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# **Physiotherapy interventions for people with dementia and a hip fracture – a scoping review of the literature**

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## **KEYWORDS**

Hip fracture, dementia, physiotherapy, scoping review

## **ABSTRACT**

### **Background**

People with dementia are 2.7 times more likely to suffer a hip fracture than those without and their management is estimated to cost £0.92 billion per year. Yet there has been little focus on the effectiveness of interventions for this population.

### **Objective**

The aim of this scoping review was to summarise the current available evidence for physiotherapy interventions for people with dementia who fracture their hip as well as to identify gaps in the literature that may require further research.

### **Data Sources**

A systematic search of the following databases was undertaken - TRIP, CINAHL, Amed, Embase, PEDro, PsycINFO, Cochrane Library, Open Grey, Ethos, ISRCTN, Proquest, PROSPERO and UK Clinical Trials Gateway.

## **Study Selection**

Articles were included if they described an intervention which is considered within the scope of a physiotherapist and targeted those with both a hip fracture and dementia.

## **Synthesis Methods**

A narrative summary was then undertaken to describe the current state of the literature.

## **Results**

Twenty six studies were included, of which thirteen were observational, six RCTs, two qualitative, two surveys and three systematic reviews. Only nine studies focused explicitly on physiotherapy interventions.

## **Conclusion**

The findings of this scoping review suggest there is limited evidence to guide physiotherapists in the management of people with dementia who fracture their hip. No evidence was found about perceptions or experiences of patients in this group or of the physiotherapists involved in their care. Further research is needed to develop and evaluate physiotherapy interventions for people with dementia who fracture their hip.

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## Introduction

Despite reported improvements in surgical technique for the repair of hip fractures (1), the recovery of people who sustain a hip fracture is often complex and involves a challenging interaction of physical, psychological and social factors (2). Long-term functional recovery is frequently considered to be poor (3), and an estimated 27% to 59% of people move into permanent long-term care within the first year after fracture (4, 5).

The management of hip fractures can be more challenging if patients have dementia and it is estimated that people with dementia are 2.7 times more likely to sustain a hip fracture than sex- and age-matched controls without dementia (6). In people with a diagnosed dementia, hip fractures are the third most common cause of admission into an acute setting (7) and lead to high levels of mortality (8) and morbidity (9). It is estimated that, in the UK, 80,000 people will fracture their hip each year (10), costing £2.3 billion (11). Of these, it is suggested that 40% will have coexisting dementia (10), which equates to approximately 32,000 people at a cost of £0.92 billion per year.

It is suggested that people with dementia are frequently excluded from trials (12), with systematic reviews often excluding studies if the participants have any cognitive defects (13). Concerns were recently raised by the British Orthopaedic Association (BOA) in conjunction with the Chartered Society of Physiotherapy (CSP) about poor management of people who fracture their hip (14). This report highlighted, amongst other things, concern about the lack of emphasis placed on immediate post-operative physiotherapy.

National guidance suggests people should be offered a physiotherapy assessment and mobilised on the day after surgery and seen at least daily after this. Although the guidance does not specify that the latter needs to be undertaken by a physiotherapist, regular physiotherapy review is advised (15).

### **Scoping Review**

There is much debate about the aims and objectives of scoping reviews and systematic reviews (16) and about the methodology involved. The suggestion is that scoping reviews seek to explore the quantity and type of evidence in a broad area of the literature whereas systematic reviews aim to synthesize and evaluate the quality of evidence to answer a more specific research question (17) .

This scoping review was guided by the framework developed by Arksey and O'Malley (18) and follows 5 steps:

*i) Identify the Research Question*

*ii) Identify relevant studies*

*iii) Study Selection*

*iv) Chart the data*

*v) Collate, summarise and report the results*

## **Aims and Objective**

The aim of this scoping review was to gain a clear understanding of the current evidence base surrounding physiotherapeutic interventions for people who sustain a hip fracture and also have dementia. A scoping review should be undertaken to determine the value of undertaking a full systematic review (19), and forms part of the complex interventions framework (20).

The research objectives of this review were to:

- 1) Summarize the current evidence base of physiotherapy interventions for people with dementia who fracture their hip;
- 2) Identify gaps in the literature that may require further research.

### ***i) Identifying the Research Question***

To formulate a search strategy for this scoping review, the PICOT(S) method was employed as described by Sackett and colleagues (21).

