

### **Implant details**

Reason for revision as listed by the surgeon: Dislocation/Subluxation, and Wear of Acetabular Component

Explanted prosthesis: 28 mm (+5 offset) DePuy MoP THR

Implantation side: Left

Implantation date: 2009

Explantation date: 04/02/2023

Implantation duration: Approximately 14 years

### Acetabular shell (Ti alloy) and liner

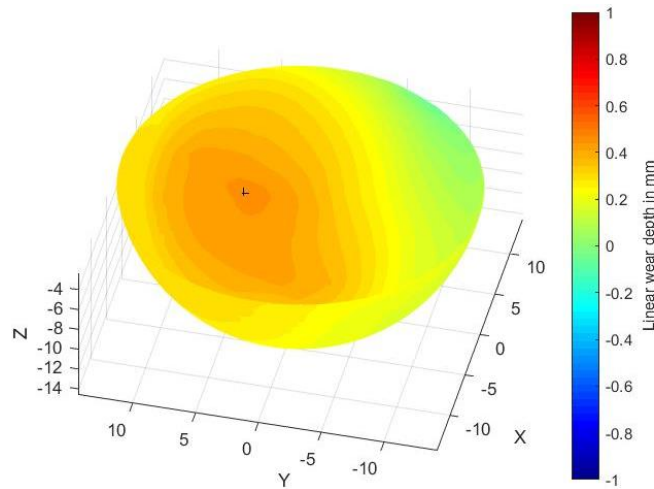
There was damage to the rim of the polyethylene liner consistent with femoroacetabular impingement, as shown by the red ellipse in the macroscopic image below. There was also damage on the rim directly opposite the site of impingement, most likely due to the head subluxation consistent with the reason for revision as listed by the surgeon. There was yellow discoloration on the bearing surface. There was significant bone growth on the posterior surface. Retrieval damage was identified on the rim.



**Acetabular liner**



**Coordinate Measuring Machine (CMM) analysis**



|                             | <b>Max Linear<br/>Wear (<math>\mu\text{m}</math>)</b> | <b>Volumetric<br/>Wear (<math>\text{mm}^3</math>)</b> | <b>Nominal<br/>Diameter (mm)</b> |
|-----------------------------|---|---|----------------------------------|
| <b>Acetabular<br/>Liner</b> | 451   | 285.52  | 28.5000*                         |

**\*estimated diameter; see comments in summary**

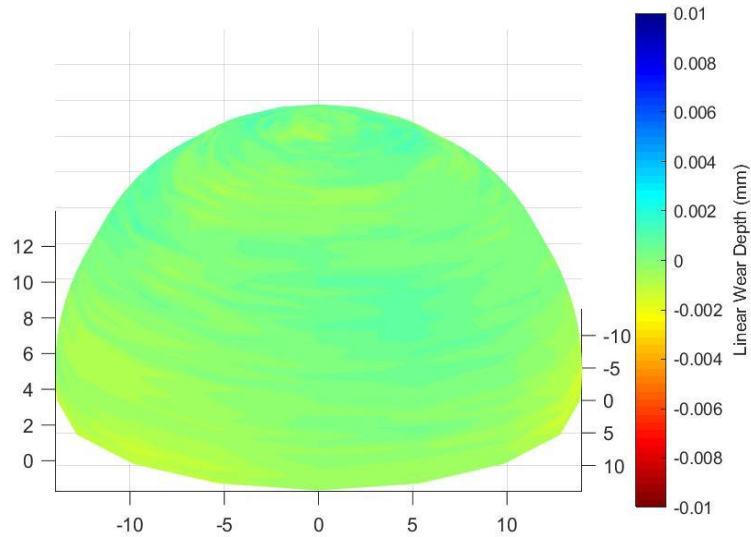
**Femoral head (CoCr alloy)**

There were no clinically relevant abnormalities identified on macroscopic inspection. There was retrieval damage on the bearing surface.



