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CORR Insights

CORR Insights®: Modular Tapered Implants for Severe Femoral Bone Loss in THA: Reliable Osseointegration but Frequent Complications

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Where Are We Now?

Modular tapered implants have become a widely available and useful tool for femoral revision in the setting of severe bone loss. While cylindrical extensively porous-coated stems have been the workhorse of cementless femoral revisions for at least three decades, several authors have reported higher failure rates when using these stems to reconstruct femora with extensive bone loss [2, 3, 10, 12]. Additionally, several groups have demonstrated the benefit of modular tapered stems, particularly in the more complex bone loss scenarios [8, 10, 11]. The benefit of these stems seems to be derived from their modularity. A modular junction allows the surgeon to separate distal fixation from reconstruction of length, offset, and anteversion. Monolithic stems do not permit this. Additionally, longer stems require a bow to match the shape of the femur; therefore the shape of the femur dictates anteversion. An additional benefit also appears to be related to the tapered, splined distal geometry. The Revision Total Hip Arthroplasty Study Group [7] compared 55 modular tapered stems to 44 modular cylindrical stems. Despite having worse defects, the tapered group had significantly better osseointegration and significantly fewer revisions. The benefits of modularity do come at a price, though, as the modular junction has been a site of mechanical failure in these designs. Additionally, recent publications have raised concern about the risk of corrosion and adverse local tissue reactions arising from modular taper junctions [1, 4].

Where Do We Need To Go?

Brown and colleagues have demonstrated the value of this stem design in a challenging cohort of femoral revisions. The authors do note a high complication rate, although it was similar to other published studies evaluating similarly complex revisions [5, 6, 9, 11, 13]. Of note, none of the complications were mechanical failure of the implant.

This CORR Insights® *is a commentary on the article* "Modular Tapered Implants for Severe Femoral Bone Loss in THA: Reliable Osseointegration but Frequent Complications" *by Brown and colleagues available at:* DOI: 10.1007/s11999-014-3811-7

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Unfortunately, because this is a retrospective review of a single design, we cannot easily compare the complication rate or survival in this cohort to patients managed with cylindrical, extensively porous coated stems. The Revision Total Hip Arthroplasty Study Group [7] attempted to answer this question with another retrospective review, comparing similar groups managed with different stem geometries. While this study provided valuable information on a complex patient cohort suggesting the benefits of tapered modular implants, only a well-designed multicentered randomized trial will provide the definitive answers we seek.

How Do We Get There?

While retrospective reviews provide valuable information regarding uncommon findings, the best implant to manage the Paprosky IIIB and IV femoral defects would be determined through a multicentered randomized trial. A trial of this nature would require a thoughtful design and power analysis, however with the plethora of retrospective data available this should not be prohibitive. There are clearly several centers around the country performing dozens of these procedures per year. If all of these centers were to participate, enrollment would likely go well, and our specialty would have solid data with which to guide management of a complex and expensive problem.

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