**P** (Population) – people with any form of dementia who suffer a hip fracture

**I** (Intervention) – a physiotherapy intervention which could be carried out within the standard scope of a physiotherapist (22)

**C** (Comparator) – any comparator; no comparator

**O** (Outcomes) – functional ability, quality of life, participation, experiences,

attitudes towards physiotherapy interventions, any physical or self-reported outcome measures (such as wellbeing or fear of falling)

**T** (Time) – all studies were considered, studies were not limited according to time of follow-up

**S** (Study design) – any study design were considered, excluding papers published only as conference proceedings/abstracts, or where only published in protocol stage

**ii) Identifying relevant studies**

**Search strategy**

In order to ensure a comprehensive search of the literature, the following databases were searched for articles: TRIP database, Cochrane Library (including ALOIS), Embase (via Ovid), Amed, PsycINFO (via Ovid), CINAHL, Medline (via Ovid), and PEDro. The databases were searched from creation until present day (July 2015) to ensure the historical context of the literature was obtained as well as ensuring all up to date articles were found. The search strategy was initially created in Medline and then translated into the other databases (see supplementary file). Following the initial database searches, grey literature searching took place using Open Grey, ProQuest and Ethos. Keywords focused on different types of dementia and terms related to physiotherapy, or aspects of physiotherapy that may be undertaken for this population. Search terms around the types of study or outcomes were not used to prevent limiting the search.

Hand searching was undertaken to ensure a comprehensive search was undertaken.

Backwards citation was undertaken by searching the bibliographies of included studies and forwards citation checking was achieved using the SCOPUS medical database.

### *iii) Study Selection*

After completion of all database searches, the citations were compiled and entered into EndNote X7.1 bibliographic manager, where duplicate citations were removed. The first stage screening was of titles and abstracts (16) and was done independently by two reviewers (AJH and AH). Disputes were discussed and consensus reached between reviewers. Should resolution of disputes not have been achieved, a third expert reviewer (VG) would have been consulted. Full text copies were obtained and then independently screened by the two reviewers, allowing consensus to be reached about the articles to be included in the review. Following retrieval of these articles, hand searching was undertaken to ensure comprehensiveness.

### *iv) Charting the data*

Unlike systematic reviews, whereby a full and comprehensive critical appraisal of the literature is required (23), the purpose of the scoping review is to map the relevant literature (24), so data were collected from the articles as suggested by Arksey and O'Malley (18). A data extraction tool was created to collect data from each study including the included participants, aims of the study, intervention delivered, outcomes



of the study and time points, as well as the study design. The data extraction tool was piloted with five articles of varied methodological approaches in order to ensure it would gather the correct information. Piloting the data extraction form led to some alterations in order to ensure effective data collection, which was then used for the remaining studies (see supplementary file). Data were extracted by one reviewer (AJH) and then checked by a second (VG) to ensure accuracy.

v) **Collating, summarizing and reporting**

Following data extraction, a narrative synthesis (18) was undertaken to describe the articles included in terms of the type of study, the intervention delivered and also the participants included in the study. Overall, this sought to describe the evidence available and identify the gaps in the current literature base.

## **Results**

### ***Types of Study***

Following study selection (additional file 2) twenty six papers were included in the scoping review: three systematic reviews (25-27), six randomised controlled trials (RCTs) (28-33), thirteen observational studies (2, 34-45), two qualitative surveys (46, 47), and two qualitative studies (45,46).

The three included systematic reviews (25-27) all focused on multidisciplinary rehabilitation rather than physiotherapy in isolation. Only one of these (26), made reference to the specific physiotherapy input, with the authors determining that it was difficult to isolate the role of physiotherapy from other interventions. They indicated that there was insufficient evidence to draw conclusions as to the effectiveness of multidisciplinary rehabilitation (26, 48). The majority of studies included in these systematic reviews were observational, with the exception of one, which considered only RCTs for inclusion (48).

Six relevant RCTs were included in this review (28-33), of which only one sought to establish the effectiveness of a physiotherapy intervention (29), instead they focused on physiotherapy within a multidisciplinary team intervention . Similarly of the thirteen observational studies included in this review, approximately half involved cohorts of patients receiving a multi-disciplinary intervention.

Two qualitative interview studies (49, 50), and two studies using qualitative surveys (46, 47), were included. One of these studies (49) used semi-structured interviews with next of kin in order to determine which conditions were deemed necessary to achieve successful outcomes. The same author also used non-structured diaries (50) and semi-structured surveys (46) to determine how the cognitive status of patients affected the experience of the rehabilitation process for next of kin or proxies.

No qualitative studies were found that focused on the experiences of physiotherapy for people with dementia who fracture their hip. Furthermore, no studies were found on the specific experiences of physiotherapists treating this population.

### ***Intervention***

Despite all studies stating they included physiotherapy as part of the intervention, a significant number of the articles failed to describe the physiotherapy input in sufficient detail that it would be reproducible. A further three articles described the intervention as being - “normal physiotherapy” (50), “standard physiotherapy” (36), or physiotherapy that was “left to the discretion of the physiotherapist” (51).

