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Wear Analysis Report for Explanted Metal-on-Metal Hip Prosthesis

*****EXAMPLE REPORT*****

Explant Information

Lot number – Head:	999XXXX
Lot number – Cup:	122XXXX
Implant Manufacturer:	DePuy
Type and Model:	ASR™ (Articular Surface Replacement) XL
Head/Cup/Head and Cup:	Head and Cup supplied
Duration of implantation:	4 years

Wear Analysis

Femoral Head Wear Volume:	27.6 mm ³
Acetabular Cup Wear Volume:	64.1 mm ³
Combined Femoral and Acetabular Wear Volume:	91.7 mm ³
Average Wear Rate	22.93 mm ³ /year
Taper Wear Volume:	2.3 mm ³

For context, the average wear rate we see from the articulating surfaces of failed metal-on-metal resurfacing hips [DePuy ASR™] is approximately 18mm³/year, though importantly the range is 3.1-96mm³/year [Lord et al, Wear, 2011, 79-87]. It is our current opinion that a wear rate of 3mm³/year represents a 'tipping-point' above which failure will occur.

As shown in figure 1, both the femoral head (left) and acetabular cup (right) of the explanted ASR™ hip is heavily worn. It is likely that the high volumes of metal wear from the articulating surfaces of the femoral head and acetabular cup have been linked with clinical problems. Wear at the edge of the acetabular cup is seen and this is a common feature with failed metal-on-metal hip resurfacings. Although the taper wear volume is relatively small compared with the volume of metal released from the articulating surfaces, its effect should not be ignored. The local distribution of wear marks on the internal taper is shown in figure 2.

Figure 3 shows a photograph of the femoral head and the edge of the wear scar is visible by eye, as indicated by the different colour of the unworn region. Figures 4 and 6 offer images of the lot numbers of the femoral head and acetabular cup respectively, while figure 5 offers a macroscopic view of the articulating surface of the acetabular cup.

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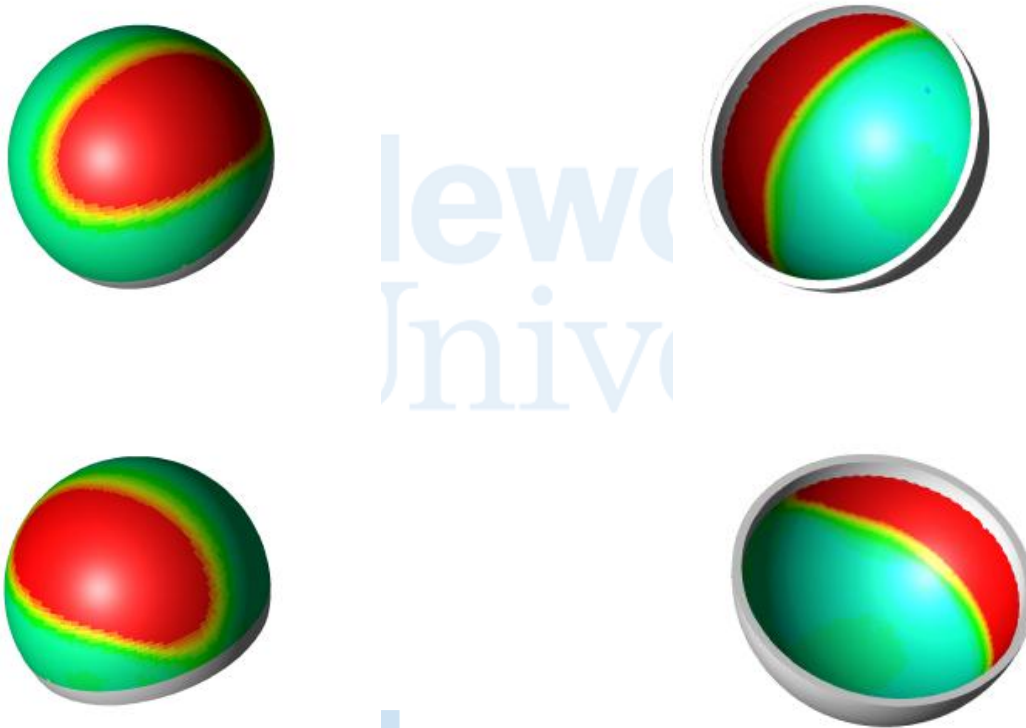


