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Intensity of Rehabilitation During the Acute Hospitalization Period After Hip or Knee Arthroplasty: A Rapid Review

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Conflict of Interest Statement

All reports prepared by the Evidence Development and Standards branch at Health Quality Ontario are impartial. There are no competing interests or conflicts of interest to declare.

Rapid Review Methodology

Clinical questions are developed by the Evidence Development and Standards branch at Health Quality Ontario, in consultation with experts, end users, and/or applicants in the topic area. A systematic literature search is then conducted to identify relevant systematic reviews, health technology assessments, and meta-analyses; if none are located, the search is expanded to include randomized controlled trials and guidelines. Systematic reviews are evaluated using a rating scale developed for this purpose. If a systematic review has evaluated the included primary studies using the GRADE Working Group criteria (http://www.gradeworkinggroup.org/index.htm), the results are reported and the rapid review process is complete. If the systematic review has not evaluated the primary studies using GRADE, the primary studies in the systematic review are retrieved and the GRADE criteria are applied to a maximum of 2 outcomes. Because rapid reviews are completed in very short time frames, other publication types are not included. All rapid reviews are developed and finalized in consultation with experts.

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Health Quality Ontario is an arms-length agency of the Ontario government. It is a partner and leader in transforming Ontario's health care system so that it can deliver a better experience of care, better outcomes for Ontarians, and better value for money.

Health Quality Ontario strives to promote health care that is supported by the best available scientific evidence. The Evidence Development and Standards branch works with expert advisory panels, clinical experts, scientific collaborators, and field evaluation partners to conduct evidence-based reviews that evaluate the effectiveness and cost-effectiveness of health interventions in Ontario.

Based on the evidence provided by Evidence Development and Standards and its partners, the Ontario Health Technology Advisory Committee—a standing advisory subcommittee of the Health Quality Ontario Board—makes recommendations about the uptake, diffusion, distribution, or removal of health interventions to Ontario's Ministry of Health and Long-Term Care, clinicians, health system leaders, and policy-makers.

Health Quality Ontario's research is published as part of the *Ontario Health Technology Assessment Series*, which is indexed in MEDLINE/PubMed, Excerpta Medica/Embase, and the Centre for Reviews and Dissemination database. Corresponding Ontario Health Technology Advisory Committee recommendations and other associated reports are also published on the Health Quality Ontario website. Visit http://www.hqontario.ca for more information.

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In addition, Evidence Development and Standards collects and analyzes information about how a health intervention fits within current practice and existing treatment alternatives. Details about the diffusion of the intervention into current health care practices in Ontario add an important dimension to the review. Information concerning the health benefits, economic and human resources, and ethical, regulatory, social, and legal issues relating to the intervention may be included to assist in making timely and relevant decisions to optimize patient outcomes.

Disclaimer

This report was prepared by Health Quality Ontario or one of its research partners for the Ontario Health Technology Advisory Committee and was developed from analysis, interpretation, and comparison of scientific research. It also incorporates, when available, Ontario data and information provided by experts and applicants to Health Quality Ontario. It is possible that relevant scientific findings may have been reported since the completion of the review. This report is current to the date of the literature review specified in the methods section, if available. This analysis may be superseded by an updated publication on the same topic. Please check the Health Quality Ontario website for a list of all publications: http://www.hqontario.ca/evidence/publications-and-ohtac-recommendations.

Table of Contents

List of Abbreviations

AMSTAR	Assessment of Multiple Systematic Reviews
GRADE	Grading of Recommendations Assessment, Development, and Evaluation
ILOA	Iowa Level of Assistance scale
PT	Physiotherapy
RCT	Randomized controlled trial
SD	Standard deviation
TKA	Total knee arthroplasty
THA	Total hip arthroplasty

Background

As legislated in Ontario's *Excellent Care for All Act*, Health Quality Ontario's mandate includes the provision of objective, evidence-informed advice about health care funding mechanisms, incentives, and opportunities to improve quality and efficiency in the health care system. As part of its Quality-Based Funding (QBF) initiative, Health Quality Ontario works with multidisciplinary expert panels (composed of leading clinicians, scientists, and administrators) to develop evidence-based practice recommendations and define episodes of care for selected disease areas or procedures. Health Quality Ontario's recommendations are intended to inform the Ministry of Health and Long-Term Care's Health System Funding Strategy.

