Best Practices
Across the Continuum of Care
for Total Joint Replacement

July 2005
BEST PRACTICES ACROSS THE CONTINUUM OF CARE FOR TOTAL JOINT REPLACEMENT

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FINAL REPORT

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EXECUTIVE SUMMARY

Introduction

The purpose of this report is to inform a project undertaken by the Greater Toronto Area (GTA) Rehab Network and funded by the Change Foundation. The final product of the project will be a virtual forum whereby patients with total joint replacement, their informal caregivers, orthopaedic surgeons, as well as acute, rehabilitation, and home care organizations, can collaborate, educate, and dialogue. The project has two components. The first is a standardized comprehensive information package on the processes of care across the continuum. The second is the formation of a virtual community, which will allow patients and informal caregivers to exchange experiential knowledge, to have online discussions, and to discuss system issues.

In order to inform the development of a comprehensive information package on total hip and total knee replacement, a three-pronged approach to investigating best practices related to total hip and total knee replacement was conducted. This report describes the three-pronged approach, which included an extensive review of the academic literature, a review of the grey literature of participating hospitals and institutions in the GTA, and a qualitative study asking the question “What do Patients Undergoing Total Hip and Knee Joint Replacement Want to Know?”

Background

Total joint replacement of the hip and knee are widely accepted, efficacious forms of treatment for patients with advanced arthritis of the hip and knee who have unacceptable levels of pain and/or physical function. The primary reason for undergoing total hip or knee joint replacement is for the relief of symptoms associated with arthritis. Arthritis is a leading cause of pain, physical disability, and use of health care services in Canada today. In 2000, arthritis and other rheumatic conditions affected nearly 4 million Canadians, about 1 in 6, aged 15 years and older. It is projected that approximately 6 million Canadians will have arthritis by the year 2026. With the increasing prevalence of arthritis, the need for total joint replacement is also increasing. There is evidence that patients with total joint replacement have better outcomes with timely information and education. Increasing demands are constantly being placed on our health care system, necessitating a best practice approach to care of total joint replacement patients. A best practice approach to care of total joint replacement patients includes information that is based on current, best available evidence.

Key Findings of the Literature Review

An extensive review of the academic literature regarding total joint replacement management across the continuum of care was undertaken. The following key findings emerged from the research:

- There is a documented need for education of patients undergoing total joint replacement through various media.
• Pain management is an important consideration at the various stages of the continuum of care with various options being recommended.
• Various options aimed at blood conservation following total joint replacement are available with insufficient evidence in the literature to recommend one as optimal treatment.
• Three anticoagulants are recommended to prevent venous thromboembolism, but the literature does not support the use of one over the other.
• Use of clinical pathways has been shown to decrease hospital length of stay and reduce costs.
• Rehabilitation has been shown to be an effective component of the management of total joint replacement at various stages of the continuum.
• A standardized approach to determining optimal discharge destinations following acute care for patients with total joint replacement has not been conclusively identified.
• Outcome after total hip and total knee replacement has been shown to be very favorable.
• Both self-report and performance measures that are disease-specific and general health measures are considered important for assessing overall outcome following total joint replacement.

Key Findings from the Grey Literature

In order to ascertain information on current practices in the Greater Toronto Area, two methods were utilized: a focus group methodology with the participating institutions; and a review of the grey literature provided by the participating institutions. Key findings from the grey literature are as follows:
• Written information is the most common type of educational media provided to patients undergoing total joint replacement.
• Most information is provided to patients during the preoperative phase of the continuum of care.
• Variations and inconsistencies in practice exist with respect to provision of grey literature for patients undergoing total hip and total knee replacement, across the continuum of care, in the GTA.
• Content of grey literature includes topics such as ‘what is a joint replacement’, ‘what to expect during hospital stay’, and ‘pain control’. The level of detail related to such topics varies.

Key Findings from the Qualitative Research

The qualitative component of the project investigated the educational needs of adults who undergo total hip and total knee replacement surgery. Using a semi-structured interview methodology, 15 participants, who were either scheduled for a total joint replacement or were three to six months following their total joint replacement, were interviewed. Key findings from this component of the project include:
• Four main categories of information needs emerged from interviews with patients who were either scheduled to undergo a total joint replacement or who had
undergone a total joint replacement in the previous six months. These categories were psychosocial, medical/surgical, episode of care, and physical/functional. Examples of themes included under each of the four categories are psychosocial – information about the team; medical/surgical – information about anaesthesia; episode of care – information about preparing for surgery; and physical/functional – information about therapy and exercises.

- The emergent themes validated the importance of having a comprehensive information package regarding total hip and total knee replacement available for patients, families, and their informal caregivers.
- Several methods of learning about total joint replacement were identified by participants, including the internet.

### Stakeholder/Expert Opinion Sessions

An integrated summary of the findings of the academic literature, grey literature, and qualitative study, including recommendations for an information package for total joint replacement patients was presented to 1) representatives of rehabilitation (physiotherapists, occupational therapists, nurses) from institutions in the GTA; and 2) orthopaedic surgeons and physiatrists as well as representatives from The Arthritis Society and Community Care Access Centres in the GTA. Stakeholders supported the development of a virtual information package for patients with total hip and total knee replacement. Stakeholder suggestions were considered in developing the final recommendations for the information package.

### Conclusions

The results from the research suggest there is a need for a comprehensive information package for patients undergoing total hip and total knee replacement. The academic literature demonstrated the beneficial effect of education of patients regarding total hip and total knee joint replacement on outcomes. The grey literature that was reviewed indicated that education of patients with total hip and total knee replacements occurs but there are inconsistencies with respect to the detail of content and mode of delivery of the information. Emergent themes from the qualitative project illustrated patients’ desires, needs, and expectations for information regarding a multitude of topics relating to total hip and total knee replacement. Based on these findings as well as input from the stakeholders, recommendations on content for a comprehensive information package for patients with total joint replacement are made. Information is categorized according to the following four main categories which represent stages of the continuum of care: Preoperative Visit; Inpatient/Acute Care Stay; Transition Home/Rehabilitation; and Follow-up and Living with Joint Replacement.
CHAPTER 1
INTRODUCTION

1.1 Purpose of this Report

The purpose of this report is to inform a project undertaken by the Greater Toronto Area (GTA) Rehab Network and funded by The Change Foundation. The final product of the project will be a virtual forum whereby patients with total hip and total knee replacement; their informal caregivers; acute, rehabilitation, and home care organizations; as well as orthopaedic surgeons can collaborate, educate, and dialogue. The project has two components. The first is a standardized comprehensive information package on the continuum of care. The second is the formation of a virtual community, which will allow patients and informal caregivers to exchange experiential knowledge, to have on line discussions, and to discuss system issues. The specific objective of this report is to investigate best practices related to total hip and knee joint replacement in order to inform the development of the comprehensive information package on the continuum of care.

1.2 Structure of this Report

In order to inform the development of the final product of this project a three-pronged approach to investigating best practices related to total hip and total knee replacement has been undertaken. This three-pronged approach included an extensive review of the academic literature, a review of the grey literature of participating hospitals and institutions in the GTA, and a qualitative study asking the question “What do Patients Undergoing Total Hip and Knee Joint Replacement Want to Know?” Figure 1 illustrates the conceptual model utilized in this report to investigate best practices related to total hip and total knee replacement.
Chapter 2 of this report includes details regarding the review of the academic literature pertaining to total hip and total knee joint replacement. Information related to the review of the grey literature is outlined in Chapter 3, while Chapter 4 addresses the qualitative study. A summary of key findings related to the academic literature, grey literature, and qualitative study concludes each respective chapter. Upon completion of this three-pronged approach, an integrated summary of the findings along with recommendations for topics to be included in the information package was presented to the following two groups:

1) representatives of rehabilitation from institutions in the GTA; and
2) surgeons and physiatrists in the GTA. Chapter 5 includes details related to these processes that were designed to seek stakeholder and expert opinions. Chapter 6 integrates the findings of the three-pronged approach that was utilized to investigate best practices, with the recommendations from the stakeholder/expert opinion sessions. Based on this integration of findings, conclusions and recommendations are included to inform the final product of the project, a virtual forum. Throughout all chapters of this report, where applicable, differences between total hip and total knee joint replacement are highlighted.

1.3 Background and Rationale

1.3.1 Arthritis

The primary reason for undergoing total hip or knee joint replacement is for the relief of symptoms associated with osteoarthritis, one of the more common forms of arthritis. Arthritis is a leading cause of pain, physical disability, and use of health care services in Canada today.\(^1\) The pain and disability of arthritis affect aspects of life such as travel, social participation, and labour force participation.\(^2\) According to the 2000 Canadian Community Health Survey (CCHS), people with arthritis reported experiencing more pain, long term disability, disrupted sleep, and being more likely to need help with activities of daily living. They also reported poor self-reported health compared to people with other chronic conditions.\(^3\)

In 2000, arthritis and other rheumatic conditions affected nearly four million Canadians, about one in six, aged 15 years and older.\(^1\) The number of Canadians with arthritis is projected to grow with the aging of the ‘baby boomer’ population.\(^1\) It is projected that approximately six million Canadians will have arthritis by the year 2026. This represents an increase of 54% of people living with arthritis.

Arthritis has a significant economic burden on society. In 1998, the total economic burden of arthritis was estimated at $4.4 billion.\(^1\) Most of the costs of arthritis, approximately 78%, are indirect morbidity costs due to short and long-term disability. The implications of the growing burden of arthritis are an increased economic burden placed on the health care system and increased need for health care services for this population.

1.3.2 Total Joint Replacement

Total joint replacements of the hip and knee are widely accepted, efficacious forms of treatment for patients with advanced arthritis of the hip and knee who have unacceptable levels of pain and/or physical function.\(^4\)\(^5\) Over eighty percent of total hip and knee replacements are performed for osteoarthritis.\(^7\) Research has shown that total hip and knee replacements relieve pain and improve physical function as well as demonstrate a beneficial effect on health-related quality of life of people living with arthritis.\(^5\)\(^6\)\(^8\) This includes reported improvements in areas of social function, and improvements in life evaluation, mood, and subjective health. Although most improvements in pain and function occur within the first six months, functional gains have been reported up to two
years following surgery. In fact, total knee replacement has been shown to yield successful outcomes for almost 90% of patients. Total joint replacement has also been shown to be a cost-effective and even cost-saving procedure.

The use of total hip and knee joint replacement in Canada has grown exponentially in past years. In Canada, since 1994, the rate of total hip replacement increased by 10% and the rate of total knee replacement increased by 36%. Most total hip and knee joint replacements are done on adults over the age of 65. Despite the increase in surgeries, there is evidence that there is an unmet need in the population. With the evidence of the projected increase in arthritis in the Canadian population and the current unmet need, the demand for total hip and knee joint replacement is expected to increase in the future.

Care of patients undergoing total hip and knee joint replacement surgery spans the continuum of care including preadmission, surgery, acute care, and rehabilitation in various settings. In order to meet the increasing demand for total hip and knee joint replacement, there is a need for efficient use of scarce healthcare resources across this continuum. An important component of the care of total joint replacement patients includes education regarding total hip and total knee joint replacement. There is variation in the information materials available to patients regarding total hip and knee joint replacement. Patients have identified gaps in information and education as one of their key concerns. Providing information that is tailored to patients’ needs promotes informed decision-making.

Timely information and education have been shown to have positive effects on outcomes and reduce length of stay. Studies have shown that preoperative education reduces anxiety in patients just before surgery. Preoperative education reduces anxiety by providing patients with an understanding of what to expect. Postoperative pain declined more rapidly in a group of patients who received specific educational information preoperatively. Another study compared the effects of preadmission and postadmission educational programs and found that the preadmission group had higher knowledge levels, performed exercise more regularly, and had improved flexion of the knee joint postoperatively.

There is minimal literature that has studied the learning needs of patients who have total hip and knee joint replacement surgery. However, one study collected information from patients following total hip replacement in Finland using the Canadian Patient Learning Needs Scale. Learning needs were shown to decrease after discharge from the hospital. Patients felt that the most important information pertained to complications and symptoms, followed by medications. Another study using survey research asked potential candidates for hip or knee joint replacement surgery to rate the importance of a predetermined list of questions. The results showed that patients had the most questions regarding the effects of surgery on their ability to care for themselves, the need for physical therapy, their mobility after surgery, and when they would walk normally again.

There is research supporting the positive outcomes of educational initiatives with total hip and knee joint replacement surgery. However, there is minimal research that
explores the educational needs of individual patients who have total joint replacement. While the previous studies did address educational needs of individual patients in a quantitative manner, no studies have been found that used a qualitative methodology to ascertain patients’ perspectives on their information needs prior to and following total hip and knee joint replacement surgery. Two studies were found that did highlight the importance of including patients’ preferences into the items included in outcome measures that are utilized for total hip joint replacement patients. These findings support the need to incorporate patients’ perspectives into development of a comprehensive educational information package on the continuum of care.

1.4 Adult Learning

When developing an information package for patients with total hip and total knee joint replacement, principles of adult learning are important to consider. Adult learners are unique and as such each has his or her own learning style, experiences, outside commitments, pressures, goals, pace, and motivations for learning. Adult learners typically come ready to learn what they believe will contribute to an effective performance and higher level of achievement.

Learners differ from one another in their stage and style of learning. Learning style is defined as “the individual’s characteristic ways of processing information, of feeling and behaving in certain situations.” Kolb’s four dimensions of learning include concrete experience (experience-based input); active experimentation (“doing” phase of learning); abstract conceptualization (learning advanced by the generation of analytical and conceptual hypotheses in an attempt to explain the data generated by the learning experience); and reflective observation (gathering all available data generated by an experience). Kolb suggests that learners constantly rotate through the cycle. These theories of learning have implications for health education.

1.5 Best Practice

Sackett et al (1991) define evidence-based medicine as the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. They suggest that the practice of evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research. In addition to the components of an evidence-based approach, the perspectives of clients contribute further to informing the topic of interest. For purposes of this report, a best practice approach has been utilized and incorporates integrating information from patients and/or family members, clinicians’ experiences/expertise, and the best available evidence from the literature.

1.6 Summary

In conclusion, the prevalence of arthritis in the Canadian population is high and expected to increase. With the increasing prevalence of arthritis, the need for total joint replacement is also increasing. There is evidence that total joint replacement patients have better outcomes with timely information and education. Increasing demands are
constantly being placed on our health care system, necessitating a best practice approach
to care of total joint replacement patients. A best practice approach to care of total joint
replacement patients includes information that is based on current, best available
evidence.
CHAPTER 2
LITERATURE REVIEW

Key Findings

- There is a documented need for education of patients undergoing total joint replacement through various media.
- Pain management is an important consideration at the various stages of the continuum of care with various options being recommended.
- Various options aimed at blood loss conservation following total joint replacement are available with insufficient evidence in the literature to recommend one as optimal treatment.
- Three anticoagulants are recommended to prevent venous thromboembolism, but the literature does not support the use of one over the other.
- Use of clinical pathways has been shown to decrease hospital length of stay and reduce costs.
- Rehabilitation has been shown to be an effective component of the management of total joint replacement at various stages of the continuum.
- A standardized approach to determining optimal discharge destinations following acute care for patients with total joint replacement has not been conclusively identified.
- Outcome after total hip and total knee replacement has been shown to be very favorable.
- Both self-report and performance measures that are disease-specific and general health measures are considered important for assessing overall outcome following total joint replacement.

2.1 Literature Search Strategy

Relevant literature was identified from searches of computerized databases using the terms total joint replacement/arthroplasty, total hip replacement/arthroplasty, and total knee replacement/arthroplasty. Searches were restricted to human and English language journals published between the years 1996-2004. Further relevant literature was also retrieved beyond this time period based on the researchers’ awareness of other literature and based on reference lists of literature identified through the formal search.

Databases and web sites used to obtain information on total joint replacement included:
- Medline
- CINAHL
- EMBASE: Cochrane DSR, ACP Journal Club, DARE, and CCTR
- Proquest
- Google http://www.cihi.ca
In order to identify specific topics related to total joint replacement, the following key words were used in combination with the terms above: anaesthesia, best practice, evidence-based practice, primary health care, preoperative care, postoperative care, perioperative care, patient expectations, complications, inpatient, outcome measures, outcome assessment, practice guidelines, patient education, teaching, continuous passive motion (CPM), occupational therapy, physiotherapy, physical therapy, rehabilitation, blood loss, blood transfusion, autologous, and patient satisfaction.

2.2 Results of Search Strategy

A total of 300 references were retrieved. Of these 249 were reviewed. Refer to Appendix I for a table categorizing the literature that was identified to be relevant to this project.

2.3 Methods of Review

A systematic process was undertaken to review the literature. Forms developed by Law et al (2002) for reviewing systematic reviews, qualitative studies, and quantitative studies were modified and used to record pertinent details specific to each article (Appendix II). All literature reviewed was graded according to ‘Excellent,’ ‘Good,’ ‘Fair,’ and ‘Poor.’ The literature was reviewed by one of three reviewers, all of whom have clinical and/or research experience in total joint replacement. In order to ensure consistency in grading of the literature among the reviewers, twenty articles, relating to a variety of topics, were independently reviewed by two different reviewers. Ratings according to ‘Excellent,’ ‘Good,’ ‘Fair,’ and ‘Poor’ were independently assigned and then compared. Ratings of these articles were consistent between reviewers 90% of the time, with the only discrepancies in ratings between ‘Excellent’ and ‘Good.’

A summary of the best available evidence follows in the next sections of this chapter. The best available evidence was categorized as either suggestive evidence or emerging/inconclusive evidence. Suggestive evidence includes one or more randomized control trials rated as good or excellent; one or more systematic reviews rated good or excellent; or four or more other types of research rated fair or above.

Emerging/inconclusive evidence includes one or more randomized control trials rated fair; or one or more systematic reviews rated fair; or one or more other types of research rated fair or above. Literature rated as poor was not accepted.

2.4 Literature

The following topics were reviewed. Key findings are presented for each topic.

2.4.1 Patient Expectations

Patient expectations may vary according to age, preoperative function, and surgical procedure. Patient expectations play a critical role in total hip and total knee replacement as these are elective procedures and patients have chosen them as a means to
improve function and quality of life. Pain reduction and future walking ability often emerge as primary outcome variables. Other patient concerns include scar management, cancellation of surgery, risk of infections and complications, and availability of care.

Patients and surgeons need to have consistent expectations to ensure they are working towards the same goals. This is particularly true in patients with worse preoperative status where expectations tend to be higher. Gaining misleading information from family and friends has been suggested to lead to unrealistic expectations. Patient satisfaction has also been linked to patient expectations being met and more specifically to improvements with pain and function. It has been suggested by some, that those who have traditionally evaluated outcome following total hip replacement according to x-rays, pain, and function should also include a patient expectations assessment. Understanding patient expectations highlights the well-known dilemma of selecting patients, and has important implications for postoperative management.

During the preadmission phase the spectrum of expectations, the importance of expectations, and the amount of expected improvement should be considered within each patient’s clinical situation. This discussion is essential in determining realistic and unrealistic goals. For example, patients who had undergone some form of preoperative counseling demonstrated less concern related to the provision of services while in the hospital. However, they had greater concerns related to the technical aspects of the surgery. It has been suggested that patients who are mentally well-prepared, who actively seek information about surgery, and who exhibit vigilant coping behaviours may develop more realistic expectations compared to those who are reluctant to grasp information. Valid and reliable questionnaires facilitate the important task of obtaining and recording patient expectations. Knowing these expectations can help physicians and health care providers to provide more focused care, highlight areas of patient education, and promote shared decision-making when several treatment options are available.

2.4.2 Preoperative Education

Research has shown that patients who participated in preoperative education programs have more favorable outcomes than those who did not receive instruction. Cost-effective preoperative preparation of patients undergoing anaesthesia and surgical procedures is a central issue in perioperative patient management. It has been suggested that cost-effective preoperative evaluation is within the ability of each health care provider and can be approached from a variety of methods including education and the use of data to modify clinical practice. Proposed benefits of developing a successful preoperative evaluation clinic include: decreased surgical morbidity; minimization of expensive delays and cancellations; opportunity to evaluate and optimize patient health status; facilitation of the planning of anaesthesia and perioperative care; reduction of patient anxiety through education; and opportunity to obtain informed consent. Cost effectiveness and enhanced quality of patient care are the outcomes, which occur at a time when patient satisfaction and decreased cost have never been more important.
Other researchers agree that preadmission interventions can reduce postoperative length of stay and help decrease the cost for hospital stay and increase hospital income.\textsuperscript{41 42}

A recently updated systematic review on preoperative education for hip or knee replacement found that there were no differences in preoperative or postoperative anxiety, length of stay (LOS), mobility, postoperative pain, satisfaction, exercise compliance, and complication rates. Therefore, the authors concluded that there was insufficient evidence to support or refute the use of preoperative education to improve postoperative outcomes in people undergoing total hip and total knee replacement surgery especially with respect to level of function and length of stay. A major factor influencing this finding was that very few studies contributed to the analysis pool and the sample sizes in each study were small.\textsuperscript{43} Several other researchers have found that preoperative education had no impact on length of stay.\textsuperscript{17 36 44-46}

Many believe LOS may not be the indicator of choice as it is multi-factorial. Recently, the outcomes of interest in studies have been more patient-focused such as patient anxiety, satisfaction, and pain. Several studies have shown that those patients that received preoperative education have lower anxiety levels.\textsuperscript{37 47-49}

Findings from qualitative studies suggested that preoperative education gives patients an understanding of what to expect and allows familiarization of experiences through demonstration and educational content.\textsuperscript{19 44 48} Further conclusions from the same studies were that familiar experiences, familiar personnel, familiar environment, having knowledge, and having understanding of expectations enabled patients to feel less anxious. Similarly, patients who received pamphlets and videos in addition to a standard visit from an anaesthesiologist demonstrated less increase in preoperative anxiety. It was proposed that by providing patients with alternative information designed to educate and to answer patients’ questions, anxiety scores would be lower.\textsuperscript{47}

The importance of psychological factors in orthopaedic surgical management was reinforced by a report which demonstrated higher preoperative anxiety was associated with greater postoperative anxiety, pain, use of pain medications, poorer mental status, and longer stay in hospital.\textsuperscript{20} When asked, patients who had already undergone a total hip replacement reported they would have liked to receive information about postoperative complications and felt that the information would have decreased their anxiety.\textsuperscript{50}

Studies comparing different types of preoperative delivery methods tended to not show any difference in anxiety levels.\textsuperscript{18 48} However, significant differences have been found regarding the knowledge levels and performance of exercises in those undergoing an education program prior to surgery.\textsuperscript{20 44 51} Patients who received one on one preoperative education three to 28 days before surgery had significantly higher knowledge levels and were more compliant with their postoperative exercise routine.\textsuperscript{20 44} An increase in patient satisfaction with postoperative care and pain control has also been demonstrated in patients who received one on one preoperative education in conjunction with written pamphlets.\textsuperscript{37}
Timing and delivery of preoperative education have also been studied. With respect to timing, shortened lengths of stay have reduced the practicality and effectiveness of teaching patients during their hospital stay. While in the hospital setting, other factors such as pain, physical limitations, and emotionally-challenging situations may contribute to a decreased ability of patients to learn. Preoperative education has the advantage of giving the opportunity to both patients and families to review the information and therefore providing them with information regarding what to expect.

Recommendations based on a systematic review suggested that a preadmission pamphlet combined with post-admission instruction resulted in quicker learning times compared with post-admission pamphlets combined with instruction. Home-based preoperative interventions were not supported with the outcomes of LOS or discharge destination.

With respect to type of media, several patients have reported that multiple forms of education such as video and booklets were beneficial and helped ease their fears about coming to the hospital and gave them greater satisfaction with their level of knowledge. Videotapes and mailing of materials have also been suggested as a means of reaching patients in rural areas and allowing patients to view information in their own homes. Combinations of verbal and written materials, repetition of information, simplifying statements, and making specific statements as opposed to general statements, have been suggested to be helpful.

Providers of patient and family education agree that patients can be assisted to identify their own concerns, need a relaxing environment, need time and opportunity for individual consultation, and require the provision of either written handouts or video.

2.4.3 Surgical Procedures

A review of surgical techniques and procedures related to total hip and knee replacement was not the focus of this literature review. Rather, select topics relating to surgery were briefly reviewed, using systematic reviews as the information source, whenever possible. These select topics were reviewed in response to emergent themes in the qualitative component of the study, with the goal of informing the overall study.

