

## 2.1 Long Term Wear of Ceramic on Ceramic Hips

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First and second generation alumina on alumina bearings in hip prostheses showed low long term wear rates in vivo 1 mm<sup>3</sup>/year with a characteristic style wear pattern on the head, thought to be associated with cup rim contact [1]. Standard laboratory simulator studies have failed to replicate this wear rate or mechanism [2,3]. In 1999 we developed a new hip simulation method which replicates joint laxity, microseparation and head cup rim contact [4], and this has been shown to replicate wear rates, mechanism and debris found in third generation hip and alumina on alumina BioloX Forte bearings [4,5,6,7,8]. The wear rates of these third generation bearings is at least ten fold less than highly cross linked polyethylene. Additionally, the ceramic wear debris has been found to be less reactive than cross linked polyethylene [9,10] resulting in substantially lower functional osteolytic potential. Using these novel simulator methods fourth generation BioloX Delta alumina matrix components, have shown further reduction in wear compared to third generation BioloX Forte bearings [11].

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