

A Scoping Review Protocol

Title

Delaying knee flexion following knee arthroplasty surgery: A Scoping Review Protocol

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Abstract

Introduction

The shift in the model of care being delivered for elective knee arthroplasty patients has been towards a shorter length of stay in hospital and more self-guided rehabilitation. Regaining knee flexion in the first few days can be extremely painful and pain can delay discharge as it can make managing at home harder for patients. Therefore, there have been recent studies that have explored whether delaying knee flexion might facilitate earlier discharge without adversely affecting longer-term patient outcomes. There is very little research on this method of rehabilitation and more needs to be understood if it is to be a viable option in the management of patients following knee arthroplasty.

Aims

The aims of this scoping review are to identify current literature surrounding the content, delivery and effectiveness of delaying flexion exercises following knee arthroplasty and to identify research gaps.

Methods and analysis

This scoping review will follow the Joanna Briggs Institute updated methodology including the use of the PRISMA Extension for Scoping Reviews (PRISMA-ScR) reporting guidelines. Allied & Complementary Medicine (AMED), the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, Physiotherapy Evidence Database (Pedro) and the Cochrane Central Register of Controlled Trials (CENTRAL) will be searched. Grey Literature searching and hand searching of article

reference lists will also be employed. Two independent reviewers will screen titles and abstracts followed by a full-text review to assess papers regarding their eligibility. All types of publications that may contain information about the content, delivery and potential effectiveness of the intervention will be included. To give consistency and clarity, the TIDieR (Template for Intervention Description and Replication) and PAGER (Patterns, Advances, Gaps, Evidence for practice, Research recommendations) frameworks will be used to report the findings.

Key Words

Knee, arthroplasty, flexion, rehabilitation, protocol

Introduction

Knee replacement surgery is a common operation carried out for patients with end stage arthritis or other joint damage within the knee (1). It has been proven as an effective treatment option by markedly reducing pain and improving quality of life for most patients (2). Prior to 2020, in the United Kingdom (UK) there were more than 100 000 knee replacements carried out each year, although since the start of the Covid-19 pandemic the numbers of knee replacements in the UK have fallen by 52 % (3). This pattern is also demonstrated by joint registries worldwide (4) (5). The cancellation of planned arthroplasty surgeries has resulted in increased waiting lists. This increased demand places more pressure on the already stretched UK National Health Service (NHS) and so focus must turn to how these services can be delivered in a more efficient way whilst still upholding current standards of care and most importantly patient satisfaction (6). With the advance in multimodal pain relief and early mobilisation, enhanced recovery pathways are becoming increasingly common (7), demonstrating reduced length of stay and cost to healthcare organisations as well as improved patient satisfaction. This has encouraged teams to consider all options when trying to provide better care for patients.

Physiotherapists play an important part within acute hospital settings, selecting treatment regimens and aiding patients to return to normal function following knee replacement. The current UK clinical guidelines (8) are broad with their advice around the implementation of care following arthroplasty, giving a great deal of autonomy on how much and what sort of care is provided (9). Currently interventions focus on range of movement, strength and proprioception. Often getting the knee back to good function leads to a reduction in pain and thus improved patient satisfaction (2). Therefore, as the demand for surgery increases it is vital that postoperative physiotherapy interventions are effective and efficient. Whilst starting basic muscle activation work is essential to

facilitate early function (10), too much early flexion work can lead to increased pain levels, limiting function (11).

The UK National Guideline 157 (8) supports the concept of reducing length of stay and the transfer of care to the patient's home environment as soon as practicably possible. There has been an increasing number of studies published on the day case pathway following arthroplasty and none report negative impact (7). It is also documented that there is no extra benefit to completing rehabilitation in a clinic-based setting face to face, as opposed to in the patients' own home (12). Consideration must therefore be given to how current physiotherapy protocols can be adapted to facilitate rehabilitation at home. Currently, most post-arthroplasty protocols include the commencement of knee flexion on day 1 post surgery. This has historically been the case, as stiffness post knee arthroplasty can be a major complication in care (13). However, beginning early knee flexion can be painful, stretching and moving already inflamed structures. A recent study by Jenkins et al. (11) introducing a day case pathway following unicompartmental knee replacement, allowed patients to go home the same day with a straight knee. This challenged the usual treatment of encouraging flexion as soon as possible following knee replacement; yet was shown to have a positive impact on early discharge, mobilisation and patient satisfaction, documenting no increase in complications or readmissions. Jenkins et al. (14,15) later expanded their work, demonstrating the effectiveness of this approach with total knee replacements as well.

