

# Total Hip and Knee Replacements 2011: An Update for Rheumatologists

Written by Debra Gordon, MS

An aging population, obesity, and the growing incidence of knee injuries in young people are factors that are likely to increase the demand for total joint replacement. Joanne M. Jordan, MD, University of North Carolina Rheumatology/Thurston Arthritis Research Center, Chapel Hill, North Carolina, USA, provided an update on the topic.

Between 1990 and 2002, the rate of primary hip replacement increased 50% to 60%, but knee replacements increased by as much 2.5- to 3-fold, even among the ≥85-year-old population [Singh JA et al. *Mayo Clin Proc* 2010]. Using a computer simulation model and population-based data from the 2008 census, an analysis published in 2011 found that 13% of individuals aged between 60 and 64 years in the United States (US) had symptomatic knee osteoarthritis (OA). Of those who survive another decade, 20% will have developed symptomatic severe or end-stage knee OA, with estimates ranging from 10% in nonobese individuals to as much as 35% in obese individuals [Holt HL et al. *Osteoarthritis Cartilage* 2011]. A Centers for Disease Control and Prevention report of joint replacements in the Medicare population between 2000 and 2006 found an increase of approximately 2 million procedures [MMWR. 2009;58(6)].

Murphy et al., in a 2008 study, predicted that approximately 45% of individuals who live to 85 years in the United States would have symptomatic knee OA, with a lifetime risk in those who are obese that is nearly twice that of those with a body mass index (BMI) <25 kg/m<sup>2</sup> (Table 1). A significantly higher risk in individuals with a history of knee injury was also noted (56.8, 95% CI, 48.4 to 65.2 vs 42.3, 95% CI, 37.2 to 47.4) [Murphy L et al. *Arthritis Rheum* 2008].

**Table 1. Lifetime Risk of Knee OA.**

BMI Status	Lifetime Risk (%)	95% CI
<25 kg/m <sup>2</sup>	30.2%	23.0% to 37.4%
25 to <30 kg/m <sup>2</sup>	46.9%	39.3% to 54.5%
≥30 kg/m <sup>2</sup>	60.5%	53.0% to 68.1%

An analysis by Losina et al. found that total quality of life years that are lost due to knee OA was nearly double in obese individuals compared with nonobese people with knee OA, with Hispanic and African-American women losing disproportionately more quality of life years than their overall percentage of the population would otherwise suggest [Losina E et al. *Ann Int Med* 2011].

An analysis of the British Birth Cohort Study, which has been following 5000 individuals since 1946 (3035 of whom were alive and able to be followed), found that the risk of knee OA, assessed at age 53, is higher in those with a high BMI in adolescence and young adulthood, starting at age 20 for men and age 15 for women (95% CI, 1.11 to 1.71 per Z-score increase in BMI for men and 1.89 [95% CI 1.59 to 2.24 for women]), and exposure to high BMI throughout adulthood was most predictive of risk of developing knee OA in both men and women [Will AK et al. *Ann Rheum Dis* 2011].

These data suggest that weight control throughout life is important and that childhood weight tracks closely with adult weight but that the effect of childhood or adolescent weight is eliminated once weight at adult age is considered.



Peer-Reviewed  
Highlights from the

**American College of  
Rheumatology  
75<sup>th</sup> Annual Scientific  
Meeting**

### *Physical Activity, Injury, and Osteoarthritis*

Approximately 12% of OA is related to injury, and the annual cost is approximately \$3.1 billion [Brown TD et al. *J Orthop Trauma* 2006].

A study of relatively young male soccer players (aged 16 to 42 years at time of injury) found that 14 years after sustaining an ACL tear, 41% of injured knees would develop advanced OA, compared with only 4% of uninjured knees [von Porat A et al. *Ann Rheum Dis* 2004]. In another study of female soccer players aged under 20 years at the time of injury, the OA rate was 51% in injured knees only 12 years postinjury, compared with an 8% rate of OA in uninjured knees [Lohmander LS et al. *Arthritis Rheum* 2004].

A recent epidemiological study found that approximately half of children in the US aged between 6 and 17 years (27 million children) play team sports, which may be predictive of a postinjury problem that will continue to grow [Caine DJ et al. *Br J Sports Med* 2011]. Additionally, 65% of sports and recreational injuries that are seen in emergency departments occur in those aged younger than 19 years [*MMWR*. 2002;51(33)].

Severe symptomatic OA is a significant public health issue that is clearly related to the aging of our society, obesity in childhood and throughout life, and joint injury. While total knee and hip replacements are increasing in frequency among all age groups, racial and ethnic disparities persist.

### *Outcomes of Total Hip and Total Knee Replacement*

Jeffrey Katz, MD, professor of medicine and orthopedics at Brigham and Women's Hospital, Boston, Massachusetts, USA, discussed total hip and knee replacement outcomes. His analysis placed outcomes into three relevant categories: the perioperative period, the honeymoon period (1 to 10 years postsurgery), and long-term follow-up of more than 10 years.

Mortality within the first 90 days postsurgery ranges between 0.5% and 1% for new replacements and 2% to 2.5% for revisions. There is a higher rate for hip replacements versus knee replacements, with advanced age, male gender, low socioeconomic status, comorbidities (diabetes, cardiovascular disease, renal failure, dementia), African-American race, and hospitals that perform a low volume of procedures are associated with poor outcomes [Katz JN et al. *J Bone Joint Surg Am* 2001].

In the first 90 days after surgery, total hip replacement (THR) recipients have a higher risk of death due to myocardial infarction, pulmonary embolism, and peptic ulcer than the general population. However, over the subsequent 12 years, THR recipients are less likely to die of these causes than the general population [Roberson et al. *JBJS* 2007]. It is unclear whether this is reflective of favorable patient selection of healthier individuals for THR, or whether it may be a salubrious effect in terms of the functional benefits that are offered by the procedure.

During the honeymoon period, patients exhibit a favorable improvement in pain during the first year. However, as Bourne et al. and others have demonstrated, there is significant variability around that improvement, with approximately 20% of total knee replacement patients dissatisfied with the end results [Bourne RB et al. Annual Meeting of the Knee Society 2010; Beswick A et al. *ACR* 2011]. Patients with residual pain at 6 months also have worse functional status and pain outcomes at 5 years [Katz JN et al. World Congress on Osteoarthritis 2011].

In the long-term follow-up period, patients who underwent total joint replacement faced ongoing risks of infection, repeated dislocation, and revision. The risk of revision for infection after the first year of a THR is approximately 0.7% over 15 years, while the risk for knee replacement revision is approximately 1%. However, these figures fail to capture dislocations that may present in the emergency department.

The lifetime risk of periprosthetic fracture is 1% to 2%, usually related to low-energy trauma, with some data pointing to older age, female gender, a history of rheumatoid arthritis, loose implant, peptic ulcer disease, and cardiovascular disease as being associated with fracture risk [Singh JA et al. *ACR* 2011; Della Rocca GJ et al. *J Orthop Trauma* 2011].

Overall, 12 years after total joint replacement, one-third of patients aged 65 to 75 years will have died; 9.4% will have had a revision procedure; and 61% will be alive and at risk for revision [Katz JB. In process.]. In the ≥75-year-old age group, 58% will have died; 5.7% will have undergone revision, and 35% will be alive and at risk of revision. The cumulative risk of revision for total knee replacement is about 0.5% per year and about 1% per year with hip replacement [Robersson O et al. *Acta Orthop* 2010].