Several studies reported that people should be encouraged to stand on the first post-operative day and then mobilised after this as able (28, 44, 45, 52), however the exact nature of this was not described in any detail.

While many of the studies failed to describe the physiotherapy intervention in any detail those that did described it as having components of strengthening (42, 47, 53), functional exercises (29), range of movement exercises (2, 54), gait re-education (2, 28, 53, 54), balance (43) and transfer practice (42). Other studies state that the physiotherapy intervention was part of the MDT intervention and failed to describe the

physiotherapy in detail (38, 40, 51). Only one of these studies incorporated pre-operative strengthening exercises for the non-fractured limb (45).

Despite lacking detail about the intervention, one study (35), described the novel use of body-weight supported treadmill walking for a single severely demented subject. The use of equipment to aid mobility and balance after hip fracture may be considered an important factor, however only three of the included studies commented on the use of mobility aids (42, 45, 55).

The location of the intervention was described by all studies, with the majority (fifteen) of studies involving physiotherapy being provided on a rehabilitation unit. A further five were undertaken on an acute orthopaedic ward or geriatric wards (28, 30-32, 43). Only one study (33), involved participants in nursing homes, while two RCTs (29, 31), and one qualitative (50), study followed the whole patient journey from acute to community settings.

### ***Participants***

Only two of the RCTs sought specifically to study participants with dementia and hip fracture (32, 33). Similarly, only two of the observational studies included only participants with dementia (44, 51). All of the other studies performed post-hoc analyses or pre-planned subgroup analyses of the participants with dementia. Indeed, a

total of 2915 participants were included in the studies, of whom it was reported only 838 had dementia.

The majority of studies included in this scoping review involved participants with mild to moderate dementia. Two RCT's included participants in this classification, reporting that cognition had no effect of functional gain (34, 56). A further two RCT's (30, 31), included participants with a similar classification of dementia, but sought to determine the effectiveness of interdisciplinary input.

Four observational studies were included in the review which targeted participants with mild to moderate dementia (38, 45, 57, 58), reporting contrasting evidence for the outcomes. All but one of these studies (58), reported positive outcomes for people within this classification. Only two qualitative studies included this severity of dementia and explored the beliefs of carers about the effect of cognition on the rehabilitation process (46, 49).

Less studies involved participants with severe dementia. However, three RCT's were included in the scoping review which did target this population (32, 33, 41). Again, the results are contradictory with no conclusive evidence to support physiotherapy interventions for severely demented subjects. A single patient case study (35), reported positive outcomes in a case study involving an 82 year old lady with severe dementia in

an Italian rehabilitation hospital, using body-weight supported treadmill training as a novel approach to rehabilitation.

Morghen and colleagues (42) were the only authors who sought to compare the outcomes of rehabilitation in terms of the severity of dementia and suggested that people with dementia could make functional improvements.

## **Discussion**

The aims of this scoping review were to determine the current literature regarding physiotherapy for people with dementia who sustain a hip fracture, in order to identify gaps in the evidence. In accordance with the aims of scoping reviews the inclusion and exclusion criteria were deliberately very broad (18). A total of twenty six articles met the inclusion criteria for this review.

This review has demonstrated the lack of research aimed specifically at people with dementia who have a hip fracture, with the majority of studies including subgroups of people with dementia or performing post-hoc analyses of people with dementia. This is supported by a general lack of dementia related research historically in the UK. Research by the Alzheimer's Society found that there were only 125 ongoing clinical trials in the dementia field in 2013, compared to 5,755 for cancer (59).

Few RCTs were found and of these only one focused specifically on a physiotherapy intervention (29). Similarly, the majority of the observational studies included studies with physiotherapy as part of a rehabilitation process. There is contrasting evidence to determine the value of multidisciplinary versus isolated physiotherapy. In musculoskeletal rehabilitation, one study found no difference between the outcomes between the provision of isolated physiotherapy interventions and a multidisciplinary approach (60), however a similar study comparing multidisciplinary rehabilitation for chronic back pain found benefits of a multi-disciplinary approach compared to isolated physiotherapy (61). It could be considered that patients with chronic, long-term conditions may benefit more from the multidisciplinary approach, although no research has compared this in patients with dementia specifically. Although these studies add context to the overall rehabilitation interventions for this population, the importance of physiotherapy being provided in isolation or as part of a multidisciplinary input are not clear and therefore, limit the inferences that can be drawn from this evidence.

