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Accepted: 8 August 2007

Occupational therapy for patients with problems in personal activities of daily living after stroke: systematic review of randomised trials

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BMJ 2007;335:922-5
doi:10.1136/bmj.39343.466863.55

This article is an abridged version of a paper that was posted on bmj.com on 27 September 2007. Cite this version as: *BMJ* 27 September 2007, doi:10.1136/bmj.39343.466863.55 (abridged text, in print: *BMJ* 2007;335:922-5).

ABSTRACT

Objective To determine whether occupational therapy focused specifically on personal activities of daily living improves recovery for patients after stroke.

Design Systematic review and meta-analysis.

Data sources The Cochrane stroke group trials register, the Cochrane central register of controlled trials, Medline, Embase, CINAHL, PsycLIT, AMED, Wilson Social Sciences Abstracts, Science Citation Index, Social Science Citation, Arts and Humanities Citation Index, Dissertations Abstracts register, Occupational Therapy Research Index, scanning reference lists, personal communication with authors, and hand searching.

Review methods Trials were included if they evaluated the effect of occupational therapy focused on practice of personal activities of daily living or where performance in such activities was the target of the occupational therapy intervention in a stroke population. Original data were sought from trialists. Two reviewers independently reviewed each trial for methodological quality. Disagreements were resolved by consensus.

Results Nine randomised controlled trials including 1258 participants met the inclusion criteria. Occupational therapy delivered to patients after stroke and targeted towards personal activities of daily living increased performance scores (standardised mean difference 0.18, 95% confidence interval 0.04 to 0.32, $P=0.01$) and reduced the risk of poor outcome (death, deterioration or dependency in personal activities of daily living) (odds ratio 0.67, 95% confidence interval 0.51 to 0.87, $P=0.003$). For every 100 people who received occupational therapy focused on personal activities of daily living, 11 (95% confidence interval 7 to 30) would be spared a poor outcome.

Conclusions Occupational therapy focused on improving personal activities of daily living after stroke can improve performance and reduce the risk of deterioration in these abilities. Focused occupational therapy should be available to everyone who has had a stroke.

INTRODUCTION

Stroke is the second leading cause of death in the world and the leading cause of serious, long term disability in adults; about half of those who survive are dependent on others for assistance with personal activities of daily living six months after the stroke.^{1,2}

Personal activities of daily living are necessary for survival and include "those tasks which all of us undertake every day of our lives in order to maintain our level of care"³ such as feeding, dressing, toileting, grooming, transferring, and mobilising.⁴

We conducted a systematic review to test the hypothesis that occupational therapy aimed at encouraging people to participate in personal activities of daily living after stroke will improve the recovery of ability to perform such activities.

METHODS

Eligibility criteria

We sought any randomised controlled trials that compared an occupational therapy intervention focused on activities of daily living with no routine input as the control intervention. The interventions had to be delivered by, or under the supervision of, a qualified occupational therapist. Our primary outcome of interest was independence in personal activities of daily living at the end of scheduled follow-up. The second primary outcome of interest was the extent to which participants had poor outcome, defined as death or deterioration of ability or dependency in personal activities of daily living. Secondary outcomes were death, institutionalisation, extended personal activities of daily living necessary for maintaining a dwelling in a given socio-cultural setting (for example, preparing own meals, doing light housework, managing own money, shopping for personal items), patients' mood and quality of life, carers' mood and quality of life, and patients' and carers' satisfaction with services.

Search strategy and data extraction

We followed the search strategy developed for the stroke group of the Cochrane collaboration.⁵ Further details

are on bmj.com. Two reviewers independently rated the methodological quality of studies using recognised criteria⁶ and two independent reviewers extracted data using a standard data recording form.

Data analysis

We performed an intention to treat analysis to reduce potential biases (follow-up, publication, and reporting) associated with extracting data from published reports. We obtained original trial data for eight^{w17 w18 w20-w25} of the nine studies. Eight studies used individuals as the unit of randomisation and analysis^{w17-w23 w25}; one study used a randomised cluster trial design where the unit of randomisation was the nursing home.^{w24} The data from the cluster randomised trial were analysed for the number of events (participants worse or dead) at the individual level using data for each participant in each cluster. Further details are on bmj.com.

RESULTS

We included nine studies in the review (see bmj.com) with information on 1258 participants.^{w17-w25} The tables on bmj.com give details of the included and excluded studies.

