

CHARACTERIZATION OF CONVENTIONAL AND CROSSLINKED UHMWPE USED IN HIP JOINT ENDOPROTHESIS

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Ultra high molecular weight polyethylene (UHMWPE) has been using in the biomedical industry for articulating surface, due to its self-lubricating characteristics, high impact strength and wear resistance. Wear is the major failure of implant material and hinders the ideal performance of total hip prosthesis. To overcome this problem crosslinked implants were produced to additional conventional implants [1]. Another problem is, UHMWPE is susceptible to oxidative degradation [2]. Both above problems are reducing implant's mechanical properties.

In this study a total of 28 explants, of which 13 conventional and 15 crosslinked, were investigated in their chemical, morphological and micromechanical properties.

Fourier Transform Infrared Spectroscopy (FTIR), Differential Scanning Calorimetry (DSC), and Depth Sensing Indentation (DSI) were used for testing the aforementioned properties.

The correlation between oxidation index (OI), crystallinity, E-Modulus and hardness were evaluated. Increases in vivo time increases the OI and crystallinity in conventional and crosslinked explants. A good correlation was also found between crystallinity and mechanical properties as with previous study [3].

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