

The effectiveness of inpatient physical therapy compared to outpatient physical therapy for older adults after total hip replacement in the post-discharge period: a systematic review protocol

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Review question

What is the effectiveness of inpatient physical therapy compared to outpatient physical therapy for quality of life and gait measures in older adults after total hip replacement in the post-discharge period?

Background

Total hip replacement (THR) is the most effective and safest method for treating severe degenerative, traumatic and other diseases of the hip joint. From 2000 to 2010 the incidence of primary THR in the USA increased from 142.2/100,000 to 257/100,000 in patients aged 45 and over.¹ A similar study in Denmark reported an increased rate of THRs from 101/100,000 to 131/100,000 between 1996 and 2002.² In Australia, an annual increase of 46.3 % was observed from 2003 to 2013.³ More importantly, modeled future projections expect further increase in the need for THRs.⁴

Total hip replacement can reliably relieve pain and improve function in the majority of patients for a period of 15 to 20 years or more postoperatively.⁵ This is valid especially for the elder population but not for younger patients aged below 60 years. The Kaplan-Meier ten-year revision-free survival estimates for younger patients range from 72% (95% CI: 67-76) in Finland to 86% (95% CI: 84.5-88.2) in Sweden.⁶ Hence, 14% to 28% of such patients on average did not achieve a 10-year THR functioning without revision. On this basis, the expected time of service of THRs is insufficient and the number of revision surgeries would therefore increase in the future. To avoid this trend, new technologies were introduced into the practice (e.g. highly cross-linked polyethylene, trabecular metal and new generation of ceramics). Currently, their true contribution to increased survivorship of THR is widely discussed.⁷

However, valid and reliable data with at least 15 years of follow-up for a group of younger patients is still not available.

For the purpose of this review, the reviewers will be focusing on THR only in the context of elderly patients. Particularly, we will aim to compare the effectiveness of inpatient and outpatient physical therapy in achieving and maintaining the long-term outcome of THR.

An understanding of the baseline status of patients undergoing THR surgery is fundamental, especially elderly patients who have to face a continuously growing number of challenges closely related to aging, such as cognitive and sensory impairments, comorbidities that decrease aerobic functional capacity, increased risk for falls, progressively decreased muscle strength and loss of coordination, and psychological and social problems. The next key objective is related to examining the overall physical activities after the THR surgery. Decreased physical activity is one of the most important health problems worldwide, particularly in elder people. Orthopedic surgeons believe that THR surgery leads to an increase in the overall level of physical activity.⁸ However, to date, there is only weak evidence supporting this belief. One of the most recent studies revealed no difference in physical activity six months after the surgery despite the self-reported improvement after THR in terms of pain relief, physical function and quality of life.⁹ The focus of this study was to determine the minimal level of daily exercises and physical activities required for long-term satisfactory function of THR.

Physical therapy follows each THR surgery. Physical therapy protocols after THR in the post-discharge period vary widely in terms of setting (inpatient, outpatient), content (the particular set of exercises recommended), and frequency (e.g. daily versus twice a week). Inpatient physical therapy is provided in a rehabilitation department, hospital unit or in an inpatient rehabilitation center with daily frequency. In the case of inpatient physical therapy, the patient is also accommodated in this setting under guidance of professionals with education in physical therapy. Outpatient physical therapy is provided in rehabilitation day centers or clinics minimally twice a week under guidance of professionals with education in physical therapy. Outpatient physical therapy can be also home-based under the above conditions.¹⁰⁻¹³ However, a couple of important questions remain unanswered. For instance, how long should postoperative physical therapy be provided and should it be repeated in the post-discharge period (and, if yes, when, etc.)? On one hand, there is strong consensus that health professional-supervised functional programs that are provided regularly (starting immediately postoperatively) are more effective than those based on unguided individual exercise platform on “body structure and function” (e.g. pain, joint proprioception, etc.) and “activity and participation” outcomes (e.g. gait, stability, etc.).¹⁴ Overall, there is no one universally accepted physiotherapeutic approach in older adults after THR in the post-discharge period.¹⁵ Finally, it is clear that even intermittent but regular institutional physical therapy for all elderly patients after THR surgery is not affordable, even in the most developed countries.¹⁶

In current literature, there is no high quality evidence from systematic reviews comparing the effectiveness of inpatient and outpatient physical therapy in patients after THR in the post-discharge period. Five systematic reviews dealing with general effectiveness of the physical therapy after THR showed the overall effect of physical therapy after THR.^{15,17-20} However, these systematic reviews included only controlled trials and their results were limited by lack of controlled trials in the literature.^{15,17-20} In 2005, “an evidence-based analysis” comparing inpatient and outpatient physical therapy was done in Canada.¹⁰ However, this study included not only patients after THR but also those

who had undergone total knee replacement. Unfortunately, conclusions of comparison between inpatient and outpatient physical therapy in groups after THR are very unclear.

A search of the JBI Database of Systematic Reviews and Implementation Reports, the Cochrane Library and PROSPERO database for systematic reviews was undertaken but no systematic review relevant to our review question existing or currently underway was found. This systematic review will include not only randomized controlled trials but also lower levels of evidence including non-randomized controlled trials, quasi-experimental studies, before and after studies, prospective and retrospective cohort studies, case control studies and analytical cross sectional studies.

In this review, the effectiveness of inpatient and outpatient physical therapy after THR according to quality of life and gait measures will be assessed. Evaluation of quality of life is included in most of the medical studies which had assessed the effectiveness of the indicated therapy and allowed for both physical and psychical aspects of health to be examined. This systematic review will also focus on the influence of physical therapy after THR on gait performance because gait is the basic function characterizing human locomotion. Biomechanical gait analysis could contribute to complex information about influence of the chosen therapy on the most natural human motion behavior.

