

Outpatient Total Joint Arthroplasty-Can It Be Done Safely? : A Review



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Abstract

Total knee arthroplasty and total hip arthroplasty are one of the most successful procedures treating patients with later stage of osteoarthritis. With an improvement of patient care, in every step from pre-operation, intra-operation and post operation, the length of hospital stay is decreasing to a few days and lastly, in outpatient service. We reviewed the current literatures about outpatient arthroplasty, to determine what you should know before doing an outpatient total joint arthroplasty, results and complications.

Keywords: outpatient, day-surgery, total knee arthroplasty, total hip arthroplasty

Total knee arthroplasty (TKA) and total hip arthroplasty (THA) are among the most successful orthopedic procedures with a 15 year-survival rate of more than 90% in most studies.^{1,2} They have traditionally been considered as inpatient surgical procedures. Historically, the inpatient stay exceeded several weeks. With multiple improvements including surgical techniques, anesthesia and implementation of clinical pathways, the length of stay (LOS) in the hospital has substantially decreased to a few days.^{3,4} The reasons that keep patients in hospital care postoperatively include patient and physician concerns about uncontrolled pain, delayed mobilization and possibility of perioperative complications.^{5,6} However, more recent studies⁷ indicate that there are no differences between longer hospital stays, short hospital stays and outpatient surgery. Berger et al have reported successful outpatient total knee arthroplasty without an increase in perioperative and early postoperative complications.⁸ The studies which reported the outpatient arthroplasty results defined an outpatient as a patient discharged within 23 hours.^{8,9}

Why outpatient arthroplasty?

Historically, it was thought that an extended acute hospital stay for several weeks was the best way for patients to recover and achieve a good outcome after total joint arthroplasty. However, there are studies that show with early discharge protocols,^{10,11} patients can recover safely and faster than previously thought, and this decreases inpatient workload and subsequent cost. Moreover, patients discharged quickly have comparable outcomes to patients who remain admitted for the standard hospital stay of 5-10 days. Bertin¹² has reported that outpatient THA costs average 4,000 USD less than inpatient surgery. Lovald et al.⁷ have compared the incremental payment for osteoarthritis and attributable costs at 2 years and reported that costs were approximately 8,527 USD lower for the outpatient group.

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Key to success in outpatient arthroplasty

To initiate and accomplish outpatient arthroplasty surgery, the roadblocks need to be understood. Studies¹³⁻¹⁵ show that patient fear or anxiety about the unknown, not knowing what is going to happen, and fear of pain are major obstacles as well as patient co-morbidities. For the surgeon, the side effects of the treatment from narcotics or anesthesia, blood loss or surgical trauma are concerning and indications for keeping the patient in hospital care under observation.^{10,16} For all of these reasons, good clinical pathways and protocols are crucial.

Preoperative care

Patient selection is the first and most important step to success in outpatient arthroplasty. In addition to the history and physical examination by the surgeon, the patient's home status should be also assessed to determine whether the patient has any support to help them move around the house safely after surgery.¹⁷ Patients with a history of diabetes, myocardial infarction, stroke, congestive heart failure, venous thromboembolism, cardiac arrhythmia, respiratory failure, chronic pain requiring regular opioid medications or patients who are on anti-coagulation therapy should not be considered candidates for outpatient total joint surgery as they were excluded from some of the studies.^{8,9} Lovald et al.¹⁸ has reported increased risk of revision, infection, accidental falls, wound complications, and death in patients with poorer health status (i.e. with a higher Charlson score). However, patients with ischemic heart disease or diabetes were not associated with increased risk for re-hospitalization, death, revision, infection, or DVT. Courtney et al.¹⁹ have reviewed 1,012 consecutive patients undergoing elective primary hip and knee arthroplasties and reported the independent multivariate risk factors for developing late (> 24 hours) complications included COPD (adjusted OR 4.16), CHF (adjusted OR 9.71), CAD (adjusted OR 2.80), and cirrhosis (adjusted OR 8.43).

Co-morbidities and any surgical risks of the patient should be evaluated carefully and cleared by a team of internal medicine specialists who are familiar with out-patient procedures and aware of factors that would make an outpatient procedure undesirable.^{5,20}

There are studies²¹⁻²⁵ that confirm that a significant aspect to consider is patient education which involves giving the patient appropriate goals and expectations, education about the surgical procedure and potential complications, the entire expected hospital course and postoperative care especially for pain control and ambulation. Reviewing the patient's questions and particularly addressing the patient's needs are necessary steps to improve postoperative patient satisfaction and outcome.