The mean age of participants in studies ranged from 55 to 87.5 years and the proportion of men ranged from 19% to 66%. Four trials included people with mild to moderate disability^{w17 w18 w23 w25} but one trial recruited more severely dependent participants.^{w24} Most studies had parallel groups with occupational therapy focused on personal activities of daily living compared with usual care or no routine intervention. Two trials compared two alternative interventions (occupational therapy based on leisure activities or personal activities of daily living) against usual care or no routine intervention in three parallel groups. One trial used a crossover design in which participants were given dressing practice followed by the personal activities of daily living intervention of interest, in sequence.^{w21}

Personal activities of daily living

Six studies used the Barthel index⁷ to measure personal activities of daily living,^{w17 w18 w22-w25} one study used the

self care section of the Rivermead personal activities of daily living scale,^{8 w21} and one study used the functional independence measure.^{9 w19} A score for personal activities of daily living was available for 961 (80.6%) participants from eight trials.^{w17-w19 w21-w25} The pooled result for all trials, combined as a standardised mean difference, was 0.18 (95% confidence interval 0.04 to 0.32; $P=0.01$) with no significant heterogeneity ($P=0.33$) (fig 1). Therefore, participants who received occupational therapy after stroke were significantly more independent in personal activities of daily living than those who received no intervention or usual care. The estimated standardised mean difference of 0.18 is equivalent to a one point (5%) difference on the 20 point Barthel index, assuming a population SD of six points.

There was no substantial change in results when we limited sensitivity analyses to the seven trials with clear allocation, randomisation procedures, or blinding^{w17 w18 w20-w25} (standardised mean difference 0.17, 0.02 to 0.33; $P=0.03$). When we restricted analysis to the four trials that performed an intention to treat analysis,^{w18 w22 w24 w25} the effect was reduced and became non-significant (0.12, 0.10 to 0.33; $P=0.28$).

Deterioration in personal activities of daily living

Data on poor outcome (defined as the combined outcome of death or experiencing a deterioration in ability to perform personal activities of daily living) were available for 1065 (90.6%) participants from seven trials^{w17 w18 w20 w22-w25} and showed that the odds of a poor outcome were significantly lower in the participants who received occupational therapy (odds ratio 0.67, 0.51 to 0.87; $P=0.003$) with no significant heterogeneity between studies ($P=0.28$) (fig 2). The overall rate of a poor outcome for controls was 42%, which combined with an odds ratio of 0.67 gives an estimated number needed to treat of 11 (7 to 30).

Re-analysis for the combined outcome death and deterioration in the score for personal activities of daily living included information on 407 (98.5%) participants from four trials^{w17 w18 w20 w24} and produced similar results (odds ratio 0.60, 0.39 to 0.91; $P=0.02$) with no significant heterogeneity. There was no substantial change in

Study	Treatment		Control	
	No	Mean (SD)	No	Mean (SD)
Corr 1995 ^{w17}	46	12.30 (4.74)	39	10.87 (5.72)
Gilbertson 2000 ^{w18}	60	16.17 (3.76)	62	15.45 (4.48)
Chiu 2004 ^{w19}	30	108.90 (11.60)	23	104.90 (12.00)
Walker 1996 ^{w21}	12	10.75 (3.86)	15	10.33 (4.19)
Logan 1997 ^{w22}	45	15.42 (4.64)	38	14.82 (3.97)
Walker 1999 ^{w23}	84	18.44 (2.72)	79	17.35 (3.05)
Sackley 2006 ^{w24}	53	10.21 (5.90)	47	8.09 (4.45)
Parker 2001 ^{w25}	218	15.77 (4.04)	110	16.08 (3.87)

