PETER BREHM
Die Präzision in Titan
für den Menschen

Executive Summary

Publication	**Analysis of prosthesis stem failures in noncemented modular hip revision prostheses.** Efe T, Schmitt J. J Arthroplasty 2011 Jun;26(4):665.e7-12. doi: 10.1016/j.arth.2010.05.020 Epub 2010 Jul 14. https://www.ncbi.nlm.nih.gov/pubmed/20634038
Study	Case study
Implant	Modular cementless femoral revision stems: LINK MP (Waldemar LINK GmbH & Co. KG), ZMR standard junction (Zimmer BIOMET), Prevision Revision (B. Braun, Aesculap AG)
Patients	4 (2 male, 2 female)
Follow-up	-
Method	Between 2007 and 2010, 4 patients who had suffered a fracture of the cementless modular femoral stem during a period ranging from 27 to 104 months postoperatively presented at the Marburg University Medical Center. The patients had no history of trauma. In all cases, the implant failure was diagnosed clinically and radiologically. The fractures were verified by radiographs (anterior-posterior and axial views). Stem fixation was evaluated according to the criteria defined by *Engh et al*. The periprosthetic radiolucencies were evaluated according to the zones described by *Gruen et al.* One removed stem was examined by the manufacturer using metallography and scanning electron microscopy (B. Braun, Aesculap AG, Prevision Revision). **All fractured revision stems were replaced with the MRP-TITAN cementless modular revision implant (PETER BREHM GmbH) in revision procedures.**
Results	The stems had fractured just below the junction between the prosthetic neck and the stem in a region subject to high biomechanical stresses. A **multi-factor etiology** is postulated for the stem failure. This includes inadequate bony support in the region of the femoral calcar, an overweight patient, the varus position of the stem, the prosthesis design, the fixation of the implant, and the implant materials. All failures exhibited radiographic evidence of loosening in the proximal stem region in zones 1, 2, 6, and 7 according to *Gruen et al.* in combination with strong fixation in the distal region of the femoral component.

	A correlation between patient weight and stem failure has already been established**. Overweight** is regarded as a risk factor for a stem fracture. At the time of the stem fracture, 3 of the 4 patients exhibited grade 1 obesity (BMI 34.3 / 34.5 / 35.7 kg/m^2). The manufacturer's analysis of the removed stem (B. Braun, Aesculap AG, Prevision Revision) revealed that the fracture had begun in the anterolateral portion of the implant. The high mechanical stresses led a fatigue fracture.
Key Points	**All fractured revision stems were successfully replaced with the MRP-TITAN cementless modular revision implant.** If a patient reports sudden pain secondary to revision hip surgery, one should consider the possible complication of a stem fracture. Accordingly, the **patient should always be informed preoperatively** of the risk of an implant fracture.
Abbreviations	BMI - body mass index

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