For more information on Health Quality Ontario's Quality-Based Funding initiative, visit www.hqontario.ca.

Objective of Analysis

The objective of this analysis was to assess the effectiveness of increased intensity of rehabilitation during the acute hospitalization period after primary hip arthroplasty and knee arthroplasty.

Clinical Need and Target Population

Rehabilitation during the immediate postoperative hip or knee arthroplasty period has been recommended to help restore patient mobility, flexibility, and strength and reduce pain prior to discharge. (1-3) Rehabilitation during this period often includes mobilization and weight-bearing activities, which can be delivered by various care providers including physiotherapists (PTs) or occupational therapists. (1-3)

The appropriate intensity of rehabilitation required after hip and knee arthroplasty during the acute hospitalization period remains unclear. For the purpose of this review, rehabilitation intensity was defined as different doses of the same rehabilitation therapy, namely different amounts of time spent in therapy measured either by different lengths of sessions, different number of sessions, or different duration of the overall intervention.

Rapid Review

Research Questions

- What is the effectiveness of higher intensity of rehabilitation compared with lower intensity rehabilitation during the acute hospitalization period after primary hip arthroplasty?
- What is the effectiveness of higher intensity of rehabilitation compared with lower intensity rehabilitation during the acute hospitalization period after primary knee arthroplasty?

Research Methods

Literature Search

Search Strategy

A literature search was performed on May 14, 2013, using OVID MEDLINE, OVID MEDLINE In-Process and Other Non-Indexed Citations, OVID Embase, EBSCO Cumulative Index to Nursing & Allied Health Literature (CINAHL), and EBM Reviews for studies published from January 1, 2008, until May 13, 2013. (Appendix 1 provides details of the search strategies.) Abstracts were reviewed by a single reviewer and, for those studies meeting the eligibility criteria, full-text articles were obtained. Reference lists were also examined for any additional relevant studies not identified through the search.

Inclusion Criteria

- English language full-text publications
- published between January 1, 2008, and May 13, 2013
- systematic reviews and meta-analyses (if no systematic reviews were identified, randomized controlled trials [RCTs] were included)
- adult primary hip arthroplasty (research question 1) or knee arthroplasty (research question 2) populations
- studies comparing 2 or more doses of intensity (as defined above) of the same type of rehabilitation during the acute postoperative period

Exclusion Criteria

- studies where outcomes of interest cannot be abstracted
- studies that compared 1 dose of therapy with no treatment
- studies that compared 1 dose of therapy with different types of treatment (e.g., weight-bearing exercises versus non-weight-bearing exercises)
- studies that did not describe the control or usual care group intensity

Outcomes of Interest

A maximum of 2 outcomes were assessed, according to the following hierarchical order, as available:

1. Range of motion
2. Functional status
3. Pain
4. Length of stay

Expert Panel

In April 2013, an Expert Advisory Panel on Episodes of Care for Hip and Knee Arthroplasty was struck. Members of the panel included physicians, personnel from the Ministry of Health and Long-Term Care, and representation from community laboratories.

The role of the Expert Advisory Panel on Episodes of Care for Hip and Knee Arthroplasty was to contextualize the evidence produced by Health Quality Ontario and provide advice on the appropriate clinical pathway for a hip and knee arthroplasty in the Ontario health care setting. However, the statements, conclusions, and views expressed in this report do not necessarily represent the views of Expert Advisory Panel members.

Quality of Evidence

The Assessment of Multiple Systematic Reviews (AMSTAR) measurement tool is used to assess the methodological quality of systematic reviews. (4)

The quality of the body of evidence for each outcome was examined according to the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) Working Group criteria. (5) The overall quality was determined to be very low, low, moderate, or high using a step-wise, structural methodology.

