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### Authors

Bernthal, Nicholas M  
Burke, Zachary DC  
Hegde, Vishal  
[et al.](#)

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# Long-term follow-up of all-polyethylene tibial components when used for oncological endoprosthetic reconstruction

[Nicholas M Bernthal](#)<sup>1</sup>, [Zachary D C Burke](#)<sup>1</sup>, [Vishal Hegde](#)<sup>1</sup>, [Alexander Upfill-Brown](#)<sup>1</sup>, [Clark J Chen](#)<sup>1</sup>, [Richard Hwang](#)<sup>1</sup>, [Jeffrey J Eckardt](#)<sup>1</sup>

Affiliations expand

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## Abstract

**Aims:** We aimed to examine the long-term mechanical survivorship, describe the modes of all-cause failure, and identify risk factors for mechanical failure of all-polyethylene tibial components in endoprosthetic reconstruction.

**Methods:** This is a retrospective database review of consecutive endoprosthetic reconstructions performed for oncological indications between 1980 and 2019. Patients with all-polyethylene tibial components were isolated and analyzed for revision for mechanical failure. Outcomes included survival of the all-polyethylene tibial component, revision surgery categorized according to the Henderson Failure Mode Classification, and complications and functional outcome, as assessed by the Musculoskeletal Tumor Society (MSTS) score at the final follow-up.

**Results:** A total of 278 patients were identified with 289 all-polyethylene tibial components. Mechanical survival was 98.4%, 91.1%, and 85.2% at five, ten and 15 years, respectively. A total of 15 mechanical failures were identified at the final follow-up. Of the 13 all-polyethylene tibial components used for revision of a previous tibial component, five (38.5%) failed mechanically. Younger patients (< 18 years vs > 18 years;  $p = 0.005$ ) and those used as revision components ( $p < 0.001$ ) had significantly increased rates of failure. Multivariate logistic regression modelling showed revision status to be a positive risk factor for failure (odds ratio (OR) 19.498, 95% confidence interval (CI) 4.598 to 82.676) and increasing age was a negative risk factor for failure (OR 0.927, 95% CI 0.872 to 0.987). Age-stratified risk analysis showed that age > 24 years was no longer a statistically significant risk factor for failure. The final mean MSTS score for all patients was 89% (8.5% to 100.0%).

**Conclusion:** The long-term mechanical survivorship of all-polyethylene tibial components when used for tumour endoprostheses was excellent. Tumour surgeons should consider using these components for their durability and the secondary benefits of reduced cost and ease of removal and revision. However, caution should be taken when using all-polyethylene tibial components in the revision

setting as a significantly higher rate of mechanical failure was seen in this group of patients. Cite this article: *Bone Joint J.* 2020;102-B(2):170-176.

**Keywords:** All-polyethylene; All-polyethylene tibial; Endoprosthesis; Oncology; Survivorship; Tumour.