

◇A Randomized Controlled Trial Comparing Wear of Oxinium and Cobalt-Chrome on Standard and Cross-Linked Polyethylene

Sunit Patil, FRCS, Emil H. Schemitsch, MD, **James P. Waddell, MD**, Zachary Morison, MSc

Introduction: Materials such as Oxinium (oxidized Zirconium) and cross-linked polyethylene (XLPE) have been used to reduce the polyethylene wear in total hip arthroplasty. The purpose of the current investigation was to assess the polyethylene wear rate in four bearing surfaces.

Methods: 80 patients (91 hips) undergoing total hip arthroplasty between November 2004 and October 2007 at a single center were randomized to one of four bearing surfaces; (1) cobalt-chrome (CoCr) and standard (ultra-high molecular weight) polyethylene, (2) CoCr and XLPE, (3) Oxinium and standard polyethylene, (4) Oxinium and XLPE. All patients received a porous coated cementless acetabular shell and a cylindrical proximally coated stem with 28mm femoral heads. Standardized radiographs were taken at each follow-up visit and the polyethylene wear was measured in a blinded fashion using a computer software package.

Results: There were 42 men and 38 women included in this study and the average age was 52 years (range, 22-67 years). The mean follow-up was 6.8 years (range, 2-8.3 years). The mean abduction angle for each group was 43, 47, 45, 46 degrees for Groups 1-4 and there was no correlation between abduction angle and wear rate ($r < 0.2$). There were no significant differences in the SF-12 scores in any of the groups. The linear wear rate for Groups 1 and 2 were 0.241mm/year and 0.076mm/year respectively ($p=0.00$) and Groups 3 and 4 were 0.238mm/year and 0.061 mm/year ($p=0.00$). There was no statistical difference in wear rates between Oxinium and CoCr heads when used with the same polyethylene liner ($p>0.24$).

Conclusion: Our findings demonstrate that cross-linked polyethylene results in significantly less wear than the standard ultra-high molecular weight polyethylene. These findings are in-line with most current literature on XLPE. However, we found no significant reduction in wear rate by using Oxinium in place of cobalt-chrome femoral heads at early follow-up.

◇The FDA has not cleared the following pharmaceutical and/or medical device (Biomet hip resurfacing implants) for use described in this presentation.