Study design was the first consideration; the starting assumption was that RCTs are high quality, whereas observational studies are low quality. Five additional factors—risk of bias, inconsistency, indirectness, imprecision, and publication bias—were then taken into account. Limitations in these areas resulted in downgrading the quality of evidence. Finally, 3 main factors that may raise the quality of evidence were considered: large magnitude of effect, dose response gradient, and accounting for all residual confounding factors. (5) For more detailed information, please refer to the latest series of GRADE articles. (5)

As stated by the GRADE Working Group, the final quality score can be interpreted using the following definitions:

High	High confidence in the effect estimate—the true effect lies close to the estimate of the effect
Moderate	Moderate confidence in the effect estimate—the true effect is likely to be close to the estimate of the effect, but may be substantially different
Low	Low confidence in the effect estimate—the true effect may be substantially different from the estimate of the effect
Very Low	Very low confidence in the effect estimate—the true effect is likely to be substantially different from the estimate of effect

Results of Rapid Review

The database search yielded 1,130 citations published between January 1, 2008, and May 13, 2013 (with duplicates removed). Articles were excluded based on information in the title and abstract. The full texts of potentially relevant articles were obtained for further assessment.

Results for Primary Hip Arthroplasty Population (Research Question 1)

The literature search did not identify any systematic reviews or meta-analyses that met the inclusion criteria; as a result, RCTs were included in the search. A single RCT that evaluated the impact of increased intensity of acute care physiotherapy (PT) for patients undergoing total hip arthroplasty (THA) was identified. The reference list of the included study was hand searched to identify any additional potentially relevant studies, but none were identified. A summary of the identified RCT is shown in Table 1.

Table 1: Summary of Randomized Controlled Trial Evaluating Increased Intensity Physiotherapy Rehabilitation During the Acute Hospitalization Period for Total Hip Arthroplasty Patients

Author, Year	Sample Size (Intervention/ Control)	Start Day of Rehabilitation	Intervention (Higher Intensity)	Comparator (Lower Intensity)	Total Extra Minutes of Rehabilitation
Stockton & Mengersen, 2009 (6)	30/27	First day after surgery	2 PT sessions per day	1 PT session per day	Not provided

Abbreviations: PT, physiotherapy.

The RCT evaluated 2 outcomes of interest, functional status and hospital length of stay.

Functional Status

Functional status was assessed by Stockton and Mengersen (6) using the Iowa Level of Assistance Scale (ILOA). The scale ranges from a score of 0 (no assistive device and completely independent) to 50 (using a walking frame but unable to attempt test for safety reasons). (6) A difference of 7 in the scores was considered clinically significant. A summary of the results is shown in Table 2.

Table 2: Functional Status Measured Using Iowa Level of Assistance for Higher Intensity Rehabilitation Compared With Lower Intensity Rehabilitation for Total Hip Arthroplasty

Author, Year	Day of Follow-up	Intervention Mean ILOA (SD)	Control Mean ILOA (SD)	Statistical Significance (*P*)
Stockton & Mengersen, 2009 (6)	3	28.5 (7.6)	32.2 (6.9)	0.041
	6	18.2 (7.7)	20.6 (7.1)	0.129

Abbreviations: ILOA, Iowa Level of Assistance scale; SD, standard deviation.

Overall, there was a statistically significant improvement in ILOA scores at day 3; however, the authors considered this clinically nonsignificant. There was no significant difference in scores at day 6. The GRADE of quality for this body of evidence was assessed as moderate (see Appendix 2, Tables A2 and A4).

Length of Stay

There was no significant difference in mean hospital length of stay between patients receiving twice-a-day PT compared with those receiving once-a-day PT during the immediate acute care phase after THA (Table 3). The GRADE for this body of evidence was assessed as very low (see Appendix 2, Tables A2 and A4).

Table 3: Length of Hospital Stay for Higher Intensity Rehabilitation Compared With Lower Intensity Rehabilitation for Total Hip Arthroplasty

Author, Year	Higher Intensity PT Mean LOS (SD)	Lower Intensity PT Mean LOS (SD)	Statistical Significance (*P*)
Stockton & Mengersen, 2009 (6)	8 (3.3)	8.2 (2.6)	0.851

Abbreviations: LOS, length of hospital stay; PT, physiotherapy; RCT, SD, standard deviation; THA, total hip arthroplasty.