Very few of the studies described the physiotherapy intervention in a manner that would be reproducible. Indeed, although all of the studies state they included physiotherapy as part of the intervention, the majority failed to describe the physiotherapy component at all. These authors simply describe the intervention as “physiotherapy” – assuming that this is a treatment in itself rather than an umbrella term for multiple potential treatment techniques. A further three articles described the

intervention as being “normal physiotherapy” (50), “standard physiotherapy” (36), or physiotherapy that was “left to the discretion of the physiotherapist” (51). This “black box” of physiotherapy has been highlighted by several other authors (62, 63) and the importance of determining the contents of unpicking such interventions has been highlighted.

This suggests that there is insufficient evidence to guide physiotherapists about what intervention to deliver, evidence which is supported by the systematic reviews included in this study. One study suggested that people with mild to moderate dementia may show improvement with rehabilitation, but was unable to isolate the role of physiotherapy (25). The further two systematic reviews concluded that there was little evidence to support the physiotherapy interventions for this population (26, 27). It is clear there is little evidence to support the actual interventions but the lack of information about the experiences of those receiving or providing the intervention highlights the need for more high-quality research for this population.

This review also highlights the lack of qualitative research into physiotherapy interventions for this population. However, the importance of understanding the experiences of those delivering the physiotherapy, as well as those receiving it, is suggested to be a vital part of delivering any complex intervention (64). The lack of involvement of people with dementia in research has been highlighted by several authors (65, 66), who suggest that the person with



dementia is frequently regarded as a subject to be studied rather than being encouraged to contribute rich data to describe their experiences.

The strengths of this study could be considered the broad nature of the searches as well as the robust screening and data extraction techniques using two researchers. However, we note that we were interested only in 'standard' techniques that a physiotherapist may use, which excluded us from searching for more general techniques that a physiotherapist could employ – techniques such as 'tai chi' or 'music therapy'. The definition of such standard techniques is difficult to ascertain, however, we suggest that these are techniques that would not require extra training or education in order to provide to patients.

## **Conclusion**

The lack of evidence to support physiotherapy interventions for this population appears to pose a challenge to physiotherapists. The aim of this scoping review was to identify gaps in the literature which may guide a future systematic review. However, the lack of evidence found means that undertaking a systematic review is not appropriate or necessary.

There is currently insufficient evidence to guide the nature of the physiotherapy intervention. There is also limited evidence to describe the experiences of patients, next of kin, or physiotherapists working with this population. The consideration of the attitudes towards an intervention could be considered a vital component of a complex intervention and it is suggested that they should be an integral part of the implementation of that intervention. This advocates high quality research being needed to determine what physiotherapy techniques may be of benefit for this population and to help guide physiotherapists as how to deliver this.

### **Ethical Approval**

Ethical approval was not required for this study.

### **Competing Interests**

The author(s) declare that they have no competing interests.

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**Table 1 – Description of included randomised controlled trials**

| Author(s)                 | Country   | Sample   | Location(s) of intervention     | Intervention  | Control                                   | Follow up     | Outcome Measures   |
|---------------------------|-----------|--|---------------------------------|---|---|---------------|--|
| Huusko, Karppi (28)       | Finland   | 238 (141 with dementia)  | Rehab unit v's orthopaedic ward | Geriatric rehab unit rehabilitation - mobilise on day 1                                     | Normal hospital care                      | 3 & 12 months | Length of stay, mortality, place of residence  |
| Moseley, Sherrington (29) | Australia | 160 (54 $\geq$ 3 on short portable mental score questionnaire) | Rehab unit then community       | Partial body weight supported treadmill, stepping, tapping foot, sit to stand, on/off block | Seated or lying exercises (not described) | 4 & 16 weeks  | Knee extensor strength, walking speed, functional abilities, balance abilities, pain, fear of falling, quality of life, length of stay, residential status and community service utilisation |
| Naglie, Tansey (30)       | Canada    | 279 (74 with dementia)   | Acute hospital                  | Multi-disciplinary team input. 2x daily physiotherapy weekdays                              | Usual care                                | 3 & 6 months  | Mortality and change from baseline mobility and transfers  |
| Shyu, Tsai (31)           | Taiwan    | 160 (51 with dementia)   | In patient and then community   | Multi-disciplinary team approach including physiotherapy                                    | Usual care                                | 2 years       | Hip flexion ratio, recovery of walking ability, activities of daily living, falls, mortality, Emergency Department visits, re-admission and institutionalisation                             |
| Stenvall, Berggren (32)   | Sweden    | 64 (all with dementia)   | Specialist geriatric unit       | Multi-disciplinary team approach, early mobility with physiotherapist                       | Usual care                                | 12 months     | Walking ability, function  |
| Uy, Kurrle (33)           | Australia | 10 (all with dementia)   | Nursing homes                   | Accelerated rehabilitation program  | Early return to nursing home              | 4 months      | Barthel, gait velocity   |

