We took a look at our total joint replacement patients and determined that we could improve the care experience of the patient while they were in hospital – how to best manage their pain, how to shorten their hospitalization so they would be able to get back to their normal lives – and we wanted to make sure we were optimizing their outcomes. So we analyzed what we were doing, and we came up with some plans for what we thought we could change that would improve the outcome.

R. John Wright, MD
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From the initial consult to the follow-up phone calls after discharge, total joint replacements at Brigham and Women’s Hospital now follow standardized procedures for reliably better outcomes. The convincing results helped launch a care redesign for total joint replacements, with similar early trends in reducing pain scores and length of stay and increasing patient satisfaction.

Osteoarthritis and Joint Replacement

Osteoarthritis – the breakdown of cartilage surrounding the joints – is a growing concern for our country’s aging population. Recent data shows that systematic knee arthritis alone affects one in eight American adults over the age of 60. The burden of a disease like knee arthritis includes both economic difficulties and the inability to maintain daily activity. For instance, the cost of treating knee arthritis has been estimated at up to $4,000 a year for an individual, with the added downsides of loss of mobility and activity. Data from 2005 showed over 600,000 knee replacements performed in the year, at a cost of over 11 billion dollars. As the American population gets older and continues to be more active into older age, the number of knee and other joint replacements is likely to increase over 600 percent by 2030.

Patient Care Improvement at Brigham and Women’s

In 2006, the multidisciplinary Care Improvement Team in Orthopedics began to examine approaches to improve the Hospital’s joint replacement process. By bringing together pharmacists, nurses, anesthesiologists, surgeons, care coordinators and social workers, the team aimed to improve measurable physical outcomes for patients and also increase the efficiency of the joint replacement procedure.
Testing procedural changes in real-time environments, the team researched improvements to part of the care process, then tested the improvements and evaluated them for efficacy. Changes that were shown to have a positive effect on patient outcomes became part of the treatment process.

**Standardization of the Process**

The Care Improvement Team’s work was based around a number of clear goals aimed to standardize the care process and provide an optimal and consistent level of care. The first goal of the improvement process was to set clear expectations for the patient going into the surgery. To reduce the amount of concern and stress that patients may have about the procedure, the team developed a total joint replacement education class for patients and their caregivers to attend prior to the surgery. The class demystified the surgical procedure and laid out the expectations for pain and mobility post-surgery. This measure removed uncertainty and inaccuracies from the patients’ and caregivers’ expectations for the surgery, allowing for as few surprises as possible and increased knowledge of what the recovery timeline would be.

Next, the team changed the pain management approach, from pre-operative through post-operative medications. In order to reduce pain, the team researched the most effective combination of pre-surgery medications and piloted the use of nerve blocks during the surgical process. The goal of these changes was to increase patients’ comfort coming out of surgery so that the rehabilitation process could begin soon after the joint replacement. Early movement after joint replacement has been shown to reduce overall recovery time – a beneficial outcome for patients and families. Increasing the range of motion at discharge is important for patients’ recovery. A groundbreaking change that the team implemented involved replacing continuous passive motion (CPM) machine therapy in favor of the new pain protocols and physical therapy aimed at mobilization sooner.

Finally, the team focused on strong coordination of care and communication between nursing staff, surgeons, anesthesiologists and physical therapists – and patient and family members. Staff members provided consistent instructions and care to patients at each step along the way, allowing for a smoother and more predictable process. Increased coordination helped the patient to realize that the Hospital provides a comprehensive and consistent procedure when it comes to total joint replacement.

Standardizing the total joint replacement procedure and care process has allowed surgeons, nurses and physical therapists to focus more intently on the more individualized needs of the patients. Patients receive one-on-one attention from medical professionals that are prepared to handle unique situations.
“A lot of people say, ‘patients are all different, they have different needs,’ and that’s very true, but in fact patients are more alike than they are different,” explains Dr. Wright. “One of the beauties of standardizing the care is that 95 percent of the care happens automatically and because of that you can really focus on what the patient needs individually. What are the things about this patient that are different? What is it that we need to do for them that makes sure that they have the best possible outcome? So by standardizing 95 percent of the care, the five percent that’s left is really customized care for that patient.”

Evaluating the Changes

The team has been able to assess the impact of their changes by measuring patient outcomes from 2007, and then from 2010. The populations that were evaluated in each study were similar demographically, but their experiences differed due to the standardization of the total joint replacement procedure. The patients in the 2010 group performed better than the 2007 group in a number of notable tests. First, in measurements of the distance that a patient could walk on the first day after discharge the 2010 group averaged 85 feet, while the 2007 group had only averaged 55 feet. This improvement in mobility is attributable to the elimination of CPM machine therapy and the increase of mobilization through physical therapy and pain management practices.

The studies also showed an improvement in patients’ perceptions of pain. When asked to rank the severity of their pain on a one to 10 scale where one is low and 10 is high, patients in the 2007 study averaged 7.5 on the first day after surgery and 6.5 on the second day after surgery. In the 2010 study, however, patients gave an average score of just under five for both the first and second days after surgery. Again, the improvements in pain management were responsible for this change. It is also likely that the more informed patients were expecting the level of pain that occurs after surgery, lowering their perception of discomfort. This result is in line with the Care Improvement Team’s goal of educating patients on what to expect from their surgery.

In the three years between the two studies, the average number of days that patients stayed in the hospital after their surgery decreased from 3 ¼ to 2 ½. Over the same time span, the percentage of patients that went straight home as opposed to going to a rehabilitation facility increased from 40 percent to 60 percent. These outcomes stem from the Care Improvement Team’s goal of creating a more efficient surgery and recovery process across the board.
Improving Patient Outcomes for Joint Replacement: a white paper on groundbreaking research from Brigham and Women’s Hospital

The Importance of Progress

As the Care Improvement Team’s work has showed, a procedure like a total joint replacement can always be optimized to provide better patient outcomes and a more efficient process. Total joint replacement patients at Brigham and Women’s Hospital experience a comprehensive and coordinated surgical procedure that starts with education for them and their caregivers, before progressing to an effective and standardized recovery process. The dedicated staff at Brigham and Women’s is able to put the Department of Orthopedic Surgery’s body of research into action to create a routine, yet personalized experience for patients. In the future, the team will continue to evaluate the total joint replacement process to improve patients’ recovery times and to reduce the risk of auxiliary complications of surgery such as infection.