

Intercalary Custom-made Compressive® Implants for the Reconstruction of Malignant Femoral Diaphysis Tumors----cases report and three-dimensional finite element analysis

Chunlin Zhang, MD
Department of Orthopaedic Surgery,
Shanghai Tenth People's Hospital Affiliated To Tongji University
301 YanChang Zhong Road,
Shanghai
China
Zip Code: 200072
Email: shzhangchunlin@163.com

Background: Aseptic failure of CPS in the reconstruction of major skeletal defects remains a major clinical problem.

Questions/Purposes: The purpose of this study was to answer the following questions: (1) What is the survival rate for this technique (CPS) at short term follow-up? (2) Is there any prosthesis-related failure? (3) With extra cortical plates, is it better at avoiding early aseptic failures?

Patients and Methods: *en bloc* resection with reconstruction of CPS implants with extra cortical plates at either end was used. Three-dimensional finite element analysis was used to evaluate the stress distribution and interfacial stress of intercalary prosthesis with and without extra cortical plates.

Results: A total of 3 patients were available at a mean follow-up of 31.3 months. All patients achieved primary healing. No early CPS implant failures were observed at the last follow-up. No tumor recurrences, infections, or peri-prosthetic fractures were observed during follow-up. At the time of the final follow-up, 3 patients were alive and free of disease. The mean MSTS for 3 patients evaluated at the last follow-up was 25.3. The stress peak of prosthesis with extra cortical plates is approximately 45.98% of the prosthesis without extra cortical plates in cortical bone conditions, but the stress concentration were at the same location.

Conclusions: Intercalary custom-made CPS implants with extra cortical plates are effective and safe for malignant tumors of the femoral diaphysis in the short term. The extra cortical plates may theoretically reduce the possibility of early aseptic failure since they can provide extra fixation and reduce the high stress on the interface between the bone and implant junction.