2.4.3.1 Total Hip Replacement

A variety of surgical approaches has been used for total hip replacement including anterior, anterolateral, direct lateral, transtrochanteric, and posterior. The most commonly used surgical approaches are the direct lateral and posterior. There are reported advantages and disadvantages to each, with increased rates of dislocation reported with the posterior approach and increased risk of gait abnormality with the direct lateral approach. A systematic review examining risks of prosthesis dislocation, postoperative Trendelenburg gait, and incidence of sciatic nerve palsy, with the direct lateral and posterior approaches found insufficient quantity and quality of information to make any firm conclusion regarding the optimum choice of surgical approach.
2.4.3.1.1 Minimally-invasive Total Hip Replacement

Minimally-invasive total hip replacement is a relatively new approach to total hip replacement and is somewhat controversial due to a lack of definition of the term “minimally invasive.” Minimally-invasive surgery has the potential to minimize surgical trauma, reduce pain, reduce blood loss and need for transfusion, reduce length of hospital stay, and improve recovery. Although this procedure has been shown to be safe and practical for many patients requiring total hip replacement, there are situations where this surgical approach would not be appropriate. Morbidly obese patients, patients with abnormal hip anatomy, patients with significant prior surgical scarring, or patients with complete hip dislocation may be situations where the minimally-invasive approach is not indicated.

2.4.3.2 Total Knee Replacement

2.4.3.2.1 Patellar Resurfacing

The decision as to whether to resurface the patella remains controversial. A prospective randomized study examining the advantages of patellar resurfacing found that at the 24-month follow-up, especially patients with advanced arthritis achieved superior results if their patellae were resurfaced compared to those who did not have the patella resurfaced. Although the sample size was relatively small, the advantages recognized were improved function scores and improved ability to climb stairs, with less pain. Another randomized prospective study found no significant differences between the knees that had resurfacing and those that had not, with regard to The Knee Society Score for pain or function or the assessment of patellofemoral function. Conversely, a randomized controlled trial comparing the outcome of resurfacing and not resurfacing the patella found a higher rate of anterior knee pain following total knee replacement without patellar resurfacing. However, these same authors also found no significant difference between the groups with regard to the postoperative function score. Factors such as age, state of articular surface, and implant being used may help guide decision-making regarding which patients may or may not benefit from patellar resurfacing.

2.4.3.2.2 Sequential Bilateral Total Knee Replacement

Bilateral total knee replacement performed either sequentially or simultaneously, during one anaesthetic, has the potential to offer long-term relief for patients with pain and functional restrictions in both knees. Only one surgical event and one rehabilitation period are required if this approach is taken. When patients are selected appropriately according to age, overall health, and daily activity endurance, sequential bilateral total knee replacement has demonstrated the following advantages: decreased costs, decreased total rehabilitation time, decreased physical therapy requirements, decreased total anaesthesia time, and decreased hospital length of stay.
2.4.3.2.3  Minimally-invasive Total Knee Replacement

Minimally-invasive total knee replacement refers to the extent of the disruption of the anatomic structures around the knee, such that the extensor mechanism and the suprapatellar pouch are not violated. There is minimal literature studying the short and long-term results of this surgical approach. However, early results support that the procedure is viable and comparable with standard total knee replacement.

2.4.3.2.4  Mobile Bearing Versus Fixed Bearing Prostheses for Total Knee Replacement

Total knee replacements have a polyethylene insert that can either be fixed to the tibial plateau or have freedom of rotation and/or translation. A systematic review was conducted to assess the effects, if any, of mobile bearing versus fixed bearing prostheses, on range of motion and functional outcome. Only two studies that met the criteria were found and both were of low quality. One of the two studies found no difference in range of motion (ROM), but did find a superiority of the mobile bearing knee on functional outcome, as measured by the Knee Society Score and Oxford Knee Score and the pain scores of these measures. The second study found no differences at all.

2.4.3.3  Surgical Drains

Surgical drainage systems may utilize either open or closed suction drains. An open drain is when an opening is left in the surgical wound to allow drainage of fluids to the exterior and a closed suction drain consists of a perforated drainage tube placed within the wound and connected to a drainage bottle. A recent systematic review has not found enough evidence to either support or refute the routine use of closed suction drainage in orthopaedic surgery using incidence of wound infections, haematomas, and wound dehiscence as outcome measures.

2.4.4  Pain Management

Total joint replacement patients may experience intense postoperative pain. Effective pain management following total joint replacement is essential if patients are to achieve desired outcomes. Inadequate pain management hinders early intensive physical therapy, whereas adequate pain management is the most influential factor for good postoperative rehabilitation. Postoperative pain control can be obtained using a variety of methods, such as intravenous (IV) patient controlled analgesia (PCA), epidural analgesia, lumbar plexus blockade, oral medications, and intramuscular injections.

A compilation of studies examining PCA, epidural catheter and intramuscular morphine injections demonstrated little difference between the three for controlling postoperative pain. However, PCA has been shown to be more effective than conventional pain therapy (intramuscular or oral medication) resulting in significantly higher patient satisfaction and decreased pain scores. Other benefits of PCA include a decrease in lag time in medication and decreased dependency on nursing staff. A recent systematic review of epidural analgesia for pain relief following total hip or total knee replacement
concluded that epidural analgesia may be useful for pain relief. However, the benefits may be limited to the early (four to six hours) postoperative period. Other authors who have compared PCA and epidural analgesia found those patients who had epidural analgesia had lower pain scores initially but by 20 hours postoperatively, the pain scores were similar in both groups. Those patients in the PCA group were less satisfied and experienced significantly more adverse effects, especially hypotension and vomiting. An epidural infusion of local anesthetic or local anesthetic-narcotic mixture may be better than epidural narcotic alone. Insufficient evidence is available to draw conclusions on the frequency of complications in epidural postoperative pain patients.

Recent studies have demonstrated that extended femoral nerve sheath blocks provide comparable pain control to intravenous PCA and epidural analgesia but with fewer side effects. Different treatment protocols have been tried with extended femoral nerve sheath blocks following total hip replacement. Extended femoral nerve blocks with PCA techniques showed a reduction in local anaesthetic consumption without compromise in patient satisfaction when compared to continuous infusions. Similar results were found in the total knee population with extended “three-in-one” blocks. The knee is innervated by the lumbosacral plexus. This plexus is made up of the femoral and obturator nerve supplying the front of the knee and the sciatic nerve behind the knee. Recent studies have compared “three-in-one” blocks that block all three nerves, to femoral nerve blocks, alone. One such study found that femoral nerve blocks improved analgesia and decreased morphine use after total knee replacement. However, the addition of a sciatic nerve block did not improve analgesia efficacy.

Psoas compartment block techniques used primarily in hip fracture patients have the ability to block all branches of the lumbar plexus. Positive results have been seen with psoas blocks for total hip replacement patients by providing optimal analgesia with few side effects, providing the block is positioned correctly. Research has shown that lower postoperative pain scores are the best predictors of satisfaction and helpfulness of treatment. Therefore, it is essential that postoperative pain be treated adequately by hospital staff.

2.4.5 Blood Conservation

Major blood loss usually occurs during total joint replacement surgery and may lead to the need for a blood transfusion. Blood loss and the need for blood during or after surgery are dependent on many variables including preoperative hemoglobin, anaesthetic technique, operative approach, duration of the procedure, previous exposure to acetylsalicylic acid and/or anti-inflammatory medications, and comorbid conditions. There has been an increase in public and medical concerns regarding blood transfusion. These concerns, including risk of infections, availability of blood, and associated costs, have motivated the medical community into exploring alternative options regarding blood transfusions. The standards of practice in this field are changing and many facilities have adopted new strategies for counteracting the effects of blood loss. ‘Bloodless’ surgery is quickly becoming the gold standard.
Red blood cells contain hemoglobin, which enables them to carry oxygen from the lungs to other body tissues; during the postoperative period, levels of hemoglobin may drop. Until recently hemoglobin levels less than 10g/dL were justified as the cut off for transfusion postoperatively. In the literature, the cut off hemoglobin level ranges between 7.0 g/dL and 8.5 g/dL with the surgeon taking into consideration the patient’s symptoms, clinical needs, and past medical history, particularly those patients with cardiac and/or pulmonary disease.

Patients need to be educated regarding the risks and benefits of any therapy, in order to make informed choices about medical management of their conditions. Following is a list of commonly used treatment options for blood loss:

- **Allogeneic or donor blood transfusion** – This treatment option for blood loss remains the most widely accepted alternative when autologous blood is unavailable.
- **Autologous or transfusion of one’s own blood** – In order to be able to receive one’s own blood, it is donated prior to the surgery and stored. Blood can be safely stored for 21 to 44 days. Autologous blood transfusion has been shown to be safe and decreases patient anxiety. However, there are costs related to the storage of blood and the disposal of non-transfused blood.
- **Erythropoietin alfa** – Erythropoietin alfa, a pharmaceutical treatment, increases red blood cell mass by binding to erythroid progenitor cells in the bone marrow and thereby stimulating the production of mature erythrocytes and generating a reserve of red blood cells. Although relatively new with the orthopaedic population erythropoietin alfa has been used in renal failure patients for many years. Use to date, in the orthopaedic population, has resulted in a reduced need for blood transfusion. Recommended doses are 600 U/kg weekly or daily doses of 300 U/kg. Erythropoietin alfa is effective when adequate supplies of iron, folic acid, and B12 are available.
- **Intraoperative blood salvage or auto transfusion** – This process involves salvaging red blood cells from blood loss from patients during surgery and reinfusing the salvaged red blood cells back to the same patient. Research has demonstrated a reduced need for allogeneic transfusion with blood salvaging techniques.
- **Hypotensive epidural anaesthesia (HEA)** – This form of anaesthesia creates arterial hypotension, with a mean arterial pressure (MAP) of 50mm Hg. By creating this state, a decrease in total blood loss has been observed. Other advantages of HEA that have been reported include a decreased incidence of deep vein thrombosis and decreased blood leakage from exposed bony surfaces during surgery.
- **Other pharmacologic agents** – Other medications including aprotinin, aminocaproic acid, vasopressin, and desmopression are antifibrinolytic agents which reduce blood loss intraoperatively. These are available for patients who cannot use the other options, such as those with hemophilia or Willebrand’s disease. However, more research is needed before these various pharmaceutical agents can be considered safe and acceptable methods of controlling blood loss.

Of all these treatment options aimed at counteracting blood loss following total joint replacement, there is not sufficient evidence in the literature to recommend one as optimal treatment.
2.4.6 Venous Thromboembolism Prophylaxis

Venous thromboembolism prophylaxis is the prevention of blood clots in the superficial and deep veins. Objectives of venous thromboembolism prophylaxis include:

- Prevention of fatal pulmonary embolism
- Prevention of symptomatic deep vein thrombosis
- Prevention of symptomatic pulmonary embolism.$^{97}$

Prevention of venous thromboembolism is important because deep vein thrombosis and pulmonary embolism are associated with mortality and significant morbidity; decreased quality of life of those affected; and increased demands on scarce health care resources. Patients undergoing total hip and total knee replacement are two groups who are at high risk for venous thromboembolism. Consequently, substantial research has been conducted to study venous thromboembolism and investigate optimal regimens for prevention.$^{98-111}$ Recently an extensive systematic review regarding prevention of venous thromboembolism has been conducted and published on this topic. The following information summarizes findings and recommendations from this review regarding venous thromboembolism prophylaxis with respect to total hip and total knee replacement.$^{97}$ Some of the findings are common to both total hip and total knee replacement, while others are specific to total hip or total knee replacement.

In patients who have not had any preventive measures for venous thromboembolism, the incidence of objectively confirmed, hospital-acquired deep vein thrombosis is approximately 40% to 60% following total hip or knee replacement. The proximal deep veins are involved in about one-quarter to one-third of these thrombi. Even in the presence of prophylactic measures, venous thromboembolism has been reported within three months, of 2.4% and 1.7% of total hip and total knee replacement patients, respectively. Thrombi affecting the deep veins are more likely to be symptomatic and to result in pulmonary emboli. It has been found that most symptomatic thromboembolism occurs after hospital discharge, with the risk of venous thromboembolism being higher than normal for at least two months following total hip or total knee replacement. Currently, there are no methods of identifying patients who are at risk of symptomatic venous thromboembolism. Therefore, thromboembolism prophylaxis is recommended for all patients undergoing total hip and total knee replacement.

There are two main methods of venous thromboembolism prophylaxis: mechanical and pharmaceutical. Mechanical methods of prophylaxis include graduated compression stockings, intermittent pneumatic compression devices, and venous foot pumps. Mechanical methods of prophylaxis increase venous outflow and/or decrease venous stasis in the veins of the legs. Less potential for bleeding is the primary advantage of mechanical prophylaxis methods. Thus, patients who have high bleeding risks are candidates for consideration of mechanical methods. Each of the mechanical methods of prophylaxis reduces the relative risk of deep vein thrombosis by 20% to 70%. However, current anticoagulation pharmaceutical treatments provide more protection for preventing venous thromboembolism, especially with respect to proximal deep vein thromboses.
Therefore, recommendations are that mechanical methods of venous thromboembolism prophylaxis be used as the only line of treatment only in patients who are at high risk of bleeding or as an adjunct to pharmaceutical treatments that anticoagulate the blood.

2.4.6.1 Total Hip Replacement and Venous Thromboembolism Prophylaxis

For patients who have undergone total hip replacement, venous thromboembolism is the most common cause for readmission to hospital following total hip replacement. The use of epidural anaesthesia compared to general anaesthesia is associated with a significant decrease in the incidence of postoperative deep vein thrombosis for total hip replacement patients. With respect to pharmaceutical anticoagulation therapy, low-molecular-weight heparin and fondaparinux have been found to be more effective than Vitamin K antagonists in preventing symptomatic and asymptomatic in-hospital venous thromboembolism. On the counter side, there is a slight increased risk of surgical site bleeding and wound hematomas with low-molecular-weight heparin and fondaparinux.

The authors of the review, however, do not recommend one anticoagulant over another. Rather they recommend routine use of one of the following three anticoagulants for total hip replacement patients:

1) Low-molecular-weight heparin (at a usual high-risk dose, started 12 hours before surgery or 12 to 24 hours after surgery, or four to six hours after surgery at half the usual high-risk dose and then increasing to the usual high-risk dose the following day);
2) Fondaparinux (2.5 mg started six to eight hours after surgery); or
3) Adjusted-dose Vitamin K antagonists started preoperatively or the evening after surgery (International normalized ratio (INR) target, 2.5; INR range 2.0 to 3.0).

Further, the reason that the authors do not recommend one of the three anticoagulants over each other is because a relatively low value was placed on the prevention of venographic thrombosis and a relatively high value was placed on minimizing bleeding complications.

The sole use of acetylsalicylic acid, dextran, low-dose unfractionated heparin, graduated compression stockings, intermittent pneumatic compression, or venous foot pump is not recommended as a means of venous thromboembolism prophylaxis for total hip replacement patients.

2.4.6.2 Total Knee Replacement and Venous Thromboembolism Prophylaxis

The rate of venographically detected deep vein thrombosis is higher after total knee replacement than after total hip replacement. However, total knee replacement patients seem to experience lower rates of proximal deep vein thrombosis and symptomatic venous thromboembolism.

Although data are limited, data that are available suggest that graduated compression stockings provide no protection for total knee replacement patients against venous thromboembolism. Conversely, intermittent pneumatic compression devices do provide venous thromboembolism prophylaxis in total knee replacement patients. The authors of
the systematic review recommend the optimal use of intermittent pneumatic compression as an alternative option to anticoagulant prophylaxis. These devices are most effective if they are applied either intraoperatively or immediately postoperatively and are worn continuously at least until the patient is fully ambulatory. However, the utility of intermittent pneumatic compression devices is limited by the lack of availability in the home environment.

Continuous passive motion machines, when compared to routine physiotherapy alone, do not decrease the rate of deep vein thrombosis for total knee replacement patients.

The authors of the systematic review recommend routine use of one of the following three anticoagulants for total knee replacement patients:
1) Low-molecular-weight heparin (at the usual high-risk dose);
2) Fondaparinux; or
3) Adjusted-dose Vitamin K antagonist (INR target, 2.5; INR range 2.0 to 3.0).

The authors do not recommend one of the three anticoagulants over each other because a relatively low value was placed on the prevention of venographic thrombosis and a relatively high value was placed on minimizing bleeding complications.

The sole use of acetylsalicylic, low-dose unfractionated heparin or venous foot pump is not recommended as a means of venous thromboembolism prophylaxis for total knee replacement patients.

### 2.4.7 Clinical Pathways

Clinical pathways are flowcharts or algorithms for the total care of a patient with a clinical problem from the time of diagnosis until the desired outcome is achieved.\(^{112}\) Clinical pathways are one means of standardizing treatment.\(^{113}\) They outline and coordinate the recommended sequence and timing of interventions of the members of the health care team.\(^{114}\) They are often developed by a multidisciplinary group of providers within an institution based on best practice and team experience.\(^{115}\) Clinical pathways have proliferated in response to pressures to reduce health care costs whilst maintaining quality of care.\(^{116}\) Clinical pathways are also known as “care pathways” and “critical pathways.”\(^{114}\)

Clinical pathways for total joint replacement have been designed to improve clinical efficiency, cost-effectiveness and quality.\(^{112}\) Clinical pathways are often used for patients undergoing total hip and total knee replacement.\(^{112} 117 118\) Total hip and total knee replacements have been identified as key procedures for the use of clinical pathways as they are relatively common standardized procedures that are costly.\(^{116}\) The effectiveness of clinical pathways has been studied in terms of the impact on lengths of stay (LOS), costs to hospitals, patient outcomes, complications, and patient satisfaction.
2.4.7.1 The Impact of Clinical Pathways on Length of Stay

Generally, acute hospital LOS has been shown to decrease with the implementation of clinical pathways. Healy et al (1998) studied the impact of clinical pathways and a hip implant standardization program on LOS and found that LOS differed significantly between the clinical pathway group and the control group, whereby the hospital LOS reduced from a mean of 8.62 days to 5.67 days. Other studies have reported a decrease in LOS of 57% for total knee replacement and 46% for total hip replacement. The day of the week that surgery is performed has not affected the LOS of patients when clinical pathways are utilized.

2.4.7.2 The Impact of Clinical Pathways on Costs

Hospitals have reported a reduction in acute hospital costs with the implementation of clinical pathways. Specifically, it was found that mean hospital costs for total knee replacement decreased from $21,709 to $17,618 after commencing the implementation of clinical pathways. The percentage decrease in hospitalization costs was 1.56 fold greater in the total knee replacement patients compared to the control group of patients with radical prostatectomy and 2.02 greater than the control group of patients with total hip replacement. Wammack et al (1998) measured the effects of case management using critical pathways on hospital costs, LOS, and patient outcomes. Hospital costs were reduced by 57% for patients following total knee replacement and 38% for patients following total hip replacement. These cost savings were not statistically significant and some professional costs were omitted from the analysis due to difficulties in these calculations. Healy et al (1998) also evaluated the economic impact of clinical pathways on patients with total hip replacement. There was a 7.75 inflation-adjusted hospital cost reduction, which was a statistically significant result.

2.4.7.3 The Impact of Clinical Pathways on Patient Outcomes

Various outcome measures have been utilized to ascertain the impact of clinical pathways on patient outcomes. Mabrey et al (1997) compared patients with total knee replacement on clinical pathways to a retrospective cohort of patients treated prior to the implementation of the clinical pathway. There were no significant differences in outcome as measured by the Knee Society Clinical Rating System. Healy et al (1998) found that Harris Hip Scores were not statistically significant different between patients who had been treated using a clinical pathway and those who had not, following total hip replacement. Other functional scores, including distance walked, and pain scores as measured by a 10-point Visual Analogue scale, were not significantly different between the groups. Wammack et al (1998) also compared functional outcomes for patients before and after the implementation of a clinical pathway, using the Harris Hip score and The Knee Society Clinical Rating System. Again, no significant differences were found in patient outcomes using these measures. However, improved function was reported with patients following total knee replacement. Long term follow-up of outcomes (e.g., timed 10-meter walk) have shown improvements at six months for patients treated on a clinical pathway following total joint replacement.
Overall, it appears patient outcomes are not compromised by the use of clinical pathways for patients with total hip and total knee replacement and in some cases, outcomes have improved with implementation of clinical pathways. A review of the literature regarding the effectiveness of clinical pathways for total hip and total knee replacements concluded that, in general, most studies showed a trend in reduction of LOS and hospital costs with clinical pathway use, as well as either improved or unchanged functional outcomes.\textsuperscript{116}

### 2.4.7.4 The Impact of Clinical Pathways on Complications

There is considerable variability in the types of complications addressed in various studies.\textsuperscript{116} Complications following total joint replacement were defined in the literature in different ways. Firstly, complications were defined as events that either increase LOS, increase cost, cause a readmission, or cause morbidity or mortality.\textsuperscript{113} Secondly, complications were referred more specifically to operative complications, anaesthetic complications, medical complications, thromboembolic complications, infections, problems with wound healing, and instability and dislocations.\textsuperscript{112} Mabrey et al (1997) found that total knee replacement patients on the clinical pathway were 4.6 times less likely to experience a complication. In 30 days of follow-up, there were no deaths and readmissions.\textsuperscript{113} The rates of complication for patients following a clinical pathway for total hip replacement were not significantly different than patients who were not treated using the pathway.\textsuperscript{112,118}

### 2.4.7.5 The Impact of Clinical Pathways on Patient Satisfaction

Patient satisfaction, with care provided using a clinical pathway, is another outcome studied in the literature. Patient satisfaction derived from questionnaires following total hip replacement showed that there were no significant differences in satisfaction with care between groups who had treatment with a clinical pathway compared to those who had not.\textsuperscript{112} Other studies have demonstrated that patients were generally satisfied with care for total hip and total knee replacement with the implementation of clinical pathways.\textsuperscript{117,119}

### 2.4.7.6 Limitations

Two key limitations have been identified in the studies that address the impact of clinical pathways and total joint replacement: 1) use of retrospective controls in the studies; and 2) the lack of accounting for LOS in rehabilitation facilities. Overall, there is a trend toward a reduction in LOS and cost with improved or unchanged outcomes with the implementation of clinical pathways.\textsuperscript{116}

### 2.4.7.7 Variance Analyses of Clinical Pathways

Variance analysis is a process that has been identified to evaluate clinical pathways.\textsuperscript{115} A variance is defined as any deviation from the proposed standard of care in the pathway.\textsuperscript{115} One study was reviewed that aimed to demonstrate the process of variance analysis for patients following total hip and knee replacement.\textsuperscript{115} Variances were categorized as serious and non-serious. Variances included complications but were not restricted to
complications. Following total knee replacement, 12.3% of patients had a serious variance from the pathway including cardiac conditions and wound problems. For patients following total hip replacement, 13.5% of patients had a serious variance from the pathway. These serious variances were higher than anticipated. This process can be utilized for quality control and to improve patient outcomes.\textsuperscript{115}

2.4.7.8 Patient Variability and Clinical Pathway Design

The majority of hospitals have developed one clinical pathway for patients with either total hip or total knee replacement. Wang et al (1997) evaluated the degree of patient variability and its effects on postoperative recovery and function in order to assist with the development of clinical pathways.\textsuperscript{120} Using the Modified Barthel Index (MBI) to measure outcomes after total hip replacement, not all patients were determined to be fit for discharge within the same time period. A MBI score of 90 out of a maximum of 100 is required before patients are ready for discharge. Fifty-eight percent of patients were fit for discharge by the eighth day in acute care and 42% required 10 days or longer. Patients in these groups differed significantly in terms of age, the number of comorbidities, preoperative and early MBI scores, and muscle strength. The authors concluded that there is heterogeneity in the population indicating that one pathway may be insufficient. Rather two pathways, one for an eight-day LOS and one for a LOS of 10 days or greater may be more appropriate for patients following total joint replacement.

2.4.7.9 Practice Guidelines

Like clinical pathways, practice guidelines have proliferated in use throughout hospitals. Clinical practice guidelines have been differentiated from clinical pathways in that they assist in overall treatment planning and decision-making, but not daily care.\textsuperscript{115} One study examined LOS guidelines on patient outcomes for several patient populations, including total hip and total knee replacement.\textsuperscript{121} For patients with total hip and total knee replacement, there was a statistically significant decrease in LOS with improved compliance with the guideline. For total hip replacement patients, shorter lengths of stay were associated with discharge to nursing homes and rehabilitation facilities.\textsuperscript{121}

2.4.8 Rehabilitation

The efficacy of rehabilitation has been studied in patients with total joint replacement during the preoperative, acute care, and post-acute care phases. This includes research on rehabilitation programs, as well as specific components of rehabilitation such as exercise and continuous passive motion. For the purpose of this report, rehabilitation is discussed broadly across the continuum of care.