Keywords

Hip Replacement; Meta-analysis; Inpatient; Osteoarthritis; Physical Therapy; Quality of life; Outpatient; Systematic review

Inclusion criteria

Types of participants

This review will consider studies that include older adults (over 65 years) who have had total hip replacement and are in the post-discharge period. Adults with bilateral or multiple simultaneous surgeries and also patients who have had hemiarthroplasty of the hip joint will be excluded.

Types of intervention(s)

This review will consider studies that include any type of physical therapy delivered in inpatient settings provided by professionals with education in physical therapy. Studies on inpatient physical therapy delivered at any frequency and over any duration will be included.

Types of comparison(s)

This review will consider studies that include as a comparator any type of physical therapy delivered in outpatient settings provided by professionals with education in physical therapy or no physical therapy.

Types of outcomes

This review will consider studies that include the following primary and secondary outcomes.

Primary outcome includes quality of life, assessed by any validated assessment tool (such as Short Form (36) Health Survey – SF-36, World Health Organization Quality of Life – WHOQOL, Assessment of Quality of Life – AqoL, etc.).

Secondary outcomes include gait measures assessed by any valid methods (such as kinematics analysis, dynamic analysis, electromyography, etc.).

Where possible, outcomes will be reported at the following time points:

- baseline description
- immediately after physical therapy program
- six months and less after total hip replacement
- one year and less after total hip replacement
- more than one year after total hip replacement.

Types of studies

This review will consider both experimental and observational study designs including randomized controlled trials, non-randomized controlled trials, quasi-experimental, before and after studies, prospective and retrospective cohort studies, case control studies and analytical cross sectional studies for inclusion.

Search strategy

The search strategy aims to find both published and unpublished studies. A three-step search strategy will be utilized in this review. This will be followed by an analysis of the title, abstract and index term of each article.

An initial limited search of MEDLINE, Embase and CINAHL will use keywords, such as "hip", "replacement", "arthroplasty", etc.

A second search using all identified keywords and index terms will then be undertaken in the following databases: Medline (Ovid MEDLINE(R) 1946 to current), CINAHL (CINAHL® Plus with Full Text 1935 to current), Embase (1974 to current), Cochrane library, Web of Science, Nursing Ovid and Pedro. The search for unpublished studies will include: grey literature (ClinicalTrials.gov, The Grey Literature Report, Current Controlled Trials, Cos Conference Papers Index), dissertation theses (ProQuest), etc.

Thirdly, the reference list of all identified reports and articles will be searched for additional studies.

Studies published in all languages will be considered for inclusion in this review if they contain an abstract written in English.

Studies published in any date will be considered for inclusion in this review.

Initial keywords to be used will be:

1. hip OR hips
2. arthroplasty OR implantation OR endoprosthesis OR replacement
3. rehabilitation OR kinesiotherapy OR physiotherapy OR physical therapy OR physical training OR physical exercise OR resistance training OR aquatic therapy OR pool exercise OR hydrotherapy OR musculoskeletal manipulation OR exercise therapy OR kinesiology OR manual therapy OR therapeutic exercise
4. inpatient OR outpatient OR home-based OR center-based
5. 1 AND 2 AND 3 AND 4

Assessment of methodological quality

Papers selected for retrieval will be assessed by two independent reviewers (JK and MK) for methodological validity prior to inclusion in the review using standardized critical appraisal instruments from the Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument (JBI-MAStARI) (Appendix I). Any disagreements that arise between the reviewers will be resolved through discussion, or with a third reviewer.

Data extraction

Data will be extracted from papers included in the review using the standardized data extraction tool from JBI-MAStARI (Appendix II) independently by two reviewers. Any disagreements that arise between the reviewers will be resolved through discussion, or with a third reviewer. The data extracted will include specific details about the interventions, populations, study methods and outcomes of significance to the review question and specific objectives. The authors of primary studies will be contacted for missing or unclear data.

Data synthesis

Quantitative data will, where possible, be pooled in statistical meta-analysis using JBI-MAStARI. All results will be subject to double data entry. Effect sizes expressed as odds ratio (for categorical data) and weighted mean differences (for continuous data) and their 95% confidence intervals will be calculated for analysis. Heterogeneity will be assessed statistically using the standard Chi-square. Variations in therapy effect according to our inclusion criteria (intervention differences, study designs, study quality and population differences) will be explored using subgroup analysis. Where statistical pooling is not possible the findings will be presented in narrative form including tables and figures to aid in data presentation where appropriate.

Conflicts of interest

All the reviewers have no potential conflicts of interest to declare.

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Appendix I: Appraisal instruments

MAStARI appraisal instrument

JBI Critical Appraisal Checklist for Randomised Control / Pseudo-randomised Trial

Reviewer Date

Author Year Record Number

	Yes	No	Unclear	Not Applicable
1. Was the assignment to treatment groups truly random?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were participants blinded to treatment allocation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Was allocation to treatment groups concealed from the allocator?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were the outcomes of people who withdrew described and included in the analysis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Were those assessing outcomes blind to the treatment allocation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Were the control and treatment groups comparable at entry?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were groups treated identically other than for the named interventions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were outcomes measured in the same way for all groups?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Were outcomes measured in a reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Was appropriate statistical analysis used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include Exclude Seek further info.

Comments (Including reason for exclusion)

Appendix II: Data extraction instruments

MAStARI data extraction instrument

**JBI Data Extraction Form for
Experimental / Observational Studies**

Reviewer Date

Author Year

Journal Record Number

Study Method

RCT Quasi-RCT Longitudinal

Retrospective Observational Other

Participants

Setting _____

Population _____

Sample size

Group A _____ Group B _____

Interventions

Intervention A _____

Intervention B _____

Authors Conclusions:

Reviewers Conclusions:
