

Executive Summary

Publication	Uncemented femoral revision arthroplasty using a modular tapered, fluted titanium stem. 5-to 16-year results of 163 cases. Wirtz DC, Gravius S, Ascherl R, Thorweihe M, Forst R, Noeth U, Maus UM, Wimmer MD, Zeiler G, Deml MC. Acta Orthop. 2014 dec;85(6):562-9. doi: 10.3109/17453674.2014.958809. Epub 2014 Sep 1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4259034/ (PMC free full text)
Study	Retrospective, multicenter
Implant	Cementless modular revision stem MRP-TITAN (PETER BREHM GmbH)
Patients	159 consecutive patients
Follow-up	The mean follow-up was 10 years (range, 5-16 years).
Method	Between 1993 and 2003, 163 cementless modular revision stems were used in 159 patients. The implantations were performed in 4 German centers specializing in hip revision. Inclusion criteria were revision procedures with bone defects type I-III according to <i>Paprosky</i> (1990). The clinical findings included intra- and postoperative complications, revision reason, implant failure and the assessment of pre- and postoperative function according to HHS, taking into account comorbidities according to the <i>Charnley</i> classification (type A-C) and bone defects according to the <i>Paprosky</i> classification (1990). Patient satisfaction was routinely recorded. The radiological findings, which included pelvic and <i>Lauenstein</i> images during preoperative and postoperative follow-up, were evaluated by an experienced surgeon. The evaluation of periprosthetic changes of the bone structure (regeneration, resorption, radiolucent lines, osteolysis) was performed according to the criteria of <i>Engh et al.</i> The periprosthetic radiolucent lines were evaluated according to the zones of <i>Gruen et al.</i> Implants with an axial migration greater than 5 mm, advanced osteolysis and/or complete periprosthetic signs of loosening were classified as unstable or loosened. Periarticular ossifications were classified according to <i>Brooker</i>. The survival rate of the implants was determined using the Kaplan-Meier method.
Results	Pronounced bone defects (Paprosky type IIB-III) were found in 99 cases (61%). The HHS improved significantly from an average of 37 points preoperatively to 79 points postoperatively. The subgroup analysis (comorbidities) according to the <i>Charnley</i> classification (type A-C) showed an improvement in HHS in each group. The survival rate of the stem was comparatively lower in the group of the most

	functionally impaired patients (type C). In 151 cases (93%) the radiological examination showed a stable stem fixation. Implant failure was observed in 10 cases (6%) due to postoperative subsidence of more than 5 mm (n=7), aseptic loosening (n=1), late infection (n=1) and periprosthetic fracture (n=1). There was no stem fracture and no failure of the modular components. The Kaplan-Meier survival rate was 97% after 10 years and 85% after 15 years. The survival analysis of the stem (subgroup analysis) according to <i>Paprosky's</i> classified bone defects showed no significant differences in survival rates.
Key Points	This is one of the largest medium- and long-term analyses of cementless modular revision stems with distal, diaphyseal fixation. The medium- and long-term results with the cementless modular revision stem MRP-TITAN in a large patient group confirm the promising preliminary clinical results of earlier publications (<i>Wirtz et al. 2000, Mumme et al. 2004 and 2007, Wimmer et al. 2013</i>). The Kaplan-Meier survival rate of 97% after 10 years is encouraging, as the literature reports aseptic loosening rates of 4-16% with other cementless revision stems. Compared with study results from other implants, the cementless modular revision stem MRP-TITAN showed a lower rate of postoperative subsidence. The cementless modular revision stem MRP-TITAN was equally reliable in both <i>Paprosky</i> type I-III bone defects and cases with high functional impairment (<i>Charnley</i> type B and C). The dislocation rate (12%) was comparable to published results for equivalent bone defect situations. The advantage of the cementless modular revision stem MRP-TITAN is the possibility of intra- and postoperative separability of the modular components in order to achieve optimal alignment of the prosthesis with the stem inserted.
Abbreviations	HHS - Harris hip score