2.4.8.1 Preoperative Rehabilitation

Preoperative rehabilitation typically includes exercise as well as education delivered at the preoperative stage. There is a scarcity of research that has been published that examines the impact of preoperative rehabilitation. From the studies that have been conducted, the results vary.
In a randomized control trial, Gilbey et al (2003) studied an eight week preoperative customized exercise program for patients scheduled for total hip replacement, followed by post-surgery exercise to determine the effect on functional recovery. This was compared to a control group who received only the routine inpatient physical therapy. Exercise included sessions at the clinic as well independently at home. Clinic exercises included cycle, arm or rowing ergometer, resistance exercises for the hip as well as exercises to improve trunk, shoulder, and arm strength to help patients with bed to chair transfers and walking with gait aids. Hydrotherapy sessions consisted of walking, stretching, mobility and strength exercises, water cycling, and running. The authors found that exercise programs were well tolerated by patients with end-stage hip arthritis and were effective in improving early recovery of physical function in total hip replacement.

Another preoperative rehabilitation program of education, occupational therapy, and physical conditioning with a physical therapist was found to decrease LOS and decrease time to meet discharge criteria compared to a control group in a randomized control trial.

Other studies found that implementation of preoperative rehabilitation programs didn’t have an impact on patient outcomes. A non-randomized control trial examined a preoperative physical therapy program of exercise three times per week in 10 patients scheduled for total knee replacement. A control group included 10 patients who did not receive preoperative physiotherapy. There were no differences in isokinetic knee flexor strength between the groups following surgery. Gocen et al (2004) studied the effect of preoperative physical therapy, including stretching exercises, strengthening exercises, and education, for patients undergoing total hip replacement in a randomized control trial. There were no significant differences found between the treatment group and control group who didn’t have preoperative physiotherapy with regard to Harris Hip scores, hip ROM, and pain. Small sample sizes were limitations to these studies.

A systematic review concluded that preoperative physiotherapy does not improve outcomes in total knee replacement; and there is insufficient evidence to determine the impact of preoperative physiotherapy on total hip replacement. Additional research is needed to determine the efficacy of preoperative rehabilitation in patients scheduled for total joint replacement.

### 2.4.8.2 Early Postoperative Rehabilitation

Rehabilitation is an essential component of postoperative care for total joint replacement. Early postoperative rehabilitation focuses on restoring mobility, strength and flexibility; reducing pain; preventing deep vein thrombosis and other complications; teaching adherence to ROM and weight bearing precautions; ordering equipment; teaching patients and families; and organizing home resources.

The gold standard for achieving functional mobility is early mobilization. The physical therapist typically has a role in increasing the mobility of the patient, and educating patients regarding exercises and precautions. Physical therapy intervention has been
related to a lower total cost of care and increased probability of discharge home from acute care. The amount of physical therapy provided in acute care was found to be directly related to functional improvements in patients with lower extremity problems, including total joint replacement.

The evidence of the effects of different exercise programs after total joint replacement is limited. Physiotherapy treatment programs for patients in acute care who have had total joint replacement differ in terms of frequency, exercise, and functional activities. A modified Delphi technique was used to ascertain consensus on a standardized treatment program for total knee replacement and total hip replacement for patients with primary osteoarthritis using 18 clinicians as panelists from around the United States. In round three, 76% of panelists accepted the total hip replacement program and 70% accepted the total knee replacement program. The table below describes the standardized programs developed for patients following total joint replacement.

### Table 1. Consensus on a Total Hip and Total Knee Replacement Treatment Program

<table>
<thead>
<tr>
<th>Total Knee Replacement</th>
<th>Total Hip Replacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients will be seen twice/day 5 days/week</td>
<td>Patients will be seen twice/day 5 days/week</td>
</tr>
<tr>
<td>Postoperative Day 1-2: Initiate bed exercises (quadriceps sets, active and active-assistive knee flexion, terminal knee extension, and straight leg raise) and transfer training in patient’s room. Bed exercises will be done 10 repetitions every hour</td>
<td>Postoperative Day 1-2: Initiate bed exercises (quadriceps sets, gluteal sets, ankle pumps) and transfer training in patient’s room. Bed exercises will be done 10 repetitions every hour</td>
</tr>
<tr>
<td>Postoperative Day 2-3: Initiate gait training and exercises (quadriceps sets, active, active-assistive and passive knee flexion, passive knee extension, terminal knee extension, and straight leg raises) in physical therapy</td>
<td>Postoperative Day 2-3: Initiate gait training and exercises (quadriceps sets, gluteal sets, ankle pumps, active hip flexion and abduction, terminal knee extension, and isometric hip abduction) in physical therapy</td>
</tr>
<tr>
<td>Progression of the elements of the treatment program is by patient tolerance. Intensity guidelines are to progress to 20 repetitions three times per day.</td>
<td>Progression of each element of the treatment program is by patient tolerance. Intensity guidelines are to progress to 20 repetitions three times a day.</td>
</tr>
<tr>
<td>Prior to discharge the patient will demonstrate:</td>
<td>Prior to discharge the patient will demonstrate:</td>
</tr>
<tr>
<td>• Active or active-assistive knee flexion of 80-90 degrees</td>
<td>• Total hip precautions, including: no hip flexion greater than 90 degrees; no hip adduction past neutral; no internal rotation past neutral</td>
</tr>
<tr>
<td>• Independence in a home exercise program</td>
<td>• Independence in a home exercise program</td>
</tr>
<tr>
<td>• Independence of transfers (functional activities)</td>
<td>• Independence in a home exercise program</td>
</tr>
</tbody>
</table>
2.4.8.2.1 Continuous Passive Motion

Continuous passive motion (CPM) is a machine-dependent modality in which an internal motorized device moves the limb through a pre-set arc of motion. Post-surgery rehabilitation protocols often include continuous passive motion. However, protocols vary considerably amongst institutions. It has been suggested that ROM of the knee, particularly in flexion, is important for tasks such as walking, transfers, and activities of daily living. A minimum of 65 degrees of knee flexion is recommended in the swing phase of normal gait, 90 degrees of flexion to descend stairs and at least 105 degrees to rise from a toilet or a low chair. A recent systematic review found that CPM combined with physiotherapy intervention is effective at increasing active knee flexion two weeks following total knee replacement compared to physiotherapy alone. However, the clinical significance of an additional four degrees of knee flexion can be questioned.

Similar findings with minimal to no improvement in ROM have been reported with a variety of CPM protocols. Most studies reporting improved ROM with CPM use showed that by one year there were no significant differences in ROM, compared to those where CPM was not used. If hospital discharge is not dependent on attaining a specific amount of flexion, then CPM may not be necessary since any initial differences in flexion seem to equalize over time. One author reported that increased pain and blood loss with CPM use was a clinically significant problem resulting in increased nursing requirements and therefore increased costs of patient care. The conclusion with this study was that CPM had definite clinical disadvantages with no worthwhile improvement in ROM or function.

Patient compliance with CPM has also been reported as a problem. When outpatient physiotherapy was compared to home CPM use following hospital discharge, no difference in clinical outcomes at six months were found. The author concluded that CPM use at home is cheaper than traditional outpatient physiotherapy and may be an option for cooperative patients who adequately understand its functioning and who have assistance at home to help with its use.

2.4.8.2.2 Exercises Following Total Knee Replacement

The goals of rehabilitation following total knee replacement are to obtain recovery of knee ROM, to improve hip and knee muscle strength, and to improve functional independence. Patients with severe knee joint rheumatoid arthritis have also been shown to have postural instability. The reliance on visual feedback in a non-randomized
control group study suggests poor sensory feedback from the lower extremities. There were no prospective randomized trials found to suggest the most efficacious exercise protocol for patients with total joint replacement.

A non-randomized comparison trial compared the muscle force of the quadriceps femoris in patients who had total knee replacement with a healthy control group. The average normalized knee extension force was 64% lower in the total knee replacement group and the average volitional activation deficit in the total knee replacement group was four times as great as the comparison group. These results suggested that early intervention aimed at improving quadriceps femoris muscle activation may improve efforts to restore muscle force in patients with total knee replacements. Most treatment protocols included active-assisted ROM on postoperative day one, progressing to isometric hip and knee strengthening exercises by postoperative day four. Specific exercises that are recommended following total knee replacement are described in Table 1 as developed in a consensus panel in the United States.

2.4.8.2.3 Exercises Following Total Hip Replacement

Exercise programs for total hip replacements vary among institutions. There has been debate in attempts to reach consensus on the type of exercises that are optimal following total hip replacement. For example, in vivo studies have shown that straight leg raises generate one to two times higher forces in the hip than walking. As a result, there is debate regarding the inclusion of straight leg raises into treatment programs following total hip replacement. It has been suggested that the key is to prescribe exercises that maximize strength and flexibility while limiting abnormal forces across the joint. A total hip replacement exercise program, reported by consensus of clinicians, is presented in Table 1.

Jesudason and Stiller (2002) assessed the additional benefit of bed exercises in terms of hip pain, ROM and function compared to a control group who received only the program of mobilization in a randomized control trial. Exercises included hip and knee flexion, extension to neutral, ankle dorsiflexion and plantarflexion, and static quadriceps over a roll. There were no differences in terms of ROM, pain, and function as measured by the Iowa Level of Assistance on the seventh or eighth postoperative day. The authors concluded that bed exercises were not beneficial for total hip replacement patients in the acute care period. No long-term follow-up beyond acute care was included in the study.

Hip abductor strengthening has been identified as an important component of exercise programs. In a non-randomized trial comparing a home program of ROM exercise, low resistance isometric exercises, and eccentric exercises of the hip abductors, the home program was effective in long-term post-total hip replacement recovery as indicated by improvements in gait speed, cadence, and isometric torque.

The duration that exercises are performed is also important. An ex post facto research study using prospective analysis of differences between the involved hip and uninvolved hip was conducted on patients following total hip replacement. ROM was restored at
one year following surgery. Strength impairments were not significantly different between the involved and uninvolved hips. However, the perception of level of function was related to muscle strength of the hip abductors and knee extensors. The authors recommended that patients should continue their exercise program for at least one year or be given more advanced exercises later in recovery, including knee extensor strengthening exercises, in addition to exercises for the hip musculature.

The setting in which the exercises are delivered has been examined for both total hip and total knee replacement. Exercise administered in home programs or in groups led by physiotherapists has been shown to improve outcomes following total joint replacement. However, no differences have been found between home exercise programs or group programs in terms of patients’ gait, pain, quality of life, or activities of daily living.131

2.4.8.2.4 Precautions

After a posterior or lateral approach, hip flexion of more than 90 degrees, hip adduction, and internal rotation past midline are avoided to protect against dislocation. After the more uncommon anterior approach, hip extension, and external rotation are also avoided.147 144

2.4.8.3 Postoperative Rehabilitation Discharge Destinations

Typically, patients with total joint replacement are discharged from the acute care setting to one of two discharge destinations: home or inpatient rehabilitation. Those discharged home may receive different options for rehabilitation, including homecare services, outpatient rehabilitation, and/or no formalized services. Those receiving no formalized services have been previously instructed regarding an independent home exercise program. Likewise, following inpatient rehabilitation, patients may receive homecare services, outpatient rehabilitation, and/or no formalized services.

Following the acute care stay for total joint replacement patients, a standard approach to discharge planning, including discharge destinations and options for rehabilitation, has not been identified. Existing services vary with respect to the setting and the amount of services provided.150 In Ontario, between 1995/1996 and 2001/2002, the percentage of people who underwent total joint replacement and who participated in inpatient rehabilitation increased from 30-40%.150

A recent study from Australia has suggested that patients are unnecessarily discharged to inpatient rehabilitation when they are functionally ready to be discharged home.151 Reasons given for these findings were pressure to decrease acute care LOS and the need to make decisions regarding discharge early in the acute care stay when patient outcomes are yet unclear.151 Researchers also found variability from institution to institution in the types of discharge destinations following total knee replacement. One hospital sent 97% of patients home following surgery compared to two other hospitals who discharged 40% and 57% of patients directly home.152
In Ontario, geographic variability in the use of inpatient rehabilitation following total joint replacement is evident. In 13 district health council (DHC) regions in Ontario, the percentage of patients who received inpatient rehabilitation increased, while in seven DHCs 88% of patients with total knee replacement and 75% of patients with total hip replacement were not transferred to inpatient rehabilitation. This indicates that referral patterns to inpatient rehabilitation may not be consistent across the province of Ontario.150

2.4.8.3.1 Inpatient Rehabilitation and Home Care

Inpatient rehabilitation has been shown to be effective in improving outcomes in patients following total joint replacement. A longitudinal study examined the functional recovery following total knee replacement in 86 patients who had inpatient rehabilitation. Preoperative levels of function were achieved by six weeks postoperatively in a seven-day inpatient rehabilitation program for patients who required a short inpatient rehabilitation stay.153 Levels of pain were decreased at six weeks and patients perceived functional improvement as measured by the Lower Extremity Activity Profile.153 The rehabilitation program included exercises (with an emphasis on closed kinetic chain exercise of the lower extremity) and transfer, ambulation, and gait training using a care pathway.127 A retrospective chart review found that inpatient rehabilitation, including twice daily treatment of muscle strengthening exercises, ROM exercises, and ambulation, was successful in improving knee flexor strength, ROM, and ambulation following total knee replacement.128 Similar results in improving function were found in another retrospective chart review where the authors suggested that inpatient rehabilitation is successful for the small percentage of patients who need it.128

Patients who have been selected for inpatient rehabilitation following total hip replacement have also had positive outcomes. Retrospective data were collected on patients who had both primary and revision total hip replacement. Functional Independence Measure scores improved from an average of 89 on admission to 110 at discharge, indicating improvements in functional recovery. There were no significant differences between revision and primary surgeries in terms of outcomes.154

Measuring outcome following various combinations of discharge destinations and options for rehabilitation would assist in developing a standardized approach to care for patients with total joint replacement following acute care. However, there are relatively few studies that have compared the outcomes after rehabilitation for various discharge destinations. In a randomized trial with three months follow-up of patients following total hip replacement where patients were randomized to home-based care or inpatient rehabilitation, patients in the home-based group reported significantly greater improvements in quality of life.131 More patients in the home-based group reported that they received their preferred treatment. However, in patients with total knee replacement, there were no differences between the home-based group and inpatient rehabilitation group and more patients in the inpatient rehabilitation group felt they had received their preferred method of care. It has been suggested that this may be attributed to more demanding rehabilitation following total knee replacement as compared to total hip replacement.131
A retrospective cohort of 146 patients compared patient characteristics and outcomes of patients who received inpatient rehabilitation following total joint replacement with those who received home care after discharge from acute care. No significant differences in patient outcomes (Western Ontario and McMaster University Osteoarthritis Index (WOMAC), 36-Item Short-Form Health Survey (SF-36), and patient satisfaction) were found between the two groups. The group that received home care was more likely to be men, with social support, be more knowledgeable about total joint replacement and have a preference to receive care at home. There were no significant differences between the groups in terms of comorbidity or level of social support.

In a descriptive comparative study by Kelly and Ackerman (1999), functional outcomes of patients with total joint replacement were compared between those discharged to subacute rehabilitation and those discharged to home with homecare follow-up. There were no differences in functional outcomes between the groups. The mean total cost of total joint replacement was significantly less for the patients discharged home with home physical therapy. The group who received inpatient rehabilitation were more likely to be older, have comorbidities, and live alone.

Kane et al (2000) estimated the difference in functional outcomes attributable to discharge to one of four outcomes following five types of illness, including hip replacement and the costs and benefits attributable to each destination. For hip procedures, the optimal destination to achieve maximum functional outcome was recommended as home with home health.

Although there are few studies that compare home-based care with inpatient rehabilitation, the available evidence to date suggests that home-based care has similar outcomes as inpatient rehabilitation. Further research quantifying the costs and outcomes of various rehabilitation processes are needed. It has been suggested that strategies, to assist clinicians to make timely and appropriate discharge decisions regarding discharge decisions and destinations, are also required.

2.4.8.3.2 Outpatient Rehabilitation

There is minimal literature that has compared outpatient physiotherapy to other options for rehabilitation. The literature that is available pertains primarily to total knee replacement. A randomized control trial of outpatient physiotherapy following inpatient physiotherapy compared to inpatient physiotherapy and a home program found that the outpatient group performed better with respect to knee ROM measured by a blinded observer. These differences were not statistically significant. A definite limitation of the study was the lack of measurement of any functional outcomes following total knee replacement.

Only a small percentage of patients will have difficulty in obtaining proper knee function following surgery. A retrospective chart review comparing inpatient physiotherapy following total knee replacement to inpatient and outpatient physiotherapy was conducted in a Toronto hospital. Patients in these two groups had similar preoperative functional
status. At time of discharge from outpatient physiotherapy, there were no significant differences between the groups in terms of Western Ontario and McMaster Osteoarthritis Index (WOMAC) or Timed Up and Go (TUG) scores, or mean change in these scores. Despite a longer course of rehabilitation, the inpatient plus outpatient group did not have a significantly better functional outcome compared to the outpatient group.\textsuperscript{159}

A randomized control trial was used to evaluate the effectiveness of a new intensive functional rehabilitation program on functional ability and quality of life in persons following primary total knee replacement. The treatment program commenced two months after surgery and consisted of 12 outpatient rehabilitation sessions with individualized home exercises. Subjects with the intervention walked further in the six minute walk test at all evaluations and had less stiffness, pain, and difficulties with activities of daily living at two evaluations, suggesting rehabilitation in the subacute phase can optimize functional recovery.\textsuperscript{90}

Only one study was examined that compared outpatient physical therapy to homecare. In this study, home-based physical therapy monitored by a physical therapist by telephone was compared to outpatient physical therapy. There were no significant differences in patient performance between the groups.\textsuperscript{160}

The literature comparing outpatient care to other rehabilitation processes warrants further research to determine the optimal processes of care following total joint replacement.

\textbf{2.4.8.3.3 Determinants of Inpatient Rehabilitation}

The best functional outcomes and prosthesis survival rates for total hip replacement were described among patients who were age 45-75 years, weighed less than 70kg, had strong social support, had high education, had better preoperative function and had no comorbid disease.\textsuperscript{148,161} The following characteristics have been consistently associated with discharge to inpatient rehabilitation: older age, comorbidity and living alone.\textsuperscript{150,162} Being female and housebound prior to admission has also been associated with increased discharge to inpatient rehabilitation.\textsuperscript{151} In a retrospective chart review, MacDermaid and O’Callaghan (2000) identified duration of disease, level of preoperative complications, lack of support at home, and previous total knee replacement as risk factors for inpatient rehabilitation for patients following total knee replacement.\textsuperscript{128} Ridge et al (2000) explored the relationship among functional status, pain, and mobility and found that pain and mobility varied widely among patients and may or may not be associated with patient function at three months post discharge. The authors recommend caution when using pain and mobility in discharge criteria.\textsuperscript{163}

Lingard et al (2000) compared postoperative rehabilitation management in 12 orthopaedic centres in the United States, United Kingdom and Australia.\textsuperscript{164} Differences were found between these centres in the use of extended care facilities and outpatient physical therapy services. The variation was associated with financial resource availability.\textsuperscript{164} Better decisions about discharge could improve the outcomes for patients.\textsuperscript{157} It is not clear in the literature how much these factors that are associated with inpatient rehabilitation influence the amount, type and setting for rehabilitation services.
Nor is it clear to what degree these factors are considered when determining discharge destinations. It is important to determine best practices and the most effective methods of addressing the rehabilitation needs of patients.

### 2.4.8.3.4 Criteria for Determining Discharge Destinations

Hospitals often use discharge criteria to guide decisions for specific patient populations. Failure to identify optimal timing of discharge from acute care could result in unsafe discharges, ineffective utilization of hospital beds, and delayed recovery. Few discharge criteria are outlined or evaluated in the literature. However, one example of a systematic process for determining discharge was reported by Wong et al (1997). They proposed a discharge scoring system for patients with total hip replacement to determine optimal timing for discharge and post-acute placement. The proposed post-total hip replacement discharge scoring system provides a method for quantifying clinical criteria to permit a reproducible, objective determination of timing for discharge of patients. Variables are assigned scores to indicate patient readiness for discharge, which may assist with determination of optimal discharge destinations. The proposed scoring system uses four parameters to guide decisions: patient characteristics; social support; the severity of the illness; and comorbidity. No evaluation of the effectiveness of this tool was described.

### 2.4.8.4 Athletic Activity Recommendations

The long-term impact of regular physical activity on prosthetic longevity is debated. Assumptions have been made on prosthetic longevity based on in vitro testing of implant material capacity, in vivo measurements in hip studies, mathematical models, and clinical outcome studies using age as a proxy for activity. This literature will not be examined in detail here. In a review of the literature, recommendations for sports and exercise following total joint replacement were made. To recommend an activity following total joint replacement, factors such as wear, joint load and intensity, and type of prosthesis need to be considered. Participation in athletic activity can increase the risk for joint bearing surface wear and loosening of implant fixation. For total knee replacement it is important to consider the load and angle of knee flexion. It is recommended that patients should remain active following total joint replacement. It is generally suggested that activities should be low impact and low contact. For example, swimming, cycling, or walking are recommended. Tennis and hiking might be appropriate for some people. High impact sports are not recommended. It has been suggested that it is more prudent to be conservative with total knee replacement than total hip replacement. Further research is warranted on the long term impact of athletic activity on both total hip replacement and total knee replacement.

### 2.4.8.5 Driving

Driving is an essential component of daily life for many adults. One recent study on driving following total hip replacement examined driving reaction time. Driving reaction time is one measure of driving capability. Driving reaction time was measured using a driving simulator system that has a car brake and accelerator pedal. The results
showed that driving reaction time worsened one week postoperatively for patients who had a right hip replacement and then improved up to one year postoperatively. Patients who had a left hip replacement improved after the first postoperative week. Overall, patients reached their preoperative driving reaction time four to six weeks postoperatively although patients with a left total hip replacement could be ready to resume driving as early as one week postoperatively.\textsuperscript{167}

2.4.8.6 Follow-up

Follow-up after total joint replacement has been reported in the literature. Orthopaedic surgeons in the United States were surveyed on follow-up care for patients with total joint replacement. The results showed that 80\% of respondents recommended annual or biennial orthopaedic clinical and radiological examinations with more frequent follow-up times for clinical signs of failure, previous revision surgery, previous joint sepsis, and subnormal periprosthetic bone quality.\textsuperscript{168} In a chart review of patients following total joint replacement, Bhatia and Obadare (2003) found that 78\% of patients had no problems.\textsuperscript{169} Most problems were identified at the first outpatient appointment following surgery. They recommended that the postoperative out-patient appointment of the patients with total hip and knee replacement should be restricted to a visit at six to 12 weeks followed by discharge if no problems are anticipated.\textsuperscript{169} Practice patterns for follow-up vary amongst orthopaedic surgeons and there is limited evidence to suggest appropriate timing and frequency of follow-up visit.

2.4.9 Length of Stay

Lengths of stay in acute care hospitals in Ontario following total joint replacement have decreased steadily in recent years.\textsuperscript{150} Between 1995/1996 and 2001/2002, the median LOS for primary total hip replacements decreased from eight days to six days in Ontario. Similar trends were reported for total knee replacements. In Ontario in 2001/2002, the median acute care LOS was longer for patients discharged directly home compared to patients who were transferred to inpatient rehabilitation. These findings have also been reported outside Canada.

With the reduction in LOS, research has emerged examining the effect of these reductions on patient outcomes. One prospective observational study found that short-term outcomes at three months following total hip replacement in a population with osteoarthritis, measured by the Charnley Hip Scoring system and Nottingham Health Profile, were not affected by a marginal reduction in LOS in situations when adequate rehabilitation and support were available.\textsuperscript{170} In this study, variability in patient outcomes was not explained by differences in hospital LOS.\textsuperscript{170} A study of the correlation between outcome and knee ROM following total knee replacement found that early discharge from the hospital, prior to achieving 90 degrees ROM in the knee, did not appear to have a negative impact on short term outcomes.\textsuperscript{171}

Hospitals have implemented various interventions and strategies to facilitate a reduction in LOS following total joint replacement whilst maintaining quality of care. A number of interventions reviewed in the current literature have been shown to impact LOS, with the
most common interventions being clinical pathways, preoperative rehabilitation, weekend coverage, coordination of care, and hospital at home.

