Multi-disciplinary rehabilitation after hip fracture is associated with improved outcome: a systematic review

HipFracture Rehabilitation Trial Collaborative Group

CRD summary
The authors concluded that multidisciplinary rehabilitation following hip fracture results in a significantly lower risk of a poor outcome, defined as either death or nursing home admission. They noted that the validity of the pooled outcome is unclear as the effect does not necessarily exist for either outcome individually. Nonetheless, the review was well-conducted and their conclusions appear justified.

Authors' objectives
To compare the effectiveness of multidisciplinary rehabilitation and usual orthopaedic care following hip fracture.

Searching
MEDLINE, EMBASE and CINAHL were searched in July 2005, using the search strategy previously used in a relevant Cochrane review (see Other Publications of Related Interest no.1). The reference lists of retrieved articles were also checked. Papers in Spanish and Japanese were included, whereas a paper written in Russian was excluded because of translation problems.

Study selection
Randomised controlled trials (RCTs) comparing multidisciplinary rehabilitation with other forms of care were eligible for inclusion. Rehabilitation was defined as services provided by a multidisciplinary team aiming to reduce disability by the improvement of task-orientated behaviours such as walking and dressing. Studies of rehabilitation for secondary prevention were excluded, as were studies in which the number of participants with hip fracture could not be determined. The interventions in the included studies took place within a variety of settings: geriatric orthopaedic rehabilitation units, a geriatric hip fracture programme, an early supported discharge programme, a mixed assessment and rehabilitation unit, and an orthopaedic ward geriatric assessment and rehabilitation programme. These programmes typically included supervision by a geriatrician and/or rehabilitation specialist, early mobility, regular interdisciplinary review with physiotherapy and occupational therapy input, and intensive discharge planning. The control interventions comprised standard care, generally on an orthopaedic ward, with less intensive involvement of allied health personnel and access to other specialists by request. However, the models of care varied widely in both the intervention and control groups. Eligible studies reported the following outcomes: return home on discharge from hospital (measured only among participants living at home prior to fracture), mortality, poor outcome (defined as death or nursing home admission on discharge), total length of hospital stay (including both acute care and rehabilitation), readmission to the hospital and physical functioning. Measures of physical functioning included the Barthel Index and measures of ambulation and activities of daily living, such as dressing, toileting and cooking. Follow-up times varied from time of hospital discharge to 12 months. The participants in eligible studies were older patients after a hip fracture. In all the included studies, participants were aged over 50 years. Some studies were restricted to females and most excluded patients with terminal illness or pathological fractures. Where stated, the mean age varied from 78 to 85 years.

Two reviewers independently selected studies for inclusion, with any discrepancies resolved by a third.

Assessment of study quality
The following criteria were considered in the assessment of study validity: allocation method, allocation concealment, baseline comparability of the groups, blinding, losses to follow-up, intention-to-treat analysis, representativeness of the study population and length of follow-up.

Two reviewers independently conducted the validity assessment, with any discrepancies resolved by a third.

Data extraction
Risk ratios (RRs) and 95% confidence intervals (CIs) were calculated for binary data, and group means for continuous data (length of hospital stay). Two reviewers independently extracted the data. Trial authors were contacted for missing data.

Methods of synthesis
Binary data were pooled for two outcomes, using both fixed-effect and random-effects models to calculate pooled RRs and 95% CIs. The results from random-effects models were reported in the review. The number-needed-to-treat (NNT) was calculated for one outcome. Statistical heterogeneity was assessed using the $\chi^2$ and $I^2$ statistics and clinical heterogeneity was discussed in the text. Owing to clinical heterogeneity, continuous data were not pooled but were described in the narrative.

Results of the review
Eleven RCTs (n=2,177) were included.

Five RCTs did not conceal allocation, seven had groups that were not comparable at baseline on functional status (n=3) or other (n=4) characteristics, eight did not clearly use blinded outcome assessment, three did not conduct an intention-to-treat analysis, and six followed up for less than 12 months. The authors noted that publication bias was a possibility.

Return home (11 RCTs): there was no statistically significant difference between the groups for this outcome, though there was a trend favouring the intervention group (RR 1.07, 95% CI: 1.00, 1.15, p=0.06). There was low to moderate statistical heterogeneity ($\chi^2$ test p=0.12; $I^2=35\%$).

Mortality (11 RCTs): there was no statistically significant difference between the groups, measured at follow-up times ranging from 4 weeks to 12 months.

Poor outcome (10 RCTs): there was a statistically significant difference between the groups, favouring the intervention group (RR 0.84, 95% CI: 0.73, 0.96). This translates to a need to treat 24 people to avoid one death or admission to a nursing home at discharge from hospital (NNT=24).

Total length of hospital stay (11 RCTs): lengths of hospital stay varied from 10 to 56 days where this was reported (6 RCTs). Four RCTs reported that the length of stay was shorter in the intervention group.

Readmission to hospital (5 RCTs): 4 RCTs reported no difference between the groups for the number or length of hospital admissions following discharge (either related or unrelated to the original admission); the fifth reported significantly more readmissions for orthopaedic conditions in the control group in the first post-operative year.

Physical functioning: 5 RCTs reported better outcomes in the intervention group, while 4 RCTs reported no difference between the groups.

Authors' conclusions
Multidisciplinary rehabilitation following hip fracture results in a significantly lower risk of a poor outcome, defined as either death or admission to a nursing home at hospital discharge.

CRD commentary
The review objectives and inclusion criteria were clear and the search was thorough in most respects, though one study was unable to be translated. However, the authors made no attempt to locate unpublished studies, and although they acknowledged the potential for publication bias, it is unclear whether this was formally assessed. Steps were taken to reduce error and bias in the review process by having more than one reviewer make decisions independently. Adequate information was provided about the included studies and relevant criteria were considered in the assessment of validity. The pooling of studies appears justified and heterogeneity was appropriately evaluated and addressed. It is unclear whether the decision to combine hospital discharge and mortality as an outcome was predetermined since the text suggests that it may have been a post hoc decision. As the authors noted, the validity of the combined outcome is unclear as it may suggest an effect that does not exist for either outcome individually. Nonetheless, the review was generally well-conducted and the authors' conclusions appear justified.
Implications of the review for practice and research
Practice: The authors stated that health services should be organised so that patients with hip fracture routinely receive multidisciplinary rehabilitation.

Research: The authors stated that future research in this area should use standardised measures for health service outcome (e.g. length of hospital stay) and for functional outcomes. They recommended use of the Standardized Audit for Hip Fractures in Europe (see Other Publications of Related Interest no.2).

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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.