Results for Primary Knee Arthroplasty Population (Research Question 2)

The literature search identified 1 systematic review that evaluated the impact of increased frequency of PT visits on acute care length of stay in patients with total knee arthroplasty (TKA). The reference lists of the included studies and health technology assessment websites were hand searched, and no additional citations were identified. Table 4 provides a summary of the systematic review.

Table 4: Summary of Systematic Review Evaluating Higher Intensity Rehabilitation Compared With Lower Intensity Rehabilitation for Total Knee Arthroplasty

Author, Year	Search Dates	Population Evaluated	Intervention/Comparator Evaluated	Number of Relevant Studies	AMSTAR Score[a]
Kolber et al, 2013 (7)	Unclear; most recent study published in 2011	TKA	1) Twice-daily PT/once-daily PT 2) Weekend visits/Monday through Friday visits	1 RCT	4

Abbreviations: AMSTAR, Assessment of Multiple Systematic Reviews; PT, physiotherapy; RCT, randomized controlled trial; TKA, total knee arthroplasty.

[a] Out of a possible 11, with higher scores representing higher methodological quality; details of scores shown in Appendix 2, Table A1.

Of the 4 studies identified by Kolber et al, (7) only 1 RCT (8) met the inclusion criteria of this rapid review; the remaining studies assessed the impact of weekend visits on hospital length of stay. Given the limited methodological quality of the systematic review (AMSTAR score of 4 out of 11) and no quantitative data provided for the outcome of interest, the individual RCT by Lenssen et al (8) which met the inclusion criteria for the present rapid review, was extracted and assessed.

In their RCT, Lenssen et al (8) evaluated the effectiveness of increased number of PT sessions immediately after surgery for patients undergoing TKA. The intervention consisted of PT twice a day, with patients in the control arm receiving PT once a day. The intervention group received an additional 20 minutes of PT per day. However, how soon after surgery the rehabilitation was started was not mentioned. Because Kolber et al (7) assessed only length of hospital stay as an outcome in their systematic review, only data on this outcome was further extracted from the RCT by Lenssen et al. (8)

Length of Stay

The RCT by Lenssen et al (8) found no significant differences in hospital length of stay for individuals receiving higher intensity acute care PT compared with those receiving lower intensity acute care PT ($P = 0.34$) (Table 5). The GRADE for this body of evidence was assessed as very low.

Table 5. Length of Hospital Stay for Higher Intensity Rehabilitation Compared With Lower Intensity Rehabilitation for Total Knee Arthroplasty

Author, Year	Sample Size (Intervention/ Control)	Higher Intensity PT Mean LOS (SD)	Lower Intensity PT Mean LOS (SD)	Mean Difference in LOS (95% CI)
Lenssen et al, 2006 (8)	21/22	4.1 (0.9)	4.5 (1.3)	0.4 (−0.3, 1.0)

Abbreviations: CI, confidence interval; LOS, length of stay; PT, physiotherapy; SD, standard deviation.

Conclusions

Research Question 1: Intensity of rehabilitation during the acute care stay after primary hip arthroplasty

In total hip arthroplasty (THA) patients receiving higher intensity physiotherapy (PT) rehabilitation compared with lower intensity PT rehabilitation during the immediate acute care hospitalization period, there was

- A statistically, but not clinically, significant difference in functional status measured using the Iowa Level of Assistance score at 3 days after surgery, and no significant difference 6 days after surgery based on ***moderate*** quality of evidence
- No significant difference in acute care hospital length of stay based on ***very low*** quality of evidence

Research Question 2: Intensity of rehabilitation during the acute care stay after primary knee arthroplasty

Among total knee arthroplasty (TKA) patients receiving higher intensity PT rehabilitation compared with lower intensity PT rehabilitation during the immediate acute care hospitalization period, there was no significant difference in hospital length of stay based on ***very low*** quality of evidence.