Pre-arthroplasty rehabilitation further educates patients about what is expected from them after the operation, such as how patients are going to move the operated extremity, how to use a cane or crutches, and what to expect in the perioperative phase. Patients who receive pre-arthroplasty rehabilitation education have been shown to have significantly better post-operative outcomes regarding strength, recovery and function²⁶ and also tend to save on hospital-related expenditure and have a shorter length of stay in the hospital.^{22,27,28}

Perioperative care

The main perioperative goals are prevention and prompt treatment of pain, nausea, and hypovolemia. It is better to manage these issues before symptoms arise. Premedication and perioperative protocols are varied in details between published studies, but all try to avoid using narcotics and aim to keep the patient well hydrated.^{8,9,29-31}

The choice of anesthesia for outpatient arthroplasty varies according to surgeon, anesthesiologist, and institution. Multimodal pain management including spinal anesthesia, local nerve block, intravenous narcotics and anti-inflammatory drugs have been shown to have significantly better post-operative pain management results.³²⁻³⁷

Tranexamic acid administration has also been demonstrated to safely reduce perioperative blood loss in hip and knee arthroplasty³⁸⁻⁴¹ and to reduce blood transfusion requirements which are one of the main problems that keep patients in the hospital.

The operative intervention itself should be smooth and efficient, but not hurried. Less invasive approaches and techniques have been reported to have significantly decreased pain and improve outcomes especially in the short term.⁴²⁻⁴⁴

Post-operative care

Physical therapy is usually started a few hours after surgery, soon after patients are assessed for vital signs and nausea. If any signs of hypovolemia or nausea are present, these should be treated promptly.^{8,45} The draining tube can be used in an effort to reduce wound complications⁸ and is typically removed 4 hours post-operation in the recovery room. However, there is a study⁹ that did not use the draining tube and reported no wound complication.

Patients will be discharged to return home only if all discharge criteria are met satisfactorily. To meet the criteria, patients must have stable vital signs, be able to eat regular diet and oral medication, and complete a formal physical therapy protocol. This protocol requires

that patients can independently transfer out of bed to standing and into bed from standing, rise from a chair to standing and sit from standing, ambulate 100 feet in distance, and ascend and descend a full flight of stairs.

After being discharged, patients will follow the care plan explained preoperatively. Pain is managed with oral narcotics and anti-inflammatory agents. Patients are seen by a home health nurse and therapist on the first post-operative day. Patients will be seen by the surgeon 1 week post operation and thereafter as a usual follow up.

Current published results

Most of the out-patient total joint arthroplasty studies have reported more than 90% success in discharging patients home within 23 hours without postoperative short term complications and less than 1% readmission due to pain, nausea or hypotension (Table 1).^{8,9,29,30} Lovald et al.⁷ have reported significantly less pain (31.7% vs 43.5%) in the outpatient group compared to the standard stay (3-4 days) group, but had higher 90 days infection (2% vs 1.9%), dislocation (0.4% vs 0.3%) and readmission rates (0.9% vs 0.5%). However, none of these differences are considered significant.

Table 1: Results of outpatient arthroplasty.

Study	Year	Operation	Patient	Follow up	Result
Berger et al. ⁸	2005	TKA	50	3 months	48 (96%) discharged within 23 hours 5 (10%) readmission within 30 days
Kolisek et al. ⁹	2009	TKA	64	24 months ¹²⁻⁴¹	62 (100%) discharged within 23 hours 0 (0%) readmission within 30 days 1 peroneal nerve dysfunction 1 genu recurvatum 10 months post op 1 tibial plateau fracture 1 year post op 2 manipulations
Berger et al. ³⁰	2009	THA	150	Minimum 3 months	150 (100%) discharged within 23 hours 0 (0%) readmission within 30 days 7 (4.67%) emergency visits
Dorr et al. ²⁹	2010	THA	69	6 months	53 (77%) discharged within 23 hours 0 (0%) readmission within 30 days

