Periprosthetic tissues contained both polymeric and metal particles. The average score for the elbow tissue was 1.8 (0.8). This was lower than that observed previously for hip tissue 2.1 (0.8), but not statistically different. Numerous mast cells and lymphocytic cells were observed adjacent to regions of diffuse metal particle loading. Burning of the stem of the ulnar component was noted as evidence of stem pistoning and as a potential source of the metal debris. This was predominantly seen on ulnar stems with a PMMA precoat. PE debris were primarily excluded from dense collagogenous regions of the tissue, whereas adjacent loose connective tissue contained significant amounts of PE debris. Tissue necrosis was frequently observed in proximity to regions with extensive PE wear debris, as confirmed by brightfield and polarized light microscopy. While PE particle loading was similar to that seen in periprosthetic tissues from the hip, the particle size observed under polarized light spanned from the micron scale up to 300-400 microns. The larger micron sized particles are not generally considered to contribute to osteolysis. The clinical effect, if any, of the PE debris will require further analysis.

DISCUSSION:
Our study is the first to present volumetric wear rates for a semi-constrained elbow. Although the volumetric wear rates were lower than those observed in the hip, the effect of PE wear debris, metal debris and/or a combination of both on the potential for adverse tissue responses or osteolysis after TEA is yet to be determined. In addition, the precise nature of the initiation of PE damage and/or wear is highly complex and requires further analysis. The effect of the presence of either PE, metal particles and/or a combination of both on the potential for osteolysis after TEA is yet to be determined. Evidence of third body wear, focal loading, PE oxidation and burnishing points to many potential causal factors including design, material properties, sterilization methods, surgical placement of the implant and patient compliance.

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