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[Intervention Review]

Physical rehabilitation approaches for the recovery of function and mobility following stroke

Alex Pollock¹, Gillian Baer², Pauline Campbell¹, Pei Ling Choo³, Anne Forster⁴, Jacqui Morris⁵, Valerie M Pomeroy⁶, Peter Langhorne⁷

¹Nursing, Midwifery and Allied Health Professions Research Unit, Glasgow Caledonian University, Glasgow, UK. ²Department of Physiotherapy, Queen Margaret University, Edinburgh, UK. ³School of Health & Life Sciences, Glasgow Caledonian University, Glasgow, UK. ⁴Academic Unit of Elderly Care and Rehabilitation, Bradford Institute for Health Research, Bradford Teaching Hospitals NHS Foundation Trust/University of Leeds, Bradford, UK. ⁵School of Nursing and Midwifery, University of Dundee, Dundee, UK. ⁶School of Rehabilitation Sciences, University of East Anglia, Norwich, UK. ⁷Academic Section of Geriatric Medicine, University of Glasgow, Glasgow, UK

Contact address: Alex Pollock, Nursing, Midwifery and Allied Health Professions Research Unit, Glasgow Caledonian University, Buchanan House, Cowcaddens Road, Glasgow, G4 0BA, UK. alex.pollock@gcu.ac.uk.

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ABSTRACT

Background

Various approaches to physical rehabilitation may be used after stroke, and considerable controversy and debate surround the effectiveness of relative approaches. Some physiotherapists base their treatments on a single approach; others use a mixture of components from several different approaches.

Objectives

To determine whether physical rehabilitation approaches are effective in recovery of function and mobility in people with stroke, and to assess if any one physical rehabilitation approach is more effective than any other approach.

For the previous versions of this review, the objective was to explore the effect of 'physiotherapy treatment approaches' based on historical classifications of orthopaedic, neurophysiological or motor learning principles, or on a mixture of these treatment principles. For this update of the review, the objective was to explore the effects of approaches that incorporate individual treatment components, categorised as functional task training, musculoskeletal intervention (active), musculoskeletal intervention (passive), neurophysiological intervention, cardiopulmonary intervention, assistive device or modality.

In addition, we sought to explore the impact of time after stroke, geographical location of the study, dose of the intervention, provider of the intervention and treatment components included within an intervention.

Search methods

We searched the Cochrane Stroke Group Trials Register (last searched December 2012), the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* Issue 12, 2012), MEDLINE (1966 to December 2012), EMBASE (1980 to December 2012), AMED (1985 to December 2012) and CINAHL (1982 to December 2012). We searched reference lists and contacted experts and researchers who have an interest in stroke rehabilitation.

Selection criteria

Randomised controlled trials (RCTs) of physical rehabilitation approaches aimed at promoting the recovery of function or mobility in adult participants with a clinical diagnosis of stroke. Outcomes included measures of independence in activities of daily living (ADL), motor function, balance, gait velocity and length of stay. We included trials comparing physical rehabilitation approaches versus no treatment, usual care or attention control and those comparing different physical rehabilitation approaches.

Data collection and analysis

Two review authors independently categorised identified trials according to the selection criteria, documented their methodological quality and extracted the data.

Main results

We included a total of 96 studies (10,401 participants) in this review. More than half of the studies (50/96) were carried out in China. Generally the studies were heterogeneous, and many were poorly reported.

Physical rehabilitation was found to have a beneficial effect, as compared with no treatment, on functional recovery after stroke (27 studies, 3423 participants; standardised mean difference (SMD) 0.78, 95% confidence interval (CI) 0.58 to 0.97, for Independence in ADL scales), and this effect was noted to persist beyond the length of the intervention period (nine studies, 540 participants; SMD 0.58, 95% CI 0.11 to 1.04). Subgroup analysis revealed a significant difference based on dose of intervention (P value < 0.0001, for independence in ADL), indicating that a dose of 30 to 60 minutes per day delivered five to seven days per week is effective. This evidence principally arises from studies carried out in China. Subgroup analyses also suggest significant benefit associated with a shorter time since stroke (P value 0.003, for independence in ADL).