TKA – Total knee arthroplasty, THA – Total hip arthroplasty

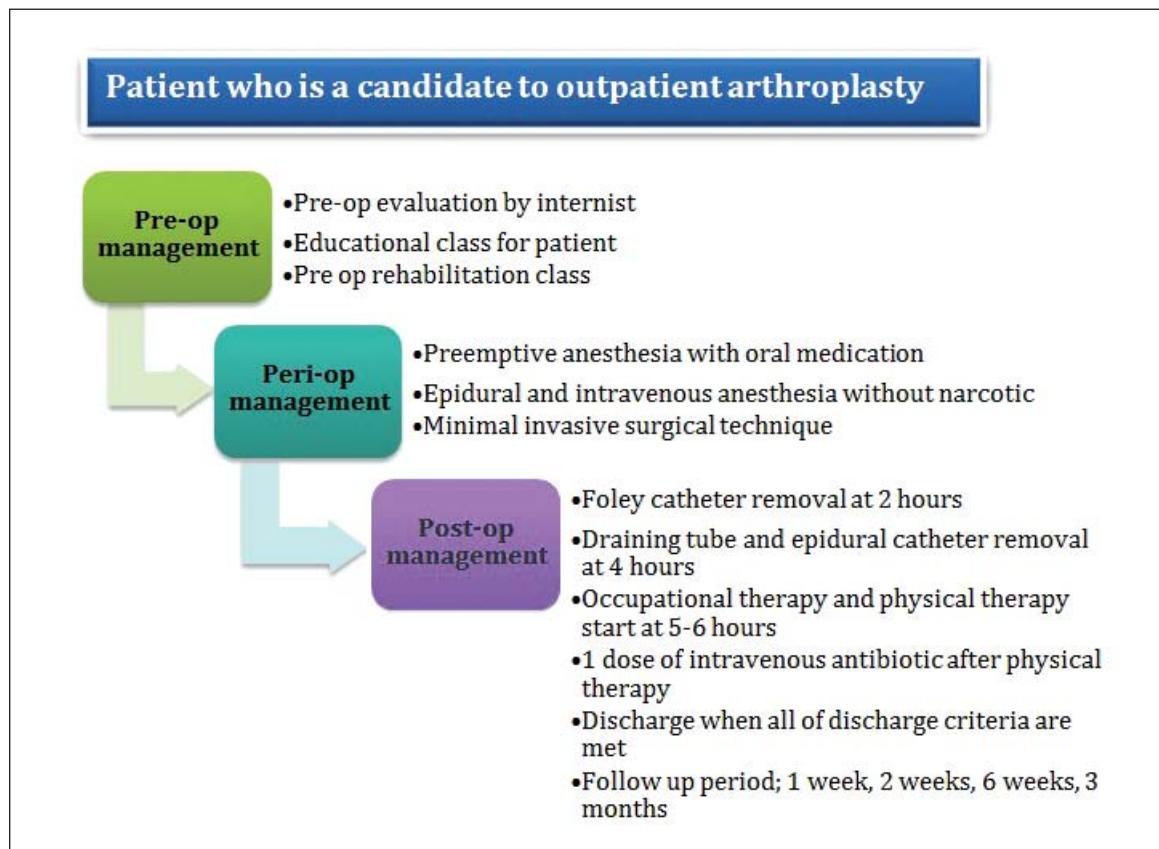
Conclusion

A trend of outpatient arthroplasty is emerging. It has already been established for orthopedic procedures which were formerly done as inpatient procedures such as upper extremity surgery, arthroscopy and anterior cruciate ligament reconstruction. The potential benefit is that patients can recover in their own home with reduced inpatient services. Outpatient arthroplasty involves multiple and specialized protocols for preoperative, perioperative and postoperative care. The surgeon's role will change from the physician in the hospital to coordinator of the entire care experience.

Those interested in performing outpatient arthroplasty should initially aim to reduce the length of stay to 2 days. After a successful protocol and clinical pathway implementation, once a 1 day discharge can be achieved safely, then a same day discharge may be considered.

With careful patient selection and good clinical pathways, outpatient total joint arthroplasty can be done safely. However, current clinical studies have demonstrated only short term follow-up outcomes. Further studies with longer term follow-up and larger patient number are needed.

