Highly crosslinked polyethylene (XLPE) was introduced to decrease peri-prosthetic osteolysis related to polyethylene wear, a major reason for revision of total hip arthroplasty. There are few reports of wear and osteolysis at 10 years post-operatively. We asked the following questions: (1) What are the linear and volumetric wear rates of one remelted XLPE at 10-14 years using the Martell method? (2) What is the relationship between volumetric wear, femoral head size, and osteolysis? (3) What is the incidence of osteolysis using conventional radiographs with Judet views and the Martell method?

Methods We evaluated a previously reported cohort of 84 hips (72 patients) with one design of an uncemented acetabular component and one electron-beam irradiated, remelted XLPE at a mean follow-up of 11 years (range 10 to 14 years). Measurements of linear and volumetric wear were performed in one experienced laboratory by the Martell method and standard radiographs, with additional Judet views, were used to detect peri-prosthetic osteolysis. Statistical analysis of wear and osteolysis compared to head size was performed.

Results The mean linear wear rate by the first-to-last method was 0.024 mm/year (median, 0.010 mm/year) and the mean volumetric wear rate by this method was 12.2 mm³/year (median, 3.6 mm³/year). We found no association between femoral head size and linear wear rate. However, there was a significant relationship between femoral head size and volumetric wear rates, with 36/40 mm femoral heads having significantly higher volumetric wear (p=0.02). Small osteolytic lesions were noted in 12 hips (14%), but there was no association with head size, acetabular component position, or linear or volumetric wear rates.

Conclusion This uncemented acetabular component and this particular remelted XLPE had low rates of linear and volumetric wear. Small osteolytic lesions were noted at 10 to 14 years, but were not related to femoral head size, linear or volumetric wear rates.

References:
- Lachiewicz PF, Soileau ES. Highly crosslinked polyethylene provides decreased osteolysis and reoperation at minimum 10 years followup. J Arthroplasty DOI: 10.1016/j.arth.2016.02.038.