



O12:102

## Reconstruction of massive bone defects using compressive osseointegration

Peter Rose<sup>1</sup>, Adam Schwartz<sup>1</sup>, Christopher Beauchamp<sup>1</sup>, Franklin Sim<sup>1</sup>

<sup>1</sup> Mayo Clinic, United States

**Background:** Extensive segmental bone loss and poor bone quality can complicate revision arthroplasty. Highly porous components, cementless fully-coated stems, and cemented techniques have been described. Unfortunately, these devices can be difficult to remove and may result in even greater bone loss if further revision is needed. Compressive osseointegration has been described as an alternative method to achieve fixation. These devices rely upon compressive initial fixation to achieve biological osseointegration over a comparatively short segment of bone. We believe that compressive osseointegration provides predictable, stable endoprosthesis fixation and that osseointegration can be evaluated radiographically.

**Methods:** We retrospectively reviewed a total of 34 implants in 30 patients. Procedures were performed at two institutions by six surgeons. Data recorded included patient demographics, indications, diaphyseal segment and joint reconstructed, and any complications. The ratio of total cortex width to spindle width measured at the bone-prosthesis interface on most recent followup AP radiograph was compared to the immediate post-operative ratio measured using the same method. Statistical significance was measured using student's T-test.

**Results:** 28 of 34 implants (82.4%) achieved stable osseointegration at a mean follow-up of 12.3 months (range 0.5-57.4). The cortex/spindle ratio of these increased from .33 (SD 0.9) postoperatively to .53 (SD 0.15) at latest follow-up ( $p < .001$ ). All reported satisfaction and painless function of the operative limb at latest follow-up. A total of 6 implants in 5 patients failed to achieve stable osseointegration. Cortex/spindle ratio of the failures increased .09, however, this was not statistically significant ( $p < .11$ ). 3 failures were revised using compressive osseointegration; 2 achieved stable fixation. There were no deep infections in this series.

**Conclusion:** Use of compressive osseointegration for reconstruction of massive diaphyseal and segmental bone defects provides reliable short term fixation, and may prove to be bone conserving in cases that require future re-revision. The cortex/spindle ratio reliably increases as osseointegration is achieved.

*E-mail (main author):* [rose.peter@mayo.edu](mailto:rose.peter@mayo.edu)