Supplementary Online Content

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eTable 1. TJA History and Implant Composition for 952 Participants With at Least One Surgery

eTable 2. Difference in Annual Rate of Change on Domain-Specific z Scores According to Time Since Surgery

This supplementary material has been provided by the authors to give readers additional information about their work.
## eTable 1. TJA History and Implant Composition for 952 Participants With at Least One Surgery

| Patient characteristics       | Participants with TJA at baseline N=724 | Participants with first TJA during follow-up N=228 | Total Participants with TJA N=952 |
|-------------------------------|----------------------------------------|---------------------------------------------------|----------------------------------|
| Total hip arthroplasty (THA)  | 318 (44%)                              | 98 (43%)                                          | 430 (45%)                        |
| Total knee arthroplasty (TKA) | 468 (65%)                              | 140 (61%)                                         | 626 (66%)                        |
| Metal composition (ever)      |                                        |                                                   |                                  |
| Cobalt-chromium               | 547 (76%)                              | 152 (67%)                                         | 699 (74%)                        |
| Titanium                      | 478 (66%)                              | 160 (70%)                                         | 638 (67%)                        |
| Stainless steel               | 10 (1%)                                | 4 (2%)                                            | 14 (1.5%)                        |
| Oxinium/ceramic               | 39 (5%)                                | 31 (14%)                                          | 70 (7%)                          |
| Tantalum                      | 5 (0.7%)                               | 0 (0%)                                            | 5 (0.5%)                         |

| Surgery characteristics       | TJA surgeries before baseline N=1139  | TJA surgeries during follow-up N=304              | Total TJA surgeries* N=1592      |
|-------------------------------|--------------------------------------|---------------------------------------------------|----------------------------------|
| Total hip arthroplasty (THA)  | 451 (40%)                            | 119 (39%)                                         | 641 (40%)                        |
| Total knee arthroplasty (TKA) | 688 (60%)                            | 185 (61%)                                         | 951 (60%)                        |
| Metal composition             |                                      |                                                   |                                  |
| Cobalt-chromium               | 928 (73%)                            | 201 (66%)                                         | 1129 (72%)                       |
| Titanium                      | 820 (65%)                            | 209 (69%)                                         | 1029 (65%)                       |
| Stainless steel               | 21 (2%)                              | 4 (2%)                                            | 30 (2%)                          |
| Oxinium/ceramic               | 94 (7%)                              | 42 (14%)                                          | 136 (9%)                         |
| Tantalum                      | 15 (1%)                              | 1 (0.3%)                                          | 16 (1%)                          |

* Implant metal composition was not available for 20 surgeries. 724 participants with a history of 1139 TJA surgery at baseline had 149 additional TJA surgeries during follow-up.
### eTable 2. Difference in Annual Rate of Change on Domain-Specific Z Scores According to Time Since Surgery

| Years since surgery | z score Memory   | z score Attention/Executive | z score Language |
|---------------------|------------------|-----------------------------|------------------|
|                     | THA              | TKA                         |                  |
|                     | b (95% CI)<sup>a</sup> | b (95% CI)<sup>a</sup>      |                  |
|                     |                  |                             |                  |
| <80 years of age    |                  |                             |                  |
| 0-2 y               | 0.041 (-0.061 to 0.143) | -0.035 (-0.118 to 0.048)   |                  |
| 2-4 y               | -0.006 (-0.083 to 0.071) | 0.021 (-0.039 to 0.081)   |                  |
| 4-8 y               | -0.008 (-0.049 to 0.033) | 0.002 (-0.030 to 0.034)   |                  |
| >8 y                | 0.008 (-0.016 to 0.031) | 0.003 (-0.024 to 0.029)   |                  |
| ≥80 years of age    |                  |                             |                  |
| 0-2 y               | 0.014 (-0.103 to 0.131) | 0.050 (-0.048 to 0.148)   |                  |
| 2-4 y               | -0.009 (-0.090 to 0.072) | -0.030 (-0.098 to 0.038) |                  |
| 4-8 y               | 0.010 (-0.032 to 0.052) | 0.003 (-0.030 to 0.036)   |                  |
| >8 y                | -0.015 (-0.042 to 0.012) | -0.035 (-0.056 to -0.013) |                  |
| <80 years of age    |                  |                             |                  |
| 0-2 y               | 0.061 (-0.032 to 0.153) | -0.024 (-0.099 to 0.051)   |                  |
| 2-4 y               | -0.057 (-0.126 to 0.011) | 0.000 (-0.054 to 0.054)   |                  |
| 4-8 y               | 0.018 (-0.018 to 0.054) | -0.007 (-0.036 to 0.022) |                  |
| >8 y                | -0.016 (-0.036 to 0.004) | -0.004 (-0.029 to 0.021)  |                  |
| ≥80 years of age    |                  |                             |                  |
| 0-2 y               | 0.060 (-0.046 to 0.167) | 0.005 (-0.0879 to 0.098)  |                  |
| 2-4 y               | -0.057 (-0.131 to 0.018) | 0.026 (-0.0381 to 0.090)  |                  |
| 4-8 y               | -0.008 (-0.046 to 0.031) | -0.032 (-0.064 to -0.000) |                  |
| >8 y                | -0.003 (-0.028 to 0.022) | -0.047 (-0.068 to -0.026) |                  |
| ≥80 years of age    |                  |                             |                  |
| 0-2 y               | -0.020 (-0.115 to 0.075) | -0.051 (-0.129 to 0.026)  |                  |
| 2-4 y               | -0.023 (-0.095 to 0.049) | 0.016 (-0.040 to 0.071)   |                  |
| 4-8 y               | 0.006 (-0.031 to 0.043) | 0.002 (-0.029 to 0.032)   |                  |
| >8 y                | 0.004 (-0.016 to 0.023) | -0.025 (-0.050 to -0.000) |                  |

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| Years since surgery | THA b (95% CI) | TKA b (95% CI) |
|---------------------|----------------|----------------|
| 4-8 y               | 0.018 (-0.022 to 0.057) | -0.022 (-0.054 to 0.009) |
| >8 y                | -0.001 (-0.026 to 0.023) | -0.013 (-0.034 to 0.007) |

**z score Visuospatial**

| Age group | Visuospatial |
|-----------|--------------|
| <80 years of age | |
| 0-2 y | 0.044 (-0.058 to 0.146) | -0.014 (-0.097 to 0.069) |
| 2-4 y | -0.022 (-0.097 to 0.053) | 0.008 (-0.051 to 0.066) |
| 4-8 y | 0.025 (-0.012 to 0.063) | 0.007 (-0.024 to 0.037) |
| >8 y | -0.024 (-0.042 to -0.005) | -0.018 (-0.039 to 0.004) |
| ≥80 years of age | |
| 0-2 y | 0.028 (-0.088 to 0.144) | -0.038 (-0.140 to 0.063) |
| 2-4 y | -0.009 (-0.088 to 0.070) | -0.004 (-0.072 to 0.065) |
| 4-8 y | -0.013 (-0.053 to 0.027) | 0.004 (-0.027 to 0.036) |
| >8 y | 0.005 (-0.019 to 0.028) | -0.003 (-0.022 to 0.016) |

*Adjusted for age, sex, education, test naïve (whether or not the participant had previously taken the cognitive tests), APOE ε4 status.
All estimates for THA and TKA are derived simultaneously from the same model.