

# Does memory rehabilitation improve health outcomes in people with multiple sclerosis? A Cochrane Review summary with commentary

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## Abstract.

**BACKGROUND:** Memory disturbance is common in people with multiple sclerosis (pwMS). Currently, a range of memory rehabilitation approaches alone or as a component of cognitive rehabilitation is utilized clinically.

**OBJECTIVE:** To evaluate the effectiveness of memory rehabilitation in improving health outcomes (memory, cognitive function, functional ability, quality of life) in pwMS.

**METHODS:** A summary of the Cochrane Review “Memory rehabilitation for people with multiple sclerosis” by Taylor et al from a rehabilitation perspective.

**RESULTS:** The review included 44 studies (with 2714 participants). The memory rehabilitation approaches varied amongst the included primary studies for memory retraining techniques (computerized programs, training using internal and external memory aids, etc.). Overall, the risk of bias amongst the included trials was low. The findings suggest *high-certainty evidence* for a beneficial effect of memory rehabilitation in improving subjective memory at intermediate- (1–6 months) and longer-term (> 6 months); and *moderate-certainty evidence* at immediate post-intervention. The evidence of the effect of memory rehabilitation on other outcomes showed mixed results.

**CONCLUSION:** The evidence suggests some beneficial effects of memory rehabilitation in improving subjective memory and quality of life in pwMS. However, further evidence is required for the evaluation of memory strategies for other outcomes.

Keywords: Multiple sclerosis, memory, health outcomes, rehabilitation

This commentary discusses the rehabilitation perspective in the published Cochrane Review “Memory rehabilitation for people with multiple sclerosis” (Taylor et al., 2021) by Taylor LA, Mhizha-Murira

JR, Smith L, Potter K-J, Wong D, Evangelou N, Lincoln NB, das Nair R,<sup>a</sup> published by Cochrane

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Multiple Sclerosis and Rare Diseases of the CNS Group. This Cochrane Corner is produced in agreement with *NeuroRehabilitation* by Cochrane Rehabilitation with views\* of the review summary authors in the “implications for practice” section.

## 1. Background

Multiple sclerosis (MS) is a complex immune-mediated disease of the central nervous system causing various physical and cognitive deficits. Memory dysfunction is one of the common cognitive impairments, reported in 40% to 60% of people with MS (pwMS) (Rao et al., 1993). Memory dysfunction can negatively impact activities of daily living (ADLs) and quality of life (QoL) in pwMS (Kalmar et al., 2008).

As a part of cognitive rehabilitation, memory rehabilitation is implemented to improve memory functioning in pwMS. There has been some progress in developing effective memory rehabilitation programs and several studies have evaluated their effectiveness using different methods. The findings reported are largely mixed, with single-case and small-group studies showing positive results in favour of the intervention, while randomized controlled trials (RCTs) and some systematic reviews report less favourable and inconclusive evidence (Taylor et al., 2021). A recent updated Cochrane Review by Taylor et al. (2021) evaluated the effectiveness of various memory rehabilitation strategies on health outcomes for pwMS.

### Memory rehabilitation for people with multiple sclerosis

(Taylor LA, Mhizha-Murira JR, Smith L, Potter K-J, Wong D, Evangelou N, Lincoln NB, das Nair R. 2021)

## 2. Objective

This Cochrane Review evaluates the effectiveness of different types of memory rehabilitation strategies on memory, other cognitive function, and functional abilities (i.e. quality of life (QoL), ADLs, and mood) for pwMS.

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Database of Systematic Reviews should be consulted for the most recent version of the review.

\*The views expressed in the summary with commentary are those of the Cochrane Corner authors and do not represent the Cochrane Library or Wiley.

## 2.1. What was studied and methods

Adults with clinically definite MS (all types) and any type of memory deficits were included. The primary outcomes were subjective/objective measures of the extent of memory problems in daily life. Secondary outcomes were: mood (depression, anxiety), functional abilities (ADLs), and QoL. All outcomes were assessed at “immediate” ( $\leq 1$  month, T1), “intermediate” (1–6 months, T2), and “longer” ( $>6$  months, T3) time points. The interventions included any memory rehabilitation strategy implemented alone or as part of a comprehensive cognitive rehabilitation program. The risk of bias and the certainty of the evidence in all included studies were assessed with the ‘Cochrane Risk-of-Bias’ tool and ‘GRADE’ approach, respectively.

A comprehensive search of prominent electronic databases (up to 6 September 2020) was conducted for RCTs and quasi-RCTs examining the effects of memory rehabilitation or cognitive rehabilitation compared to those who received no treatment, or active control.

