



Title

EFFECT OF STERILIZATION METHOD AND OTHER MODIFICATIONS ON THE WEAR RESISTANCE OF ACETABULAR CUPS MADE OF ULTRA-HIGH MOLECULAR WEIGHT POLYETHYLENE: A HIP-SIMULATOR STUDY

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Purpose/Premise

This paper reports on a hip simulator study that examines the wear rates of polyethylene cups sterilized by various methods.

Material and Methods

Cups sterilized with and without gamma irradiation were tested for wear before and after artificial thermal aging to accelerate oxidative degradation. The gamma-irradiated cups were sterilized after packaging in a low-oxygen atmosphere. The nonirradiated cups were sterilized with ethylene oxide. A control group consisted of nonsterilized cups.

Outcomes

Before thermal aging, the gamma-irradiated cups exhibited approximately a 50% lower wear rate. After 14 days of thermal aging, the gamma-irradiated cups showed a similar wear advantage, but after 30 days of thermal aging, the gamma-irradiated cups showed an increased wear rate.

Conclusion/Recommendation

The authors concluded that gamma-irradiation crosslinking improves the wear resistance of polyethylene, and oxidation reduces wear resistance. They suggest that gamma-irradiation crosslinking be performed in a way that avoids oxidation.

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