Total (95% CI) 548 413

Test for heterogeneity: $\chi^2=8.08$, $df=7$, $P=0.33$, $I^2=13.3\%$

Test for overall effect: $z=2.45$, $P=0.01$

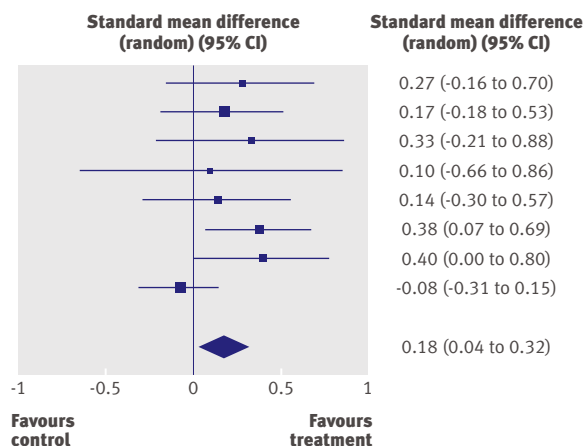


Fig 1 | Effects of occupational therapy on personal activities of daily living

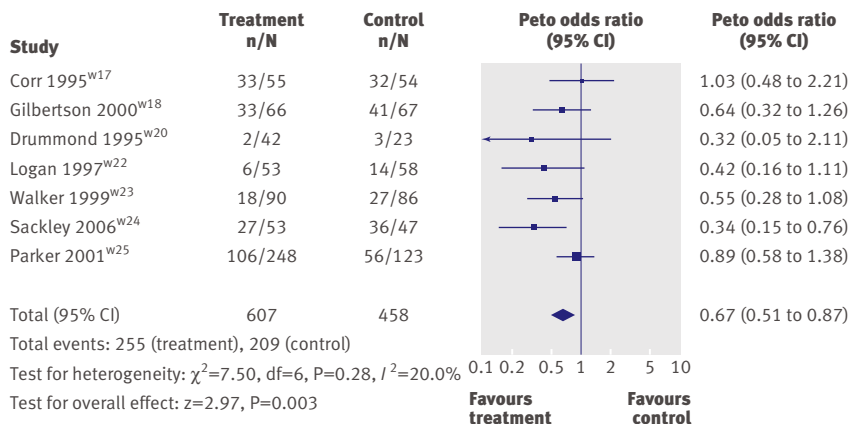


Fig 2 | Effects of occupational therapy on poor outcome

results when we conducted sensitivity analyses excluding trials with clear intention to treat analysis. We found no evidence of publication bias from the rank correlation test for the outcome death or “poor outcome” ($P=0.108$, seven studies) or in the funnel plot.

Secondary outcomes

We had scores on the Nottingham extended activities of daily living scale for 847 (78.8%) participants from six trials.^{w17 w18 w20 w22 w23} Those who received occupational therapy were significantly more independent in instrumental activities of daily living (standardised mean difference 0.21, 0.03 to 0.39; $P=0.02$). There was a non-significant benefit in mood or distress scores for participants and carers. Data on use of institutional care, participants’ and carers’ quality of life, and satisfaction with services were incomplete and available for only a few studies and therefore the results from pooled analysis were inconclusive.

DISCUSSION

Stroke patients who receive occupational therapy focused on personal activities of daily living, as opposed to no routine occupational therapy, are more likely to be independent in those activities.

WHAT IS ALREADY KNOWN ON THIS TOPIC

Reviews of rehabilitation therapies show that they improve personal abilities in activities of daily living in people who have had a stroke, but the individual contribution from occupational therapy is not certain
 Previous reviews of trials of occupational therapy in stroke have not specifically studied such personal ability

WHAT THIS STUDY ADDS

Occupational therapy is an effective intervention to improve personal ability in activities of daily living in patients who have had a stroke
 Around 11 (95% confidence interval 7 to 30) people with stroke would need to be treated to avoid a poor outcome in one person

Limitations of the study

It is difficult to design and conduct high quality clinical trials of rehabilitation. Firstly, the masking of therapies from patient and therapist is difficult, particularly when the person providing the intervention is also the person doing the research, as is the case with many of the studies in this review. Secondly, while usual or standard care is recognised as an appropriate control, this may include interventions that promote activities, which potentially reduces the estimate of the intervention effect.¹⁰ Despite these potential concerns, however, the quality of the included trials was generally good and the results were consistent between trials.

Occupational therapy is a complex intervention. Practice includes skilled observation; the use of standardised and non-standardised assessments of the biological, psychiatric, social, and environmental determinants of health; clarification of the problem; formulation of individualised treatment goals; and the delivery of a set of individualised problem solving interventions. While we are confident that all the interventions in this review were consistent with this broad concept of occupational therapy, we recognise that the exact nature of the interventions in each study differed according to the type of patient, the expertise of the therapist, and the resources available. The interventions tested were probably provided by experts and not particularly constrained by day-to-day service factors. Our review did not compare occupational therapy with alternative rehabilitation interventions, nor did it examine the effect of occupational therapy combined with other interventions.

