Factors affecting functional outcome after stroke: a critical review of rehabilitation interventions
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Authors' objectives
To examine the associations between rehabilitation interventions and functional outcome after stroke.

Searching

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) or meta-analyses.

Specific interventions included in the review
The following aspects of rehabilitation interventions were evaluated: timing of rehabilitation; type of inpatient rehabilitation (interdisciplinary versus multidisciplinary); type of non-inpatient rehabilitation (home health versus outpatient versus day); specificity of rehabilitation services; and intensity of rehabilitation services. The review also looked at the functional deficits of participants at rehabilitation admission.

Participants included in the review
Patients who have had a stroke.

Outcomes assessed in the review
Functional ability at rehabilitation discharge and at follow-up (typically 3 or 12 months). In general, included studies examined functional outcome with commonly utilised measures, such as the Barthel Index, Kenny ADL Scale, and Functional Independence Measure.

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
Review articles were critically assessed based on the following criteria: comprehensiveness, critical versus descriptive review, and use of a meta-analysis. Investigational articles were objectively evaluated by the following criteria: prospective versus retrospective, randomised versus nonrandomised, blinded versus nonblinded, number of patients studied, patient selection criteria, statistical analysis, functional assessment measures used, presentation of results, and appropriateness of conclusions. Based on the criteria above, studies were grouped into different 'levels of evidence' by the system developed by Sackett (see Other Publications of Related Interest no.1). Only studies that were either level I (large RCT with clear cut results and low risk of error or meta-analysis) or II (small RCT with uncertain results and moderate risk of error) were then included in the review. It was not stated how many authors were involved in this process.
Data extraction
The authors do not state how the data were extracted from the review, or how many of the reviewers performed the data extraction.

Methods of synthesis
How were the studies combined?
Studies were combined in a narrative. Relationships were considered 'strong' if they were demonstrated in more than 75% of Level I and II studies. If there was only one Level I or II study, or if the relationship was demonstrated in only 50% to 74% of level I and II studies, it was considered to be present but 'weak'. No relationship between factors was noted if no Level I and II studies demonstrated it. This system was developed for the review but modified from the work of Sackett (see Other Publications of Related Interest no.1).

How were differences between studies investigated?
No statistical test for heterogeneity was performed.

Results of the review
A total of 79 studies investigated the association between rehabilitation interventions and functional outcomes after stroke. Of these, 38 were found to be either Level I or II evidence and therefore included in the review. The number of participants included in each study was not stated.

Eleven well-designed Level II studies looked at functional deficits as predictors of functional outcome following stroke. Overall, the available literature demonstrated that decreased functional abilities in the first 1 to 4 weeks after stroke were strongly associated with decreased discharge to home rates and functional outcome at both rehabilitation discharge and up to 6 months follow-up.

Four well designed Level II studies looked at the association of the timing of rehabilitation interventions, and outcome after stroke. Overall, the available literature demonstrated that early onset of rehabilitation interventions - within 3 to 30 days poststroke - was strongly associated with improved functional outcome.

Eleven well-designed Level I studies investigated the type of inpatient rehabilitation, interdisciplinary versus multidisciplinary, as a predictor of outcome following stroke. Overall, the available literature demonstrated that interdisciplinary versus multidisciplinary inpatient rehabilitation is strongly associated with improved functional outcome, shorter length of stay, decreased costs, and decreased mortality. Importantly, all of the available meta-analyses and Level II investigations were performed in Europe (Great Britain, Scandinavia), and thus the generalisability of these findings to non-European rehabilitation care is unknown.

Three well-designed Level II studies investigated the association between type of non-inpatient rehabilitation services, specifically day versus outpatient versus home therapy, and functional outcome after stroke. This literature did not allow clear differentiation between type of non-inpatient rehabilitation services; however, home health services may be weakly associated with improved 6-month functional outcome when compared with day rehabilitation services.

Five Level I (n=1) and Level II (n=4) studies examined the association between the specificity of rehabilitation services, in particular the types of physical, occupational, speech, and psychology therapy, and functional outcome following stroke. Overall, the available literature demonstrated that task-specific therapy services versus more generalised therapy was weakly associated with improved functional outcome after stroke.

Four Level I (n=1) and II (n=3) studies examined the association between the intensity of rehabilitation services, in particular occupational, speech, and psychology therapy, and functional outcome following stroke. Overall, the available literature demonstrated that the intensity of rehabilitation services was weakly associated with improved functional outcome after stroke.

Authors' conclusions
Increased functional skills on admission to rehabilitation, early initiation of rehabilitation services, and rehabilitation in
an interdisciplinary versus multidisciplinary setting after stroke appear to have a strong relationship with improved functional outcome at hospital discharge and follow-up. The use of specialised types of therapy services and greater intensity of therapy services appears to have a weak relationship with improved functional outcome at hospital discharge and follow-up. The current literature is too limited to allow an assessment of the relationship of specific types of non-inpatient rehabilitation services after stroke and functional outcome.

**CRD commentary**

The review states an objective and clearly presents inclusion criteria. MEDLINE was the only electronic database that was searched and therefore some important information may have been missed. No attempt was made to look for unpublished studies and the presence of publication bias cannot be ruled out. Information about the methodology of the review process (such as whether more than one reviewer was involved in assessing the quality and relevancy of primary studies, and if so how discrepancies were resolved) was not presented. Information given on the included studies and participants was also very limited.

The authors conclusions seem to follow from the results.

**Implications of the review for practice and research**

The authors did not state any implications for further research and practice.

**Bibliographic details**


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**Other publications of related interest**


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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.