Diagram shows patient management flow chart summary from Berger et al.⁸



References

1. Makela KT, Matilainen M, Pulkkinen P, et al. Failure rate of cemented and uncemented total hip replacements: register study of combined Nordic database of four nations. *BMJ* 2014;348:f7592.
2. Ulivi M, Orlandini L, Meroni V, et al. Survivorship at minimum 10-year follow-up of a rotating-platform, mobile-bearing, posterior-stabilised total knee arthroplasty. *Knee Surg Sports Traumatol Arthrosc* 2014;23: 1669-75.
3. Mertes SC, Raut S, Khanduja V. Integrated care pathways in lower-limb arthroplasty: are they effective in reducing length of hospital stay? *Int Orthop* 2013;37:1157-63.
4. Husted H, Holm G, Jacobsen S. Predictors of length of stay and patient satisfaction after hip and knee replacement surgery: fast-track experience in 712 patients. *Acta Orthop* 2008;79:168-73.
5. Yasunaga H, Tsuchiya K, Matsuyama Y, et al. Analysis of factors affecting operating time, postoperative complications, and length of stay for total knee arthroplasty: nationwide web-based survey. *J Orthop Sci* 2009;14:10-6.
6. Husted H, Lunn TH, Troelsen A, et al. Why still in hospital after fast-track hip and knee arthroplasty? *Acta Orthop* 2011;82:679-84.
7. Lovold ST, Ong KL, Malkani AL, et al. Complications, mortality, and costs for outpatient and short-stay total knee arthroplasty patients in comparison to standard-stay patients. *J Arthroplasty* 2014;29:510-5.
8. Berger RA, Sanders S, Gerlinger T, et al. Outpatient total knee arthroplasty with a minimally invasive technique. *J Arthroplasty* 2005;20:33-8.
9. Kolisek FR, McGrath MS, Jessup NM, et al. Comparison of outpatient versus inpatient total knee arthroplasty. *Clin Orthop Relat Res* 2009;467:1438-42.
10. Hayes JH, Cleary R, Gillespie WJ, et al. Are clinical and patient assessed outcomes affected by reducing length of hospital stay for total hip arthroplasty? *J Arthroplasty* 2000;15:448-52.
11. Renkawitz T, Rieder T, Handel M, et al. Comparison of two accelerated clinical pathways--after total knee replacement how fast can we really go? *Clin Rehabil* 2010;24:230-9.
12. Bertin KC. Minimally invasive outpatient total hip arthroplasty: a financial analysis. *Clin Orthop Relat Res* 2005;435:154-63.
13. Ong PH, Pua YH. A prediction model for length of stay after total and unicompartmental knee replacement. *Bone Joint J* 2013;95-B(11):1490-6.
14. Horlocker TT. Pain management in total joint arthroplasty: a historical review. *Orthopedics* 2010 ;33:14-9.
15. Brander VA, Stulberg SD, Adams AD, et al. Predicting total knee replacement pain: a prospective, observational study. *Clin Orthop Relat Res* 2003;416:27-36.