Acknowledgements

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Expert Panel for Health Quality Ontario: Episode of Care for Primary Hip/Knee Replacement

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Panel Chair		
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Charissa Levy	GTA Rehab Network	Executive Director
Jane DeLacy	William Osler Health System	Executive Director Clinical Services
Kathy Sabo	University Health Network Toronto Western Hospital	Senior Vice President Executive Head

Appendices

Appendix 1: Literature Search Strategies

Database: Embase <1980 to 2013 Week 19>, Ovid MEDLINE(R) <1946 to May Week 1 2013>, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations <May 13, 2013>

1	exp Arthroplasty, Replacement, Hip/ use mesz or Arthroplasty, Replacement/ use mesz	19032
2	exp hip arthroplasty/ use emez or exp Hip Prosthesis/	54693
3	((hip* adj2 (replacement* or arthroplast*)) or ((femoral head* or hip*) adj2 prosthes?s) or THR).mp.	111779
4	exp Arthroplasty, Replacement, Knee/ use mesz or Arthroplasty, Replacement/ use mesz	14984
5	exp knee arthroplasty/ use emez or exp Knee Prosthesis/	32711
6	((knee* adj2 (replacement* or arthroplast*)) or (knee* adj2 prosthes?s) or TKR).mp.	47964
7	or/1-6	153390
8	exp Rehabilitation/	340985
9	Rehabilitation Nursing/	1983
10	exp Rehabilitation Centers/ use mesz	11617
11	exp rehabilitation center/ use emez	8392
12	exp "Physical and Rehabilitation Medicine"/ use mesz	19217
13	exp rehabilitation medicine/ use emez	4567
14	exp rehabilitation research/ use emez	290
15	exp rehabilitation care/ use emez	7709
16	exp Physical Therapy Modalities/ use mesz	117183
17	exp physical medicine/ use emez	370105
18	exp mobilization/ use emez	15955
19	rehabilitation.fs.	156351
20	(rehabilitat* or habilitat* or movement therap* or physiotherap* or physical therap* or exercis* or occupational therap* mobili?ation or strength train*).ti,ab.	669487
21	or/8-20	1386372
22	(Meta Analysis or Controlled Clinical Trial or Randomized Controlled Trial).pt.	472961
23	Meta-Analysis/ use mesz or exp Technology Assessment, Biomedical/ use mesz	49071
24	Meta Analysis/ use emez or Biomedical Technology Assessment/ use emez	82162
25	(meta analy* or metaanaly* or pooled analysis or (systematic* adj2 review*) or published studies or published literature or medline or embase or data synthesis or data extraction or cochrane or ((health technolog* or biomedical technolog*) adj2 assess*)).ti,ab.	320557
26	exp Random Allocation/ use mesz or exp Double-Blind Method/ use mesz or exp Control Groups/ use mesz or exp Placebos/ use mesz	209244
27	Randomized Controlled Trial/ use emez or exp Randomization/ use emez or exp RANDOM SAMPLE/ use emez or Double Blind Procedure/ use emez or exp Triple Blind Procedure/ use emez or exp Control Group/ use emez or exp PLACEBO/ use emez	613192

28	(random* or RCT or placebo* or sham* or (control* adj2 clinical trial*)).ti,ab.	1714134
29	exp Standard of Care/ use mesz or exp Guideline/ use mesz or exp Guidelines as Topic/ use mesz	128854
30	exp Practice Guideline/ use emez or exp Professional Standard/ use emez	545615
31	(guideline* or guidance or consensus statement* or standard or standards).ti.	227599
32	or/22-31	3111562
33	7 and 21 and 32	2422
34	limit 33 to english language	2209
35	limit 34 to yr="2008 -Current"	1202
36	remove duplicates from 35	910

