on memory-specific goals over time. Both CCT and MSG interventions resulted in fewer memory complaints post-intervention and there was some evidence of greater efficacy of CCT.

Limitations include small sample size and influence of concurrent regular rehabilitation input.

References:
1. Ponsford, J. L., Downing, M. G., Olver, J., Ponsford, M., Acher, R., Carty, M., & Spitz, G. (2014). Longitudinal follow-up of patients with traumatic brain injury: outcome at two, five, and ten years post-injury. *Journal of Neurotrauma, 31(1)*, 64-77
2. Jokinen, H, Melkas, S., Ylikoski, R., Pohjasvaara, T., Kaste, M., Erkinjuntti, T., & Hietanen, M. (2015). Post-stroke cognitive impairment is common even after successful clinical recovery. *European Journal of Neurology, 22(9)*, 1288-1294.
3. Turner-Stokes, L. (2009). Goal attainment scaling (GAS) in rehabilitation: a practical guide. *Clinical rehabilitation, 23(4)*, 362-370.