

# **Serum Metal Ion Levels in Dual Mobility Liners after Total Hip Arthroplasty: A Comparison by Years and Implant Manufacturers**

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## **INTRODUCTION:**

Dual mobility (DM) liners are commonly used in revision and primary total hip arthroplasty (THA) cases in an effort to decrease hip instability. However, DM constructs are composed of cobalt (Co), chromium (Cr), and zirconium (Zr) surfaces, which may induce wear, corrosion and/or metal ion release. The purpose of this study was to investigate metal ion levels in the years after THA and between different bearing and implant materials.

## **METHODS:**

This retrospective study enrolled patients who underwent THA with a DM liner. All patients had no other reported implants. Patients underwent a blood draw to evaluate Co, Cr and Zr levels. Patients were grouped into time cohorts of 1-2 years, 2-5, 5-8, and 8+ years based on years since DM placement. Implant sizing, material composition, and manufacturer was collected. The primary outcome of the study was the serum Co, Cr, and Zr levels.

## **RESULTS:**

156 patients were included, 25 (16.0%) in the 1-2 years cohort, 74 (47.4%) in the 2-5 years, 30 (19.2%) in the 5-8 years, and 27 (17.3%) in the 8+ years cohort. Cobalt levels were normal ( $<1.5 \mu\text{g/L}$ ) in 147 (94.2%) patients, with elevated levels found in 9 patients (5.8%), 3 in each of the 1-2 years and 2-5 years cohorts, 2 in the 5-8 years cohort, and 1 patient in the 8+ years cohort. Chromium levels were normal ( $<1.2 \mu\text{g/L}$ ) in 153 (98.1%) patients; of the 3 patients (1.9%) with abnormal levels, there was 1 patient in each of the 2-5, 5-8, and 8+ years cohorts. There was no difference in metal ion levels between manufacturers. Zero patients with OXINIUM diffusion hardened (ODH) liners and OXINIUM heads had elevated Co, Cr, and Zr levels.

## **DISCUSSION AND CONCLUSION:**

The present study shows an initial period of low metal ion levels from the DM implant and a gradual increase over time. This may be due to the increase in patients' activities after some time post surgery. Alternative, non-cobalt chrome bearing materials used in these constructs, may be promising. Ultimately, long-term results require further investigation.