2.4.9.1 Length of Stay - Clinical Pathways

Generally, acute hospital LOS has been shown to decrease with the implementation of clinical pathways. Practice guidelines have also resulted in decreased LOS for patients with total joint replacement. Refer to the Clinical Pathways section 2.4.7.3 for more details. There is evidence that functional outcomes remain unchanged or improved with reduced LOS and the implementation of clinical pathways for total knee and total hip replacements.

2.4.9.2 Length of Stay - Preoperative Rehabilitation

Crowe et al (2003) evaluated a preoperative rehabilitation program for patients with complex needs undergoing total hip and total knee replacements in order to determine the effect on hospital LOS. Participants were assessed by a physical therapist, occupational therapist, and a nurse and scheduled into the appropriate aspects of the program. A preoperative education package was provided, including a booklet and video. These focused on patient responsibility during the postoperative phase as well as precautions following surgery and preparation for home. Some patients were given a tour of the unit, a demonstration of equipment, dietitian counseling, pharmacy, and social work input. All patients received counseling from an occupational therapist about devices to assist with activities of daily living. A physical conditioning program was available for patients to focus on strengthening either in an outpatient physical therapy department or in-home by a physical therapist. When evaluated, the program demonstrated favourable outcomes. Patients who had preoperative rehabilitation reached discharge criteria earlier and had a significantly shorter LOS than the control group (mean of 6.5 days versus 10.5 days).

2.4.9.3 Length of Stay - Weekend Coverage

Many hospitals have implemented weekend physical therapy coverage in order to reduce acute care hospital LOS for patients following total joint replacement. Research has indicated that weekend physical therapy coverage, in addition to traditional five days per week coverage, has been shown to reduce postoperative LOS for people following total joint replacement. Seven days per week physiotherapy coverage was shown to be effective at reducing LOS compared to five days per week coverage. However, six days per week physiotherapy versus seven days per week physiotherapy did not result in significant differences in LOS, discharge destination or discharge disposition for patients with total joint replacement. Although research suggests that weekend physiotherapy coverage is warranted, the amount of coverage (six versus seven days) remains unclear.

2.4.9.4 Length of Stay - Coordination of Care

Coordination of care and multidisciplinary team work have been identified as important components of patient care. Relational coordination has been defined as frequent, timely, accurate communication, that includes problem solving, shared goals, shared knowledge,
and mutual respect among health care providers. The impact of relational coordination on patient outcomes following total joint replacement has been measured using a quality of care index, LOS data, and postoperative pain and function scores from the Western Ontario and McMaster Osteoarthritis Index (WOMAC). Results showed that LOS was reduced when a relational coordination approach was utilized. Furthermore, quality of care was improved by relational coordination; postoperative pain was reduced; and function was improved by several dimensions of relational coordination, including frequency of communication, the strength of shared goals, and degree of mutual respect among health care providers. These results highlight the importance of formal processes to strengthen communication and relationships among health care providers in order to reduce LOS and improve outcomes.174

2.4.9.5 Length of Stay - Hospital at Home

Hospital at home schemes aim to either facilitate early discharge from hospital, prevent admission, or provide palliative care.175 Hospital at home can be defined as a service that provides treatment by health professionals, that would typically require an acute care admission, in the patient’s home.176 A Cochrane review of hospital at home concluded that hospital at home may reduce pressure on acute care beds as LOS in acute care is reduced. However, this advantage was offset by the provision of hospital at home services.176 An evaluation of the effectiveness of inpatient compared to hospital at home interventions for patients undergoing primary total joint replacement found that patient satisfaction and carer satisfaction were greater for the hospital at home group. There were no significant differences in incidence of postoperative complications and only findings of joint stiffness, as measured by the WOMAC, differed between the groups, favoring the hospital at home group.175

2.4.10 Outcome

Outcome after primary total hip and total knee replacement is reported in the literature as being very favourable.177-181 Although revision surgeries are generally less successful than primary procedures, both total hip and knee revision surgeries also produce favourable outcomes for most patients.180-182

Various ways of reporting outcome are reported in the literature. Historically, outcome was assessed from a surgical perspective and addressed issues such as loosening, complications, morbidity, and mortality.183 More recently, outcome is also assessed from the perspective of the patient, and addresses issues such as pain, function and satisfaction.183 It is recognized that the effectiveness or success of a surgical intervention is determined both by its ability to please the patient as well as the outcomes as defined by the surgeon.184 The outcomes movement has been stimulated by a number of factors. These factors include the importance of determining appropriate care for joint replacement patients, the phenomenon of geographic area variation and increasing costs of medical care.184 With increasing demands being placed on our health care system, evidence-based practice including measuring outcomes to validate orthopaedic techniques178 is critical for ensuring optimal care for patients undergoing total hip or knee joint replacement.
2.4.10.1 Short-term Outcome

Outcome is typically assessed according to short-term and long-term status. Long-term outcome is defined as five-to-ten years or longer and short-term outcome is defined as one to five years.\(^{185}\) However, outcome in the period from time of surgery up until one year is also important and for purposes of this report is included in short-term recovery. Recovery in both the short-term and the long-term, is an important consideration for patients, health care professionals, hospital administrators and policy makers. In the short-term, from the perspective of the patient, recovery of function and reduction of pain are important factors governing expectations and adaptation to functional limitations. Knowledge of typical short-term outcomes can also help hospital administrators allocate sufficient resources so that health care professionals can provide optimal care during the postoperative period. In the long-term, long-lasting successful outcomes contribute to improved quality of life for patients and decreased burden on the health care system.

Measuring both short and long-term outcomes is critical for optimizing patient care and promoting continuous improvements. Short-term outcomes for total hip and knee replacements were found to be significantly different at seven weeks postoperatively.\(^{186}\) Aarons et al (1996) found that function as measured by the WOMAC had improved for total hip replacement patients but not for total knee replacement patients.\(^{186}\) Pain as measured by the WOMAC and by a visual analogue scale was more reduced at seven weeks postoperatively for total hip than for total knee replacement patients.\(^{186}\) Short-term outcome at six weeks postoperatively as measured by the Self-paced walk, Timed Up and Go, and ability to negotiate stairs was equal to preoperative levels in total knee replacement patients.\(^{153}\) A study examining attainment of four functional milestones, including sit-to-stand transfers, supine-to-sit transfers, ambulation to a distance of 100 feet, and climbing stairs, in the immediate postoperative acute care period determined that overall, patients who had undergone total hip replacement required fewer treatment sessions and postoperative days to achieve independence than those who had undergone total knee replacement, with the exception of supine to sit transfers.\(^{187}\)

Both short-term and long-term outcomes are reported in the literature. Ultimately, favourable long-term outcomes are most desired by patients. Since many factors are important for determining long-term outcomes, this review addresses some of the specifics reported in the literature related to outcome, such as age; function; range of motion; pain; morbidity/mortality/medical complications/surgical complications; and satisfaction.

2.4.10.2 Age and Outcome

The long-term results of total hip replacements performed in patients less than 45 years of age have a worse prognosis with respect to functional outcome and prosthesis survival.\(^{188}\)\(^{185}\) Cemented total hip replacements in adolescents did not produce encouraging long-term results.\(^{188}\) The probability of failure reached nearly 50% after 15 years indicating the most favourable candidates are those who have a sedentary level of function because of some other musculoskeletal disease, have a form of bilateral hip disease that is not treatable with an osteotomy, and weigh sixty kilograms or less.\(^{188}\) In a prospective cohort,
evaluating the results of a consecutive group of patients 55 years or younger, who underwent cemented total knee replacement, excellent results were demonstrated at various stages of follow-up: one year, five years, 10 years, and latest follow-up which ranged between 10 and 17 years.177

Advanced age alone is not a contraindication for total knee replacement.185 Persons aged 75 to 80 years and older experienced dramatic improvement in pain after undergoing either total hip or total knee replacements both in the short-term and the long-term.183 190 191 Age did not have an effect on Short Form Health Survey– 36 (SF-36) scores in patients scheduled for total hip replacement.192 In patients scheduled for total knee replacement, there was a statistically significant correlation between age and SF-36 scores for men (bodily pain, general health, vitality, social functioning, and mental health) and women (bodily pain, general health, and mental health).192 Although those over 80 years of age were more likely to have multiple comorbidities, the number of comorbidities was not predictive of hospital length of stay. However, having no comorbidities was predictive of having no major postoperative complications. When performed on patients who are medically stable, both primary total hip and total knee and revision total hip replacements were found to be reliable, durable, and relatively safe for patients 90 years of age and older.190 193 For a cohort of sixty-five patients 90 years and older who were followed for up to 10 years and assessed for patient satisfaction, substantial relief of pain and improvement in function were reported.193 Medical and surgical complications were common, but overall did not compromise the ultimate outcome of the operation.193

A study comparing functional ability perceived by individuals following total knee replacement compared to age-matched individuals without knee disability, demonstrated that perceived function among men and women who had undergone total knee replacement was approximately 80% of that of age-matched controls as measured by the Lower Extremity Activity Profile (LEAP).194 When perceived function was measured by the WOMAC in the same group men perceived their functional ability at approximately 87% of men their own age and women perceived their function at approximately 75% of their counterparts.194

2.4.10.3 Function and Outcome

When measuring function, use of both self-report questionnaires and physical performance measures is important.194 Generic health status measures used in conjunction with patient-reported disease-specific scales are also considered useful.195-197 Function includes tasks such as sitting, walking, housework, shopping and negotiating stairs. Several studies have determined that patients with greater dysfunction prior to surgery will not attain comparable functional outcomes as those patients with less preoperative dysfunction.161 185 189 198 More specifically, the more disabled patients were preoperatively, the less likely they were to be able to walk greater than one mile for at least one year.161 Outcome was the least desirable when patients required assistance with activities such as walking, housework and grocery shopping.161 189 However, patients who are worse off preoperatively derive the most net benefit from surgery.161 181 185
2.4.10.4 Range of Motion and Outcome

Less commonly, active range of motion (ROM) of the knee is reported as an outcome following total knee replacement. A study examining whether knee ROM after total knee replacement correlates with responses on select items of the WOMAC functional scale determined that knee ROM is difficult to predict from self-administered surveys of a patient’s functional status. Limb function as measured by the WOMAC was only moderately related to ROM of the index knee and 95 degrees of knee flexion was found to be a clinically meaningful cut-off point above which ROM does not typically limit a patient’s activities after total knee replacement. In a study looking at discharge destination, postoperative ROM was not a determinant of discharge destination. Body weight has been found to have a significant influence on both the preoperative and postoperative flexion of the knee.

2.4.10.5 Pain and Outcome

Pain relief is one of the main reasons that patients undergo total hip and total knee replacement, making pain intensity an important outcome to measure. Preoperative teaching regarding pain control is very effective for controlling pain in the immediate postoperative period. A substantial decline in pain was reported in a cohort of patients with a mean age of 70 years who underwent total knee replacement between the preoperative period and the six-month follow-up with an additional decline occurring between the six and 12-month evaluations. Likewise with knee revision surgery, a meta-analysis found there was substantial pain relief as well as improvement in function following surgery.

2.4.10.6 Morbidity/Mortality/Medical Complications/Surgical Complications and Outcome

A study looking at 30-day mortality rate, one-year mortality rate, readmission rates, complications, and rate of transfusion found that patients undergoing simultaneous bilateral total knee replacement are at a slightly increased risk for perioperative cardiovascular, pulmonary, and neurological complications compared with those undergoing unilateral total knee replacement. The average convalescence period was also slightly longer in the bilateral group. Patients undergoing bilateral total knee replacement also experienced a higher rate of postoperative confusion. The authors hypothesized this may be secondary to lower hemoglobin readings. No difference in the rate of deep vein thrombosis between bilateral and unilateral total knee replacements was found.

Another study comparing bilateral and unilateral total knee replacement medical complication rates found that cardiopulmonary complications were nearly three times higher in the bilateral group. When patients 80 years or older who underwent total hip or total knee replacement were compared to a group who had an average age of 70.5 years, the patients 80 years and older were more likely to have multiple comorbidities. However, in either group, the number of comorbidities did not predict the occurrence of postoperative complications. Generally, the effect of comorbid diseases is controversial,
with other authors reporting presence of comorbid diseases having a negative effect on postoperative functional status. For example, the presence of comorbid conditions, longer time in the operating room, abnormal laboratory values, and cases considered to be higher risk were associated with increased postoperative length of stay and 30-day morbidity.

A study that assessed outcome from the perspective of dislocation following total hip revision surgery determined the following:

- Age and gender were not significant risk factors for dislocation following revision
- Larger (28-32 mm diameter) femoral heads were associated with lower rates of dislocation than were smaller (22mm diameter) femoral heads
- Elevated rim liners reduced the rates of dislocation in primary and revision replacements
- Surgical approach did not affect dislocation rates
- Trochanteric nonunion is a significant risk factor for instability
- Only about one-third of hips that dislocated and were treated conservatively remained stable after non-operative treatment.

2.4.10.7 Satisfaction and Outcome

With total knee replacement, overall satisfaction is approximately 85% (156, 298) and is determined by the degree to which outcome matches expectations. Expectations are partially determined by the patient understanding of the information that was given them before the surgery. Patients with better states of social, emotional, and physical well-being are more likely to be satisfied, demonstrating that patient satisfaction is closely associated with patient-assessed quality of life variables. Self-report functional status scores appear to be very good predictors of patient satisfaction.

In Sweden, a study was undertaken to determine patient satisfaction after total knee replacement on all patients operated on between 1981 and 1995. The question regarding satisfaction was answered for 27,372 knees and overall showed that 81% were either very satisfied or satisfied; 8% were dissatisfied; and 11% remained uncertain. Some specific findings from this study were:

- Women with osteoarthritis who had a total knee replacement were slightly less satisfied than men.
- The more chronic the disease, the smaller the fraction of dissatisfied or uncertain patients.
- In patients with rheumatoid arthritis, there was a correlation with higher mean age and dissatisfied patients, whereas in patients with osteoarthritis there was no significant correlation between age and group of satisfaction.
- In patients with both osteoarthritis and rheumatoid arthritis, those who had not had the patella resurfaced with a button were generally not as satisfied as those who did have the patella resurfaced.
- Patients with revisions were generally less satisfied than the patients with unrevised knees.
• Patients revised for infections were more often dissatisfied than those revised for other reasons.\textsuperscript{207}

In order to measure outcome after total hip and total knee replacement, standardized tools are necessary.\textsuperscript{208}

2.4.11 Outcome Measures

Outcome measures, ideally, should inform and promote best practices and quality assurance or continuous quality improvement initiatives.\textsuperscript{208} Documentation of complete, plausible, and comparable data that can be analyzed to implement corrective measures is key to quality assurance.\textsuperscript{209} Quality assurance is not meant to expose individual mistakes. It is however, designed to analyze processes, treatments, and implement specific solutions.\textsuperscript{209} Joint registries allow such analyses to occur. It has been proposed that economic variables should be collected in national joint registries along with outcomes data.\textsuperscript{210} It is important that outcome measures are reliable, valid, and responsive.

Reliability refers to “the ability to differentiate among clients and provide consistent values on repeated assessments.”\textsuperscript{211} Types of reliability include internal consistency, test-retest reliability, and interrater reliability.\textsuperscript{211} Validity refers to “the ability of a tool to assess what it is intended to measure” which means that validity is not an all or none property.\textsuperscript{211} There are also different ways of expressing validity including: face validity, which considers whether a measure appears to be measuring what it is intended to measure; content validity, which assess the extent that a measure is composed of a comprehensive sample of items that completely assess the domain of interest; criterion validity, which examines the extent to which a measure provides results that are consistent with a gold standard; and construct validity, which is necessary in the absence of a gold standard and involves forming theories about the topic of consideration and then assessing the extent to which the measure provides results that are consistent with the theories.\textsuperscript{211} Reliability is a prerequisite of validity. However, reliability does not ensure validity.\textsuperscript{211} Responsiveness “focuses on clinically important change and contributes to the interpretation of a measure.”\textsuperscript{211} Responsiveness is extremely important to distinguish those patients who benefit from a procedure and those who do not.\textsuperscript{212}

Several standardized tools for measuring outcome following total hip and total knee joint replacement are available and in use. Both self-report and performance measures that are disease-specific and general health measures are considered important for assessing overall outcome following total hip or total knee replacement.\textsuperscript{196} Following is information regarding some of the more commonly used measures.

2.4.11.1 Disease-specific Measures

The University of Iowa Level of Assistance Scale is a performance measure that grades short-term outcomes in the acute phases of rehabilitation related to the following five activities: ability to get out of bed; stand from the bed; ambulate 4.57 m (15 feet); ambulation velocity walking a 13.4 m (44 feet) distance; and climb up and down three
steps.\textsuperscript{213} These five activities of The University of Iowa Level of Assistance Scale demonstrate moderate-to-good between-tester reliability and good-to-excellent within-tester reliability when applied to patients with total hip or knee replacement.\textsuperscript{213} The assessment of the five functional activities appears to be valid as demonstrated by the close association between the total functional score and the Harris Hip Rating Scale scores.\textsuperscript{213} The total functional score of the five activities appears to be responsive to changes in patients’ functional status between two and six days postoperatively.\textsuperscript{213}

The Lower Extremity Function Scale (LEFS) is a self-report functional status measure that was conceived to be applicable to all lower extremity conditions of musculoskeletal origin.\textsuperscript{214} The LEFS has been demonstrated to be a reliable and valid measure for assessing lower extremity functional status following total hip and total knee replacement.\textsuperscript{214}

The Lower Extremity Activity Profile (LEAP) is a self-report questionnaire that has been used for individuals with end-stage hip or knee osteoarthritis and total knee replacement.\textsuperscript{211} It assesses perceived difficulty and satisfaction with the activity categories of self-care and mobility and the participation categories of household, work, leisure, and social activities. Questions concerning pain severity and frequency, the effect and subsequent satisfaction of knee disability on emotional health, sleep and rest patterns, and appearance are also included.\textsuperscript{211} Reliability as measured by internal consistency equals 0.73.\textsuperscript{211}

The Patient-Specific Index for Total Hip Arthroplasty, as originally developed, is administered by an interviewer.\textsuperscript{215} The self-reported version, which is more feasible and less expensive, has been shown to be reliable and to have criterion validity compared with an interviewer-administered version.\textsuperscript{215}

The Oxford Hip Score (OHS) is a 12-item self-report questionnaire that specifically assesses function and pain after total hip replacement.\textsuperscript{216} With the OHS, sensitivity to change after total hip revision surgery has been demonstrated, providing evidence of its construct validity.\textsuperscript{216}

The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) is a self-report measure that assesses pain, stiffness, and physical function. The pain scale of the WOMAC has been shown to be more responsive than the function section and the stiffness scale less responsive than both the pain and function scales for both hip and knee patients.\textsuperscript{217} The responsiveness of all scales combined was comparable for hip and knee patients.\textsuperscript{217} However, there was a tendency to greater change for hip interventions.\textsuperscript{217} In a study comparing the responsiveness of six knee outcome measures for patients undergoing total knee replacement, the WOMAC was most responsive when comparing preoperative and six month postoperative scores.\textsuperscript{212} This suggests that this measure would be the most likely to show a change in score if the patient’s clinical status were to change. These findings are confirmed by another study that demonstrated good responsiveness of the WOMAC at both three- and six-month intervals postoperatively.\textsuperscript{212}
The Knee Society Clinical Rating System (KSS), a performance measure, is composed of two components, function and pain, which are weighted equally to produce an overall score. In a study comparing the responsiveness of six knee outcome measures for patients undergoing total knee replacement, The Knee Society System was the second most responsive when comparing preoperative and six month postoperative scores. The ability of the Knee Society Clinical Rating System to be responsive in the three to six months postoperative period following total knee replacement has been confirmed in another study. A study further analyzing the components of the KSS found that the knee score was a responsive instrument for assessing the outcomes of total knee replacement and the function score was not. Both the knee and function scores demonstrate convergent construct validity with the comparable domains of the WOMAC and SF-36.

The Timed Up and Go (TUG) is a performance measure that was designed to assess general balance and function and has been used as a test with total joint replacement patients. The TUG has demonstrated excellent reliability and validity has been established by comparing the time score with measures such as the Berg balance scale and the Barthel Index of Activities of Daily Living (ADL). The TUG has been determined to be an appropriate performance-based measure to use to plan for service requirements following total joint replacement. Specifically, total joint replacement patients with TUG scores between 15 and 24 seconds were almost four times more likely to receive homecare following inpatient rehabilitation and those with TUG scores greater than 25 seconds were almost eight times more likely to require homecare following inpatient rehabilitation.

2.4.11.2 General Health Measures

The Nottingham Health Profile (NHP) is a self-report general quality of life measure. Both good reliability and validity have been demonstrated with the NHP repeatedly discriminating between different types of patients.

The 36-Item Short-form Health Survey (SF-36), a self-report measure, has been shown to be reliable and valid in several patient populations. The SF-36 assesses eight functional categories including physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health. The SF-36 is sensitive to change after total hip or total knee replacement and is recommended as a general health measure because of its ease of use, interpretability, and limited training required to administer and score responses. The SF-36 also has the ability to reveal differences between total hip and total knee replacement and between men and women. One drawback with the SF-36, found in a study looking at appropriateness of questionnaires for total knee replacement, was that patients reported a significantly greater frequency of requiring assistance to complete the SF-36 compared with other general health questionnaires.

The 12-Item Short-form Health Survey (SF-12) is a self-report measure and contains a subset of items from each of the eight concepts represented in the SF-36. This tool has been shown to be reliable and valid. Several interesting findings were reported in a
study that addressed use of the SF-36 to document the burden of osteoarthritis and the benefits of total joint arthroplasty including:

- Preoperative scores on the SF-36 were not significantly different for those undergoing total hip or total knee replacement
- Women consistently scored lower than men for all domains of the SF-36
- Comorbid conditions were weakly associated with low SF-36 scores
- Postoperatively, the largest incremental improvement in scores was seen at three-month follow-up
- Scores improved sooner and more substantially in total hip replacement versus total knee replacement patients and in men versus women.\(^{192}\)

In a study looking at appropriateness of questionnaires for total knee replacement, the Sickness Impact Profile was not recommended due to poor ratings with respect to reliability, validity, and feasibility which was calculated by taking the usable response rate as well as the time required for each patient to complete and the need for assistance to complete.\(^{223}\)

### 2.4.12 Summary

The purpose of this literature review was to investigate best practices related to total hip and total knee joint replacement. There is extensive literature, of varying types, available related to several topics regarding total joint replacement. Some of this literature yielded suggestive evidence that provides direction for a best practice approach, while other literature yielded only emerging or inconclusive evidence. Suggestive evidence, for the purposes of this report, includes one or more randomized control trials rated excellent or good, or one or more systematic reviews rated excellent or good, or four or more other types of research rated fair or above. Emerging or inconclusive evidence, for the purposes of this report, includes one or more randomized control trials rated fair, or one or more systematic reviews rated fair, or three or fewer other types of research rated fair or above. Table 2 summarizes the types of research, number of studies reviewed, as well as the assigned rating.

### Table 2. Summary of Literature

<table>
<thead>
<tr>
<th>Type of Research</th>
<th>Number</th>
<th>Quality (E/G/F/P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative – RCT</td>
<td>43</td>
<td>6/32/5/0</td>
</tr>
<tr>
<td>Prospective Cohort</td>
<td>43</td>
<td>6/28/9/0</td>
</tr>
<tr>
<td>Quantitative Retrospective Review</td>
<td>29</td>
<td>2/16/9/2</td>
</tr>
<tr>
<td>Quantitative – Other</td>
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<td>5/28/14/1</td>
</tr>
<tr>
<td>Systematic Review</td>
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<td>2/17/3/0</td>
</tr>
<tr>
<td>Qualitative</td>
<td>16</td>
<td>2/10/4/0</td>
</tr>
<tr>
<td>Other</td>
<td>48</td>
<td>2/34/11/1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>249</strong></td>
<td><strong>25/165/55/4</strong></td>
</tr>
</tbody>
</table>
There is suggestive evidence supporting the following practices and/or interventions for achieving optimal outcomes after total hip and total knee replacement:

- Preoperative education through various media
- Use of clinical pathways
- Pain management using IV PCA, epidural analgesia, lumbar plexus blockade, oral medications, and intramuscular injections
- Options for blood conservation
- Venous thromboembolism prophylaxis using one of three recommended anticoagulants
- Rehabilitation during the preoperative, acute, and post-acute phases.