However, to better inform the possible adoption of this physiotherapy management approach, an understanding of the wider evidence relating to delayed flexion following knee replacement is needed.

Aim

The primary aim of this scoping review is therefore to identify current literature surrounding the content, delivery and effectiveness of delayed flexion following knee arthroplasty. It will explore if this may be a viable option in the improvement of pain and mobility, facilitating earlier discharge and aims to identify research gaps.

Objectives

This scoping review aims to assess and understand the amount and scope of research literature in this emerging field, thereby enabling the development of a research agenda, helping to advance the field, and identifying areas of primary research that are required (16).

In line with Arksey and O'Malley's (17) scoping review objectives, updated by Peters et al. (16) the following objectives have been set:

1. To identify current literature surrounding the content, delivery and effectiveness of delayed flexion exercises following knee arthroplasty
2. To describe the interventions using an established framework
3. To identify gaps in this research area to enable the development of a research plan

Methods

Contributions

Authorship contribution to this review will be decided based upon the four criteria recommended by the International Committee of Medical Journal Editors (18), with other individuals receiving acknowledgement. The primary author will be the guarantor and hold responsibility for the original idea. All other sections including design of the protocol, the review, drafting and finalisation will have joint responsibility between the named authors.

Registration

This scoping review protocol will be registered with Figshare (19). Any amendments to the protocol will be clearly documented in the protocol addendum and in the final review report (20). Updates will also be made online at Figshare.

Support

Support for searches has been provided by Librarians from University Hospitals Coventry and Warwickshire NHS Trust (UHCW).

Sources

This review will be conducted as part of an awarded Clinical Academic Internship Programme, funded by the National Institute of Health Research and Health Education England.

Review Method

The review will follow Peters et al. (21) updated guidance which includes methodology from the Joanna Briggs Institute for the conduct of scoping reviews (19), as well as the recent PRISMA Extension for Scoping Reviews (PRISMA-ScR) reporting guideline and checklist (22). Table 1 outlines the stages of the scoping review that will be used. In section 6 of the table, the TIDieR framework (Template for Intervention Description and Replication) will be used to guide the extraction of the

data. Then in section 7 the PAGER (Patterns, Advances, Gaps, Evidence for practice, Research recommendations) approach designed by Bradbury-Jones et al. (23) will be used, aiming to give consistency and clarity in the analysis and reporting of the review findings.

Consultation with research librarians and experts will be conducted throughout the whole process (16). The experts will be a research Professor and experienced clinical colleagues working within this discipline area.

Table 1 – Stages of the scoping review

(19) (23) (24)

Stages	JBI	TIDieR	PAGER
1	Defining and aligning the objective/s and question/s		
2	Developing and aligning the inclusion criteria with the objective/s and question/s		
3	Describing the planned approach to evidence searching, selection, data extraction, and presentation of the evidence.		
4	Searching for the evidence		
5	Selecting the evidence		
6	Extracting the evidence	TIDieR Framework (Template for Intervention Description and Replication)	
7	Analysis of the evidence		PAGER Framework (Patterns, Advances, Gaps, Evidence for practice, Research recommendations)
8	Presentation of the results		
9	Summarizing the evidence in relation to the purpose of the review, making conclusions and noting any implications of the findings		

Information Sources - Databases, hand searching and grey literature

To ensure the most up to date research is found the following databases will be searched: Allied & Complementary Medicine (AMED), the Cumulative Index to Nursing and Allied Health Literature

(CINAHL), EMBASE, Medline, Physiotherapy Evidence Database (PEDro) and the Cochrane Central Register of Controlled Trials (CENTRAL).

