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## **Radiographic Alterations In Short-Stem Total Hip Arthroplasty: A 2-Year Follow-Up Study Of 216 Hip Replacements Comparing Results Of 108 Unilateral Vs. 54 Bilateral Cases**

Orthopaedics / Pelvis, Hip & Femur / Joint Replacement - Primary

**Karl Philipp Kutzner**<sup>1</sup>, Dominik Pfeil<sup>1</sup>, Mark Predrag Kovacevic<sup>1</sup>, Philipp Rehbein<sup>1</sup>, Werner Siebert<sup>2</sup>, Joachim Pfeil<sup>1</sup>

1. Orthopaedic Department, St. Josefs Hospital, Wiesbaden, Germany
2. Clinic for Orthopaedics, Vitos Clinic, Kassel, Germany

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### **Introduction**

In recent years a variety of short-stems have been introduced to the market in total hip arthroplasty (THA). A member of the newest generation of calcar guided implants is the optimys-stem. The development of short femoral components aimed at preserving bone and soft tissue by utilizing a minimally invasive approach, thus allowing a quick return to an active life. However, stable osteointegration is a key to a satisfying long-term result. Also an increasing number of patients with severe bilateral osteoarthritis is being treated using simultaneous bilateral THA. Still to date, there is concern about the safety and reliability of one stage bilateral THA.

### **Objectives**

The purpose of this study is the evaluation of postop subsidence and radiological alterations using this device in a 2 year-FU accompanied by a comparison of clinical results of unilateral and simultaneous bilateral cases.

### **Methods**

Using an antero-lateral approach 216 optimys short-stems (Mathys Ltd, Bettlach, Switzerland) were implanted in combination with a cementless cup (Fitmore, Zimmer, Indiana, USA; vitamys RM Pressfit, Mathys Ltd, Bettlach, Switzerland). Patients were allowed full weight-bearing. Pre- and postop X-rays were done in a standardized technique. Radiological alterations, as bone resorption, radiolucency, osteolysis, femoral cortical hypertrophy (FCH) and heterotopic ossifications (HO) were detected and located using the Gruen-zones and Brooker-classification and subsidence was measured in a standardized conventional digital technique in a series of images over 2 years. Groups were divided into unilateral (108 hips) and bilateral (108 hips) treatment. Harris Hip Score (HHS), visual analogue scale (VAS) pain and VAS satisfaction were assessed in both groups. Clinical and radiological controls were performed after 6 weeks, 6 months, 1 and 2 years.

### **Results**

One patient had to be revised due to early infection in the unilateral group without stem revision. One intraoperative crack to the right greater trochanter occurred in bilateral group as well as one deep vein thrombosis. At last follow-up 6 stems (3.6%) showed radiolucent lines with a maximum of 2mm. Resorption of femoral bone stock was detected in a total of 4 cases (2.4%). FCH was seen in a total of 9 hips (5.4%) after a FU of 24 months. 11 hips (6.6%) showed HO Brooker type 1, whereas 2 hips (1.2%) showed HO Brooker type 2. Type 3 and 4

were not observed. No patient showed osteolysis at any point. Subsidence was detected in 47% after 6 weeks postop. Only 6,4% showed further progression at the 6 month control. Subsidence over 2mm only occurred in 15.3%. In the mean a migration of 0.7mm ( $\pm 1.1$ ) was measured. The maximum value of subsidence observed was 7mm in 1 patient. These results show no significant differences in unilateral and bilateral cases. HHS preoperatively was 47.4 in unilateral group vs. 43.6 in bilateral group and increased to 90.6 vs. 87.4 after 6 weeks and 97.4 vs. 98.7 after 24 months. VAS rest pain was 0.6 vs. 0.6 after 6 weeks postop and 0.2 vs. 0.1 after 24 months, whereas VAS load pain showed 1.3 vs. 1.2 after 6 weeks and 0.6 vs. 0.1 after 24 months. VAS satisfaction increased from 2.2 vs. 1.4 preop to 9.3 vs. 9.4 after 6 weeks and 9.6 vs. 9.8 after 24 months.

### **Conclusions**

The results of this radiographic analysis give support to the principle of using metaphyseal anchoring, calcar guided short-stems also in one stage bilateral THA. The low incidence of bony alterations after a follow-up of 2 years indicates a stable and durable osteointegration and physiological load distribution of the investigated short-stem.