Total knee replacements (TKRs) are increasing throughout the developed world. More than 600,000 primary TKRs were performed in the USA in 2009, with >95% of these done on people with advanced knee OA [1]. The use of TKRs is increasing especially in individuals <65 years of age [1], who have less functional impairment than their older counterparts [2]. Although TKR is generally regarded as a highly successful procedure, emerging evidence suggests that 15–20% of people who have undergone TKR had persistent pain after the usual period of rehabilitation [3]. This means that over 100,000 people who undergo TKR experience suboptimal outcomes every year, which is roughly equal to the annual incidence of RA [4]. These observations highlight the importance of identifying patients at risk of suboptimal outcome and devising interventions to improve outcomes in these at-risk patients. An increasing number of studies have assessed outcomes of TKR, but there is no consensus on whether to define success based on the degree of improvement from preoperative status (the journey) or based on the level of pain or functional status achieved at a specific point in time (the destination).

In this issue, Judge and colleagues report TKR outcomes in a large community-based cohort in the UK, focusing on outcomes assessed at 6 months post-surgery (the destination) [5]. The investigators focus on the patient’s acceptable state of symptom, the highest level of symptomatic burden at which the person still feels well [6], arguing that this metric is what matters to the patient and has been shown to be related to satisfaction with surgery. The authors identify several independent preoperative risk factors for achieving poor Oxford knee scores at 6 months post-operatively, including poor preoperative functional status, greater anxiety and lower socioeconomic status. Although pain and functional status post-TKR are highly correlated, they may carry different predictors. In fact, authors report that age and gender were predictive of post-operative functional status, whereas preoperative depression and functional status scores were associated with pain at 6 months.

The study confirmed the finding observed in several previous studies that preoperative functional status seems to be one of the strongest predictors of postoperative functional status [7, 8]. In contrast to other reports [9], the authors did not find an association between BMI and post-operative pain or function. Although the overall rate of follow-up was modest (55%), it was even lower in those with higher BMI, which may have affected the study’s ability to find statistically significant associations between BMI and outcome.

Although the authors conducted a sophisticated analysis to identify predictors of post-TKR outcomes, the models had modest predictive power. This observation suggests we need to look beyond traditional psycho-social, clinical and sociodemographic factors to fully untangle the variability in TKR outcomes. A deeper understanding of these factors would allow us to devise and target interventions to reduce the number of people with suboptimal outcome.

We add one additional comment about the methods. The identification of preoperative factors associated with good or bad outcomes for total joint replacement should not be confused with identification of factors that help identify those patients in whom surgery is especially effective as compared with non-operative therapy. For example, patients with high baseline levels of functional status tend to have good functional outcomes after TKR, but they are also likely to have good functional outcomes from non-operative therapy. The critical question is whether the marginal benefit of surgical and non-operative treatment varies between those with high functional status and those with low functional status. This question requires a comparison group (ideally done by randomization, although randomized trials of TKR vs non-operative therapy are unlikely to be launched). Thus, the findings by Judge and colleagues help us identify which patients who undergo TKR are likely to do poorly, but this study does not help us identify which patients with advanced knee OA are likely to gain the most from undergoing TKR rather than continuing conservative therapy.

The association of preoperative function and outcome requires careful interpretation and reconsideration of the role of journey and destination when assessing surgical outcomes. Judge and colleagues concur with the large body of evidence that worse preoperative functional status is associated with worse function scores (destination) following TKR [7, 8]. However, patients with worse preoperative functional status also exhibit the most dramatic improvement following TKR (journey). Thus, if the authors had used improvement in functional status from baseline to the 6 months post-TKR as their measure of success, they would have concluded that patients with worse preoperative function were the best candidates for TKR surgery.
These data raise a fundamental question about how society measures the value of TKR and similar procedures. Do we view TKR as a procedure intended to preserve the highest possible level of functional status among those just beginning to experience functional decline because of arthritis? If so, post-operative functional status (destination) is a reasonable measure of success. Alternatively, do we wish to get the biggest bang for our buck, maximizing the improvement in functional status for a given patient? If this is the success criterion, patients with the worse preoperative functional status, who make the greatest improvements (longest journey), would be viewed as gaining the most from surgery, whereas patients who have good functional status preoperatively would be viewed as less appropriate candidates for TKR because they have much smaller potential gains.

We do not propose to answer this fundamental question here, but suggest that it is a critical policy issue that providers, funders and policy makers must confront. Western societies are investing increasing resources in performing TKR on highly functioning persons in their 40s and 50s, implicitly endorsing a functional preservation approach to the use of TKR. We suggest that this discussion should be more explicit. The TKR question provides the musculoskeletal community with an opportunity to take a leadership role in a critical health policy issue. Laying out a clear definition of what success means would allow us to more effectively target and address the challenges that prevent some patients from achieving it.

Acknowledgements

The authors appreciate the editorial assistance of Julian Prokopetz, BA. E.L. and J.N.K. are supported by grants R01 AR053112, K24 AR057827 and P60 AR47782 from NIH/NIAMS.

Disclosure statement: The authors have declared no conflicts of interest.

Elena Losina1,2,3 and Jeffrey N. Katz1,2,4

1Department of Orthopedic Surgery, Orthopedic and Arthritis Center for Outcomes Research, Brigham and Women’s Hospital, 2Harvard Medical School, 3Department of Biostatistics, Boston University School of Public Health and 4Harvard School of Public Health, Boston, MA, USA. Accepted 14 June 2012

Correspondence to: Elena Losina, Department of Orthopedic Surgery, Orthopedic and Arthritis Center for Outcomes Research, Brigham and Women’s Hospital, 75 Francis Street, BC-4-016, Boston, MA 02115, USA. E-mail: elosina@partners.org

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