Short-term efficacy of upper-extremity exercise training in patients with chronic airway obstruction: a systematic review


CRD summary
This well-conducted review evaluated effects of upper extremity exercise training (UEET) in addition to lower extremity training or comprehensive pulmonary rehabilitation in patients with chronic airway obstruction. The authors concluded that there was insufficient evidence to support inclusion of UEET in pulmonary rehabilitation programmes for patients with severe and very severe chronic airway obstruction. The conclusions are likely to be reliable.

Authors' objectives
To evaluate the effects of upper extremity exercise training (UEET) in addition to lower extremity training or comprehensive pulmonary rehabilitation in patients with chronic airway obstruction.

Searching
MEDLINE, CINHAL, EMBASE (all from inception to March 2007), PEDro and Cochrane Central Register of Controlled Trials (CENTRAL) (dates not reported) were searched for articles published in English, Italian and Spanish. Search terms were reported. Reference lists of relevant research articles were examined. Abstracts presented at meetings of American Thoracic Society and European Respiratory Society (both 2001 to 2007) were searched and authors of appropriate abstracts contacted for complete information. Pulmonary rehabilitation experts were contacted to locate further unpublished material.

Study selection
Randomised controlled trials (RCTs) of patients diagnosed with moderate, severe or very severe chronic airway obstruction were eligible for inclusion. Pulmonary rehabilitation programmes that included supported or unsupported UEET as the experimental intervention were eligible for inclusion. Criteria for chronic airway obstruction were detailed in the report. The intervention had to be compared with a control treatment that was described in detail and not specifically aimed at improving upper extremity exercise capacity. The control treatment could be standard training consisting of comprehensive in-patient, out-patient or home-based pulmonary rehabilitation programs, or could target only lower extremity exercise capacity. Eligible interventions and controls were supervised or unsupervised in-patient, out-patient or home-based programmes that included at least 20 sessions at a frequency of three times a week. A number of outcomes were eligible for inclusion: arm exercise capacity (maximal exercise capacity, functional exercise capacity or endurance time); symptoms of dyspnoea; arm fatigue on exertion; ability to perform activities of daily living tasks that involved the arms; and health-related quality of life (HRQoL).

The included RCTs were conducted in an out-patient or home-based setting. Interventions included were UEET (mostly unsupported) with gravity resistance training or proprioceptive neuromuscular with general physical therapy, or were UEET with lower extremity exercise training. Controls used were lower extremity exercise training alone or with comprehensive pulmonary rehabilitation (with or without placebo). Participants had a mean age of 63 to 71.8 years in the control group and 66 to 66.6 years in the intervention group. Most participants were male with severe or very severe chronic airway obstruction. Duration of interventions was six or eight weeks. Follow-up was immediately or two weeks post-intervention.

Two reviewers independently performed the search. A third reviewer was consulted in the case of disagreement.

Assessment of study quality
Study quality was assessed by two independent investigators using the Consolidated Standards of Reporting Trials (CONSORT) statement to provide a quality score out of 23 for criteria such as randomisation, allocation concealment, blinding and reporting.

Data extraction
Data were extracted by two reviewers. Missing data were requested from the authors.

Methods of synthesis
Data were synthesised narratively. Study details were presented in tables to enable examination of between-study differences.

Results of the review
Four RCTs were included (n=141 randomised, n=107 completed). Sample size ranged from 13 to 45. Study quality was described as very low in three RCTs and unsatisfactory in one RCT. The included RCTs completely satisfied between four and seven criteria. One RCT reported random sequence generation and blinding. None reported allocation concealment or randomisation implementation.

UEET was associated with a statistically significant increase in exercise capacity in one out of three RCTs. One trial measured functional exercise capacity and found a strong benefit with UEET compared with control. There was a statistically significant improvement in dyspnoea score in one of three RCTs with UEET compared with control.

UEET was associated with no benefit in endurance time (one RCT), activities of daily living (one RCT) or HRQoL (three RCTs) compared with control.

Authors’ conclusions
There was insufficient evidence to support inclusion of UEET in pulmonary rehabilitation programmes for patients with severe and very severe chronic airway obstruction.

CRD commentary
The research question was well-defined and supported by inclusion criteria for participants, outcomes, intervention, comparator and study design. A number of databases were searched in several languages, but language bias could not be ruled out. Published and unpublished sources were searched, which reduced the possibility of publication bias. Methodological quality of trials was assessed using an appropriate tool and taken into account in the analysis. Study selection, validity assessment and data extraction were performed in duplicate, which reduced the possibility of reviewer error and bias. The decision to perform a narrative synthesis appeared appropriate given the heterogeneity and poor quality of trials available. This was a generally well-conducted review and the authors’ conclusions are likely to be reliable.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that well-designed adequately powered trials based on validated outcome measures addressed to clinically meaningful end points were needed. Development of standardised and quantitative tests to assess the ability of people with chronic airway obstruction to perform activities of daily living would be helpful to obtain deeper understanding of clinically important achievements from the patient perspective. Effects of UEET on patients with different chronic airway obstruction severity or levels of disability warranted further investigation, as did the issue of whether unsupported or supported arm exercise provided greater or more selective benefits.

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Bibliographic details

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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.