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**TABLE E-1 Demographic, Clinical, and Laboratory Data for the Patients Who Underwent Revision Surgery as a Result of Corrosion at the Modular Neck-Body Taper Junction***

| Case | Age | Sex | BMI ($kg/m^2$) | Months to Initial Symptoms | Location of Pain | Other Symptoms | Harris Hip Score | Months to Revision | ESR (mm/hr) | CRP (mg/L) | Serum Cobalt (ng/mL) | Serum Chromium (ng/mL) | Serum Titanium (ng/mL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 66.2 | F | 28.3 | — | Groin | — | 37 | 19.5 | 31 | <5 | 5.6 | 0.8 | 4.9 |
| 2 | 64.0 | M | 23.3 | 13.3 | Groin | — | — | 15.6 | 20 | 23 | — | — | — |
| 3 | 61.2 | F | 38.0 | 6.0 | Groin | Limp, weakness, swelling | 22 | 20.7 | 30 | 36 | 9.5 | 0.6 | 3.4 |
| 4 | 63.4 | M | 27.9 | 5.1 | Groin and trochanteric | — | 43 | 12.6 | 3 | 5 | — | — | — |
| 5 | 74.2 | F | 26.3 | 5.8 | Groin and buttock | — | — | 12.5 | 30 | 27 | 5.4† | 0.4† | — |
| 6† | 43.0 | F | 19.6 | 7.4 | Groin, thigh, and buttock | Limp | — | 16.0 | 45 | 11 | 4.2 | 0.3 | 3.1 |
| 7† | 43.0 | F | 19.6 | 7.4 | Groin, thigh, and buttock | Limp | — | 11.8 | 45 | 11 | 4.2 | 0.3 | 3.1 |
| 8 | 65.4 | M | 30.2 | 8.1 | Groin | — | — | 14.6 | 26 | 6 | 8.9 | 1.0 | 5.8 |
| 9 | 46.9 | F | 43.6 | 6.8 | Groin | Limp | — | 14.4 | 59 | 7 | 5.1 | 0.5 | 1.6 |
| 10 | 54.6 | F | 19.5 | 9.3 | Groin and buttock | — | 71 | 12.4 | 30 | <5 | 4.4 | 0.8 | 2.8 |
| 11 | 77.1 | F | 23.1 | 11.0 | Groin, buttock, and thigh | — | — | 23.1 | 62 | 24 | 8.8† | 1.2† | — |
| 12 | 61.8 | F | 20.8 | 6.8 | Groin | — | 43 | 9.7 | 7 | <5 | 3.9 | 0.2 | 2.8 |

*BMI = body-mass index, ESR = erythrocyte sedimentation rate, and CRP = C-reactive protein level. Dashes indicate that the data were not available. †Cases 6 and 7 represent the two hips of one patient in whom the problem was bilateral. ‡Indicates values obtained at an outside commercial laboratory.

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**TABLE E-2 Surgical and Implant Data of Patients Who Underwent Revision Surgery as a Result of Corrosion at the Modular Neck-Body Taper Junction***

