



Minimum 10 Year Multi-center Study of THR with Highly Cross-linked Polyethylene and Large Diameter Femoral Heads

Charles R. Bragdon, PhD, Christopher J. Barr, BS, Christian S. Nielsen, MD, PhD, Daniel J. Berry, MD, Craig J. Della Valle, MD, Kevin Garvin, MD, Per-Erik Johanson, MD, PhD, John C. Clohisy, MD, Henrik Malchau, MD, PhD

Introduction: The first highly crosslinked and melted polyethylene acetabular component for use in total hip arthroplasty was implanted in 1998 and femoral heads larger than 32mm in diameter introduced 2004. The purpose of this study was to re-assemble a previous multi-center patient cohort in order to evaluate the radiographic and wear analysis of patients receiving this form of highly crosslinked polyethylene articulating against large diameter femoral heads at a minimum of 10 years follow-up.

Methods: Two centers contributed patients to this ongoing clinical study. Inclusion criteria for patients was: primary THR; femoral heads greater than 32mm; minimum 10 year follow-up. 69 hips have been enrolled with an average follow-up of 11.2 years (10-15), 32 females (50%). Wear analysis was performed using the Martell Hip Analysis software. Radiographic grading was performed on the longest follow-up AP hip films. The extent of radiolucency in each zone greater than 0.5mm in thickness was recorded along with the presence of sclerotic lines and osteolysis.

Results: Wear analysis: Using the average of the slopes of the individual regression lines, the wear rate was 0.004 ± 0.094 mm/yr. Using the early to latest film method, the wear rate was 0.035 ± 0.076 mm/yr. Radiographic analysis: Acetabular side: the greatest incidence of radiolucency occurred in zone 1 at 27%; sclerotic lines had a less than 2% incidence in any of the 3 zones; there was no identified osteolysis. Femoral side: the highest incidence of radiolucencies was in zones 1 and 3, 7% and 4%; sclerotic lines were rare in any zone, maximum in zone 3, 4%; there was no identified osteolysis.

Conclusions: The wear of this form of irradiated and melted highly crosslinked polyethylene remained at levels lower than the detection limit of the software at minimum 10 year follow-up and there was no identified osteolysis.