Reported ArComXL Wear Rate Not Representative of All XLPE Liners

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In response to the article by Shareghi et al., we would like to highlight that the wear rate reported for the highly cross-linked polyethylene (XLPE) control liner (ArComXL) in this randomized controlled trial is not representative of the wear rate reported for other XLPE liners at the same follow-up. Shareghi et al. report that the median proximal wear rate between two and five years of a vitamin E-infused XLPE liner (E1) was significantly lower than that of the control XLPE (ArComXL) liner. The difference in these wear rates and the divergence shown in the graph of proximal femoral head penetration in Figure 2 may be inadvertently misleading to the general orthopaedic community, who could assume vitamin E-infused XLPE liners are wearing less than all previous generations of XLPE liners.

While Shareghi et al. have correctly summarised in their conclusion that their reported wear rate of the vitamin E-infused liners is “about the same magnitude as observed for some previous versions of XLPE,” we remain concerned that this message will not be obvious to the general readership. The mean proximal wear rate of the ArComXL liner (0.04 mm/yr) is higher than the mean proximal wear rate reported in other radiostereometric-analysis (RSA) studies of XLPE liners at the same medium-term follow-up (0.02[1], 0.01[2], 0.01[3], 0.00[4], 0.00[5], and 0.01[6]). Hence, the mean proximal wear rate of E1 liners in this randomized trial (0.01 mm/yr) is not lower than that of many other XLPE liners.
A very similar randomized trial using RSA measurements by Nebergall et al. (7) also reported a significantly reduced median proximal wear rate at five years post primary THA for patients with an E1 liner compared to ArComXL. That study correctly describes the ArComXL as a “medium cross-linked polyethylene” because of the relatively low irradiation dose (50kGy) used to cross-link the polymer, and this may explain why its wear rate is not representative of all XLPE liners.

In summary, we believe it is important to make readers aware that the wear rates in this randomized trial do not suggest vitamin E-infused XLPE liners are wearing less than all previous XLPE liners.

References

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Article Author Response

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Article Author(s) to Letter Writer(s)

We thank Dr. Callary and colleagues for their valuable comments on our article. We agree that it should be emphasized that ArComXL, the control polyethylene in our study, has a higher wear rate than most
evaluated highly cross-linked polyethylenes (XLPEs), perhaps attributed to the comparably low irradiation
dose (50 kGy). Marathon® (DePuy, Warsaw, IN, USA) is another polyethylene irradiated with 50 kGy. In
studies using RSA (1) and Hip Suite Analysis (2), Marathon has displayed a linear steady state wear
similar to our result for ArComXL, while another RSA study has reported a considerably lower proximal
wear rate (0.014 mm/yr) for the same polyethylene (3).

In the absence of a clearly agreed-upon definition of “XLPE,” one can discuss the classification of
polyethylene quality perhaps to motivate labelling of XLPE, but we think that both ArComXL and
Marathon belong to the XLPE group since they were developed as such. We do, however, agree that a
more distinct definition of XLPE could facilitate clear and understandable reporting on the growing group
of cross-linked polyethylenes, but orthopaedic surgeons will still have to be aware of their considerable
heterogeneity with regard to manufacturing.

Finally, we appreciate the comment regarding our most important message: that the wear rate of the E1
liners studied by us is about equal to that of many other types of XLPE. Thus, so far, this material has no
proven advantages or disadvantages in the clinical setting, and still lacks clinical documentation in the
longer term.

References


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