There are reliable and valid self-report and performance measures that assess disease-specific as well as general health issues available, to measure functional recovery following total joint replacement. Measuring outcome has become especially critical in an ever-changing health care environment.
CHAPTER 3
SUMMARY OF GREY LITERATURE

Key Findings

- Written information is the most common type of educational media provided to patients undergoing total joint replacement.
- Most information is provided to patients during the preoperative phase of the continuum of care.
- Variations and inconsistencies in practice exist with respect to provision of grey literature for patients undergoing total hip and total knee replacement, across the continuum of care, in the GTA.

3.1 Introduction

Grey literature includes pamphlets, printed sheets, and various forms of audiovisual information that contain information regarding a specific topic. The information contained in grey literature is often derived from a number of sources including published literature, current clinical and administrative practices, formal and informal hospital-specific policies and procedures, and published and unpublished web-based information.

3.2 Purpose

The purpose of this component of the research was to gain an understanding of the educational materials hospitals and other institutions in the Greater Toronto Area are currently providing to patients, and families of patients, undergoing total hip or total knee replacement. A secondary purpose was to investigate any other educational or information-sharing initiatives that hospitals and other institutions are currently undertaking.

3.3 Methods

3.3.1 Data Collection

Grey literature regarding total hip and total knee replacement was collected in the following manner:

1) Two meetings, during a seven-week period from June to August 2004, with The Change Foundation Provider Group whereby a focus group methodology was utilized to discuss and verbally share current practices regarding grey literature;
2) Provider Group members shared copies of grey literature that was currently used at their institutions for total hip and total knee replacement patients and their families;
3) Researchers had access to other sources of grey literature from other institutions across the province of Ontario; and
4) Representative from community care access centres (CCACs) in the GTA presented and shared information regarding an initiative currently being implemented for patients with total hip and knee joint replacement.

The mandate of the Provider Group was to act in an advisory capacity to the content experts and the steering committee as well as provide access to organization-specific material currently used for patients with total hip and total knee replacements. Members of the Provider Group were representatives of rehabilitation programs from hospitals in the Greater Toronto Area that voluntarily agreed to have their staff participate in this initiative.

3.3.2 Sample

One or more representatives of rehabilitation from nine institutions participated in the first Provider Group meeting, verbally discussing and sharing information regarding current practices with respect to grey literature. There were three representatives of rehabilitation from three of the same institutions represented at the first meeting who participated in the second Provider Group meeting. Five of the nine institutions also shared copies of grey literature currently in use at their respective institutions. All focus group participants were involved in rehabilitation of patients who undergo total hip and total knee replacement. This involvement was of two types: clinical and administrative. Composition of the Provider Group included representatives from acute care hospitals, freestanding inpatient rehabilitation hospitals, acute care hospitals with inpatient rehabilitation services, and community care access centres. Physiotherapy, occupational therapy, and nursing professions were represented by the participants.

3.3.3 Focus Groups

Provider Group meetings were chaired by an appointed member of the group. The focus groups dedicated to discussing and verbally sharing current practices regarding grey literature were jointly conducted by the content experts. The content experts conducted the focus groups according to the following list of items/topics.

1) Preoperative phase – e.g., professionals that assess patients, specific assessments and procedures patients undergo at this stage, any educational media that are provided to patients at this stage
2) Surgical and acute care phase – e.g., care pathways, clinical practice guidelines, outcome measures, practices with respect to analgesia, anticoagulation, continuous passive motion, therapy services offered (disciplines seen, frequency of treatment, weekend coverage), any educational media provided at this stage
3) Post-acute care/rehabilitation phase – settings for rehabilitation that you access for your patients, e.g., home, home with CCAC, outpatient rehabilitation, inpatient rehabilitation; do you have your own designated inpatient rehabilitation beds or do you refer elsewhere?; do you have your own outpatient rehabilitation department or do you refer elsewhere?; any educational media provided at this stage
4) Community services that you access for your patients/with whom you partner
5) Experiences with CCAC services
6) Brainstorm about ideal/optimal care across the continuum for total hip and total knee joint replacement.

This list of items/topics was circulated by e-mail to participants approximately five days prior to the meeting so they would have time to consider the content of discussion. At the time of the discussion, questions/topics were open-ended and nondirective in order to allow participants to generally describe their current practices with respect to grey literature. Probes were utilized to gain more specific details regarding current practices.

Both content experts, as well as a representative from the GTA Rehab Network, took detailed notes of the discussion. These notes were subsequently presented to the Provider Group for verification of accuracy of content.

3.3.4 Copies of Grey Literature

This material was reviewed by the two content experts with respect to the following components:
   1) educational content;
   2) intended audience;
   3) purpose of providing the information;
   4) stage of administration e.g., preoperatively, during acute care stay, during post-acute care stay; and
   5) type of media e.g., written, class, video, etc.

Detailed notes were recorded according to the above components.

3.3.5 Education Component of CCAC Initiative

CCACs servicing GTA hospitals plan to implement an initiative for patients with total hip and total knee joint replacement that includes visits by CCAC personnel preoperatively at the hospital and in the home, and postoperatively in the home.

The preoperative and postoperative visits include an education component. This education involves teaching preoperative and postoperative exercises and safety regimes. Written materials provided to patients include an information sheet regarding the CCAC service delivery approach to patients with total hip or knee joint replacements and a checklist of items related to preparation for return home after surgery.

3.3.6 Analysis

The detailed notes of the focus groups and the detailed notes of the review of copies of the grey literature, and a summary of the presentation and notes regarding the CCAC initiative were contrasted and compared according to the components listed above. Results are provided descriptively outlining current practices in participating hospitals in the Greater Toronto Area, in the next section.
3.4 Results

Grey literature that institutions were utilizing for patients following total hip and total knee replacement addressed a variety of educational initiatives aimed at patients, families and formal/informal caregivers. The grey literature will be described according to the following components:

1) Content;
2) Audience;
3) Purpose;
4) Stage; and
5) Type.

3.4.1 Content

Hospitals and other institutions shared pamphlets or booklets that were tailored to either total hip or total knee replacement. Those relating to total hip replacement included any or all of the following topics:

- What is arthritis
- What is the structure of the hip joint
- What is the function of the hip joint
- What is a total hip replacement
- What is total hip revision surgery
- Why would one have a total hip replacement
- What to expect preoperatively in assessment clinics
- What to bring to the hospital
- How to expect during hospital stay
- What to expect after surgery and acute care stay
- Plans and/or options for discharge from acute care
- Pain control
- How to care for your incision
- Members of the healthcare team
- Safe body positions/movement precautions (often these are surgeon-specific and depend on the practices and surgical approach used by individual surgeons)
- Equipment/assistive devices needs
- Equipment vendors
- Transfers and mobility
- Activities of daily living such as bathing, dressing
- Home safety
- Leisure activities
- Sexual activity
- Car transfers and driving
- Exercises
- Information about antibiotics and metal implants
- Risks associated with total hip replacement surgery and potential complications
• Benefits of total hip replacement
• Personal support provider agencies
• Other services available in the community e.g., pools
• Return follow-up visits
• Long-term care of your hip.

Those relating to total knee replacement included any or all of the following topics:
• What is arthritis
• What is a total knee replacement
• What to expect preoperatively in assessment clinics
• What to bring to the hospital
• How to prepare one’s home for recovery
• What to expect during hospital stay
• What to expect after surgery and acute care stay
• Plans and/or options for discharge from acute care
• Patient’s role in process
• Pain control
• Proper positioning/what to avoid
• Members of the healthcare team
• Equipment/assistive devices needs
• Equipment vendors
• Transfers and mobility
• Activities of daily living such as bathing, dressing
• Home preparation and safety
• Leisure activities
• Sexual activity
• Car transfers and driving
• Exercises
• Information about antibiotics and metal implants
• Risks associated with total knee replacement surgery and potential complications
• Personal support provider agencies
• Other services available in the community e.g., pools.

3.4.2 Audience

The majority of the grey literature was directed at and written in a manner that addressed patients. An understanding of the information provided was also important for family members and formal and informal caregivers. With reference to the team caring for total joint replacement patients, both patients and family members were occasionally identified as the most important members of the team. Some institutions have formalized programs for inclusion of one or more family members, spouses, or friends to be included as part of the team, acting as a coach or guide to the patient. The role of the patient as an active participant was noted to be critical throughout the various stages of the rehabilitation process.
3.4.3 Purpose

Although not explicitly stated, it appeared that the purpose of the grey literature and information-sharing was to prepare patients for the various stages of total hip and/or knee joint replacement, and thereby facilitate active participation. There was also a planning component to the content of the grey literature so that patients could plan ahead with respect to various factors such as what to bring to the hospital, ordering equipment ahead of time, preparing one’s home for return from the hospital, and post-acute care stay arrangements for rehabilitation. Most grey literature that was reviewed had a section where patients could record any questions.

3.4.4 Stage

Information was provided and shared at all stages of the continuum including preoperatively in physicians’ offices, preoperatively in patients’ homes, preadmission clinics, acute care settings, inpatient rehabilitation settings, outpatient rehabilitation settings, and community home-based care settings. By the time patients reached the post-acute care stage, most information shared was related to exercises, activities of daily living and precautions.

3.4.5 Type

Information was provided and shared through various media including written materials, audiovisual methods, class format and individual oral instructions.

3.5 Summary

Written information regarding total hip and total knee replacement was the most common type of grey literature utilized to provide education to patients and families. Grey literature was routinely provided to patients undergoing total hip and total knee replacement throughout the various stages of the continuum, with the bulk of information being provided preoperatively. Information provided in the grey literature was directed mainly at patients. The purpose of the various packages of information was not explicitly stated. However, there was often an implied purpose based on the content of the information that the information was intended to prepare patients for the various stages of total hip and/or total knee joint replacement, including return home following total hip or total knee joint replacement. The content of the various pamphlets and other media included a wide range of topics. There was variation in the content of the grey literature from each of the participating institutions. These findings demonstrated variations and inconsistencies in patient education practice with respect to total hip and total knee replacement, across the continuum of care, in the GTA.
CHAPTER 4
QUALITATIVE PROJECT

“What do Patients Undergoing Total Hip and Knee Joint Replacement Want to Know?”

Key Findings

- Four main categories of themes related to information needs emerged from interviews with patients who were either scheduled to undergo a total joint replacement or who had undergone a total joint replacement in the previous six months including psychosocial, medical/surgical, episode of care, and physical/functional.
- The emergent themes validated the importance of having a comprehensive information package regarding total hip and total knee replacement available for patients, families, and their informal caregivers.
- Several methods of learning about total joint replacement were identified by participants, including the internet.

4.1 Purpose

The purpose of this qualitative project was to investigate the educational needs of adults who undergo total hip and total knee replacement surgery. This project was one of the three components of the overall study investigating best practices related to total hip and total knee replacement.

4.2 Objectives

The specific objectives of this study were to determine:
1. educational needs of individual patients who are scheduled to undergo a total hip or total knee replacement in the GTA and individual patients who are three to six months following total hip or total knee replacement that occurred in the GTA; and
2. common themes or concepts regarding what patients undergoing total hip and total knee joint replacement want to know.

4.3 Study Design

The method of research should be determined by the research question. To address the objectives of this research study, a qualitative research design was utilized. Qualitative research is interpretive, with an emphasis placed on meanings, experiences, views, and attitudes of the participants involved. A qualitative research design was chosen to address the research question “What do Patients Undergoing Total Hip and Knee Joint Replacement Want to Know?” for the following main reasons:
1) the question is value-laden;
2) the question addresses specific individuals and groups of individuals with a specific problem, at a specific time;
3) the question is contextually-dependent; and
4) there has been relatively little previous investigation into this aspect of total hip and total knee replacement and therefore little understanding, compared to the volumes of quantitative data regarding total hip and total knee replacement.

4.4 Patient Recruitment

A purposive sampling technique was utilized for this study. This type of sampling involves identification of participants who possess characteristics or live in circumstances relevant to the phenomenon under study and are most likely to provide relevant information to the research question. Potential participants, including patients who were planning to undergo a total hip or total knee replacement in the GTA or were three to six months following total hip or total knee replacement that occurred in the GTA were recruited through participating orthopaedic surgeons at The Toronto Western Hospital and St. Joseph’s Health Centre, Toronto, Ontario. Potential participants were then contacted by telephone by one of the two research associates using a standardized script (Appendix III). During this telephone conversation, further details regarding the study, were provided by the research associate.

4.5 Inclusion/Exclusion Criteria

Participants were eligible for this study if they:
1) were scheduled to undergo a total hip or total knee replacement in the GTA;
2) were three to six months following total hip or total knee replacement that occurred in the GTA;
3) were able to participate in an interview lasting approximately one hour; and
4) were able to understand and converse in English.

Potential participants were ineligible for this study if they met the above criteria but were suffering from cognitive impairment.

4.6 Data Collection (Interview)

A semi-standardized interviewing method following an interview guide (Appendix IV, Versions 1 and 2) was used to gather data from individuals who were scheduled to undergo a total hip or total knee replacement in the GTA (Version 1) or were three to six months following total hip or total knee replacement that occurred in the GTA (Version 2). With semi-standardized interviewing methods, the interviewer asks certain, specific questions in the same manner with each subsequent interview. However, as necessary, the interviewer is free to alter the order of questioning, as well as probe for more information. Probes, or prompts, are questions not included in the interview guide that encouraged participants to elaborate on their responses and provide further discussion. Probes were posed in a neutral manner. For example, “Mrs. Smith, you mentioned you are interested in knowing what activities you will be able to do once you are home from the hospital, could you please explain in more detail, what activities about which you
would like to know?” Based on emergent data, two additional questions were added to the initial interview guide, for subsequent interviews. These questions were:

1) Please describe to me your preferred methods of learning information related to total joint replacement.
2) Have you spoken to any other people who have experienced total joint replacement? If so, please tell me about that conversation.

The interviews lasted approximately one hour and were conducted by one of the two researchers working on this study. One of the researchers had previous experience in qualitative research and interviewing and she supervised and trained the other researcher. Prior to each interview, participants were given an information sheet (Appendix V, University Health Network and Appendix VI, St. Joseph’s Health Centre) and a consent form (Appendix VII, University Health Network and Appendix VIII, St. Joseph’s Health Centre). Participants were given the opportunity to ask further questions about the study and the consent process prior to the interview. Consent forms were signed prior to the interview and each participant was given a copy. With the consent (Appendix IX, University Health Network and Appendix X, St. Joseph’s Health Centre) of each participant, interviews were tape-recorded. Tape recordings allowed for repeated examination of the primary data by the researchers. Tape recordings also allow reproduction of hesitation and uncertainty of speech.

The interviews were conducted at a time and in a location that was chosen by, and was convenient for each participant. Thirteen of the fifteen participants chose to be interviewed in their homes. One participant was interviewed at her place of employment and another participant chose to be interviewed at a restaurant close to his place of employment. For two of the interviews, family members as well as the participant participated in the interview.

The researchers recorded notes on an Interview Notes Form (Appendix XI) before, during, and after the interviews. These notes included the researcher’s thoughts on the interview itself, documentation of any nonverbal communication demonstrated by participants, as well as any conversations that were not tape-recorded before and after the interviews.

Data collection continued until saturation was reached. Saturation occurred when no new themes emerged with subsequent interviews.

4.7 Data Management

Following each interview, tape recordings were transcribed verbatim, by a professional transcriptionist. Each participant was assigned a unique identifier, to ensure confidentiality. Names were omitted from transcriptions and interview notes forms; unique identifiers were used. The data were entered into N5, a qualitative software package that was used to help organize the data. Only the researchers, transcriptionist, staff, and members of the Greater Toronto Area (GTA) Rehab Network have access to the audiotapes and transcriptions. These are kept in a secure locked cabinet at the offices of the GTA Rehab Network at 550 University Avenue, Toronto, Ontario.
4.8 Data Analysis

A comparative contrast method of analysis was utilized. The transcript of each interview and accompanying Interview Notes Form (Appendix XI) were analyzed upon completion and prior to interviewing of the next participant. Using a coding process, words and groups of words were identified that addressed the research question. These words and groups of words were organized into themes. Each researcher undertook this exercise independent of the other researcher and then the researchers met to compare and reconcile an understanding of emergent themes. This process of cross-referencing contributed to the rigour of the study. The initial interview guide was modified to include new questions that addressed new and developing themes. This method of ‘analyzing as you go’ contributed further to the rigour of the study.225

4.9 Participants

Of twenty-two potential participants who were approached, fifteen participated. All who participated in the study, consented to tape recording of the interview. All participants were English-speaking. Five were booked for a total hip or total knee replacement and ten had undergone at least one total hip or total knee replacement in the previous three to six months. Two participants were male and thirteen were female. The age of participants ranged from 23 to 89. Table 2 summarizes available demographic and biomedical information pertaining to the participants.

Table 3. Demographic and Biomedical Information for Participants

<table>
<thead>
<tr>
<th>Participant ID</th>
<th>Joint</th>
<th>Age</th>
<th>Sex</th>
<th>Pre/Post</th>
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<td>Pre</td>
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</table>

4.10 Results

Several themes emerged from the interviews, regarding educational needs of patients undergoing total hip or total knee replacement. At the heart of these themes was one
overarching goal that was based on the real potential for improved quality of life after total joint replacement. By accessing information about total joint replacement participants described how ‘knowing’ certain things would enable them to achieve this improved state. With respect to specific information that participants wanted to know, themes emerged under four broad categories including: Psychosocial; Medical/Surgical; Episode of Care; and Physical/Functional. Figure 2 depicts the four main categories of information that participants described as important to know in order to achieve a state of improved quality of life through a successful joint replacement. Table 3 summarizes the emergent themes related to the broader categories.

Figure 2. Main Categories of Information Important for Patients to Know

Categories of information important to help patients achieve an improved quality of life through a successful joint replacement

Psychosocial   Medical/Surgical   Episode of Care   Physical/Functional
Table 4. Emergent Themes

<table>
<thead>
<tr>
<th>Psychosocial</th>
<th>Medical/Surgical</th>
<th>Episode of Care</th>
<th>Physical/Functional</th>
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<tr>
<td>Lack of Knowledge</td>
<td>Arthritis</td>
<td>Access/Waiting List</td>
<td>Positioning</td>
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<tr>
<td>Expectations</td>
<td>Surgical Procedure</td>
<td>Timing of Surgery</td>
<td>Therapy and Exercises</td>
</tr>
<tr>
<td>Fears</td>
<td>Risks</td>
<td>Preadmission Visit</td>
<td>Walking and Negotiating Stairs</td>
</tr>
<tr>
<td>Knowing the Team/Arthritis Specialist</td>
<td>Anaesthesia</td>
<td>Preparation for Surgery</td>
<td>Gait Aids</td>
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<tr>
<td>Asking Questions</td>
<td>Bilateral Replacements</td>
<td>Postoperative Routine</td>
<td>Precautions</td>
</tr>
<tr>
<td>Family Information Needs</td>
<td>Longevity of the Replacement/Revision</td>
<td>Length of Stay/Discharge Destination</td>
<td>Equipment</td>
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<tr>
<td>Formal and Informal Supports at Home</td>
<td>Comorbidities</td>
<td>Follow-up</td>
<td>Bathing and Pedicure</td>
</tr>
<tr>
<td>Responsibility</td>
<td>Blood Donation</td>
<td></td>
<td>Driving/Car Transfers/Transportation</td>
</tr>
<tr>
<td>Technology</td>
<td>Anticoagulation</td>
<td></td>
<td>Recovery Period</td>
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<tr>
<td></td>
<td>Pain Management</td>
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<tr>
<td></td>
<td>Stitches/Wound Care</td>
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</table>

4.10.1 Psychosocial Themes

Lack of Knowledge

Although participants knew of the option for joint replacement, they did concede to a lack of knowledge about the surgery and the rehabilitation process. Throughout the interviews this was particularly true of those participants in the preoperative phase. Participants in the postoperative phase, also admitted to a lack of knowledge prior to their experiences with joint replacement. These findings demonstrate the importance of the final goal of this project, which is to develop a web-based comprehensive information package for patients undergoing total hip or knee replacement surgery and their informal caregivers.

The following excerpts illustrate a general lack of knowledge about joint replacement surgery and rehabilitation amongst participants.

“I think it’s the cartilages that are going to be taken out and artificial ones put in and that’s about all I know.”
“No, [I don’t know about the rehabilitation after], that I would like to know.”

“Well I don’t really know that much about [joint replacement] and I never asked [the doctor] anything really about what they were using or what the prosthesis was like, so I don’t know, I don’t know and uh, I should know … when I have the next one done I’ll try to find out a little bit more about it.”

**Expectations**

Participants referred to expectations from two main perspectives: the actual process they would undergo with a joint replacement including preparation, the surgery, rehabilitation and recovery; and the impact on their wellbeing or quality of life. Participants were most definitive about expecting an improved quality of life after joint replacement surgery and less certain about what to expect with the process and continuum of care. For example, the following quotations illustrate some uncertainties expressed by participants:

“I don’t know whether I lose all the swelling or not. It’ll be interesting.”

“Some people tell me that you’ll see you won’t have any pain at all in that knee, well, I don’t know, I have it now.”

“Well I can’t think of anything else pertaining to the operation … no, I don’t know what to expect.”

**Fears**

A number of fears was expressed by participants. Fears ranged from those that dealt with more general issues such as overall outcome, to those that were more specific. Examples of general fears included: what if the surgery was not as successful as anticipated; were two consecutive joint replacement surgeries too close together; what if the joint replacement fails and revision is necessary; would advanced age impact negatively the outcomes of surgery; would the surgery impact one’s ability to travel; what if surgery resulted in being dependent on others; and who would one contact if there are problems once discharged home. Examples of specific fears included: would there be enough help in the hospital to help with getting to the washroom if there were an urgency; would pain make getting to the bathroom difficult in the immediate postoperative period; what would be the effects of postoperative complications such as chest pain when cardiac status is already compromised; anaesthetic; postoperative pain control; precautions causing one to not function independently; fear of having a catheter postoperatively; needing a lift on footwear; using public transit; and returning to work. In the context of the various conversations where these fears were identified, participants generally proposed that having information relating to their specific area of concern would help to alleviate some of their fears. Participants also acknowledged that with joint replacement surgery, there would always be a degree of apprehension or fear.
Knowing the Team/Arthritis Specialist

Participants acknowledged that several health care professionals would be involved in their care. Knowing these individuals, including an understanding of their roles, was said to be very important. The concept of having one member of the team, aside from the surgeon, as a specialist to whom they could consult, at various stages of their joint replacement was also important. Concepts related to the team are illustrated by the following quotations:

“As I told you, knowing the team is … very important and knowing who I can contact other than the receptionist.”

“You want to know [the surgeon’s] people.”

“…because Canada doesn’t have a lot of surgeons, joint replacement surgeons, maybe somebody else could help like be with him and follow up … with the patients, like you can do this, you can do that, maybe not him because he is a very busy person and I totally understand that. … it should be another person in charge with a little more medical capacity to help you out to be able to answer questions, to follow up with things.”

Asking Questions

Having opportunities to ask questions of the various members of the health care team throughout the continuum of the joint replacement process was identified as important for participants and allowed them a method of accessing information. Participants felt that it is important that patients should know that they should ask questions about any concerns or unknowns they may have.

“Maybe I should have asked more questions.”

“Yes, I would agree that [people should be encouraged to ask questions].”

“I always ask … but you know they’re not going to tell you unless you ask.”

Family Information Needs

Participants identified that their families and other informal support systems require information regarding total joint replacement. Participants said that having information would enable families to know how they could help, especially in the home environment, as illustrated by this quotation:

“…it will be good for my husband and my mother to learn more about how they can help me to cope after the surgery and what they can do.”
Formal and Informal Supports at Home

Participants recognized that having help once they were discharged home was often necessary. The two main sources of help that were described were family and friends and professional caregivers. Absence of family was also noted to impact on help received. Accessing information regarding what family and friends could do to help and how professional help could be accessed was important.

“I’m going to get somebody come in, a friend, or not my daughter, ‘cause she has too much herself, but I’m getting grandson coming and help me cleaning up, bending down in corners.”

“If I can get somebody to come in once or twice [to help me] take a bath or whatever.”

“But I do live alone. So I have no help, I mean there’s nobody living with me, so that makes a difference.”

Responsibility

Participants also identified the importance of patients accepting some responsibility for the success of their joint replacement. They said that it is important for those contemplating joint replacement surgery to know there is responsibility involved on the part of the patient. This responsibility was described with respect to a positive attitude and expecting to have to ‘work’ at the recovery process, as illustrated by these quotations:

“I’m always thinking that it will be good.”

