The effectiveness of physical, psychological, and functional interventions in treating clients with multiple sclerosis: a meta-analysis

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Authors' objectives
To evaluate the effectiveness of occupational therapy in people with multiple sclerosis (MS).

Searching
MEDLINE, PsycLIT, and the ISI databases were searched from 1980 to 1999 using the following keywords in combination with 'multiple sclerosis': 'activities of daily living', 'occupational therapy', 'therapy' and 'rehabilitation'. The following journals were searched manually for the past 10 years: American Journal of Occupational Therapy; Canadian Journal of Occupational Therapy; Physical Therapy; and Journal of Neurologic Rehabilitation. The reference lists from all of the identified articles were examined. Publication bias was assessed.

Study selection
Study designs of evaluations included in the review
The eligible studies were not restricted by study design, but those studies that did not contain sufficient information to calculate effect sizes (ESs) were excluded. Randomised controlled studies (RCTs), cohorts, pre-test and post-test, and single case studies were eligible.

Specific interventions included in the review
Interventions or treatments that were within the scope of an occupational therapist were eligible. The intervention did not need to be carried out by an occupational therapist, but had to be one which an occupational therapist would be capable of performing. Drug interventions were excluded. The actual interventions included: tremor dampening; in- and out-patient rehabilitation programmes; fatigue management programmes; cooling; stress management; in-patient physical therapy; aquatics programme; skills training; facilitated and task-orientated treatment; psychological treatment; occupational therapy; transcutaneous nerve stimulation; aerobics exercise; attention training; career re-entry programmes; and expiratory training.

Participants included in the review
People with MS as the primary diagnosis were eligible. The mean age, where stated, ranged from 36.8 to 53.1 years.

Outcomes assessed in the review
The actual outcomes assessed included: function; fatigue; objective clinical measurement; psychological adjustment; health status; impairment, disability, and handicap; home ability; strength and endurance; cognitive and behavioural measures; self-care; pain and sleeping; quality of life; attention functions; employment status; and expiratory muscle strength. The instruments used to assess these outcomes were not reported. The outcomes were categorised as:
capacities and abilities, including muscle strength, range of motion, and mood;
task and activities, such as dressing, bathing, and ambulation; and
life roles.

Studies assessing outcomes at the physiological level were excluded.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the reviewers performed the selection.
Assessment of study quality
Each study was assessed and graded using the following criteria, which were developed for this study (see Other Publications of Related Interest):

research design, graded from I (for RCT) to IV (single-subject designs);

sample size, graded A (at least 20 patients per group) or B (20 patients or less per group);

internal validity, graded from 1 (no alternative explanation for outcome) to 3 (at least two serious alternative explanations for the outcome); and

external validity, graded from 'a' (participants representative of populations and treatments reported current practice) to 'c' (sample heterogeneous without being able to understand whether the effects were similar for all diagnoses, or treatments did not reported current practice). The authors do not state how the papers were assessed for validity, or how many of the reviewers performed the validity assessment.

Data extraction
One author extracted and coded the following data: author and year of publication; study design; purpose of study; sample size; the number of participants in the treatment and control groups; the mean age of the participants; and the outcomes. An overall study ES, and an ES by outcome category, were calculated for each study.

Methods of synthesis
How were the studies combined?
A pooled ES was calculated both overall and for each separate category of outcome, with and without weighting by the conditional variance. Publication bias was assessed. The number of studies required to render the results non significant was estimated as 400.

How were differences between studies investigated?
Statistical heterogeneity for the overall ES was assessed using the Q statistic.

Results of the review
Twenty-three studies (633 participants) were included.

The ES was small in 26% of the studies, moderate in 26%, and large in 48%.

The pooled, overall ES was large suggesting that occupational therapy-related treatments are effective in MS (ES 0.52, p<0.0001 for the overall effect exceeding zero). After controlling for the variances due to small sample size, the pooled overall ES was moderate (ES 0.39). There was evidence for statistical heterogeneity (Q=63.02, d.f.=22, p<0.005).

The pooled overall ES of occupational therapy-related treatment on capacities and abilities (19 studies, including 6 RCTs) was large (ES 0.52, p<0.0001 for the overall effect exceeding zero). The ESs ranged from 0.00 to 0.98. The weighted ES was 0.35.

The pooled overall ES for activities and tasks (11 studies) was large (ES 0.57, p<0.0001 for the overall effect exceeding zero). The ESs ranged from 0.03 to 0.93. Of the 4 RCTs, 2 reported a low ES and 2 reported a large ES. The weighted ES was 0.54. The pooled overall ES for life roles (4 studies) was moderate (ES 0.35, p<0.0001 for the overall effect exceeding zero). The ESs ranged from 0.0.16 to 0.63. The weighted ES was 0.38.

Authors’ conclusions
Occupational therapy-related treatments were effective in treating the deficits associated with MS, particularly for outcomes in the capacity and ability, and task and activity levels.
CRD commentary
The aims were clearly stated, and the inclusion criteria were broadly defined in terms of the study design, participants, interventions, and outcomes. Several relevant sources were searched for studies, but no attempt was made to locate unpublished material. In addition, the methods used to select the studies were not described. The authors did acknowledge the potential for publication bias and publication bias was assessed. The quality of the included studies was assessed using predefined criteria, but the methods used to assess validity were not reported.

Some relevant data were extracted and tabulated. However, the authors did not comment on the validity of the methods used to assess the outcomes in the individual studies, or the baseline function of patients with MS. The data were combined in a meta-analysis, but the finding of statistical heterogeneity for the overall ES implies that a meta-analysis was inappropriate. There was no assessment of heterogeneity for the specific categories of outcome. In addition, the influence of study validity on the results was not explored. The authors discussed some of the limitations of their review. The evidence of statistical heterogeneity among studies suggests that the results may not be applicable to all outcomes in all occupation therapy-related interventions. The strength of the evidence on which the conclusions were based is weakened by the failure to explore the effect of study validity on the results.

Implications of the review for practice and research
Practice: The authors state that occupational therapy is beneficial for clients with MS. They further state that the studies suggested that short, intensive, in-patient treatment could be effective in improving performance, and there was support for specific types of treatment such as exercise, tremor dampening, and training in specific impairment.

Research: The authors state that more controlled trials are required that use life roles as an outcome.

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Other publications of related interest

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Record Status
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.