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CORR Insights®: High Survivorship With Cementless Stems and Cortical Strut Allografts for Large Femoral Bone Defects in Revision THA

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Where Are We Now?

Femoral bone loss is frequently encountered during revision THA. The key is determining the quality and quantity of bone loss, as well as quality and quantity of

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remaining host bone. In contemporary North American practices, diaphyseal fixation with either an extensively porous-coated stem or titanium modular fluted tapered (TMFT) stem is the standard of care for the majority of hips with bone defects rated Paprosky Type IIIB or less. The basic principle in both techniques is the importance of obtaining immediate axial and rotational stability. The two main clinical concerns with extensively porous-coated stems are intraoperative periprosthetic femoral fracture and stress shielding over time. In response to these concerns, the interest in TMFT stems is increasing, and the indications for their

use seem to be expanding [1]. The real controversy is in those patients with Paprosky Type IV defects in whom rotational stability in the diaphysis would not be possible to obtain. In this difficult setting, consideration has traditionally been given to allograft-prosthetic composites (APCs), impaction bone grafting with long cemented stems, proximal femoral replacements, and more recently, TMFT stems.

In this intriguing paper by Kim et al., the authors studied 130 patients (140 hips) with Paprosky Type IIIB (54%) and Type IV (46%) defects who underwent revision THA. Even though all patients had less than 2 cm of available isthmic bone, the surgeons used extensively porous-coated stems. However, cortical strut allografts (one strut in 10%, two struts in 75%, and three struts in 15%) were used to provide primary stability for the extensively porous-coated stems. At a mean followup of 16 years, the authors found that all allografts had incorporated, and 87% of stems had radiographic evidence of bony ingrowth.

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Where Do We Need To Go?

When massive bone loss is encountered during revision THA, structural allografts are often a helpful technique. However, followup radiographic analysis of strut incorporation is complicated, and alternative approaches are required to see if these devices are indeed well-fixed. Moreover, deep periprosthetic infection in revision surgery remains a paramount concern to patients and surgeons alike. This may influence the liberal use of struts, particularly in those patients undergo reimplantation THA. Finally, additional investigations comparing the results of patients with prior cemented and uncemented stems are needed given that the remaining host bone quality is starkly different.

How Do We Get There?

Given the complicated nature of radiographically analyzing strut incorporation, retrieval studies investigating the interface between the cortical strut allograft and an extensively porous-coated stem, as well correlation with radiographic findings, will be helpful in determining where bony ingrowth occurs (if at all). In addition, with infection being one of the most common reasons for femoral component revision, the results of the proposed technique by Kim et al. in septic cases must be studied. Finally, a comprehensive and large-scale analysis of contemporary stems, such as the TMFT stem, will be essential to determine if outcomes vary based upon prerevision diagnosis, particularly between failed

cemented and uncemented stems. This will likely require either a multicenter investigation, or large national registries such as the American Joint Replacement Registry, to complete. I suspect that as the body of evidence continues to grow on TMFT stems in Paprosky Type IV defects, their popularity will continue given their larger diameters, as well as the ability to adjust leg length, offset, and version independent of diaphyseal fixation.

Reference

1. Abdel MP, Lewallen DG, Berry DJ. Periprosthetic femur fractures treated with modular fluted, tapered stems. *Clin Orthop Relat Res.* 2014;472:599–603.