“The rehabilitation means first of all you’re going to have to work.”

Technology

Accessing information regarding new technology related to joint replacement surgery and care was also identified by participants as being important. A quotation from one of the younger participants who was concerned about his future and the possibility of revision surgery illustrates the type of information desired.

“So, the technology, if it’s around great, if it’s not, not much I can do but basically, I just want to know like if new things are coming out… if you can sort of get a yearly info’ thing.”
4.10.2 Medical/Surgical Themes

Arthritis

Participants also expressed that having information regarding arthritic disease would be beneficial including specifics related to the type of arthritis, causes and management of symptoms. The following excerpts from two participants, relatively young and old, and with rheumatoid arthritis and osteoarthritis, respectively, illustrate the desire for arthritis-related information.

“I need more information about the disease… the information that I have found and I like sometimes to have more information regarding my age because I’m not the only one – a lot of people are very young with rheumatoid arthritis, the information so far is related to more older people than to younger.”

“I would like to know what happened to [my joint], why does it go that way, … he says in one of my bones there’s a fracture there and uh, I don’t know why the fracture is … I had a Baker’s cyst a year ago and nothing was done about it … they said your body will absorb the fluid in time … now does that create this problem?”

Surgical Procedure

Participants expressed interest in receiving information regarding details of the surgical procedure, including specifics regarding the prosthesis.

“I need more information about … the surgery.”

“I happen to like to know exactly what is going to happen and what is going and what is staying … and what it is made of, all of those kinds of things.”

“I was later informed by [the doctor] that the way he does this operation is slightly different than other surgeons, I don’t know if he is the only one or one of the ones that do it this way… he performs the operation through the gluteus maximus so that he doesn’t … cut the muscle that you need to walk.”

Risks

Participants were also interested in knowing any potential risks or complications associated with joint replacement surgery. There comments illustrated how upsetting suffering a complication can be.

“I don’t want to come home, come out of the hospital with an ulcer on my heel, which is nothing but a bed sore… I will be very upset if it happens again. I’m an old nurse … and we were always told that if anybody got a bed sore and that’s what all a heel ulcer is, it was poor nursing care.”
“[The anaesthetist] said the complications were less, he hinted particularly because of age, and I know very well that at a certain point I think over 70, whatever, every time you have a general there is a possibility that you’re not going to be quite as sharp.”

**Anaesthesia**

Information, regarding options available for anaesthesia as well as advantages and disadvantages of each, was identified by participants as being important.

“…the anaesthetist, for me, is very important, to know what kind of an anaesthetic I am going to receive … how much, the amounts, for how long I’m going to be unconscious … like what’s going to be the side effect after the anaesthesia, those kind of questions are very important for me to be resolved before surgery… because anaesthesiology is very important, it’s your life in the hands of that person, more than the joint replacement.”

“I can’t have anaesthetic and I could see what he was doing and hear and I spoke… I had a block and what’s the other one? Epidural, yes and you’re in a frame and the anaesthetist positions you so that the doctor gets right where he wants you and he didn’t mind and none of the other doctors minded that I was awake… but it didn’t bother me at all. I could hear the chisels and the hammers and the screws and everything.”

**Longevity of the Replacement/Revision Surgery**

Participants expressed concerns about potential need for revision surgery in the future. They were interested in knowing approximate lifespan of their joint replacements, specifics regarding revision surgery and if there are any measures they can undertake to avoid the need for revision surgery. The following quotations illustrate the anxiety surrounding revision surgery, necessitating the need for information about revision surgery:

“That’s the only thing that I don’t know is if in ten years if it has to be replaced, what exactly they replace.”

“I remember that generally going into the surgery that depending on my variables and how things played out generally the guarantee from the doctors and the surgeons I think was it may last five to 25 years - pretty big gap – so, maybe narrowing it down but if you can’t, you can’t.”

“For example, the life of the joint replacement is around an average of ten to fifteen years, maybe, if you take care of it, if you don’t abuse it, if you do make exercise, but if you also take care of this point, or it doesn’t matter,… a little bit more information regarding what I should and what shouldn’t I do.”
Bilateral Replacements

Participants demonstrated that they were aware that when joint disease is present in both extremities, that bilateral joint replacement performed during the same operative period is an option. Information regarding advantages and disadvantages of bilateral joint replacement was identified to be helpful and as illustrated by the following quotation, some participants had their own opinions.

“And don’t go in and push your doctor to do both at once, that’s, that’s not a good idea, you’re going to have enough with on your hands doing one at a time.”

Comorbidities

Participants described concerns they had about how their general health status could potentially affect the outcome of their total joint replacement. In the descriptions they provided, it was apparent that having information about the effect of comorbidities on outcome would be helpful as illustrated by these quotations:

“I’m restricted because of all the other things and that’s the only thing that is pulling me back, my heart is not, I can’t have surgery on my heart, it’s gotten too bad.”

“So I just have to build up the defenses whatever they are, it’s just like every morning when I get up I need to at least have, I need to be up for at least half an hour before I sort of move, I just, I don’t know what it is, but it starts to build up the body’s defenses at being conscious and I guess assess the environment’s temperature, because if I move for like, I’ve had really retarded things where like I’ve bent over to tie my shoelaces and somehow, whatever, like I can feel the blood flow in me, sort of, and whatever it did to the spine when I tied the shoelaces, I got sickle cell, I sickled from that and I was out for four days. And that’s just retarded. But, yeah and the arthritis has now become a conduit that can trigger it.”

Blood Donation

Participants were interested in knowing more information about blood donation and blood transfusion, including what procedures surrounded giving one’s blood prior to surgery and if there were options for family members to donate their blood for use by a relative.

Anticoagulation

Participants spoke about their experiences with effects of thromboses, medications for anticoagulation, as well as anti-embolic stockings. The following quotations illustrate the type of information that is required by patients regarding the topic of anticoagulation:
“…as long as I keep active I don’t see why I’d get another blood clot again.”

“I knew about the stockings for the legs… so I mean I probably would have had questions about that type of stuff.”

“I don’t have someone from the VON or St. Elizabeth nurses come in to do my fragmin shots.”

“I didn’t need a lot of help and that I could manage on my own and basically the only that I could not manage on my own was the support hose… that was the only thing that I actually needed help.”

**Pain Management**

Participants expressed the need for information regarding pain management at various stages of the continuum, including while awaiting surgery, in the immediate postoperative period and during the rehabilitation/recovery period. Interest in forms of pain management, other than medications, was evident from the interviews.

“… but information like how can you help to manage the pain before surgery. More knowing that I am not having the surgery right now because there is a waiting list so big – what can I do in these three or four months?”

“To know… like how bad is going to be the pain or if you, well at this point I don’t think that it’s going to hurt but I think that I can manage the pain but if I’m going to have enough medicine to calm down that pain – one thing that concerns me very much.”

“…there is more pain in the rehabilitation stage than I think a lot of people going in, know.”

**Stitches/Wound Care**

Details regarding care of the surgical wound including stitch/staple removal and bathing were identified as important pieces of information.

“There was final apprehension, people have already said that they are going home, they have no arrangements to go anywhere else and they were handed something for somebody to take out stitches. And by the way, it’s day 15.”

“How can I help the wound to close and be in good condition, I think this is very important to keep it out of infection.”
4.10.3 Episode of Care Themes

Access/Waiting List

Throughout the course of the interviews participants demonstrated that they realized there are waiting lists in existence in the Greater Toronto Area for joint replacement. With respect to information needs regarding access to joint replacement participants specifically indicated a need for information related to how prioritization occurs and whether one’s position on the waiting list can change depending on circumstances. These concepts were illustrated, by a participant who was awaiting joint replacement and experiencing progressively increasing pain, when she said,

“Is it based on, you know, first come, first served or is it based on priorities? If a priority really begins because [of] acute agony, can that, you know, be updated or changed or [do you] stay at the end of the list?”

Timing of Surgery

Participants spoke about their struggles with the decision-making process regarding appropriate timing of their joint replacement surgery, as illustrated by the following quotation:

“… to do the surgery, I think, the only question I had was, when, since the surgeon was going to decide what.”

Stories of waiting as long as possible were in contrast to other stories that promoted the concept of having the surgery sooner rather than later. The waiting as long as possible scenario was illustrated by this relatively young participant who had undergone a hip joint replacement, when he said,

“I was very stubborn about [getting a joint replacement]. Basically I had found out, sort of the value, that keeping your original parts is a lot better and so… I was just basically thinking I’ll just do [without a replacement] until I die… but I gave into complaints, the hip wouldn’t shut up… the squeaky wheel got the grease sort of.”

Another participant who was in the preoperative period for a knee joint replacement and had postponed the decision to undergo surgery for a lengthy period said,

“The doctor has been talking to me for over five years now and I’m getting older. But then after the knee [was] getting worse and worse and worse I told him that’s enough. Only this year I decided that I would do it.”

Participants described their decisions to proceed with surgery sooner rather than later often were made after consultation with others who had been through the experience.
The following quotation illustrates the impact of speaking with others on the decision-making process,

“I was under the impression that I should really wait as long as possible until the day that I couldn’t walk anymore and after discussing with all these people I realized that the sooner I did this the better my life would be. And um, so I decided that as long as I could find a surgeon that would agree with my decision to go ahead with the operation that I would rather do it sooner rather than later and uh enjoy my life. You know, say the next 10 years when I am still young enough to enjoy it and uh rather than waiting in pain and increasing pain.”

Another participant said,

“…each person that I talked [to] wished that they, you know, he or she hadn’t waited so long to have it done, because I mean their lives have improved, you know, so much… And of course, you know, you talk to all sorts of different people like, you know … you figure, if all these people have improved their lives why shouldn’t I do the same thing?”

**Preadmission Visit**

Participants expressed the need to know details of what happens during the preadmission visit, including the amount of time it will take.

“I guess I was surprised at the length of the pre-op when I went last time. It wasn’t until I filled out the forms, it was like four to six hours and I think it was almost four hours because I had to see the anaesthesiologist and the therapist, give blood, I think they took x-rays at that time, blood pressure and blood and everything like that.”

**Preparation for Surgery**

Participants provided several details regarding important information that helped them prepare for surgery. They spoke of preparation of themselves, general preparation for the hospital stay, as well as preparation of their home environments. Specifically, participants were interested in knowing:

- what if any of their own medications they should bring to the hospital
- if they may bring some of their own food to the hospital
- what exercises, if any, they should do prior to surgery
- if there are any blood tests that are required prior to surgery
- what notification is required regarding place of employment
- what equipment will be needed at home
- what preparations need to be made to the home environment
- the discharge destination following the acute care stay
- information about preparing food ahead of time to have at home
- what clothes and toiletries to bring to the hospital.
Postoperative Routine

Details of the routine following the surgery, while in the hospital environment were important pieces of information that participants identified. They were interested in knowing specifics such as when they would be up out of bed and when they would walk.

“I would like to know what is going to happen after the surgery, like that week I know it’s going to be around a week, what’s going to happen during that week? If I’m going to be able to walk the next day or if I’m going to be in bed, if I’m going to be like making exercises there, those would be the main questions.”

“I have no idea what to, the rehabilitation… I’m not familiar with it, like how long it takes, whether it’s just few hours a day or whether, by the time you go, you have to have crutches or something wouldn’t you to walk?”

“Getting to the bathroom, is a big factor, that’s prevalent in my mind right now, that’s my concern.”

Length of Stay and Discharge Destination

Information related to length of hospital stay and discharge destination, was identified by participants, as important information. Having such information facilitated planning for their return home.

“…when I go in the hospital and after surgery, how long will [I] be in the hospital?”

“I was just told that at the end of the stay you move to Hillcrest or St. John’s, so the option of going home really hadn’t been mentioned except by him. The fact that he mentioned it was very useful to me.”

Follow-up

Closely related to the recovery period theme was the follow-up theme. Participants were particularly interested in information regarding who would do the follow-up and when the follow-up would occur as illustrated by the following quotations:

“…what’s going to happen if I’m really bad, if I have to go into emergency and stay and wait in emergency room for whatever hours, that’s my main fear… all of a sudden you know, having a problem of some kind and [I] really need to speak to somebody, you know, is there going to be some support mechanism, 24-hour line or something?”

“…knowing who I can contact other than the receptionist, those are the things that I want to know.”
“…like after I come home will I still see the doctor? Will I have to go back and see the doctor once in a while?… what the follow-up is… and what he thinks, how he thinks it’s coming along.”

4.10.4 Physical/Functional Themes

Positioning

Participants wanted information regarding positioning oneself to provide comfort as well as preventing complications.

“One thing before surgery I think, for example, now that I have, like, so much pain, I don’t have any information on, like I feel good with a pillow between the knees”

“How long do I have to live with a pillow between the knees?”

Therapy and Exercises

Participants were interested in knowing several details regarding therapy and exercises including protocols, frequency and duration.

“During those three months my questions are what am I going to do during those three months? I understand I have to make exercises for rehabilitation, I would like to [know] if it’s going to be here, if I have to go to the hospital everyday or if I have to go somewhere else, am I going to be directed where to go or if I’m going have to find on my own – who’s going to help me. That’s basically what I would like to know.”

“The point is, the weight carrying and the number and how long I should hold it, the number of times I should work for because of course it went from 15 to 20 and 30 and finally 40, I’m delighted when the therapist does that.”

“… I don’t know whether it’s walking or I have no idea what kind of therapy… am I going to be able to walk in with a cane or am I going to need a walker?”

Walking and Negotiating Stairs

Information with details regarding ability to walk in the immediate postoperative period as well as during the recovery period were high on the list of participants’ priority lists. They were also interested in practicalities involved in negotiating stairs.

“[Getting better would mean] no pain and able to walk.”

“And actually two days after the operation I was walking, so and I could get out, in and out of bed by myself and so you know all those things were actually a relief.”
“The nurse that was down there gave me, said don’t go for long walks, shorter more often walks are more beneficial than trying to knock yourself out because I was walking probably the first couple of days trying to show that I could go, you know, quite a bit further and whatever.”

“The only problem that I have encountered with this leg at this moment is I can’t go up the stairs without holding to the railing… but I cannot do it without holding and that’s another thing that I will ask him, you know, this is the normal thing?”

“I’ve wondered about stairs, well you’re not sent home until you can manage stairs. That was something that I wanted to know.”

**Gait Aids**

Participants were interested in knowing what gait aids they may be required to use at different stages of their recovery.

“You know I could manage very well on my own, you know, I mean I went for all the exercises but only for a few weeks, and like you know I didn’t have the lengthy recuperation that a lot of people say they have to go through and you know, I didn’t, I only walk with a walker probably for three to four weeks and after that a walking stick and after that I just managed on my own.”

**Precautions**

Having information regarding do’s and don’ts was described as being very important to participants. They referenced these statements with respect to achieving positive outcomes, avoiding complications and avoiding necessity for revision surgery. Participants were interested in knowing any specific precautions they need to take regarding dentistry. The following quotations illustrate the importance participants placed on having access to information regarding precautions:

“I feel that as I go along I’ll be told what I should do, what I shouldn’t do and what I can do and what I can’t do.”

“I just feel that my life has changed because I am an old lady now. And I can’t do the same things, I can’t expect to, but once I can get out, [then I may have some questions about what activities I should or shouldn’t do] ‘cause I like to go in the pool.”

“I wasn’t given any restrictions other than certain movements. Now, the one thing that I forgot to ask the last time that I was there, is this movement will be forever or just during the time that the muscles are kind of binding together again.”

“… having to worry about any dislocations. I was, I was very surprised that I had to be quite so careful about even crossing my feet.”
Equipment

Participants expressed necessity of information regarding equipment that would enable them a safe return home and safe reintegration back into their communities.

“But those [bath seats], how do I get them, who supplies them? That I don’t know and where will I find out?”

“I have a walker and a wheelchair and not everybody needs that, but I have it for many things, but it is good to borrow them, there’s many places you can borrow them from…”

“It was regarding things such as how to use the reacher. I couldn’t put socks on then, the other plastic implement that you know, you use to put socks on, this someone demonstrated.”

Bathing and Pedicure

Practicalities regarding ability to bathe independently and tend to toenails, upon discharge home, were of concern to participants.

“I thought that I would have to have help to bathe and help to you know, move around the house… and then I found out that I really didn’t need.”

“I have also a very good set-up because I have a walk-in shower and things that, to make it easier.”

“In the shower I have a stool which I am still using… I had to sit on the stool and they, my tub is high so they had to lift my legs up over that. But when I came home the second time after therapy, I was able to do that myself.”

“Make sure they take care of their feet and toenails before they go in, even if they spend money on a chiropodist, because that is very convenient, very important, ‘cause you can’t bend, you can’t cut your nails.”

Driving, Transportation and Car Transfers

Participants expressed a need to have information regarding issues related to using public transportation, driving and transferring into vehicles.

“I opted to take the subway rather than the GO Train because I thought it would be easier just to walk onto the subway than have to up on and worry about the hustle and bustle of the GO Train.”

“I haven’t been driving yet but it’s not all together because of the knee and I’m getting another car that will be easier to get in and out of… I was told I believe
that I couldn’t drive for three months and um, well the three months is up but I didn’t… ask him about driving.”

“Do you know of any services we could have set up for her to be picked up and taken to physio?”

“I didn’t know for example, how much it matters when you are getting into and out of a car to begin with that you are very, very careful in how you do it.”

**Recovery Period**

Participants were interested in details regarding the period required for recovery. Most frequently they expressed a need for information regarding time frames. In reference to a booklet that a participant had been given, who had undergone both knee and hip replacements, she said:

“I’m still referring to it but some of the things that, some of my rehab took a little longer than my expectations were. Because I was thinking knee, it, the rehab for the hip, is quite different.”

“So for me it was, it was important to know I mean what their experiences had been. How long they had been recuperating, how long had it taken them to, you know, go back to normal, you know to resume their normal lives and all that.”

“… they should know their timing, it’s not just do it, do it and then you’re going to get up and walk away from it, it doesn’t work that way.”

**Employment**

Information needs regarding employment were most prevalent in participants who were relatively young and related to various factors including

1) estimated time required to recover from the surgery and rehabilitate
2) rights that patients have in terms of their jobs being protected and available for them to return to
3) whether certain jobs are even possible following joint replacement.

The following quotations provide examples of the necessity for information regarding joint replacement surgery and how it does or does not affect employability:

“I have questions even about what’s the best way to communicate to the company you work for now… to know what’s the best way to communicate and that it’s not going to affect my job.”

“Actually two weeks after the operation I came to work… I mean I wasn’t 100% and I didn’t work full time; I came to work one day and the following week I came to work two days and the following week I came to work three days and I
shortened the length of the day... You know I found that in spite of everything there were all kinds of things that I couldn’t that I couldn’t do but I could get around it.”

“I was always very concerned about when I was going to be able to come back to work.”

4.11 Summary

The emergent themes from this qualitative study validate the importance of having available an all-inclusive information package regarding total hip and total knee joint replacement for patients, families, and their informal caregivers. Through their narratives, participants of this study illustrated the importance of accessing information regarding a multitude of topics related to total joint replacement.

Participants provided the following practical tips to be applied when developing the information package based on the results of this study:

1) large font size should be utilized so that those with visual impairments can read the information; and
2) diagrams and pictures are excellent complementary methods of providing information.

The ultimate goal of this project is to develop a web-based information package regarding total hip and knee joint replacement. During the interviews participants were asked for their preferred methods of learning as well as their opinions regarding accessing information from the internet. Several methods of learning about total joint replacement were suggested by participants including written information, supplemented with diagrams and pictures; television; demonstration; audiotape; video; communication with health care professionals; communication with others who have undergone joint replacement; and internet. It is acknowledged that not all participants of this study would access the internet. Evidence from the interviews illustrated that, participants, would however, read any printed hard copies of information provided to them, from a reputable site.

The themes that emerged from this qualitative project all addressed the participants’ ultimate goals of improved quality of life with total joint replacement. Emergent themes have provided topics and content information required by patients undergoing total hip and/or total knee joint replacement. Evidence and/or best practices pertaining to these topics and content, as derived from the literature (Chapter 2) and the grey literature (Chapter 3) are integrated with the findings of this qualitative project and the opinions of rehabilitation representatives, orthopaedic surgeons, and physiatrists (Chapter 5) in the next chapter to make recommendations for the virtual forum.
CHAPTER 5
STAKEHOLDER/EXPERT OPINION SESSIONS

Key Findings

- Stakeholders supported the development of a virtual information package for patients with total hip and total knee replacement
- Stakeholders agreed with the four main categories of information: Preoperative Visit; Inpatient/Acute Care Stay; Transition Home/Rehabilitation; and Follow-up and Living with Joint Replacement
- Information related to each of these categories should be presented so that patients know that various services/options may not be available at all hospitals.

5.1 Introduction

An integrated summary of the findings of the academic literature, grey literature, and qualitative study, including recommendations for an information package for total joint replacement patients (Appendix XII) were presented to the following two groups at separate meetings:

1) Seven representatives of rehabilitation (physiotherapists, occupational therapists, nurses) from institutions in the GTA (January 14, 2005); and
2) Fifteen orthopaedic surgeons and physiatrists as well as representatives from The Arthritis Society and community care access centres in the GTA (February 7, 2005).

5.2 Purpose

The purpose of these meetings was:

1) to discuss and gain expert opinion regarding the summary of the findings and recommendations; and
2) to assess stakeholder support regarding use of the virtual information package and encourage those present to inform their peers of this initiative.

5.3 Objectives

Specific objectives of these meetings were to:

1) Discuss and gain expert opinion regarding the four broad categories (Preoperative Visit, Inpatient/Acute Care Stay, Transition Home/Rehabilitation, Follow-up/Living with Joint Replacement) of information; and
2) Discuss and gain expert opinion regarding the content of each of the chosen categories. Appendix XII contains details of proposed content.
5.4 Methods

For the meeting involving representatives of rehabilitation from institutions in the GTA, presentations of the integrated findings and topics for discussion were made by the content experts working on this project. Feedback from the participants of the meeting was solicited in a discussion format. Both content experts, as well as a representative from the GTA Rehab Network took detailed notes of the discussion. Participants also completed a questionnaire that included predetermined questions as well as opportunities for open-ended feedback (Appendix XIII).

For the meeting involving surgeons and physiatrists, a presentation regarding background and introduction to the project was undertaken by Charissa Levy, Executive Director of the GTA Rehab Network, Drs. Nizar Mahomed and John Flannery. The content experts presented the integrated findings and topics for discussion. Feedback from the participants of the meeting was solicited in a discussion format. Two representatives from the GTA Rehab Network as well as one of the content experts took detailed notes of the discussion.

5.5 Results

5.5.1 Representatives of Rehabilitation Meeting

The following points represent a summary of the verbal and written feedback received from the representative of rehabilitation on January 14, 2005.

Categories of Information:

- All representatives agreed with the four main categories of information
- Suggestion was made to add ‘Hospital’ to the ‘Inpatient/Acute Care Hospital Stay’ category
- Concern was expressed with the title of the third category of information ‘Transition Home/Rehabilitation’; patients may think that ‘Rehabilitation implies inpatient rehabilitation is a necessary part of the continuum
- There was a suggestion to add the concept of ‘Healthy Active Living’ to the ‘Follow-up and Living with Joint Replacement’ category

Preoperative Visit:

- Suggest some brief points about pain management prior to surgery
- Suggest that patients be given information regarding types of joint replacement, terms, aids, weight-bearing status
- Important that information be presented in such a manner that patients recognize that they have responsibilities related to a successful joint replacement e.g., staying as healthy as possible while they await a joint replacement; regular exercises following joint replacement; organize equipment prior to surgery so that it is ready when discharged home; prepare meals ahead of time; arrange ahead of time for transportation home from the hospital
List all the possible members of the team; provide statement indicating that patients may not meet all members

Strongly recommend patients bring a family member/friend to the preadmission visit since patients are usually overwhelmed with the amount of information

The section ‘What to expect during your visit’ needs to set the framework regarding length of stay and discharge destinations; if mention a number related to acute care length of stay, provide a general/average number since some institutions are challenged by what is said to patients in doctors’ offices

**Inpatient/Acute Care Stay:**

- May consider juxtaposing ‘Risks’ and ‘Responsibilities’
- Statement about length of stay could be accompanied by statement explaining that surgical techniques and practices have improved
- Need clear statement indicating that discharge destinations and options for rehabilitation depend on criteria, i.e. criteria will be used to decide which option for rehabilitation will be accessed; discharge destination could change as a result of acute care stay
- Related to anticoagulation, provide general information options, with advice to consult surgeon
- Pictures of prostheses would be helpful
- Important that patients know there will be pain associated with recovering from a joint replacement

**Transition Home/Rehabilitation:**

- Replace the word ‘Options’ for Rehabilitation with ‘Criteria’ for Rehabilitation

**Follow-up and Living with Joint Replacement:**

- Provide information related to ‘How long joint replacements last’; add some information related to revisions
- Suggest referring patients to their surgeons for advice related to driving and return to work
- Include some recommendations regarding activity resumption
- List possible postoperative complications
- Provide information related to how long precautions have to be exercised
- Provide a section about ‘Good hip/knee joint care’ – list of movements/activities to avoid such as twisting, squatting

**Overall Considerations:**

- Keep the language generic (Therapy) regarding occupational therapy/physiotherapy
- Important that the website directs patients to read the information about all categories of information/stages of the continuum preoperatively and then review various sections as necessary
- Important to keep information general since not all hospitals offer the same options
• Patients need to be empowered; use a statement such as ‘The patient is responsible for…’
• Having checklist for patients may be helpful

5.5.2 Orthopaedic Surgeons’ and Physiatrists’ Meeting

The following points represent a summary of the verbal feedback received from orthopaedic surgeons, physiatrists and representatives from The Arthritis Society and CCAC on February 7, 2005.