We found physical rehabilitation to be more effective than usual care or attention control in improving motor function (12 studies, 887 participants; SMD 0.37, 95% CI 0.20 to 0.55), balance (five studies, 246 participants; SMD 0.31, 95% CI 0.05 to 0.56) and gait velocity (14 studies, 1126 participants; SMD 0.46, 95% CI 0.32 to 0.60). Subgroup analysis demonstrated a significant difference based on dose of intervention (P value 0.02 for motor function), indicating that a dose of 30 to 60 minutes delivered five to seven days a week provides significant benefit. Subgroup analyses also suggest significant benefit associated with a shorter time since stroke (P value 0.05, for independence in ADL).

No one physical rehabilitation approach was more (or less) effective than any other approach in improving independence in ADL (eight studies, 491 participants; test for subgroup differences: P value 0.71) or motor function (nine studies, 546 participants; test for subgroup differences: P value 0.41). These findings are supported by subgroup analyses carried out for comparisons of intervention versus no treatment or usual care, which identified no significant effects of different treatment components or categories of interventions.

Authors' conclusions

Physical rehabilitation, comprising a selection of components from different approaches, is effective for recovery of function and mobility after stroke. Evidence related to dose of physical therapy is limited by substantial heterogeneity and does not support robust conclusions. No one approach to physical rehabilitation is any more (or less) effective in promoting recovery of function and mobility after stroke. Therefore, evidence indicates that physical rehabilitation should not be limited to compartmentalised, named approaches, but rather should comprise clearly defined, well-described, evidenced-based physical treatments, regardless of historical or philosophical origin.

PLAIN LANGUAGE SUMMARY

Physical rehabilitation approaches for recovery of function, balance and walking after stroke

Question

We wanted to know whether physical rehabilitation approaches are effective in recovery of function and mobility in people with stroke, and if any one physical rehabilitation approach is more effective than any other approach.

Background

Stroke can cause paralysis of some parts of the body and other difficulties with various physical functions. Physical rehabilitation is an important part of rehabilitation for people who have had a stroke. Over the years, various approaches to physical rehabilitation

have been developed, according to different ideas about how people recover after a stroke. Often physiotherapists will follow one particular approach, to the exclusion of others, but this practice is generally based on personal preference rather than scientific rationale. Considerable debate continues among physiotherapists about the relative benefits of different approaches; therefore it is important to bring together the research evidence and highlight what best practice ought to be in selecting these different approaches.

Study characteristics

We identified 96 studies, up to December 2012, for inclusion in the review. These studies, involving 10,401 stroke survivors, investigated physical rehabilitation approaches aimed at promoting recovery of function or mobility in adult participants with a clinical diagnosis of stroke compared with no treatment, usual care or attention control or in comparisons of different physical rehabilitation approaches. The average number of participants in each study was 105: most studies (93%) included fewer than 200 participants, one study had more than 1000 participants, six had between 250 and 100 participants and 10 had 20 or fewer participants. Outcomes included measures of independence in activities of daily living (ADL), motor function (functional movement), balance, walking speed and length of stay. More than half of the studies (50/96) were carried out in China. These studies showed many differences in relation to the type of stroke and how severe it was, as well as differences in treatment, which varied according to both treatment type and duration.

Key results

This review brings together evidence confirming that physical rehabilitation (often delivered by a physiotherapist, physical therapist or rehabilitation therapist) can improve function, balance and walking after stroke. It appears to be most beneficial when the therapist selects a mixture of different treatments for an individual patient from a wide range of available treatments.

We were able to combine the results from 27 studies (3243 stroke survivors) that compared physical rehabilitation versus no treatment. Twenty-five of these 27 studies were carried out in China. Results showed that physical rehabilitation improves functional recovery, and that this improvement may last long-term. When we looked at studies that compared additional physical rehabilitation versus usual care or a control intervention, we found evidence to show that the additional physical treatment improved motor function (12 studies, 887 stroke survivors), standing balance (five studies, 246 stroke survivors) and walking speed (14 studies, 1126 stroke survivors). Very limited evidence suggests that, for comparisons of physical rehabilitation versus no treatment and versus usual care, treatment that appeared to be effective was given between 30 and 60 minutes per day, five to seven days per week, but further research is needed to confirm this. We also found evidence of greater benefit associated with a shorter time since stroke, but again further research is needed to confirm this.

We found evidence showing that no one physical rehabilitation approach was more effective than any other approach. This finding means that physiotherapists should choose each individual patient's treatment according to the evidence available for that specific treatment, and should not limit their practice to a single 'named' approach.

Quality of the evidence

It was difficult for us to judge the quality of evidence because we found poor, incomplete or brief reporting of information. We determined that less than 50% of the studies were of good quality, and for most studies, the quality of the evidence was unclear from the information provided.