CORR Insights®: Reason for Revision TKA Predicts Clinical Outcome: Prospective Evaluation of 150 Consecutive Patients With 2-years Followup

David J. Deehan MD, FRCS (Tr. and Orth.),
Paul N. Baker MSc, FRCS (Tr. and Orth.)

Received: 27 March 2013 / Accepted: 8 April 2013 / Published online: 19 April 2013
© The Association of Bone and Joint Surgeons® 2013

More than 650,000 total knee replacements are performed annually in the United States [2]. This number is expected to rise in the next 20 years, as the population of the world ages and medical interventions continue to increase average life expectancy [4]. The rapid increase in the use of this health technology brings with it the growing specter of the failed knee replacement. Revision knee arthroplasty is a complex and demanding procedure requiring meticulous planning, a skilled surgical team, and familiarity with an adequate inventory of surgical implants. It does not achieve the same outcome in terms of quality of life or restoration of function compared with primary knee arthroplasty [3].

The use of primary knee arthroplasty has evolved alongside its associated evidence base. Prospective clinical trials supplemented by data from large national registry

cohorts remain an invaluable tool in the assimilation of evidence and continue to guide surgical decision making. Although questions remain regarding primary knee replacement, strides have been made to determine what the best practices are for the patient, surgeon and the wider healthcare infrastructure. The same cannot be said for revision knee arthroplasty.

Revision knee replacement encompasses a heterogeneous case mix of pathology and indication. We find it frustrating that revision knee replacement continues to be handled by the occasional surgeon, limiting ready acquisition of the necessary skill level for the surgeon, surgical team and rehabilitation service. The logistical difficulties found in attempting to design meaningful studies are magnified. While most arthroplasty registries are designed to identify revision as their ultimate endpoint, the information gathered is extremely limited. Mode of failure data is inconsistently collected and the majority of registries offer no insight into functional performance. We are left basing surgical decisions on a restricted pool of observational, often retrospective, case series data. These papers often lack the power and design to ask questions pertinent to clinical practice. We have limited information regarding who needs an operation. Which operation should be done? How will it be performed? Who will perform it? What implant should we use? How should it be fixed and what level of constraint is required? How are functional outcomes influenced by the indication for revision, the type of surgery performed (one versus two stage), and the number of previous revisions (law of diminishing returns)?

The current article from van Kempen and colleagues substantially adds to our current knowledge base by emphasizing the behavior of the revision knee population and secondarily, the role of research in revision knee surgery. It emphasizes the growing appreciation that patient

This is the CORR Insights® commentary on the article “Reason for Revision TKA Predicts Clinical Outcome: Prospective Evaluation of 150 Consecutive Patients With 2-years Followup” by van Kempen and colleagues available at DOI [10.1007/s11999-013-2940-8](https://doi.org/10.1007/s11999-013-2940-8)

Each author certifies that he or she, or a member of his or her immediate family, has no funding or commercial associations (eg, consultancies, stock ownership, equity interest, patent/licensing arrangements, etc) that might pose a conflict of interest in connection with the submitted article.

All ICMJE Conflict of Interest Forms for authors and *Clinical Orthopaedics and Related Research* editors and board members are on file with the publication and can be viewed on request.

This CORR Insights® comment refers to the article available at DOI: [10.1007/s11999-013-2940-8](https://doi.org/10.1007/s11999-013-2940-8)

D. J. Deehan (✉)
Freeman Hospital, Freeman Road, High Heaton,
Newcastle upon Tyne NE7 7DN Tyne and Wear, UK
e-mail: david.deehan@nuth.nhs.uk

P. N. Baker
Newcastle University, Newcastle upon Tyne, Tyne and Wear,
UK

satisfaction and associated functional outcomes are heavily dependent upon the reason for implant revision. This finding is consistent with previous reports from independent series [6] and a recent registry analysis of patient reported outcome data [1]. These studies, along with the work of van Kempen and colleagues, reveal that functional outcomes are best when revision is performed for a single, well-defined nonseptic cause. Poorer functional scores can be expected when revision is performed for sepsis, dysfunction of the soft tissue envelope (either excessive laxity or stiffness), or when the revision is performed for pain without an associated cause. Yet, we must acknowledge that additional information is needed for poor responders who have limited functional gains following revision. As the caseload expands, so too will the economic necessity to identify the best and worst responders to existing surgical technology. Whether certain indications and specific patient groups preclude expensive revision surgery must be decided particularly in these increasingly stringent financial times. Currently, we are uncertain of the strategies necessary to improve outcomes for poor responders. The surgical volume of the treating center, type of infecting organism, and level of implant constraint are important factors when considering proper treatment. We remain ill-informed regarding the true impact of nonsurgical factors and interventions for pre and postoperative patients.

Van Kempen and colleagues should be commended for affirming our understanding of the harmful impact of post-surgical complications and multiple pathologies upon outcome. Additionally, the authors reinforce the importance of prolonged followup. Functional recovery is more protracted following revision surgery compared with primary knee replacement. Previous work [5], alongside the findings presented in the current study, support the view that recovery will continue for 2 years following revision surgery. Definitive inferences regarding the relative merits of different approaches to surgery need to be considered in this context.

The current study benefits from consistent definitions for the reason for failure, in addition to standardized prospective followup and outcome assessment. It involved collaboration between two centers and these aspects of the study design are important for prospective researchers to appreciate. Ideally, such features should form the blueprint for funded, focused multicenter (high volume), prospective work evaluating revision knee surgery. An international collaborative registry of revision procedures using standardized definitions of failure and followup protocols could coordinate detailed observations for at least 2 years. This time would allow for the collection of important information, ensuring that significant associations could be detected. It would allow researchers to assess the impact of variables such as patient demography, surgeon volume, center type, indication for revision, mode of surgical reconstruction, level of constraint, timing of revision from primary surgery, and the number of previous procedures. The results of such observational work could then be used to direct appropriate randomized trials.

References

1. Baker P, Cowling P, Kurtz S, Jameson S, Gregg P, Deehan D. Reason for revision influences early patient outcomes after aseptic knee revision. *Clin Orthop Relat Res.* 2012;470:2244–2252.
2. Carr AJ, Robertsson O, Graves S, Price AJ, Arden NK, Judges A, Beard DJ. Knee replacement. *Lancet.* 2012;1–10.
3. Deehan DJ, Murray JD, Birdsall PD, Pinder IM. Quality of life after knee revision arthroplasty. *Acta Orthop.* 2006;77:761–766.
4. Kurtz S, Ong K, Lau E, Mowat F, Halpern M. Projections of primary and revision hip and knee arthroplasty in the United States from 2005 to 2030. *J Bone Joint Surg Am.* 2007;89:1567–1573.
5. Malviya A, Bettinson K, Kurtz SM, Deehan DJ. When do patient-reported assessments peak after revision knee arthroplasty? *Clin Orthop Relat Res.* 2012;470:1728–1734.
6. Patil N, Lee K, Huddleston JI, Harris AH, Goodman SB. Aseptic versus septic revision total knee arthroplasty: patient satisfaction, outcome and quality of life improvement. *Knee.* 2010;17:200–203.