CORROSION IS THE MAIN MECHANISM OF MATERIAL LOSS AT THE TAPER JUNCTION OF LARGE HEAD METAL ON METAL HIP REPLACEMENTS

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Abstract

Material loss at the head-stem taper junction may contribute to the high early failure rates of stemmed large head metal-on-metal (LH-MOM) hip replacements. We sought to quantify both wear and corrosion and by doing so determine the main mechanism of material loss at the taper. This was a retrospective study of 78 patients having undergone revision of a LH-MOM hip replacement. All relevant clinical data was recorded. Corrosion was assessed using light microscopy and scanning electron microscopy, and graded according to a well-published classification system. We then measured the volumetric wear of the bearing and taper surfaces. Evidence of at least mild taper corrosion was seen in 90% cases, with 46% severely corroded. SEM confirmed the presence of corrosion debris, pits and fretting damage. However, volumetric wear of the taper surfaces was significantly lower than that of the bearing surfaces ($p = 0.015$). Our study supports corrosion as the predominant mechanism of material loss at the taper junction of LH-MOM hip replacements. Although the volume of material loss is

low, the ionic products may be more biologically active compared to the particulate debris arising from the bearing surfaces.