Following consultation, it has been decided that grey literature searching will be a secondary search; it will be carried out in Web of Science core collection (25) and DISCOVERY (Chartered Society of Physiotherapy’s own search tool) as due to Librarian experience, this is where grey information on this topic is most often found. If the results do not impact the review, they will be displayed in the appendix.

Hand searching of reference lists and cross referencing will be performed for all relevant articles identified from the search strategy. Search dates will be documented as well as any contact with authors of the chosen studies. Contact may be made with authors if further clarification or information around their intervention is required (24) or if the study is still ongoing (26).

Key Words

An inclusive search strategy will be employed, with a sensitive approach (27)(28), obtaining a high number of articles in the search results but then using the inclusion and exclusion criteria to screen them in or out. Selected key words from the population, concept and context will be combined with Boolean operators and subject headings to provide potential papers (29)(30). Table 2 shows the key words for PCC (Population, Concept and Context) and Table 3 show an example preliminary search in Ovid Medline. The final search strategy for all databases and grey literature will be peer reviewed with librarians before it is run (31).

Table 2 – Key Words

Key words	
Population	Knee arthroplasty / Unicompartmental / knee replacement
Concept	Physiotherapy / Rehabilitation / Physical Therapy / Exercise / Flexion / Range of Movement / Day Case / Enhanced Recovery / Length of Stay
Context	Any setting, therefore, no key words used

Table 3 – Search example in OVID Medline

Searches	Results
18 limit 17 to (english language and yr="2014 -Current")	837
17 15 and 16	1775
16 13 and 14	9587
15 10 or 11 or 12	159460

14	4 or 5 or 6 or 7 or 8 or 9	771891
13	1 or 2 or 3	35573
12	Enhanced Recovery After Surgery/ or enhanced recovery.mp.	61704
11	daycase.mp.	104
10	day case.mp. or "Length of Stay"/	101088
9	range of movement.mp.	2714
8	"Range of Motion, Articular"/ or flexion.mp.	90034
7	exercise*.mp.	382224
6	Physical Therapy Specialty/ or physical therap*.mp.	55454
5	Rehabilitation/ or rehabilita*.mp.	324326
4	physiotherap*.mp.	25282
3	unicompartmental.mp.	2326
2	knee replacement*.mp.	9137
1	Arthroplasty, Replacement, Knee/ or knee arthroplast*.mp.	32778

Eligibility Criteria

The PCC framework has been used to develop the eligibility criteria (19).

Inclusion

In relation to the population, only studies using patients undergoing primary arthroplasty will be used. For the concept, eligibility will include research that demonstrates a rehabilitation strategy that has an intentional lack of specific knee flexion exercises until day 3 post-operatively or later.

This may include the following being clearly reported in the paper:

- specific advice to patients to avoid knee flexion ROM exercises
- specific exclusion of knee flexion ROM exercises described in the rehabilitation protocol, but functional bending would be allowed
- specific splinting/bracing/bandaging to limit knee flexion

The research must also report range of movement as an outcome. From a context view, the research can be conducted in any setting.

All types of quantitative research will be considered for eligibility (16).

Exclusion

Any research using an approach to rehabilitation which specifically encourages knee flexion exercises post-surgery that begin before day 3 post-surgery will be excluded.

Due to this being a fairly new management concept and the date of the first publication found from the initial scoping searches appears in 2019, it has been decided to search up to 5 years prior to this. So, the limit of 2014 to present will be applied. Only publications written in English will be included due to time constraints and translation costs. It is acknowledged that relevant sources could be missed due to these restrictions.

The electronic database searches will be conducted by the primary author and imported into a reference manager to manage the references and remove duplicates prior to identification of appropriate articles (32).

Data Extraction

Two independent reviewers will screen titles and abstracts, followed by a full-text review to assess papers regarding their eligibility. Description of the searches and study selection process will be presented in both a narrative and flow diagram format as indicated in the PRISMA-ScR statement (22).