Figure 1 - Images of worn (red) areas on femoral head (left) and acetabular cup (right). Such 'edge wear' or 'rim wear' is commonly seen on failed, high wear acetabular components of hip resurfacings

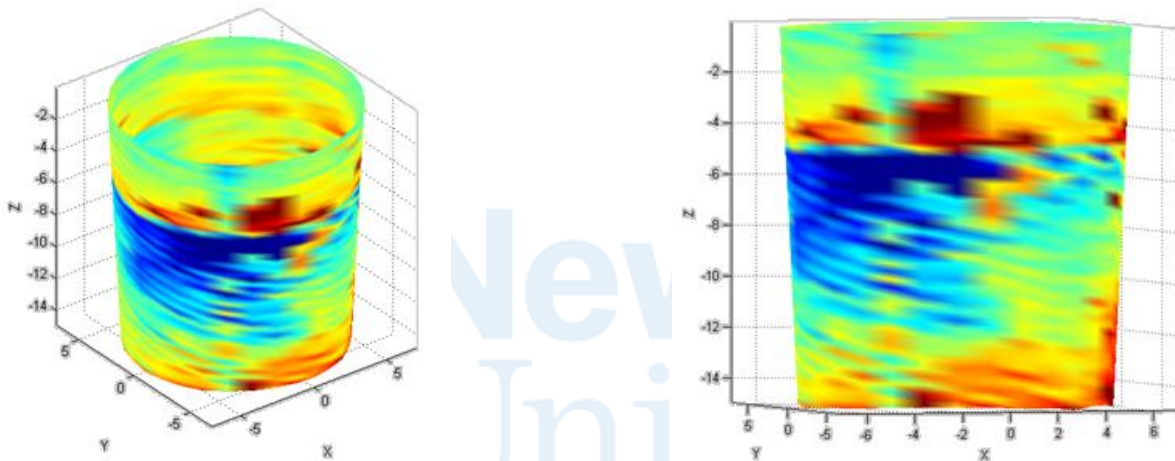


Figure 2 - Images of worn (red) areas inside taper connection of femoral head

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Figure 3 - Photo of femoral head showing edge of wear scar (discoloured surface to right and above)

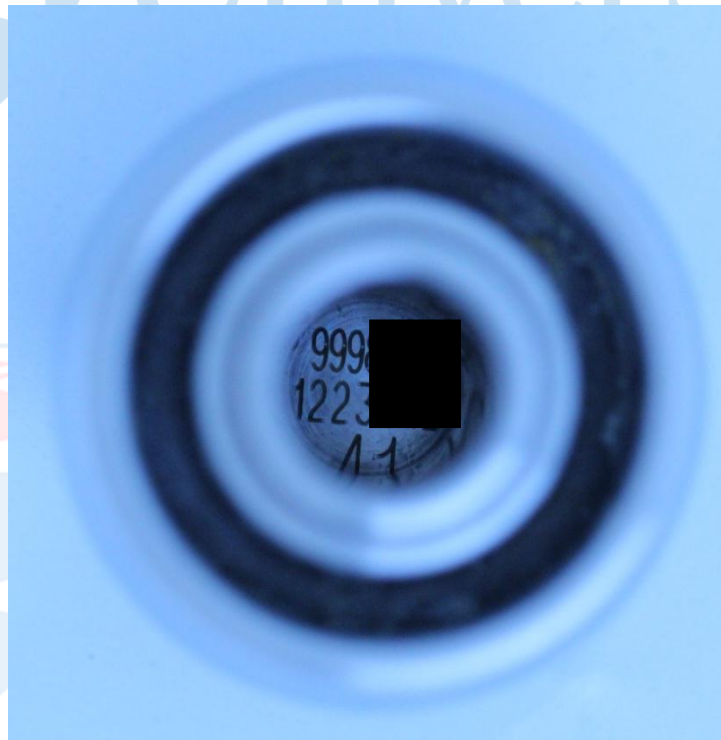


Figure 4 - Photo showing femoral head lot number

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Figure 5 - Photo showing inside of the acetabular cup



Figure 6 - Photo showing acetabular cup lot number

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