CINAHL

#	Query	Results
S22	S18 AND S21	334
S21	S19 OR S20	Display
S20	((health technology N2 assess*) or meta analy* or metaanaly* or pooled analysis or (systematic* N2 review*) or published studies or medline or embase or data synthesis or data extraction or cochrane or random* or sham*or rct* or (control* N2 clinical trial*) or guideline* or guidance or consensus statement* or standard or standards or placebo*)	Display
S19	(MH "Random Assignment") or (MH "Random Sample+") or (MH "Meta Analysis") or (MH "Systematic Review") or (MH "Double-Blind Studies") or (MH "Single-Blind Studies") or (MH "Triple-Blind Studies") or (MH "Placebos") or (MH "Control (Research)") or (MH "Practice Guidelines") or (MH "Randomized Controlled Trials")	Display
S18	S17 Limiters - Published Date from: 20080101-20131231; English Language	1,269
S17	S8 AND S16	2,333
S16	S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15	294,356
S15	(rehabilitat* or habilitat* or movement therap* or physiotherap* or physical therap* or exercis* or occupational therap* or mobilization or mobilisation or strength train*)	235,934
S14	(MH "Arthroplasty, Replacement+/RH")	1,060
S13	(MH "Arthroplasty, Replacement, Hip/RH")	490
S12	(MH "Arthroplasty, Replacement, Knee+/RH")	610
S11	(MH "Arthroplasty, Replacement"/RH)	0
S10	(MH "Rehabilitation Nursing")	2,123
S9	(MH "Rehabilitation+") OR (MH "Rehabilitation Centers+") OR (MH "Rehabilitation Patients")	166,929
S8	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7	17,339
S7	thr or tkr	906
S6	knee* N2 (replacement* or arthroplast* or prosthes*)	7,671
S5	(MH "Arthroplasty, Replacement, Knee+")	6,554
S4	(femoral head* or hip*) N2 prosthes*	353
S3	hip* N2 (replacement* or arthroplast*)	9,206
S2	(MH "Arthroplasty, Replacement, Hip")	7,932
S1	(MH "Arthroplasty, Replacement")	2,180

ALL EBM Reviews

EBM Reviews - Cochrane Database of Systematic Reviews 2005 to March 2013, EBM Reviews - ACP Journal Club 1991 to April 2013, EBM Reviews - Database of Abstracts of Reviews of Effects 2nd Quarter 2013, EBM Reviews - Cochrane Central Register of Controlled Trials March 2013, EBM Reviews - Cochrane Methodology Register 3rd Quarter 2012, BM Reviews - Health Technology Assessment 2nd Quarter 2013, EBM Reviews - NHS Economic Evaluation Database 2nd Quarter 2013

#	Searches	Results
1	exp Arthroplasty, Replacement, Hip/ or Arthroplasty, Replacement/	1372
2	exp Hip Prosthesis/	932
3	((hip* adj2 (replacement* or arthroplast*)) or ((femoral head* or hip*) adj2 prosthes?s) or THR).mp.	3279
4	exp Arthroplasty, Replacement, Knee/ or Arthroplasty, Replacement/	1292
5	exp Knee Prosthesis/	473
6	((knee* adj2 (replacement* or arthroplast*)) or (knee* adj2 prosthes?s) or TKR).mp.	2439
7	or/1-6	5206
8	exp Rehabilitation/ or exp Rehabilitation Nursing/ or exp Rehabilitation Centers/	11595
9	exp Physical Therapy Modalities/	11502
10	rehabilitation.fs.	427
11	(rehabilitat* or habilitat* or movement therap* or physiotherap* or physical therap* or exercis* or occupational therap* mobili?ation or strength train*).ti,ab.	37415
12	or/8-11	47922
13	7 and 12	586
14	(Meta Analysis or Controlled Clinical Trial or Randomized Controlled Trial).pt.	393714
15	Meta-Analysis/ or exp Technology Assessment, Biomedical/	458
16	(meta analy* or metaanaly* or pooled analysis or (systematic* adj2 review*) or published studies or published literature or medline or embase or data synthesis or data extraction or cochrane or ((health technolog* or biomedical technolog*) adj2 assess*)).ti,ab.	33338
17	exp Random Allocation/ or exp Double-Blind Method/ or exp Control Groups/ or exp Placebos/	121735
18	(random* or RCT or placebo* or sham* or (control* adj2 clinical trial*)).ti,ab.	376203
19	exp Standard of Care/ or exp Guideline/ or exp Guidelines as Topic/	1075
20	(guideline* or guidance or consensus statement* or standard or standards).ti.	6944
21	or/14-20	528911
22	13 and 21	529
23	limit 22 to english language [Limit not valid in CDSR,ACP Journal Club,DARE,CCTR,CLCMR; records were retained]	529
24	limit 23 to yr="2008 -Current" [Limit not valid in DARE; records were retained]	211
25	remove duplicates from 24	210

