Title | Tribocorrosion: Ceramic and Oxidized Zirconium vs. Cobalt-Chromium heads in Total Hip Arthroplasty

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Level of Evidence | None given. Matched cohort retrieval study

Summary | Tan et al. compared the extent of tribocorrosion between 2 matched cohorts (mean implantation time approx. 8 years) of 52 ceramic vs. 52 CoCr femoral head trunnions and also 2 matched cohorts (implantation time approx. 3 years) of 8 OXINIUM™ vs. 8 CoCr femoral head trunnions, which were retrieved mostly for osteolysis, aseptic loosening, and infection (80%) between 1999 and 2015 at one center. The cohorts were matched according to taper design, head size, neck length, and implantation time (in that order). The ceramic heads were BIOLOX®delta (15), zirconia (29) and alumina (8). The ceramic cohort was significantly younger than the CoCr cohort, otherwise they were similar. Ceramic heads demonstrated a significantly lower median fretting and corrosion score for the base, the middle zone, and the total combined score. At the apex zone, the scores were similar to the CoCr cohort. The different taper types did not show significant differences within the ceramic cohort or the CoCr cohort for the combined fretting and corrosion scores. However, when analyzing the apex zones, fretting and corrosion scores were significantly different between taper types. The largest difference at the apex for the ceramic cohort was seen with the smallest taper (11/13) being worse. Implantation time was positively correlated with the combined fretting and corrosion score in the CoCr cohort but not in the ceramic cohort. Age, BMI, and gender were not found to be significantly correlated in either group. The analysis of the OXINIUM™ vs. CoCr cohort showed no significant differences for fretting and corrosion scores in the different zones between the 2 cohorts. This study demonstrates once again that ceramic heads exhibit lower fretting and corrosion scores compared with CoCr heads.

Study Limitations | No information on stem materials
No information on stem offset
Small number of components for the OXINIUM™ vs. CoCr cohorts

Key Messages | Ceramic femoral heads exhibit lower fretting and corrosion scores compared with CoCr femoral heads
No significant differences of fretting and corrosion scores between OXINIUM™ and CoCr femoral heads