



Title

EFFECT OF MOLECULAR WEIGHT, CALCIUM STEARATE, AND STERILIZATION METHODS ON THE WEAR OF ULTRA HIGH MOLECULAR WEIGHT POLYETHYLENE ACETABULAR CUPS IN A HIP JOINT SIMULATOR

Authors

McKellop H, Shen F, Campbell P, Ota T

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Purpose/Premise

This paper reports on a study that examines the effect of molecular weight, calcium stearate, and sterilization method on the wear rates of polyethylene cups.

Material and Methods

Two separate hip simulator tests were run. One compared cups made from polyethylene with different molecular weights, and then cups made from polyethylene with the same molecular weight but with and without calcium stearate. The second test compared cups that were either EtO sterilized, gamma irradiated in air, or gamma irradiated after vacuum packaging.

Outcomes

Wear rates were nearly identical for all the cups in the first test. In the second test, initial wear rates were significantly lower for the cups that were gamma irradiated in a vacuum.

Conclusion/Recommendation

The authors conclude that the increased level of crosslinking in cups that had been gamma irradiated in a vacuum led to an initial decrease in the wear rate compared to those that had been irradiated in air. They also suggest that the polyethylene wear rate in a hip simulator test can be reduced to a negligible level depending on the amount of crosslinking, but caution that a balance must be made between wear reduction and possible degradation of physical properties.

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