Details about the interventions within the selected studies utilised in this scoping review will be extracted using the TIDieR framework (24). In addition to the rehabilitation technique regarding the range of movement and its longer-term results, we will also extract data related to any other outcomes, such as patient satisfaction, pain levels, strength, function, quality of life and length of stay. A standardised collection sheet will be developed for use with each reference. This will be developed and piloted with two reviewers before use (33). The main outcome is to ascertain that this treatment approach has equivalence, which can be measured in a variety of ways; however, we will also look to report findings that relate to superiority.

Risk of bias

Consideration on how to assess risk of bias for this study was given as advised by Levac et al. (34) however it was decided that due to all forms of research being included it would not be viable. The decision was also consolidated as the outcomes of the study will not be used to inform clinical practice (21). Risk of bias will therefore be informally considered but not formally assessed.

Strategy for synthesis

Once the key components of the intervention have been extracted, the PAGER framework will be employed to guide the synthesis of the outcomes required. The key reflective questions will be asked at each stage to identify patterns and gaps in the research selected.

Table 4 – PAGER framework (23)

PAGER Framework	Key reflective questions
Patterns	<p>What are the main groupings / themes arising from the analysis?</p> <p>What has not been written about and where are the gaps?</p> <p>What patterns exist within and across the groupings and themes?</p>
Advances	<p>How has new knowledge / findings developed over time?</p> <p>Is there anything new within the most recent findings?</p> <p>What types of insights or advances have been made in this body of work?</p> <p>What needs to be expanded upon?</p>
Gaps	<p>What has been left out of research to date that really needs to be addressed?</p> <p>Are there avenues for further enquiry? If so, how should these areas be prioritised and how might these priorities differ between stakeholders?</p> <p>What has been done extensively, to the extent that we do not need to explore it further?</p> <p>What is my/our team’s methodological and epistemological standpoint and how does this shape our findings and framing of the reviews’ recommendations?</p>
Evidence for research	<p>Who are the key stakeholders in this area who might benefit from the findings?</p> <p>What are the key messages for these stakeholders?</p> <p>What are the implications for my discipline or field of knowledge?</p> <p>What are the most appropriate means for disseminating this evidence?</p>
Research Recommendations	<p>How can the findings of the review inform further research?</p> <p>Where should that research be focused?</p> <p>What are the research questions that have not been answered yet?</p> <p>What does not require further research?</p>

The advances will then be determined in relation to the field and used to inform the research recommendations made. Practical messages will be extracted rather than remaining descriptive (23). However, care must be taken not to expand the findings too far (35) as the objective is not to produce the basis of policy or inform clinical practice.

Discussion

Throughout the development of this protocol, decisions regarding the method have been made to ensure that it is rigorous, transparent and its findings can be used with confidence. Some elements

have been chosen pragmatically due to the lack of funding. This was done with careful consideration, paying attention to the work of Khalil et al. (35) that identified common challenges in producing high quality scoping reviews:

1. Searching – counterbalancing the sensitivity and specificity of the search strategy employed will be difficult. It will be time-consuming to cast a wide search and screen by hand, therefore limits on the grey literature searched had to be included as they are not organised and indexed as academic databases (33). It is acknowledged that there might be a risk that some research may be missed.
2. Use of grey literature – grey literature does not have to be academically sound, and as such caution must be used. The use of the TIDieR framework will help to identify areas of missing information, and these will be highlighted in the final text.
3. Publication lag – there may be a time lag between publication and indexing of grey literature in the databases e.g., CENTRAL, therefore potentially relevant studies that are ongoing might be missed. Searching in clinicaltrials.gov has been identified by the healthcare librarians as being very time consuming therefore a conscious decision has been made not to do this.
4. Consultation – although consultation with a research Professor and experienced clinicians will be made throughout, there is not funding for consultation with key stakeholders such as the public or with information scientists.

Conclusion

If this scoping review shows there is no negative impact on outcomes or complications, it is hoped that the results of this scoping review can facilitate a research agenda. Ultimately, if this approach can be feasibly researched and in turn introduced as a viable method of post arthroplasty management, it could contribute to facilitating earlier discharge home and in turn decrease care costs on stretched healthcare services.

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