Appendix 2: Evidence Tables

Table A1: AMSTAR[a] Scores for Systematic Reviews

Author, Year	AMSTAR score[a]	1) Provided Study Design	2) Duplicate Study Selection	3) Broad Literature Search	4) Considered Status of Publication	5) Listed Excluded Studies	6) Provided Characteristics of Studies	7) Assessed Scientific Quality	8) Considered Quality in Report	9) Methods to Combine Appropriate	10) Assessed Publication Bias	11) Stated Conflict of Interest
Kolber et al, 2013 (7)	4	✓		✓				✓				✓

Abbreviations: AMSTAR, Assessment of Multiple Systematic Reviews; CADTH, Canadian Agency for Drugs and Technologies in Health.
[a] Details of AMSTAR method are described in Shea et al.(4)

Table A2: GRADE Evidence Profile for Comparison of Higher Intensity Rehabilitation and Lower Intensity Rehabilitation During the Acute Hospitalization Period After Hip Arthroplasty

Number of Studies (Design)	Risk of Bias	Inconsistency	Indirectness	Imprecision	Publication Bias	Upgrade Considerations	Quality
Functional Status - Iowa Level of Assistance							
1 (RCT) (6)	Serious limitations (−1)[a]	No serious limitations	No serious limitations	No serious limitations	Undetected	None	⊕⊕⊕ Moderate
Length of Stay							
1 (RCT) (6)	Serious limitations (−1)[a]	No serious limitations	Serious limitations (−1)[b]	Serious limitations (−1)[c]	Undetected	None	⊕ Very Low

Abbreviations: RCT, randomized controlled trial.
[a] See Appendix 2, Table A4 for GRADE Risk of Bias table.
[b] The study was conducted in a private hospital setting, and authors reported that patients were often expected to stay a minimum of 7 days. It was unclear how the decision to discharge patients was made. Authors stated those discharged to inpatient rehabilitation were often discharged earlier than those discharged home, and therefore hospital length of stay may not reflect improved outcomes.
[c] Study was not powered to detect a difference in hospital length of stay and does not meet the optimal information size for this outcome.

Table A3: GRADE Evidence Profile for Comparison of Higher Intensity Rehabilitation and Lower Intensity Rehabilitation During the Acute Hospitalization Period After Knee Arthroplasty

Number of Studies (Design)	Risk of Bias	Inconsistency	Indirectness	Imprecision	Publication Bias	Upgrade Considerations	Quality
Length of Stay							
1 (RCT) (8)	Very Serious limitations (−2)[a]	No serious limitations	No serious limitations[b]	Serious limitations[cd]	Undetected	None	⊕ Very Low

Abbreviations: RCT, randomized controlled trial.
[a] See Appendix 2, Table A4 for GRADE Risk of Bias table
[b] Authors stated that discharge was scheduled for day 4 after surgery, but the flexibility for discharge was unclear
[c] All analyses were conducted at the patient level; however, there was no adjustment for clustering effect, and no account for clustering in power calculation
[d] Study was not designed or powered to detect a difference in hospital length of stay

Table A4: Risk of Bias in Randomized Controlled Trials for the Comparison of Higher Intensity Rehabilitation and Lower Intensity Rehabilitation During the Acute Hospitalization Period After Hip Arthroplasty

Author, Year	Allocation Concealment	Blinding	Complete Accounting of Patients and Outcome Events	Selective Reporting Bias	Other Limitations
Hip Arthroplasty					
Stockton & Mengersen, 2009 (6)	No limitations	Serious limitations[a]	No limitations	No limitations	No limitations
Knee Arthroplasty					
Lenssen et al, 2006 (8)	No limitations	Very serious limitations[b]	No limitations	No limitations	No limitations[c]

Abbreviation: RCT, randomized controlled trial.
[a] Morning physiotherapists were blinded to treatment allocation, however blinding was not always successful. Neither afternoon therapists nor patients were blinded. An attempt was made to blind all assessors.
[b] Neither the physiotherapist nor the patients were blinded.
[c] Cluster randomized by week of surgery rather than patient; however, it was not downgraded for sampling bias as intensity assignment was not given until the day of the surgery and patient groups appeared to be balanced at baseline although no statistical analysis provided. The intracluster correlation efficient was small.

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