

Arthroplasty of the Lower Extremities: A Special Monograph Volume of the *Rhode Island Medical Journal*

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As our population ages and continues to live longer than ever before, there will be a dramatic increase in the burden of musculoskeletal diseases within our society. It is currently estimated that 10,000 Americans will turn 65 every day for the next 20 years, and between 2011 and 2030, the percentage of the American population over 65 years old will shift from 13% to 18%. These “Baby Boomers” will challenge the capabilities of our healthcare system, and place unprecedented demand on our healthcare system to restore joint junction and eliminate pain from arthritis to help maintain active, functional, and productive lifestyles.

Over the past 50 years, total joint arthroplasty has become one of the most common and successful types of orthopaedic surgeries, and total hip arthroplasty (THA) is perhaps the most successful surgery that has ever been developed.

Currently, over 750,000 THA and TKA are performed yearly in the United States, and the numbers are expected to increase exponentially in the coming years.

The high success rates enjoyed by both patients and surgeons following THA have helped to establish the procedure as the “gold standard” against which all other surgical procedures are compared regarding quality of life improvement. Accordingly, the British *Lancet* celebrated THA as the “Operation of the Century” in 2007.¹

A recent study of Medicare data presented at the 2012 Annual Meeting of the American Academy of Orthopaedic Surgeons² showed for the first time that if patients in matched groups with severe knee osteoarthritis undergo total knee arthroplasty (TKA), patients with TKA actually have a 7-year mortality rate that is half of those who don’t undergo the procedure. Similar findings for THA have also

been discussed at recent arthroplasty meetings in advance of publication, suggesting the notion that THA and TKA procedures not only relieve pain from arthritis, but may be viewed in the future as “public health interventions” that may predictably help people lead longer, more comfortable, and more productive lives.

Utilization trends verify the growing importance of total joint replacement within our national healthcare system. A recent *JAMA* article³ analyzing Medicare data in the United States reported that primary TKA volume increased 161.5% and revision TKA volume increased 105.9% between 1991 and 2010. These increases were felt to be driven both by increases in the number of Medicare enrollees and by per capita utilization rates.

Although THA and TKA are the most common types of joint replacement surgery, orthopaedic surgeons now have the capability to perform joint replacements in nearly every region of the human body. Total disc arthroplasty for the spine, total shoulder and elbow arthroplasty, and total ankle arthroplasty have also emerged as viable treatments for patients afflicted with degenerative diseases of these joints.

Currently, over 750,000 THA and TKA are performed yearly in the United States, and the numbers are expected to increase exponentially in the coming years. By 2030, it is anticipated that there will be a 274% and a 673% increase in the respective number of THA and TKA procedures performed annually.⁴

Unfortunately, the burden of revision arthroplasty surgeries is also expected to climb at a similar rate as an increasing number of primary joint arthroplasty surgeries are performed annually. Most TKA and THA revisions are currently related to “osteolysis” from plastic wear. Thankfully, in the past decade, improvements in plastics bioengineering have reduced plastic wear rates in artificial joints by up to 1,000 fold. The effect on revision rates remains unclear, but is expected to significantly reduce the need for repeat surgery as longer-term data becomes available.



'Supply Side Crisis'

At the same time, there is a looming public health crisis in hip and knee replacement surgery that has been labeled by experts as a "Supply Side Crisis."⁵ The number of young surgeons specializing in total joint replacement is declining, thought to be related both to declining reimbursement rates from cuts to the Medicare system, as well as the demanding nature of providing inpatient care for these patients. Since many senior arthroplasty surgeons are within 10 years of retirement, there is going to be a manpower crisis in arthroplasty surgery for the American public unless more orthopaedic residents and fellows can be skillfully trained to meet demands of an aging population.

With the recent development of Rhode Island's only academic Total Joint Center at the Miriam Hospital in 2011, we now have the capability to engage and develop the skills of talented young orthopaedic surgeons to help meet this important public health need. As we continually improve the quality and capability of joint replacement surgery in the state, our ability to care for local patients undergoing arthroplasty will be on par with the finest institutions in the country.

In this special volume of the *Rhode Island Medical Journal* (RIMJ), I have assembled a series of outstanding articles written by expert local authors about aspects of medical and surgical care related to lower-extremity joint arthroplasty. We will develop an improved understanding of the biology of osteoarthritis, explore novel ways surgeons and hospitals are working together to improve arthroplasty care delivery, and review current strategies to manage blood utilization surrounding arthroplasty surgery. We will gain insight into the diagnosis and management of ankle arthritis, and review cutting edge techniques relevant to THA and TKA that include both unique concepts and futuristic treatment options.

I wish to thank the leadership of the Rhode Island Medical Society and the editors of the *RIMJ* for granting the opportunity to present this unique monograph. I am also deeply grateful for the efforts of each author who contributed their insight and expertise towards making this a valuable collection of articles.



Dr. Gary Ferguson, center, in the operating room at The Total Joint Center at The Miriam Hospital, a program of Rhode Island and The Miriam hospitals. It celebrated its one-year anniversary several months ago. The Center performs more than 100 cases a month.

References

1. Learmouth ID, Young C, Rorabeck C. The Operation of the Century: Total Hip Replacement. *The Lancet*. 2007;370(9597):1508-19.
2. Lovald S, Lau E, Ong K, et al. Cost and Disease Outcomes of Total Knee Arthroplasty patients in the Medicare population. American Academy of Orthopaedic Surgeons (AAOS) 2012 Annual Meeting: Abstract, P 149: "Differences in costs and risk ratios for each outcome were adjusted using logistic regression for age, sex, race, buy-in status, region, and Charlson score. The results were compared at fixed periods of one year, three years, five years, and seven years after surgery."
3. Cram P, Lu X, Kates SL, et al. Total Knee Arthroplasty Volume, Utilization, and Outcomes Among Medicare Beneficiaries, 1991-2010. *JAMA*. 2012;308(12):1227-1236. doi:10.1001/2012.jama.11153.
4. Kurtz S, Ong K, Lau E, et al. Projections of Primary and Revision Hip and Knee Arthroplasty in the United States from 2005 to 2030. *J Bone Joint Surg Am*. 2007; 89(4):780-5.
5. Iorio R, Robb WJ, Healy WL, et al. Orthopaedic Surgeon Workforce and Volume Assessment for Total Hip and Knee Replacement in the United States: Preparing for an Epidemic. *J Bone Joint Surg Am*. 2008;90:1598-1605.