Categories of Information:
• All representatives agreed with the four main categories of information

Preoperative Visit:
• Because resources for preadmission services vary from hospital to hospital, it was suggested that statements should suggest that such services may be available; use of a disclaimer such as “Please be aware that not all services are available at all hospitals” was suggested
• Information about what to expect during the preadmission visit should include discussion about discharge planning
• Include a section called ‘Things to Avoid Before Surgery’ and include smoking cessation and excessive alcohol intake
• Include a section about ‘Wellness’ – include weight reduction, nutrition, lifestyle and link to patient expectations and responsibilities

Inpatient/Acute Care Stay:
• Suggest eliminate lumbar plexus blockade as one of the options for pain control
• Suggestion was made to include information regarding minimally-invasive surgery and surface replacement; discussion regarding this evolved to suggest that if such specialty topics are covered that patients be referred to their surgeon for further details; it was also felt that this topic requires further discussion regarding specific definition; also could link to another site about minimally-invasive surgery
• Suggestion was made to include a generic statement that non-steroidal anti-inflammatory medication should be stopped prior to surgery and give a window of time; suggest put this in blood loss section
• Change blood donation to blood conservation; intent is for blood conservation as opposed to blood donation
• Suggestion was made to restrict blood loss from 300-700 cc; other suggestion was to keep the information regarding blood loss more general
• When providing information about erythropoietin, include that its’ use is limited to those with chronic anemia and chronic illness
• In the Acute Care section, and What to Bring to the Hospital, emphasize importance of consuming nothing by mouth after midnight
• In the Acute Care section, include information regarding constipation prophylaxis, gastrointestinal prophylaxis, and complications related to pain medications and anticoagulants
• For the Anticoagulation section use warfarin or coumadin instead of Vitamin K antagonist; discussion included direct versus indirect costs of coumadin versus heparin; the thought was that there may not be much difference in cost in the end
• Related to the postoperative therapy section, include a statement suggesting that therapy will progress patients with their goals for discharge and transfer from the acute care setting
• Include that therapy will be progressed on a daily basis based on medical condition

**Transition Home/Rehabilitation:**
• The section on Discharge Destinations and Options for Rehabilitation needs to be carefully worded because popular patient perception is to go to inpatient rehabilitation
• Choose language that suggests inpatient rehabilitation is the exception rather than the norm; for example, “A recommendation will be made by the team at the hospital regarding your requirements for rehabilitation following your stay in acute care hospital….”

**Follow-up and Living with Joint Replacement:**
• Surgeons at the Orthopaedic and Arthritic Hospital have agreed on guidelines for sporting activities following total joint replacement; in the information package suggestion was to refer patients to their orthopaedic surgeon for instruction on activity
• Include information about antibiotic coverage following total joint replacement

**General Considerations:**
• Include information about heterotopic ossification as a potential complication and use of Indocid to counteract heterotopic ossification
• Suggestion was made that there is consensus needed regarding weightbearing status, anticoagulation protocols and use of anti-inflammatories preoperatively; further discussion confirmed that the purpose of this meeting was not to reach consensus regarding specific topics
• Checklists recommended as a tool to include on website
• Provide a general list of possible complications; don’t include leg length discrepancies
• A comment was made that Toronto is an anomaly in Ontario, if not Canada, in that we send a lot of our total joint replacement patients to inpatient rehabilitation and that this information package will help to change this practice and make the system more efficient
• Suggestion was made to get legal advice regarding content of the website and any potential legal implications
• Need to consider translation of medical terminology – incorporate adult learning principles
5.6 Summary

Overall representatives of rehabilitation, orthopaedic surgeons, physiatrists, and representatives of The Arthritis Society and CCAC agreed that the four main categories were representative of the important stages of the continuum of care related to total joint replacement. Information related to each of these categories should be presented so that patients know that various services/options may not be available at all hospitals. Patients should be advised to consult their orthopaedic surgeon for specific questions related to most topics.
CHAPTER 6
INTEGRATION OF FINDINGS

6.1 Introduction

Based on the key findings of Chapters 2, 3, 4, and 5 there was evidence to support the need for a virtual forum consisting of a comprehensive information package for patients undergoing total hip and total knee replacement. The academic literature provided evidence of the beneficial effect of education of patients regarding total hip and total knee joint replacement on outcomes. The grey literature that was reviewed indicated that education of patients with total hip and total knee replacement occurs but there are inconsistencies with respect to the content and mode of delivery of the information. Emergent themes from the qualitative project illustrated patients’ desires, needs, and expectations for information regarding a multitude of topics relating to total hip and total knee replacement. The representatives of rehabilitation, orthopaedic surgeons, and physiatrists supported the notion of an information package that is available to all patients in the GTA who are undergoing a total hip or knee joint replacement.

One area where the key findings of the literature review, grey literature review, and qualitative project differed was with respect to the timing of delivery of the information. The majority of academic literature regarding education promoted education in the preoperative phase. With the grey literature, information was provided and shared at all stages of the continuum including preoperatively in physicians’ offices, preadmission clinics, acute care settings, inpatient rehabilitation settings, outpatient rehabilitation settings, and community home-based care settings. The findings of the qualitative project demonstrated not only a desire, but also a need for information at all stages of the continuum of care. Specifically, the ‘lack of knowledge’ theme, which was present with both those who were awaiting total joint replacement and those who had undergone total joint replacement in the previous six months, illustrated the need for information at all stages of the continuum as well as repetition and review of various topics. Information available via a virtual forum will facilitate access of information that can be reviewed electronically or in written format.

6.2 Recommendations for Virtual Forum

Following are overall considerations for the information package as well as recommendations for the four main categories of information, and topics related to each category, to be included in the virtual forum. Specifics regarding content are included under ‘Content Suggestions’ and are based on the strength of the evidence available in the academic literature, practices that are common across the grey literature, what patients said they wanted to know, and what representatives of rehabilitation, orthopaedic surgeons, and physiatrists recommended. Practical suggestions for the development of an information package are also included.
Overall Considerations for the introductory part of the information package:

- Read all categories of information; we encourage you to review sections as necessary as you progress through the continuum of care for your total joint replacement
- Practices may vary from hospital to hospital
- What is a total hip replacement? (Include diagram or photograph)
- What is a total knee replacement? (Include diagram or photograph)

Following are the four main categories and topics related to each category, with suggestions for content to be included in the virtual forum. The content suggestions include specific details related to each topic.

Category: Preoperative Visit  
Topic: What to expect during your visit
Content Suggestions:
- Practices may vary from hospital to hospital
- Recommend patients bring a family member or friend to the preoperative visit
- Discussions regarding discharge home from the hospital will occur at the preoperative visit
- Information regarding gait aids and equipment (Include diagram or photograph)

Category: Preoperative Visit  
Topic: Who you will see/Meeting the team
Content Suggestions:
- List all possible members of the team including their role (e.g., Physical therapist, Occupational therapist, Social worker, Anaesthesiologist)
- Indicate that patients may not meet all team members or, composition of team may vary from hospital to hospital or, a disclaimer that “Please be aware that all services may not be available at all hospitals”

Category: Preoperative Visit  
Topic: Blood conservation
Content Suggestions:
- Blood conservation is an important consideration with total joint replacement because there is a risk of blood loss
- The following options may be available at your hospital for blood conservation
- One option is not necessarily better than the other
  - Allogeneic or donor blood – this involves receiving someone else’s blood
  - Autologous blood – this involves receiving your own blood that you donate prior to your surgery
  - Erythropoietin alfa – this is a pharmaceutical treatment that is limited to those with chronic anemia and chronic illness
  - Hypotensive epidural anaesthesia – this is a type of anaesthetic that decreases loss of blood
- Consult with your orthopaedic surgeon regarding which option is best for you
• Non-steroidal anti-inflammatory medications should be stopped one-to-two weeks prior to your joint replacement surgery; consult with your orthopaedic surgeon when is best for you to stop your anti-inflammatory medication

Category: Preoperative Visit
Topic: Anaesthetic options
Content Suggestions:
• Options for anaesthesia at the time of your total joint replacement will be discussed at the time of your preoperative visit
• The following options may be available at your hospital
• One option is not necessarily better than the other
  o General anaesthetic – this involves you being asleep during your surgery and is achieved by use of medications; an anaesthetist monitors your medical status during the general anaesthetic
  o Spinal anaesthetic – this involves you being awake during your surgery and is achieved by injection of medication into the cerebrospinal fluid of your low back; you may be given medication to make you drowsy but you will not feel pain
• Consult with your orthopaedic surgeon and/or anaesthetist regarding which option is best for you

Category: Preoperative Visit
Topic: Preparation of home environment/equipment
Content Suggestions:
• As a patient you have responsibilities related to your joint replacement being successful; these include:
  o Staying as healthy as possible while you await a joint replacement including stopping smoking if you smoke, reducing alcohol intake if you drink, weight reduction if you are overweight, and eating nutritious foods
  o Preparing and freezing meals ahead of time if you are responsible for the cooking in your home
  o Organizing equipment such as gait aids and equipment for the bathroom in your home prior to surgery (Include diagrams or photographs)
  o Arranging ahead of time for transportation home from the hospital
• At the time of your preoperative visit, the team at the hospital may discuss discharge plans and options for rehabilitation for you after your stay in the acute care hospital

There are two main options for rehabilitation following surgery (home and inpatient rehabilitation); these options depend on criteria.

Category: Inpatient/Acute care stay
Topic: What to bring to the hospital
Content Suggestions:
• It is important that you do not eat or drink anything after midnight before your surgery
• List of items to bring (refer to grey literature)

Category: Inpatient/Acute care stay
Topic: Pain management
Content Suggestions:
• There will be pain associated with recovering from a total joint replacement
• Adequate pain management is important for effective postoperative rehabilitation
• The following options for pain management may be available to you:
  o Patient-controlled analgesia – with this form of pain management you receive pain medication through your intravenous line, which is attached to a pump; there is a button that you can push to activate the pump to deliver your pain medication; the pump is set up as prescribed by your doctor and will only give you small measured amounts of medication that are within safe limits; pain relief occurs within minutes
  o Epidural catheter – with this form of pain management, a fine plastic tube is inserted into the epidural space in your spine so that pain medication can be injected through this tube; pain relief occurs within minutes
  o Intramuscular injections – with this form of pain management, pain medication is injected into your muscle; pain relief can take up to one hour to occur
  o Oral medications – this form of pain management involves you swallowing pills; the time for pain medication to take effect varies
• With any medication it will be important to speak with your doctor about side effects of medication such as constipation, gastrointestinal problems, and excessive bleeding

Category: Inpatient/Acute care stay
Topic: Anticoagulation
Content Suggestions:
• With total joint replacement there is a risk for venous thromboembolism or blood clot
• The two following options (medications) for anticoagulation or prevention of blood clots (blood thinners) are:
  o Low-molecular-weight heparin
  o Adjusted-dose vitamin K antagonist or warfarin
• Consult your orthopaedic surgeon regarding which option is best for you

Category: Inpatient/Acute care stay
Topic: What to expect with postoperative therapy
Content Suggestions:
• Therapy will commence soon after surgery
• Therapy will include instructions regarding bed mobility, bed to chair transfers, walking with a gait aid, range of motion and strengthening exercises, activities of daily living, positioning, and precautions (Include diagrams and/or photographs)
• Therapy will be progressed on a daily basis depending on your medical condition
• Therapy will progress you with your goals for discharge and transfer from the acute care setting

Category: Transition Home/Rehabilitation
Topic: Discharge destinations and options for rehabilitation

Content Suggestions:
• Following surgery there are two options for rehabilitation including:
  o Home with Community Care Access Centre services (home care services), outpatient therapy (therapy delivered on an outpatient basis in a hospital outpatient department or private clinic), or an independent home exercise program
  o Inpatient rehabilitation
• Inpatient rehabilitation is the exception rather than the norm
• Discharge destinations and options for rehabilitation depend on criteria and a recommendation will be made by the team at the hospital regarding patients’ requirements for rehabilitation

Category: Follow-up and Living with Joint Replacement
Topic: Activities of daily living

Content Suggestions:
• Recommendations will include information regarding activity resumption in the home such as toileting, cooking, bathing, dressing, and homemaking (include diagrams or photographs)

Category: Follow-up and Living with Joint Replacement
Topic: Instrumental activities of daily living

Content Suggestions:
• Generally, most people are able to return to driving 4-6 weeks following their surgery; discuss this with your orthopaedic surgeon
• Timing of your return to work may depend on the physical demands of your work; discuss your plan for return to work with your orthopaedic surgeon
• It is recommended that you remain active following total joint replacement; it is generally suggested that activities should be low impact and low contact (for example, swimming, cycling, or walking); high impact sports are not generally recommended (e.g., jogging, contact sports); discuss the risks of sporting activities with your orthopaedic surgeon
• It is important to remember the precautions for protecting your hip whilst resuming sexual activity (see grey literature)

Category: Follow-up and Living with Joint Replacement
Topic: Return follow-up visits

Content Suggestions:
• You will have at least one follow-up visit with your orthopaedic surgeon after discharge from the hospital; the timing of the visit and number of visits will depend on your needs and your orthopaedic surgeon
• If you are having dental procedures following your total joint replacement, it is important to discuss antibiotic coverage with your health care providers prior to having any procedures

Category: Follow-up and Living with Joint Replacement
Topic: Asking questions
Content Suggestions:
• It is important to ask your health care providers any questions that you have before your surgery, during your hospital stay, and at follow-up visits; it may be helpful to write down the list of questions you have to ask your providers

6.3 Practical Tips for Virtual Forum

Practical tips for the virtual forum are derived from the findings of the qualitative project, experience of the researchers, and expert opinion from representatives of rehabilitation, orthopaedic surgeons, physiatrists, and representatives of The Arthritis Society and CCAC. Suggestions include:
• Consideration of font size in the development of virtual forum to accommodate an elderly population with potential visual impairments
• Investigation of possibility of audio accompaniment for information component of virtual forum
• Inclusion of diagrams, illustrations, and photographs to complement the textual information
• Allowance for downloading of information into a written format
• Language at a grade six level with consideration of adult learning principles
• Inclusion of documentation of patient experiences/narratives describing their experiences with total joint replacement
• Acquisition of legal advice regarding content of the website and any potential legal implications.
REFERENCES


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APPENDIX I

Categories of Literature
# LITERATURE REVIEW

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                               Professional Practice, Evidence based  
                               Practice Guidelines  
                               Outcome  
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                               Surgical Procedure  
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                               Arthroplasty Hip or knee and  
                               professional practice, evidenced based or practice guidelines  
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                               THA/TKA and Critical path  
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APPENDIX II

Literature Review Forms
Qualitative Form

Article Title:

Author:

ID #:

Topic:

1. Study Purpose: Was the purpose stated clearly? (Yes/No)
2. Outline the purpose of the study.
3. Was relevant background literature reviewed? (Yes/No)
4. Describe the justification of the need for this study.
5. Study Design: What was the design?
6. Was a theoretical perspective identified? (Yes/No)
7. Describe the theoretical perspective for this study.
8. Method used:
9. Describe the method(s) used to answer the research question.
10. Was the process of purposeful selection described? (Yes/No)
11. Sampling was done until redundancy in data was reached. (Yes/No/Not Addressed)
12. Was the context of the study well-described?
13. Procedural rigor was used in data collection strategies. (Yes/No/Not Addressed)
15. Data analysis was inductive. (Yes/No/Not Addressed)
16. Describe method(s) of data analysis.
17. Did a meaningful picture of the phenomenon under study emerge? (Yes/No)
18. Describe any conceptual frameworks that emerged.
19. Strategies used to ensure trustworthiness.
20. Conclusions were appropriate given the study findings. (Yes/No)
21. What did the study conclude?
22. Critical Impression. (Excellent/Good/Average/Poor)
Quantitative Form

Article Title:

Author:

ID #:

Topic:

1. Study Purpose: Was the purpose stated clearly? (Yes/No)
2. Outline the purpose of the study.
3. Was relevant background literature reviewed? (Yes/No)
4. Design:
5. Was the design appropriate for the study questions? (Yes/No)
6. Sample:
7. Was the sample described in detail?
8. Describe the sample.
9. Describe the sampling procedure.
10. Was sample size justified? (Yes/No/N/A)
11. Specify the frequency of outcome measurement.
12. List outcome measures used.
13. Were the outcome measures reliable? (Yes/No/Not Addressed)
14. Were the outcome measures valid? (Yes/No/Not Addressed)
15. Was intervention described in detail to allow replication in practice? (Yes/No/Not Addressed)
16. Describe the intervention.
17. Was contamination avoided? (Yes/No/Not Addressed/N/A)
18. Was co-intervention avoided? (Yes/No/Not Addressed/N/A)
19. Were the analysis method(s) appropriate? (Yes/No/N/A)
20. Describe the results.
21. Was clinical importance reported? (Yes/No)
22. Were conclusions appropriate given study methods and results? (Yes/No)
23. Describe the conclusions.
24. Critical Impression. (Excellent/Good/Average/Poor)
Systematic Review Form

Article Title:

Author:

ID #:

Topic:

1. Was the purpose stated clearly? (Yes/No)
2. What was the purpose?
3. State the number of studies in the review.
4. Were the search methods clearly stated? (Yes/No)
5. Describe the methodology (inclusion/exclusion criteria).
6. Was bias avoided in the selection of studies? (Yes/No)
7. Were the criteria for assessing studies vigorous? (Yes/No)
8. Describe the criteria used to assess quality of studies.
9. What method was used to combine studies? (Meta-analysis/Other)
10. Were findings of the studies combined appropriately relative to the primary question? (Yes/No)
11. Were conclusions appropriate given the methods and analysis? (Yes/No)
12. State conclusions.
13. Critical Impressions. (Excellent/Good/Average/Poor)
APPENDIX III

Standardized Script for Recruitment
Telephone Screening Script

Potential Participant’s Name: ____________________________________________

Hello (Name of Potential Participant). My name is (Research Associate’s Name). I am a member of the research team from the Greater Toronto Area Rehab Network. Dr. (Name of Orthopaedic Surgeon), your orthopaedic surgeon told me you might be interested in helping with a study we are doing. Do you have time to talk about it now?

As Dr. (Name of Orthopaedic Surgeon) told you, the goal of this study is to try to understand what people like you who [are going to have a joint replacement want to know about your surgery and your rehabilitation OR have had a joint replacement, did not know prior to your surgery and rehabilitation, but would have found helpful to know]. We are interviewing people like you to try to find answers to this question.

If you are interested in participating, I would meet with you at your home, at the hospital or at another location of your choice to ask you questions about your information needs, related to your joint replacement and rehabilitation. The interview would take about one hour and I can schedule a day and time that is convenient for you. Do you have any questions about the study?

Do you think you would be interested in participating?

[If no]… Thank you for thinking about it and thank you for your time. Have a good day.

[If yes]…Before we continue, I’ll need to ask you a few simple questions to make sure you qualify for the study. Would that be all right?

1) Are you scheduled to undergo a total hip or knee replacement in the GTA?
   Yes □ (Proceed to Question 3) No □ (Proceed to Question 2)

2) Are you at a time that is three to six months since having a total hip or total knee replacement that occurred in the GTA?
   Yes □ No □

3) Do you feel that you would be able to participate in an interview lasting approximately one hour?
   Yes □ No □

[If potential participant answered “No” to both Questions 1 and 2:] Thank you
(Name of Potential Participant). Unfortunately, you do not qualify for this study.

Thank you for your time, and have a good day.

[If potential participant answered “Yes” to Questions 1 and 3 or 2 and 3:] Thank you (Name of Potential Participant). You qualify for the study. May I set up a time for the interview? Interview date: _______________ Time: _______________

Address: __________________________________________________________

Telephone #: _______________________________________________________

APPENDIX IV

Interview Guide, Versions 1 and 2
Interview Guide (Version 1)

We are interested in learning what you know about total hip or total knee joint replacement surgery and rehabilitation. Please tell me…

*Probes*

We are also interested in learning what other topics related to total hip or total knee joint replacement surgery and rehabilitation that you would like to know about. Please tell me…

*Probes*

Please tell me about any fears, anxieties, concerns or questions you may have regarding your upcoming total hip or total knee joint replacement surgery and rehabilitation.

*Probes*

Please tell me about any other information that would be useful to you and your family as you approach your upcoming total hip or knee joint replacement surgery and rehabilitation.

*Probes*
Interview Guide (Version 2)

We are interested in learning what you know about total hip or total knee joint replacement surgery and rehabilitation. Please tell me…

_Probes_

Are there topics related to total hip or total knee joint replacement surgery and rehabilitation about which you did not know prior to your total hip or total knee joint replacement surgery that you believe would have been helpful for you and your family to know? Please tell me about these topics.

_Probes_

Did you or do you now have any fears, anxieties, concerns or questions regarding your previous total hip or total knee joint replacement surgery and rehabilitation? Please tell me about these…

_Probes_

Please tell me about any other information that would be useful to you and your family now that you have experienced total hip or knee joint replacement surgery and rehabilitation.

_Probes_
APPENDIX V

Information Sheet - University Health Network
Information Sheet - University Health Network

A study is being conducted for the Greater Toronto Area (GTA) Rehab Network of which University Health Network, Toronto, Ontario and St. Joseph’s Health Centre, Toronto, Ontario are members. The principal investigator is Tina Saryeddine, MHA, CHE. Aileen Davis, PhD, John Flannery, MD, FRCP(C), Susan Jaglal, PhD, Nizar Mahomed, MD, ScD, FRCP(C) and Charissa Levy, MHSsc, BScOT, OT Reg (Ont.) are co-investigators. Leslie Soever, BScPT, MSc and Crystal MacKay, BScPT, MHSc are research associates. This study is funded by the Change Foundation through a grant to the GTA Rehab Network.

The purpose of this study is to explore what patients, like you who will be undergoing total hip or knee replacement surgery, want to know about your upcoming surgery and rehabilitation. If you have already undergone total hip or knee replacement surgery we are interested in knowing what you were told that was helpful as well as other things that you weren’t told that you would have found helpful. Either Leslie or Crystal will ask you questions about what you already know about joint replacement, what else you would like to know and any fears, concerns, anxieties or questions you may have. The interview will last approximately an hour to an hour and a half. It will take place in your home or at the hospital, depending on your preference. The interview will be tape-recorded and will be accessible to all the researchers in this study. The tape recording will allow the interviewer to review the details of the interview and to allow analysis of information that is provided. The information we gather from this study will be used to develop an information package that will be available for patients and their informal caregivers on the web.

Participation in research is voluntary. If participants choose not to participate, participants will continue to have access to customary care at University Health Network. Participants may withdraw from this study at any time.

Participants will not be identified in any report or presentation, which may arise from this study. Participants will be provided with the name and contact number of the people conducting the research in the event that they would like to contact them for any reason. All of the tapes (prior to destruction) and anonymized transcripts will be stored in a locked research room.

Participants may not benefit directly from participating in this study, however, the information gained in the study may result in future benefits of people who are undergoing total hip or knee joint replacement.

