

Long-Term Outcomes of Total Knee Arthroplasty with Distal Femoral Replacement for Non-Oncologic Indications

Barry Congdon¹, Michael Neufeld², Donald S Garbuz, Nelson Victor Greidanus, Bassam A Masri, Lisa Howard³

¹Adult Lower Extremity Reconstruction, UBC Faculty of Medicine, ²University of British Columbia, ³Vancouver, UBC

INTRODUCTION:

Distal femoral replacement (DFR) is a valuable salvage option to manage complex revision or primary total knee arthroplasty (TKA) in the setting of massive bone loss. Few studies report mid to long-term outcomes of DFR for non-oncologic indications. The purpose of this study was to report the implant survival of DFR in non-oncologic TKA for the entire cohort and by indication, as well as clinical outcomes.

METHODS:

We retrospectively identified all DFR performed for non-oncologic indications from 2002 to 2021 at a single academic center. Three patients with less than 2-year follow up were excluded, none of which underwent a rerevision after the index DFR. Forty-five DFR (45 patients) were included with a mean follow up from index DFR of 6.6 years (range 2.0-17.2). At time of index DFR the mean age was 75.3 years (range 53.3-93.6), BMI was 29.2 (range 19.4-52.4), and 64.4% (29) were female. Patients had a mean of 2.3 (range 1-6) knee surgeries prior to DFR. Indications for index DFR were mechanical failure of prior TKA (40.0%), periprosthetic fracture (33.3%), and periprosthetic joint infection (26.7%). All DFR were rotating hinge design, 43 (95.6%) were the same DFR system, and all had fully cemented stems. Kaplan-Meier analysis was used to determine all-cause implant survival for the entire cohort and by indication, with revision of any prosthesis component as the endpoint. Validated patient-reported outcomes were collected at most recent follow up.

RESULTS:

Fourteen (31.1%) patients underwent revision post index DFR at a mean time to first revision of 2.7 years (range 0.1-12.6). The most common reasons for first revision were infection (7/14, 50.0%), fracture (3/14, 21.4%), and hinge dislocation (2/14, 14.3%) (Table 1). The all-cause revision-free survival for the entire cohort was 74.6% (95% CI 67.9-81.3) at 5-years and 60.2% (95% CI 49.4-70.8) at 10-years (Figure 1). By indication for index DFR, 50% (6/12) of infection patients underwent a revision, 27.8% (5/18) of mechanical failure underwent a revision, and 20% (3/15) of fracture patients underwent revision. The differences in revision-free survival by indication were not statistically different in survival analysis (p=0.221) (Figure 2). At final follow up the mean Knee Society Score patient-reported satisfaction score was 20.3 (range 6-28) of a maximum possible score of 40. Four (8.9%) have undergone multiple revisions post DFR, and one (2%) patient has undergone an above knee amputation.

DISCUSSION AND CONCLUSION:

DFR for non-oncological indications is associated with a high rate of revisions, most due to early infection or fracture. The mid- and long-term revision-free survival is poor and patient satisfaction is modest. Differences in survival by indication for index DFR were not statistically significant. DFR remains a valuable salvage procedure, but patients need to be counselled

expected outcomes.

Figure 1. Kaplan-Meier survival estimates for all-cause revision

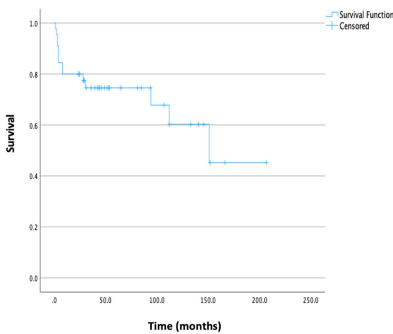


Figure 2. Kaplan-Meier survival estimates for all-cause revision by indication for index distal femoral replacement

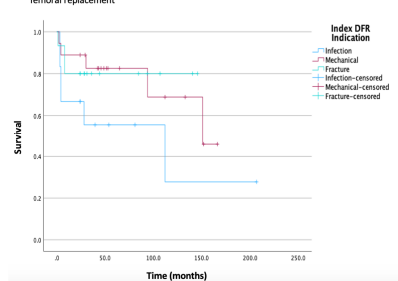


Table 1. Indications for first revision post index distal femoral replacement

Reason for revision	n	% of n=14 revisions	% of n=45 patients
Periprosthetic joint infection	7	50.0%	15.6%
Periprosthetic fracture	3	21.4%	6.7%
Hinge dislocation	2	14.3%	4.4%
Aseptic loosening	1	7.1%	2.2%
Extensor mechanism failure	1	7.1%	2.2%