**Femoral head**

**Coordinate Measuring Machine (CMM) analysis**



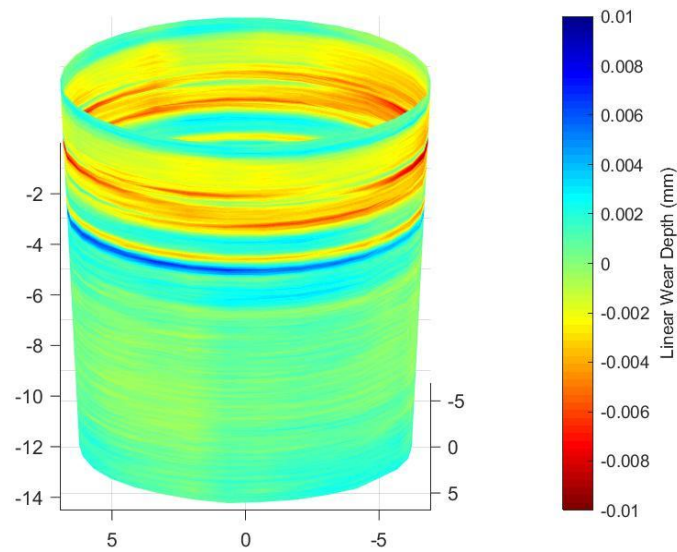
|                         | <b>Max Linear<br/>Wear (μm)</b> | <b>Volumetric<br/>Wear (mm<sup>3</sup>)</b> | <b>Nominal<br/>Diameter (mm)</b> |
|-------------------------|---------------------------------|---|----------------------------------|
| <b>Femoral<br/>Head</b> | 2                               | 0.21  | 27.9578                          |

**Female taper**

There were no clinically relevant abnormalities identified on macroscopic inspection.



**Coordinate Measuring Machine (CMM) analysis**

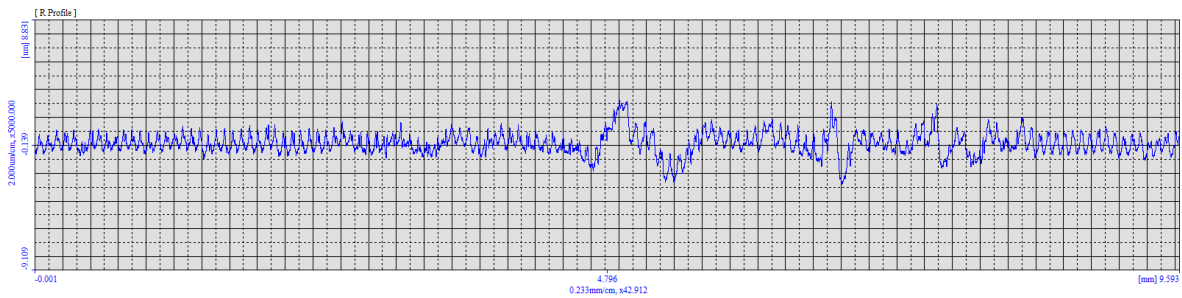


|                     | <b>Max Linear Wear (<math>\mu\text{m}</math>)</b> | <b>Volumetric Wear (<math>\text{mm}^3</math>)</b> | <b>Angle (<math>^\circ</math>)</b> |
|---------------------|---|---|------------------------------------|
| <b>Female Taper</b> | 9   | 0.38  | 5.660                              |

## Female taper

### Surface roughness analysis

There were no clinically relevant abnormalities identified on profilometry.



$R_a = 0.566 \mu\text{m}$ ,  $R_pK = 0.999 \mu\text{m}$ , and  $R_vK = 1.189 \mu\text{m}$

## **Summary**

There was severe damage on the rim of the liner due to impingement and instability of the hip.

The volumetric wear rate of the acetabular liner was approximately 20 mm<sup>3</sup>/year. Due to liner deformation caused by impingement/subluxation, the unworn geometry of the sphere could not be accurately reconstructed, and the wear rate should be interpreted as an estimate only.

As a comparison, the median wear rate of explanted polyethylene acetabular components in the ExplantLab database is 36 mm<sup>3</sup>/year.