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

A.K. Matthies, R. Racasan, P. Bills, A. Panagiotidou, L. Blunt, J. Skinner, G. Blunn, A.J. Hart

## **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.