1: J Mater Sci Mater Med. 2005 Feb;16(2):175-81

Electron beam irradiation of denture base materials.

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Electron beam irradiation can be used to influence the properties of polymers. It was the aim of this study to investigate whether PMMA denture base materials can benefit from irradiation in order to have increased fracture toughness, work of fracture or hardness. Rectangular specimens of heat-and auto-curing denture base materials were electron beam irradiated (post-cured) with 25, 100 and 200 kGy using an electron acceleration of 10 MeV or 4.5 MeV respectively. Fracture toughness, work of fracture, Vickers hardness and colour changes were measured and compared with not-irradiated specimens.The toughness, work of fracture and hardness increased using 10 MeV with a dose of 25 kGy and with 100 kGy using 4.5 MeV. However, the clinical use may not benefit from the observed small changes. Higher dosage (200 kGy) decreased the values significantly. The colour changes reached a level which was found to be not clinically acceptable. CONCLUSION: PMMA denture base materials do not benefit from post-curing with electron beam irradiation.

PMID: 15744607 [PubMed - indexed for MEDLINE]