

The 1.5 Stage Exchange Arthroplasty with Stemmed Revision Tibial Components: A Novel Technique for Management of Chronic Periprosthetic Joint Infection

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INTRODUCTION:

The management of periprosthetic joint infection (PJI) following total knee arthroplasty (TKAs) remains a challenging surgical problem. Although the current gold standard remains a two-stage reconstructive strategy, alternative methods such as “1.5-stage reconstructions” have been proposed with mixed results. We sought to describe a novel 1.5 stage reconstruction utilizing stemmed revision tibial constructs for the treatment of PJI.

METHODS:

All patients who underwent a 1.5 stage spacer at a single institution from January 2011 to December 2022 were included. A 1.5 stage was defined as a spacer that was placed with the intent of not performing a second stage. However, unlike a single stage, the 1.5 stage does not utilize cement restrictors or press-fit stems to facilitate extraction if a second stage is required. Procedures were categorized by the type of 1.5 stage performed: a custom-made or a revision stemmed-tibial component. Custom-made implants utilized an all-polyethylene tibia with a custom made dowel, whereas the stemmed-tibial component group utilized stems that were precoated with cement. Patient demographics, comorbidities, surgical history, operative details, and postoperative clinical course were collected and reported. Two-year Kaplan-Meier survival estimates for all-cause revision, revision for loosening, and revision due to PJI recurrence were generated.

RESULTS:

In total, 46 1.5-stage procedures were identified of which 12 were custom-made and 34 involved stemmed-tibial constructs. The average age of the cohort was 67.9±8.6 years, the average BMI was 32.1±6.3 kg/m², and overall follow up was 16.0±18.7 months. Patients who received a stemmed-tibial construct were less likely to undergo a reoperation for any reason (17.6% vs. 50.0%, p=0.028) and a revision for spacer loosening (0.0% vs. 25.0%, p=0.003) compared to those who received custom-made constructs. There were no differences with respect to the frequency of infection recurrence (8.8% vs. 8.7%, p=0.959) or time to revision (6.4±5.4 months vs. 14.2±16.8, p=0.305). The estimated 2-year survival with revision for loosening as the endpoint was similar between the two groups (stem: 100%, 95%-CI=100.0-100.0%, vs. custom-made: 36.5% 95%-CI=1.4-78.8%, p=0.3299).

DISCUSSION AND CONCLUSION:

The 1.5 stage reconstruction using stemmed-revision components has promising short-term results. Durable spacer constructs may be a viable option for select patients.

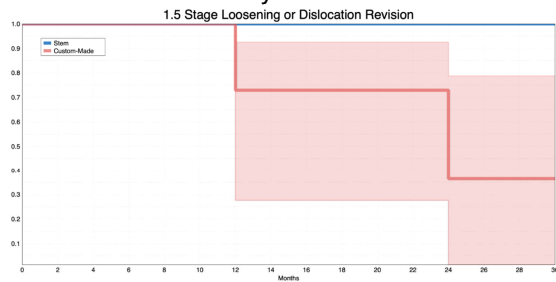


Figure 1: Kaplan-meier estimated 2-year survival with revision for loosening as the endpoint.



Figure 2: Six month postoperative anteroposterior and lateral radiographs of a left 1.5-stage stemmed-tibial revision total knee arthroplasty construct for the treatment of periprosthetic joint infection.