If you have any questions about your rights as a research participant, please call Dr. R. Heslegrave, Chair of the University Health Network Research Ethics Board at (416) 340-4557. This person is not involved with the research project in any way and calling him will not affect your participation in the study.
APPENDIX VI

Information Sheet - St. Joseph's Health Centre
A study is being conducted for the Greater Toronto Area (GTA) Rehab Network of which St. Joseph’s Health Centre, Toronto, Ontario and University Health Network, Toronto, Ontario are members. The principal investigator is Tina Saryeddine, MHA, CHE. Aileen Davis, PhD, John Flannery, MD, FRCP (C), Susan Jaglal, PhD, Nizar Mahomed, MD ScD, FRCP(C) and Charissa Levy, MHSc, BScOT, OT Reg (Ont.) are co-investigators. Leslie Soever, BScPT, MSc and Crystal MacKay, BScPT, MHSc are research associates. This study is funded by the Change Foundation through a grant to the GTA Rehab Network.

The purpose of this study is to explore what patients, like you who will be undergoing total hip or knee replacement surgery, want to know about your upcoming surgery and rehabilitation. If you have already undergone total hip or knee replacement surgery we are interested in knowing what you were told that was helpful as well as other things that you weren’t told that you would have found helpful. Either Leslie or Crystal will ask you questions about what you already know about joint replacement, what else you would like to know and any fears, concerns, anxieties or questions you may have. The interview will last approximately an hour. It will take place in your home or at the hospital, depending on your preference. The interview will be tape-recorded and will be accessible to all the researchers in this study. The tape recording will allow the interviewer to review the details of the interview and to allow analysis of information that is provided. The information we gather from this study will be used to develop an information package that will be available for patients and their informal caregivers on the web.

Participation in research is voluntary. If participants choose not to participate, participants will continue to have access to customary care at St. Joseph’s Health Centre. Participants may withdraw from this study at any time.

Participants will not be identified in any report or presentation, which may arise from this study. Participants will be provided with the name and contact number of the people conducting the research in the event that they would like to contact them for any reason. All of the tapes (prior to destruction) and anonymized transcripts will be stored in a locked research room.
Participants may not benefit directly from participating in this study, however, the information gained in the study may result in future benefits of people who are undergoing total hip or knee joint replacement.

If you have any questions concerning the study or your rights as a research subject, you may contact Dr. Hazel Markwell, Clinical Ethics Director at SJHC. She can be reached at 416-530-6486 ext. 3300.

The Research Ethics Board has reviewed the ethical aspects, physician compensation issues and the financial aspects of this study and has given their approval.
APPENDIX VII

Consent to Participate in Research - University Health Network
Consent to Participate in Research - University Health Network

Title: What Do Patients Undergoing Total Hip and Knee Joint Replacement Want to Know?

Principal Investigator: Dr. Nizar Mahomed
Toronto Western Hospital
399 Bathurst Street, Room 1114
Toronto, Ontario M5T 2S8
Tel.: 416-

Co-investigator: Tina Saryeddine, MHA, CHE
550 University Avenue, Room 1114
Toronto, Ontario, M5G 2A2
Tel.: 416-597-3057

Sponsors: Change Foundation

You are being asked to take part in a research study. Before agreeing to participate in this study, it is important that you read and understand the following explanation of the proposed study procedures. The following information describes the purpose, procedures, benefits, discomforts, risks and precautions associated with this study. It also describes your right to refuse to participate or withdraw from the study at any time. In order to decide whether you wish to participate in this research study, you should understand enough about its risks and benefits to be able to make an informed decision. This is known as the informed consent process. Please ask the study doctor or study staff to explain any words you don’t understand before signing this consent form. Make sure all your questions have been answered to your satisfaction before signing this document.

The purpose of this study is to explore what patients like you, who will be undergoing total hip or knee replacement surgery, want to know about their upcoming surgery and rehabilitation. If you have already undergone total hip or knee replacement surgery we are interested in knowing what information you were given that was helpful as well as other information that you did not receive that you would have found helpful.

Participation in this study will involve being interviewed. The interviewer will be asking questions about what you already know about joint replacement, what else you would like to know and any fears, concerns, anxieties or questions you may have. The interview will last approximately an hour to an hour and a half. It will take place in your home or at the hospital, depending on your preference. This interview will be tape-recorded and will be accessible to all the researchers in this study, as well as members of the GTA Rehab Network. The tape recording will allow the interviewer to review the details of the interview and to allow analysis of information that is provided. Upon completion of data analysis/interpretation, the tapes will be destroyed. Anonymized transcripts will be available to the research team.

There is a potential for this study to be emotionally draining for you as you talk about your upcoming surgery or recount past experiences that may not have been favourable.
You may or may not receive any medical benefit from your participation in this study. Information learned from this study may benefit other patients in the future undergoing total hip or knee replacement surgery.

All information obtained during the study will be held in strict confidence. You will be identified with a study number only. No names or identifying information will be used in any publication or presentations. No information identifying you will be transferred outside the investigators in this study or this hospital. All of the tapes (prior to destruction) and anonymized transcripts will be stored in a locked research room.

Participation in research is voluntary. If you choose not to participate, you will continue to have access to customary care at University Health Network. You can withdraw from this study at any time.

If you become ill or are physically injured as a result of participation in this study, medical treatment will be provided. The reasonable costs of such treatment will be covered by your health insurance for any injury or illness that is directly a result of participation in this trial. In no way does signing this consent form waive your legal rights nor does it relieve the investigators, sponsors or involved institutions from their legal and professional responsibilities.

If you suffer any side effects or other injuries during the study, or if you have any general questions about the study, please call Tina Saryeddine, Principal Investigator or Leslie Soever, Research Associate at (416) 597-3422 ext. 3924.

If you have any questions about your rights as a research participant, please call Dr. R. Heslegrave, Chair of the University Health Network Research Ethics Board at (416) 340-4557. This person is not involved with the research project in any way and calling him will not affect your participation in the study.

I have had the opportunity to discuss this study and my questions have been answered to my satisfaction. I consent to take part in the study with the understanding I may withdraw at any time without affecting my medical care. I have received a signed copy of this consent form. I voluntarily consent to participate in this study.

_______________________          __________________        ___________
Patient’s Name (Please Print)         Patient’s Signature             Date

_______________________        ___________________      ____________
Name of Person                            Signature                  Date
Obtaining Consent
APPENDIX VIII

Consent to Participate in Research - St. Joseph's Health Centre
Consent to Participate in Research - St. Joseph's Health Centre

What Do Patients Undergoing Total Hip and Total Knee Joint Replacement Want to Know?

INVESTIGATOR: Tina Saryeddine, MHA, CHE

CO-INVESTIGATORS: Dr. Nizar Mahomed, MD,ScD, FRCP(C)
Dr. Aileen Davis, PhD
Dr. Susan Jaglal, PhD
Dr. John Flannery, MD, FRCP (C)
Charissa Levy, MHSc, BScOT, OT REG (Ont.)

SPONSOR: Change Foundation through a grant to the Greater Toronto Area (GTA) Rehab Network

STATEMENT OF RESEARCH

This is a qualitative research study (a type of research study). Qualitative studies include only patients who choose to take part. Please take your time to make your decision. Discuss it with your friends and family.

You are being invited to take part in this study because you are scheduled to undergo a total hip or total knee replacement or you have already undergone a total hip or total knee replacement.
WHY IS THIS STUDY BEING DONE?

The purpose of this study is to explore what patients like you, who will be undergoing total hip or total knee replacement surgery, want to know about your upcoming surgery and rehabilitation. If you have already undergone total hip or knee replacement surgery we are interested in knowing what information you were given that was helpful as well as other information that you did not receive that you would have found helpful.

HOW MANY PEOPLE WILL TAKE PART IN THE STUDY?

About 30 people from St. Joseph’s Health Centre and Toronto Western Hospital will take part in this study.

The study should take six months to complete and the results should be known in one year.

WHAT IS INVOLVED IN THE STUDY?

Participation in this study will involve being interviewed. The interviewer will be asking questions about what you already know about joint replacement, what else you would like to know and any fears, concerns, anxieties or questions you may have. The interview will last approximately an hour. It will take place in your home or at the hospital, depending on your preference. This interview will be tape-recorded and will be accessible to all the researchers in this study. The tape recording will allow the interviewer to review the details of the interview and to allow analysis of information that is provided. Upon completion of data analysis/interpretation, the tapes will be destroyed. Anonymized transcripts will be available to the research team.

WHAT ARE THE RISKS OF THE STUDY?

There are no known risks to participating in this study.

ARE THERE BENEFITS TO TAKING PART IN THE STUDY?

If you agree to take part in this study, there may or may not be direct benefit to you. We hope the information learned from this study will benefit other patients who are planning total hip or total knee replacement in the future.
WHAT OTHER OPTIONS ARE THERE?

If you decide not to participate in this study, you will continue to have access to customary care at St. Joseph’s Health Centre. You can withdraw from the study at any time.

WHAT ABOUT CONFIDENTIALITY?

Every effort will be made to keep your personal information confidential.

- your name will not be used in any reports about the study
- you will be identified only by a study code
- identifying information will be kept behind locked doors

WHAT ARE THE COSTS?

You will receive no compensation for taking part in this study.

WHAT ARE MY RIGHTS AS A PARTICIPANT?

Taking part in this study is voluntary. You may choose not to take part or may leave the study at any time. Deciding not to take part or deciding to leave the study later will not result in any penalty or any loss of benefits to which you are entitled. Your doctor will discuss further treatments with you and continue to treat you with the best means available.

You will be given a copy of this signed and dated consent form and an additional copy will be placed in your health record.

WHOM DO I CALL IF I HAVE QUESTIONS OR PROBLEMS?

If you have questions about taking part in this study you can talk to your doctor. Or, you can meet with the doctor who is in charge of the study at this institution. That person is:

Dr. Martin Roscoe at 416-530-6394.

If you have any concerns about your rights as a research participant, please contact, Hazel Markwell, Chair, Research Ethics Board, St. Joseph’s Health Centre by telephone at 416- 530-6750.
APPROVAL PROCESS
The Research Ethics Board has reviewed the ethical aspects, physician compensation issues and financial aspects of this study and has approved it.

SIGNATURES
My signature on this consent form means the following:

- The study has been fully explained to me and all of my questions have been answered
- I understand the requirements and the risks of the study
- I agree to take part in this study
- I will receive a copy of this signed consent form

Name of Patient (Please print) ___________________________ Date ________________

Signature of Patient ___________________________ Date ________________

Signature of Person Conducting the Consent Discussion ___________________________ Date ________________

If this consent process has been done in a language other than that on this written form, with the assistance of a translator, please indicate:
(Language)____________________

Signature of Translator ___________________________ Date ________________

SJHC consent form, Version: July 9, 2004
APPENDIX IX

Consent for Tape Recording - University Health Network
Consent for Tape Recording - University Health Network

What Do Patients Undergoing Total Hip and Knee Joint Replacement Want to Know?

A study is being conducted for the Greater Toronto Area (GTA) Rehabilitation Network of which University Health Network, Toronto, Ontario and St. Joseph’s Health Centre, Toronto, Ontario are members. Nizar Mahomed, MD ScD, FRCP(C) is the principal investigator. Aileen Davis, PhD, John Flannery, MD, FRCP(C), Susan Jaglal, PhD, Charissa Levy, MHSc, BScOT, OT Reg (Ont.) and Tina Saryeddine, MHA, CHE are the co-investigators. Leslie Soever, BScPT, MSc and Crystal MacKay, BScPT, MHSc are research associates. This study is funded by the Change Foundation through a grant to the GTA Rehab Network.

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I, ________________________________ agree to have this interview tape recorded. The interviewer will be asking questions about what you already know about joint replacement, what else you would like to know and any fears, concerns, anxieties or questions you may have. The interview will last approximately an hour to an hour and a half. It will take place in your home or at the hospital, depending on your preference. This interview will be tape-recorded and will be accessible to all the researchers in this study, as well as members of the GTA Rehab Network. The tape recording will allow the interviewer to review the details of the interview and to allow analysis of information that is provided. Upon completion of data analysis/interpretation, the tapes will be destroyed. Anonymized transcripts will be available to the research team.

Confidentiality will be protected to the extent required by law. The tapes (prior to destruction) and anonymized transcripts will be secured in a locked cupboard to which only the researchers and their thesis committee members have direct access.

If I have any questions concerning the research or my rights as a research subject, I may contact Dr. Dr. R. Heslegrave, Chair of the University Health Network Research Ethics Board at (416) 340-4557. This person is not involved with the research project in any way and calling him will not affect your participation in the study.
I have been given a copy of this consent form. I hereby consent to have my interview tape recorded.

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<tr>
<th>Patient’s Name (Please Print)</th>
<th>Patient’s Signature</th>
<th>Date</th>
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</table>
APPENDIX X

Consent for Tape Recording - St. Joseph's Health Centre
Consent for Tape Recording - St. Joseph's Health Centre

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Confidentiality will be protected to the extent required by law. The tapes (prior to destruction) and anonymized transcripts will be secured in a locked cupboard to which only the research team will have direct access.

If I have any questions concerning the research or my rights as a research subject, I may contact Dr. Hazel Markwell, Clinical Ethics Director at St. Joseph’s Health Centre. She can be reached at (416) 530-6486 ext. 3300.

I have been given a copy of this consent form. I hereby consent to have my interview tape recorded.

Patient’s Name (Please Print)  Patient’s Signature  Date

Name of Person Obtaining Consent  Signature  Date
APPENDIX XI

Interview Notes Form
Interview Notes Form
APPENDIX XII

PowerPoint Presentations

Integrated Summary of Findings & Recommendations for Information Package

Version 1 - January 14, 2005
Version 2 - February 7, 2005
Appendix XII

Best Practices Across the Continuum of Care for Total Joint Replacement

Leslie Soever and Crystal MacKay
January 14, 2005

Objective

✓ To investigate best practices related to total hip and knee joint replacement in order to inform the development of the comprehensive information package on the continuum of care
Appendix XII

Methods

☒ Review of academic literature
☒ Review of grey literature of participating institutions
☒ Qualitative study – “What do Patients Undergoing Total Hip and Knee Joint Replacement Want to Know?”

Best Available Evidence

☒ Literature rated as poor not accepted
☒ Suggestive evidence
  – 1-2 RCTs rated good or excellent
  – 1-2 systematic reviews rated good or excellent
  – minimum of 4 other types of research rated fair or above
☒ Emerging/inconclusive evidence
  – 1-2 RCTs rated fair
  – 1-2 systematic reviews rated fair
  – 1-3 other types of research rated fair or above
Appendix XII

Academic Literature Review
Summary of Literature

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<th>Type of Research</th>
<th>Number</th>
<th>Quality (E/G/F/P)</th>
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<tr>
<td>Quantitative – RCT</td>
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<td>Prospective Cohort</td>
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<td>6/27/9/0</td>
</tr>
<tr>
<td>Quantitative</td>
<td>28</td>
<td>2/15/9/2</td>
</tr>
<tr>
<td>Retrospective Review</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantitative – Other</td>
<td>48</td>
<td>5/28/14/1</td>
</tr>
<tr>
<td>Systematic Review</td>
<td>22</td>
<td>2/17/3/0</td>
</tr>
<tr>
<td>Qualitative</td>
<td>16</td>
<td>2/10/4/0</td>
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<tr>
<td>Other</td>
<td>48</td>
<td>2/34/11/1</td>
</tr>
</tbody>
</table>

Results

Pre-operative Education
✓ Studies have addressed the impact of pre-operative education on patient-related and episode-of-care-related factors
✓ Patient-related factors include anxiety, satisfaction, and pain management
✓ Episode-of-care-related factors include LOS and cost-effectiveness
✓ Evidence of studies is suggestive
✓ Advantages of timing of pre-operative education
Pain Management

- There is suggestive evidence for various options including:
  1) Intravenous patient-controlled analgesia (PCA)
  2) Epidural catheter
  3) Lumbar plexus blockade
  4) Intramuscular morphine injections
  5) Oral medication

Blood Loss

- Various options available with insufficient evidence to recommend one as optimal treatment
  1) Allogeneic or donor blood
  2) Autologous blood
  3) Erythropoietin alfa
  4) Intraoperative blood salvage or autotransfusion
  5) Hypotensive epidural anaesthesia
  6) Other pharmacologic agents
Venous Thromboembolism Prophylaxis

- Pharmacological methods include:
  1) Low-molecular-weight heparin
  2) Adjusted-dose vitamin K antagonist
- The literature does not provide evidence to support the use of one anticoagulant over another

Clinical Pathways

- Studies have addressed the impact of clinical pathways on:
  1) LOS
  2) Cost
  3) Patient outcomes (e.g. pain and function)
  4) Complications
  5) Patient satisfaction
- Evidence in the literature is suggestive for use of clinical pathways to decrease hospital LOS and reduce costs
Rehabilitation

Studies have evaluated the impact of rehabilitation at various stages of the continuum of care including:

1) Pre-operative – inconclusive evidence
2) Post-operative (Acute care) – suggestive evidence of improved outcomes
3) Inpatient Rehabilitation/Home care/Outpatient – suggestive evidence of improved outcomes for patients who need this/these stage(s) of the continuum

Discharge Destinations

- In the available literature, outcomes following TJR are similar for patients who are discharged to home care or inpatient rehabilitation
- Specific factors are associated with discharge to inpatient rehabilitation, including older age, comorbidity, and living alone
- A standardized approach to determining discharge destinations has not yet been identified
Appendix XII

Four main categories of information related to:

1) Pre-operative Visit
2) Inpatient/Acute Care Stay
3) Transition Home/Rehabilitation
4) Follow-up and Living with Joint Replacement

Pre-operative Visit

- What to expect during your visit
- Who you will see/Meeting the team
- Blood donation
- Anaesthetic options
- Family member or friend accompany
- Preparation of home environment/Equipment
Appendix XII

Inpatient/ Acute Care Stay

- What to bring to the hospital
- Pain management
- Anticoagulation
- What to expect with postoperative therapy

Pain Management

- Adequate pain management is important for effective postoperative rehabilitation
- Treatment options for pain management include:
  1) Patient controlled analgesia
  2) Epidural catheter
  3) Intramuscular injections
  4) Oral medications
Appendix XII

With total joint replacement patients there is a high risk for venous thromboembolism.

Some options for anticoagulation include:
1) Low-molecular-weight heparin
2) Adjusted-dose vitamin K antagonist

Therapy will commence soon after surgery.
Therapy will include instructions regarding:
1) Bed mobility
2) Bed to chair transfers
3) Walking with gait aid (weight bearing status as per surgeon)
4) Exercises (strength and ROM)
5) ADLs
6) Positioning/precautions
Therapy will be progressed on a daily basis.
Following surgery, there are 2 options for rehabilitation:
- Home with CCAC, outpatient therapy, or nothing
- Inpatient rehabilitation

The type and duration of rehabilitation may depend on level of function, other health problems, age, social support, and living arrangements

Activities of daily living
Instrumental activities of daily living
- Driving
- Return to work
- Sexual activity

Return follow-up visits
Asking questions
Appendix XII

Research Findings
Crystal MacKay and Leslie Soever
February 7, 2005

www.gtarehabnetwork.ca

Objective

To investigate best practices related to total hip and knee joint replacement in order to inform the development of the comprehensive information package on the continuum of care
Appendix XII

**Research Questions and Conceptual Model**

- Literature Review
  - What is best practice?
- Qualitative Interviews
  - What patients want to know?
- Educational Needs of Patients with THR/TKR
- Gray Literature
  - What is being done?

**Best Available Evidence**

- Literature rated as poor not accepted
- **Suggestive evidence**
  - 1 or more RCTs rated good or excellent
  - 1 or more systematic reviews rated good or excellent
  - 4 or more other types of research rated fair or above
- **Emerging/inconclusive evidence**
  - 1 or more RCTs rated fair
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### Academic Literature Review
#### Summary of Literature

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### Results: Patient Education

- **When?**
  - Commencing at pre-operative stage and continuing throughout the continuum
  - Pre-operative education (3-28 days)
- **What?**
  - Written information, videos
- **How?**
  - One-on-one instruction/Group instruction
Results: Pre-Operative Education

**Why?**
- Suggestive evidence in literature of positive impact of pre-operative education on patient-related & episode-of-care-related factors
- Patient-related factors include anxiety, satisfaction, and pain management
- Episode-of-care-related factors include LOS and cost-effectiveness

**Current Situation?**
- CCACs in GTA providing pre-operative in-home visits

Results: Pain Management

There is **suggestive evidence** for various options including:
1) Intravenous patient-controlled analgesia (PCA)
2) Epidural catheter
3) Lumbar plexus blockade
4) Intramuscular morphine injections
5) Oral medication
Appendix XII

Results: Blood Loss

Various options available with insufficient evidence to recommend one as optimal treatment

- Allogeneic or donor blood
- Autologous blood
- Erythropoietin alfa
- Hypotensive epidural anaesthesia

Results: Venous Thromboembolism Prophylaxis

- Pharmacological methods include:
  1. Low-molecular-weight heparin
  2. Adjusted-dose vitamin K antagonist

- The literature does not provide evidence to support the use of one anticoagulant over another
Clinical pathways are flowcharts or algorithms for the total care of a patient with a clinical problem from the time of diagnosis until the desired outcome is achieved.

Studies have addressed the impact of clinical pathways on:

1) LOS
2) Cost
3) Patient outcomes (e.g. pain and function)
4) Complications
5) Patient satisfaction

Evidence in the literature is suggestive for use of clinical pathways to decrease hospital LOS and reduce costs.
Rehabilitation programs focus on the following:
- Education
- Organization of home resources
- Mobility/function
- Strength and ROM
- Pain reduction
- Activities of daily living

Studies have evaluated the impact of rehabilitation at various stages of the continuum of care including:

1) Pre-operative
2) Post-operative
   a) Acute care
   b) Inpatient Rehabilitation/Home care/Outpatient

Suggestive evidence of improved outcomes for patients who need these stages of the continuum
Appendix XII

Results: Discharge Destinations

- Specific factors are associated with discharge to inpatient rehabilitation, including older age, comorbidity, and social supports
- In the available literature, outcomes following TJR are similar for patients who are discharged to home care or inpatient rehabilitation
- A standardized approach to determining discharge destinations has not yet been identified and evaluated in the literature

CCAC and Current Practices

- 5 CCACs servicing 10 hospitals
- CCAC case management
- Physiotherapy +/- occupational therapy
- Nursing
- Assistance with personal care
- Equipment
Discussion Guide
Information for Patient Education on Joint Replacements

www.gtarehabnetwork.ca

Do you agree with the four broad categories of information?

Do you agree with the content of each of the chosen categories?
Appendix XII

Recommendation for Overall Categories of Information

- Four main categories of information related to:
  1) Pre-operative Visit
  2) Inpatient/Acute Care Stay
  3) Transition Home/Rehabilitation
  4) Follow-up and Living with Joint Replacement

Category 1: Pre-operative Visit

- What to expect during your visit
- Who you will see/Meeting the team
- Blood donation
- Anaesthetic options
- Family member or friend accompany
- Preparation of home environment/equipment
Category 2: Information for Inpatient Acute Care Stay

- What to bring to the hospital
- Pain management
- Anticoagulation
- What to expect with postoperative therapy

Inpatient/ Acute Care Stay: Pain Management

- Adequate pain management is important for effective postoperative rehabilitation

- Treatment options for pain management include:
  1) Patient controlled analgesia
  2) Epidural catheter
  3) Lumbar plexus blockade
  4) Intramuscular injections
  5) Oral medications
With total joint replacement patients there is a high risk for venous thromboembolism.

Some options for anticoagulation include:
1) Low-molecular-weight heparin
2) Adjusted-dose vitamin K antagonist

Therapy will commence soon after surgery.
Therapy will include instructions regarding:
1) Bed mobility
2) Bed to chair transfers
3) Walking with gait aid
   • weight bearing status as per surgeon
4) Exercises (strength and ROM)
5) Activities of Daily Living (ADLs)
6) Positioning/precautions
Therapy will be progressed on a daily basis.
Appendix XII

Category 3: Transition Home/Rehabilitation

Discharge Destinations and Options for Rehabilitation

- Following surgery, there are 2 options for rehabilitation:
  - Home with CCAC, outpatient therapy, or independent home exercise program
  - Inpatient rehabilitation
- The type and duration of rehabilitation may depend on level of function, other health problems, age, social support, and living arrangements

Category 4: Follow-up and Living with Joint Replacement

- Activities of daily living
- Instrumental activities of daily living
  - Driving
  - Return to work
  - Sexual activity
- Return follow-up visits
- Asking questions
APPENDIX XIII

Feedback Questionnaire
Feedback Questionnaire

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<td>3) Transition Home/Rehabilitation</td>
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<td>4) Follow-up and Living with Joint Replacement</td>
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<td>-Who you will see/Meeting the team</td>
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