Enhancing occupational performance through occupationally embedded exercise: a meta-analytic review

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Authors' objectives
To examine the effects of occupationally embedded exercise on motor performance. To determine whether in occupational therapy, engagement in purposeful activity produces better quality of movement than concentration on movement per se.

Searching
Computer and manual searches of Index Medicus, Excerpta Medica, EMBASE (Rehabilitation and Physical Medicine) and Psychological Abstracts were performed (search dates were unclear and no search terms were provided). All study bibliographies, and the personal files of relevant faculty members of Boston University Occupational Therapy Department, were reviewed.

Study selection
Study designs of evaluations included in the review
Repeated measures or independent group designs involving a comparison between at least two of the following occupational forms: materials-based occupation, imagery-based occupation and rote exercise. The study also had to employ dependent measures of occupational performance in the motor domain.

Specific interventions included in the review
Materials-based occupation, imagery-based occupation, rote exercise. The interventions involved motor tasks for upper extremity (arm movement, squeezing movement, use of prosthesis, functional movement, arm reach), lower extremity (reciprocal pedalling movement, kicking movement) or both (jumping movement, dynamic standing balance exercise).

Participants included in the review
No participant inclusion criteria are given. The majority of included studies involved neurologically-intact patients, a minority involved neurologically-impaired patients (diagnoses included cerebrovascular accident, multiple sclerosis, traumatic brain injury and cerebral palsy). Both age and gender were identified as moderating effects, but no details of their distribution in the patients are given (one study involved children).

Outcomes assessed in the review
Number of movement repetitions, movement duration, number of movement discontinuity, movement accuracy, movement distance (vertical, between hip and wrist), movement amplitude of pronation and supination.

Process-orientated outcomes: total displacement, velocity variability, speed of movement, reaction time, movement time and movement smoothness.

How were decisions on the relevance of primary studies made?
The decision to include a paper was made by looking at its methods only and not the results.

Assessment of study quality
The authors do not state that they assessed quality.

Data extraction
Two reviewers independently completed the coding form for each study, and any differences were resolved by consensus. The following information was abstracted from each study: sample characteristics (sex, age, sample size, diagnosis, and other reported clinical variables), study characteristics (type of design, forms of occupation involved,
motor tasks involved, period of observation of change, type of outcome measure), results.

**Methods of synthesis**

**How were the studies combined?**

Effect sizes were calculated from each of the individual studies, based on reported t-test or F-ratio statistics. The overall effect size was calculated for all studies, for studies of neurologically-intact patients, and studies of neurologically-impaired patients.

**How were differences between studies investigated?**

A test of heterogeneity was undertaken and potential moderators (age and sex) were examined.

**Results of the review**

Seventeen studies (449 patients) were identified from 16 reports, 2 of which were unpublished. Fourteen studies were repeated measure design (337 patients) and 3 were independent group design (112 patients). Eleven studies used an upper extremity task whilst 2 used a lower extremity one. Three studies involved simultaneous movement of both upper and lower extremity. One study included both an upper and lower extremity task.

Four studies compared materials-based occupation, imagery-based occupation and rote exercise; 2 studies compared imagery-based occupation to rote exercise; 1 study compared materials-based occupation with imagery-based occupation and 9 studies compared materials-based occupation with rote exercise.

The overall effect size across all studies was 0.55 (minimum -0.07, maximum 0.92, p<0.00003). The overall effect size weighted by sample size was 0.50. The test for heterogeneity was significant (chi-squared=34.37, p<0.01).

The average effect sizes were 0.44 (p<0.00003) and 0.80 (p<0.00003) in neurologically-intact and neurologically-impaired patients, respectively.

**Authors' conclusions**

The results of the meta-analysis confirmed the advantages of embedding exercise within occupation over objectless exercise. Further well-designed research will continue to enhance our understanding in this area.

**CRD commentary**

The review does not provide sufficient detail to replicate the findings. In particular, no search terms, publication years or language limitations are given for the search. There is no assessment of the quality of included studies, and there is insufficient information about the primary studies (e.g. sample size, type of patients and outcome measurement).

The fact that the included studies were found to be heterogeneous questions the validity of combining the effect sizes. It may have been more sensible to break down the results by type of comparison. The differences between the studies are investigated, but since there are relatively few studies and all have small sample sizes, no strong conclusions can be drawn. However, in all but one study, the effect size was positive suggesting that occupationally embedded exercise may be superior.

**Bibliographic details**


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