Comparison with previous studies

Previous reviews that have assessed the role of occupational therapy have either not specifically focused on stroke,¹¹ have concentrated on instrumental activities of daily living in the subgroup of stroke patients living in the community,¹² or included a wide range of studies of varying methodological quality.¹³ Our review adds substantially to the literature by examining the effects of occupational therapy focused personal activities of daily living in stroke patients regardless of treatment setting.

Implications for research

Occupational therapy after stroke “works” in that it improves outcome in terms of ability in personal activities of daily living. The estimate that 11 (7 to 30) patients need to be treated to avoid one patient deteriorating in personal activities of daily living should be regarded as an approximate indicator. Further work is required to define those individuals who are most likely to benefit from occupational therapy, and economic studies are required to examine the cost effectiveness of occupational therapy. We believe that our findings should move the research agenda away from the questions surrounding whether occupational therapy (as a package of interventions) is effective to the identification of which specific interventions are effective for particular patients.

This study was done as a Cochrane systematic review under the auspices of the Cochrane Stroke Group, whose invaluable assistance is gratefully acknowledged.

Contributors: See bmj.com.

Funding: The Big Lottery Fund and Chest Heart and Stroke Scotland funded staff time.

Competing interests: None declared.

Ethical approval: Not required.

Provenance and peer review: Not commissioned; externally peer reviewed.

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Accepted: 30 July 2007

Combined resynchronisation and implantable defibrillator therapy in left ventricular dysfunction: Bayesian network meta-analysis of randomised controlled trials

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BMJ 2007;335:925-8

doi:10.1136/bmj.39343.511389.BE

ABSTRACT

Objective To review the evidence base from randomised controlled trials of combined cardiac resynchronisation therapy and implantable cardioverter defibrillator therapy in left ventricular impairment and symptomatic heart failure.

Design Bayesian network meta-analysis.

Data sources Medline, Embase, and Cochrane databases up to June 2006.

Review methods Two reviewers independently assessed trial eligibility and quality. Included trials compared cardiac resynchronisation therapy, implantable cardioverter defibrillator therapy, combined resynchronisation and defibrillator therapy, and medical therapy alone, in patients with impaired left ventricular systolic function. Bayesian random effects network models were used to examine overall number of deaths.

Results 12 studies including 1636 events in 8307 patients were identified. Combined cardiac resynchronisation and implantable cardioverter defibrillator therapy reduced the number of deaths by one third compared with medical therapy alone (odds ratio 0.57, 95% credible interval 0.40 to 0.80) but did not further improve survival when compared with defibrillator therapy (0.82, 0.57 to 1.18) or resynchronisation therapy (0.85, 0.60 to 1.22) alone.

Conclusion Evidence from randomised controlled trials is insufficient to show the superiority of combined cardiac resynchronisation and implantable cardioverter defibrillator therapy over cardiac resynchronisation therapy alone in patients with left ventricular impairment.

INTRODUCTION

Guidelines¹⁻³ recommend an implantable defibrillator in selected patients with left ventricular dysfunction, and cardiac resynchronisation therapy in selected patients with abnormal ventricular conduction. Many patients may be eligible for both treatments but not necessarily obtain additional benefit over one treatment alone.

We systematically reviewed evidence from randomised controlled trials for combined cardiac resynchronisation and implantable cardioverter defibrillator therapy on survival compared with medical therapy, implantable defibrillator therapy, and resynchronisation therapy in patients with left ventricular impairment, using Bayesian network meta-analysis.

METHODS

Studies were eligible if they were randomised controlled or randomised crossover trials; included patients with impaired left ventricular systolic function; compared cardiac resynchronisation or cardiac resynchronisation and an implantable cardioverter defibrillator device with medical therapy or medical therapy plus an implantable defibrillator, or were primary prevention trials comparing an implantable defibrillator with medical therapy or oral antiarrhythmics; and reported all cause mortality. (See bmj.com for the search strategy.)

Primary outcomes were all cause mortality for combined resynchronisation and implantable defibrillator therapy compared with medical therapy, with resynchronisation therapy, and with implantable defibrillator therapy. We abstracted the total number of events and patients randomised to each treatment arm (intention to

This article is an abridged version of a paper that was published on bmj.com on 11 October 2007. Cite this version as: BMJ 11 October 2007, doi:10.1136/bmj.39343.511389.BE (abridged text, in print: BMJ 2007;335:925-8).