16. Jonas SC, Smith HK, Blair PS, et al. Factors influencing length of stay following primary total knee replacement in a UK specialist orthopaedic centre. *Knee* 2013;20:310-5.
17. Hansen VJ, Gromov K, Lebrun LM, et al. Does the Risk Assessment and Prediction Tool Predict Discharge Disposition After Joint Replacement? *Clin Orthop Relat Res* 2014;473:597-601.
19. Lovald S, Ong K, Lau E, et al. Patient selection in out-patient and short-stay total knee arthroplasty. *J Surg Orthop Adv* 2014;23:2-8.
20. Courtney PM, Rozell JC, Melnic CM, et al. Who Should Not Undergo Short Stay Hip and Knee Arthroplasty? Risk Factors Associated With Major Medical Complications Following Primary Total Joint Arthroplasty. *J Arthroplasty* 2015; 30:1-4.
21. Raut S, Mertes SC, Muniz-Terrera G, et al. Factors associated with prolonged length of stay following a total knee replacement in patients aged over 75. *Int Orthop* 2012;36:1601-8.
22. Livbjerg AE, Froekjaer S, Simonsen O, et al. Pre-operative patient education is associated with decreased risk of arthrofibrosis after total knee arthroplasty: a case control study. *J Arthroplasty* 2013;28:1282-5.
23. Beupre LA, Lier D, Davies DM, et al. The effect of a preoperative exercise and education program on functional recovery, health related quality of life, and health service utilization following primary total knee arthroplasty. *J Rheumatol* 2004;31:1166-73.
24. Jones S, Alnaib M, Kokkinakis M, et al. Pre-operative patient education reduces length of stay after knee joint arthroplasty. *Ann R Coll Surg Engl* 2011;93:71-5.
25. Scott CE, Bugler KE, Clement ND, et al. Patient expectations of arthroplasty of the hip and knee. *J Bone Joint Surg Br* 2012;94:974-81.
26. Sjoling M, Nordahl G, Olofsson N, et al. The impact of preoperative information on state anxiety, postoperative pain and satisfaction with pain management. *Patient Educ Couns* 2003;51:169-76.
27. Topp R, Swank AM, Quesada PM, et al. The effect of prehabilitation exercise on strength and functioning after total knee arthroplasty. *PM R* 2009;1:729-35.
28. Huang SW, Chen PH, Chou YH. Effects of a preoperative simplified home rehabilitation education program on length of stay of total knee arthroplasty patients. *Orthop Traumatol Surg Res* 2012;98:259-64.
29. Rodgers JA, Garvin KL, Walker CW, et al. Preoperative physical therapy in primary total knee arthroplasty. *J Arthroplasty* 1998;13:414-21.
30. Dorr LD, Thomas DJ, Zhu J, et al. Outpatient total hip arthroplasty. *J Arthroplasty* 2010;25:501-6.
31. Berger RA, Kusuma SK, Sanders SA, et al. The feasibility and perioperative complications of outpatient knee arthroplasty. *Clin Orthop Relat Res* 2009;467:1443-9.
32. Maheshwari AV, Boutary M, Yun AG, et al. Multimodal analgesia without routine parenteral narcotics for total hip arthroplasty. *Clin Orthop Relat Res* 2006;453:231-8.
33. Dahl JB, Kehlet H. Preventive analgesia. *Curr Opin Anaesthesiol* 2011;24:331-8.
34. Dalury DF, Lieberman JR, MacDonald SJ. Current and innovative pain management techniques in total knee arthroplasty. *J Bone Joint Surg Am* 2011;93:1938-43.
35. Hebl JR, Dilger JA, Byer DE, et al. A pre-emptive multimodal pathway featuring peripheral nerve block improves perioperative outcomes after major orthopedic surgery. *Reg Anesth Pain Med* 2008;33:510-7.
36. Buvanendran A, Kroin JS, Tuman KJ, et al. Effects of perioperative administration of a selective cyclooxygenase 2 inhibitor on pain management and recovery of function after knee replacement: a randomized controlled trial. *JAMA* 2003;290:2411-8.
37. Mallory TH, Lombardi AV, Jr., Fada RA, et al. Pain management for joint arthroplasty: preemptive analgesia. *J Arthroplasty* 2002;17:129-33.
38. Choi PT, Bhandari M, Scott J, et al. Epidural analgesia for pain relief following hip or knee replacement. *Cochrane Database Syst Rev* 2003(3):CD003071.
39. George DA, Sarraf KM, Nwaboku H. Single perioperative dose of tranexamic acid in primary hip and knee arthroplasty. *Eur J Orthop Surg Traumatol* 2015;25:129-33.
40. Bagsby DT, Hur J. Effect of intra-articular injection of tranexamic acid on postoperative hemoglobin in total hip arthroplasty. *Orthopedics* 2014;37:e557-62.
41. Huang Z, Ma J, Shen B, et al. Combination of Intravenous and Topical Application of Tranexamic Acid in Primary Total Knee Arthroplasty: A Prospective Randomized Controlled Trial. *J Arthroplasty* 2014; 29:2342-6.
42. Sabatini L, Atzori F, Revello S, et al. Intravenous use of tranexamic acid reduces postoperative blood loss in total knee arthroplasty. *Arch Orthop Trauma Surg* 2014; 134:1609-14.
43. Li C, Zeng Y, Shen B, et al. A meta-analysis of minimally invasive and conventional medial parapatella approaches for primary total knee arthroplasty. *Knee Surg Sports Traumatol Arthrosc* 2014;23:1971-85.
44. Cheng T, Liu T, Zhang G, et al. Does minimally invasive surgery improve short-term recovery in total knee arthroplasty? *Clin Orthop Relat Res* 2010;468:1635-48.
45. Tasker A, Hassaballa M, Murray J, et al. Minimally invasive total knee arthroplasty: a pragmatic randomised controlled trial reporting outcomes up to 2 year follow up. *Knee* 2014;21:189-93.
46. Berger RA. A comprehensive approach to outpatient total hip arthroplasty. *Am J Orthop (Belle Mead NJ)* 2007;36:4-5.