| Case | Preoperative Diagnosis | Surgical Approach | Femoral Component | Modular Neck | Neck Version | Head Size, Length | Bearing Surface | Acetabular Component |
|---|---|---|---|---|---|---|---|---|
| 1 | DJD | Posterior | Rejuvenate (size 7) | 132° × 30 mm | Neutral | 36 mm, +0 mm | Metal-Poly | Trident PSL |
| 2 | DJD | Anterolateral | Rejuvenate (size 8) | 132° × 30 mm | Neutral | 40 mm, universal (+4-mm adapter sleeve) | Ceramic-Poly | Trident PSL |
| 3 | DJD | Posterior | Rejuvenate (size 7) | 127° × 34 mm | Neutral | 36 mm, −5 mm | Ceramic-Poly | Trident PSL |
| 4 | DJD | Posterior | Rejuvenate (size 9) | 127° × 42 mm | 8° Anteverted | 44 mm, universal (+4-mm adapter sleeve) | Ceramic-Poly | Trident PSL |
| 5 | DJD | Posterior | Rejuvenate (size 9) | 132° × 34 mm | Neutral | 36 mm, −5 mm | Metal-Poly | Trident PSL |
| 6† | DJD | Posterior | Rejuvenate (size 8) | 132° × 34 mm | Neutral | 36 mm, −2.5 mm | Ceramic-Poly | Trident PSL |
| 7† | DJD | Posterior | Rejuvenate (size 8) | 132° × 34 mm | Neutral | 36 mm, −2.5 mm | Ceramic-Poly | Trident PSL |
| 8 | DJD | Posterior | Rejuvenate (size 9) | 132° × 34 mm | 8° Retroverted | 36 mm, −5 mm | Ceramic-Poly | Trident PSL |
| 9 | DJD | Posterior | Rejuvenate (size 7) | 127° × 34 mm | 8° Anteverted | 36 mm, +0 mm | Ceramic-Poly | Trident PSL |
| 10 | DJD | Posterior | Rejuvenate (size 7) | 132° × 34 mm | Neutral | 36 mm, +0 mm | Ceramic-Poly | Trident PSL |
| 11 | DJD | Posterior | Rejuvenate (size 8) | 127° × 38 mm | 8° Anteverted | 32 mm, +0 mm | Metal-Poly | Tritanium |
| 12 | DJD | Posterior | Rejuvenate (size 7) | 132° × 34 mm | 8° Anteverted | 28 mm, +0 mm (40-mm Anatomic Dual Mobility) | Metal-Poly-Metal | Anatomic Dual Mobility |

*DJD = degenerative joint disease, Poly = polyethylene, and PSL = peripheral self locking. †Indicates bilateral case.

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**TABLE E-3 Results of Microscopic and Histologic Examinations of Implants and Tissue Removed at the Time of Revision Surgery***

| Case | Corrosion at Neck-Body Junction | Corrosion at Head-Neck Junction? | Necrosis | Surface Fibrin | Diffuse Lymphocytes | Perivascular Lymphocytes | Plasma Cells | Eosinophils | Polymorphonuclear Leukocytes | Particles |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Yes | No | 4 | 3 | 3 | 0 | 0 | 2 | 0 | $CrPO_4$ |
| 2 | Yes | Yes | 4 | 1 | 4 | 4 | 0 | 1 | 0 | none |
| 3 | Yes | Yes | 4 | 4 | 4 | 3 | 3 | 2 | 0 | $CrPO_4$ |
| 4 | — | — | 0 | 2 | 4 | 4 | 0 | 0 | 0 | none |
| 5 | Yes | Yes | 4 | 3 | 4 | 2 | 2 | 2 | 1 | $CrPO_4$ |
| 6† | Yes | Yes | 4 | 2 | 4 | 1 | 0 | 2 | 0 | $CrPO_4$ |
| 7† | Yes | No | — | — | — | — | — | — | — | — |
| 8 | Yes | Yes | 4 | 3 | 4 | 2 | 2 | 1 | 1 | $CrPO_4$ |
| 9 | Yes | Yes | 4 | 2 | 4 | 1 | 0 | 2 | 0 | none |
| 10 | Yes | No | 0 | 2 | 4 | 2 | 3 | 0 | 1 | none |
| 11 | — | — | — | — | — | — | — | — | — | — |
| 12 | Yes | No | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $CrPO_4$ |

*Histopathology scores are graded as follows: 0 = none, 1 = rare, 2 = mild, 3 = moderate, and 4 = marked. Dashes indicate that samples were not available.
†Indicates bilateral case.

**TABLE E-4 Preoperative Metal Levels in Serum of Patients Who Underwent Revision Surgery as a Result of Corrosion at the Modular Neck-Body Junction**

| | Mean ± Standard Deviation | Range | Reference Value* | Elevation Above Reference |
|---|---|---|---|---|
| Titanium | 3.4 ± 1.3 | 1.6 to 5.8 | 4.1 (1.1 to 11.2) | 0.8 × |
| Cobalt | 6.0 ± 2.2 | 3.9 to 9.5 | 0.3 (0.2 to 1.6) | 18.7 × |
| Chromium | 0.6 ± 0.3 | 0.2 to 1.2 | 0.3 (0.02 to 1.5) | 2.3 × |

*Reference data are from data at our institution of patients with a well-functioning metal-on-polyethylene total hip prosthesis at thirty-six months postoperatively (a proximally porous-coated modular titanium-alloy stem with a cobalt-alloy head and a titanium socket)[25]. All values given in ng/mL or parts per billion (ppb).