## 3. Results

The review included 44 studies with a total of 2714 participants. The interventions assessed varied and included memory retraining techniques, such as computerized programs, and memory training using internal and external memory aids. Overall, the risk of bias amongst the included trials was low; however, eight studies were assessed as with a high risk of bias due to numerous methodological issues.

Summary of key findings are listed below (and are detailed in Table 1):

- Subjective memory: *High-certainty evidence* for improved subjective memory at T2 and T3, and *moderate-certainty evidence* at T1
- QoL: *High-certainty evidence* on improved QoL at T1, T2 and T3
- Objective verbal memory: *Low-certainty evidence* for better verbal memory at T1 and T2, but little/no beneficial effect at T3 (*Moderate-certainty evidence*)
- Objective visual memory: *Moderate-certainty evidence* on improved visual memory at T1, but little/no beneficial effect at T2 (*Moderate-certainty evidence*) and T3 (*High-certainty evidence*)

Table 1  
Summary of findings

Outcomes	Immediate (T1) (≤ 1 month)			Intermediate (T2) (1–6 months)			Long-term (T3) (> 6 months)			GRADE <sup>^</sup>					
	N	SMD	95% CI	Effect*	GRADE <sup>^</sup>	N	SMD	95% CI	Effect*		GRADE <sup>^</sup>				
Subjective memory	568	0.32	0.05, 0.58	+	Mod	1045	0.23	0.11, 0.35	+	High	775	0.16	0.02, 0.30	+	High
Objective verbal memory	922	0.40	0.22, 0.58	+	Low	753	0.25	0.11, 0.40	+	Low	619	0.13	-0.03, 0.29	-	Mod
Objective visual memory	799	0.42	0.25, 0.60	+	Mod	751	0.20	-0.11, 0.50	-	Mod	619	0.12	-0.13, 0.37	-	High
Objective working memory	655	0.45	0.18, 0.72	+	Low	821	-0.16	-0.09, 0.40	-	Mod	665	0.04	-0.11, 0.20	-	Mod
Quality of life	371	0.42	0.15, 0.68	+	High	683	0.30	0.02, 0.58	+	High	687	0.17	0.02, 0.32	+	High
Information processing	808	0.51	0.19, 0.82	+	Low	933	0.27	0.00, 0.54	+	Low	723	0.21	-0.03, 0.45	-	Mod
Depression	853	0.34	0.15, 0.53	+	Mod	1003	0.20	-0.06, 0.45	-	Mod	891	0.15	-0.04, 0.34	-	High
Anxiety	178	0.29	-0.01, 0.59	-	High	502	0.16	-0.15, 0.46	-	High	502	0.27	-0.12, 0.65	-	High
Functional abilities/ADLs	265	0.02	-0.26, 0.29	-	High	400	-0.06	-0.36, 0.24	-	High	369	-0.11	-0.49, 0.27	-	High

ADLs = activities of daily living, CI = confidence interval, GRADE: Grading of Recommendations, Assessment, Development and Evaluations, Mod = moderate, N = number of participants, SMD = standardized mean difference. \*Relative effect of intervention: '+' = improved in favour of intervention, '-' = no or little effect of the intervention. <sup>^</sup>Grades of evidence (GRADE Working Group): **High**: further research is very unlikely to change our confidence in the estimate of effect. **Moderate (Mod)**: further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate. **Low**: further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate. **Very low**: very uncertain about the estimate.

- Objective working memory: *Low-certainty evidence* on improved working memory at T1, but little/no beneficial effects at T2 and T3 (*Moderate-certainty evidence*)
- Information processing: *Low-certainty evidence* in improving information processing functions at T1 and T2, but little/no beneficial effect at T3 (*Moderate-certainty evidence*)
- Depression: *Moderate-certainty evidence* on improved depression at T1, but little/no beneficial effect at T2 (*Moderate-certainty evidence*) and T3 (*high-certainty evidence*)
- ADLs, Anxiety: *High-certainty evidence* suggesting little/no effect on improved functional abilities and anxiety at any time-points

#### 4. Conclusions

The authors concluded that there is evidence to support the effectiveness of memory rehabilitation specifically at the intermediate-term (1–6 months post-intervention) explicitly for subjective memory, verbal memory, information processing, and QoL outcomes. More robust trials examining the effectiveness of memory rehabilitation assessed in the longer-term are still required.

##### 4.1. Implications for practice in neurorehabilitation

This review suggests the beneficial effect of memory rehabilitation for improved subjective memory, verbal memory, information processing, depression and QoL in pwMS immediately and at 1–6 months post-intervention. However, over the longer-term, memory rehabilitation improved subjective memory and QoL only. The evidence also suggests little or no beneficial effect on ADLs or anxiety, and mixed results on visual and working memory. There was no indication of harm caused by the interventions.

#### Conflict of interest

The authors declare no conflicts of interest.

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