IMPRS Award Recipient

Femoral Stem Subsidence in Aseptic Hip Revision Using Modular Tapered, Fluted Titanium Stems

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Introduction: Tapered, fluted titanium (TFT) femoral stems have become the gold standard in revision total hip arthroplasty (rTHA). However, there is a paucity of data on TFT stem subsidence rates following aseptic rTHA. Subsidence can lead to instability, loosening, leg length discrepancy, and gait impairment and subsequent repeat revision surgery. This study evaluated the incidence and predictors of subsidence in aseptic rTHA performed with TFT stems.

Methods: 113 TFT femoral stems of four designs implanted between 2011 and 2020 at a single center were retrospectively reviewed. Stem subsidence was measured on digital radiographs taken immediately after surgery and at 4-weeks, 1-year, and subsequent follow-up clinic visits. Patient characteristics, risk factors for subsidence, revision etiology, and implant characteristics were extracted from the electronic medical record.

Results: 102 aseptic rTHAs were analyzed. 54% were female with mean age and BMI of 67 years and 31 kg/m2, respectively. As expected, 79% of stems subsided between the immediate postoperative and 4-week follow-up period. Further, 65% of stems subsided between 4-weeks and 1-year postoperatively, and 66% of stems subsided between 1-year and latest follow-up (>12 months postop). At all follow-up intervals, the amount of subsidence was minimal (<3mm) for the majority of cases (range 64% to 95%). In multivariate analysis, use of an extended trochanteric osteotomy (ETO) was predictive of minimal subsidence (<3mm) between 4-weeks and latest follow-up (odds-ratio 8.75, p=0.051).

Conclusion: The incidence of significant TFT stem subsidence was relatively low in this cohort. The use of an ETO may minimize subsidence over the lifetime of TFT stems, potentially due to optimal visualization of the cortical diaphyseal dimension and interference stem fit. Further research is warranted with more cases to identify specific risk factors for subsidence of TFT femoral stems.

Thomas Baldwin is a third year medical student currently interested in orthopedics. "The research I conducted last summer during IMPRS 2020 opened my eyes to how clinical research truly impacts clinical decisions. It was rewarding to see how my colleagues were genuinely invested in the outcomes of my project and how that information could contribute to the field of orthopedics. Personally, my eyes were opened to the details and nuances a clinician must be able to synthesize and apply in order to make the best decision for their patient."