

Electron-beam irradiation of experimental denture base polymers.

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OBJECTIVE: Since the properties of polymers can be influenced using electron-beam irradiation, the aim of this study was to investigate whether electron-beam post-curing can improve the mechanical properties of experimental denture base polymers.

MATERIAL AND METHODS: Rectangular specimens of different experimental polymeric blends were electron-beam irradiated (post-cured) with 25 kGy and 200 kGy using an electron accelerator of 4.5 MeV. Fracture toughness, work of fracture, Vickers hardness and colour changes were measured and compared in non-irradiated specimens.

RESULTS: The mechanical properties of all the investigated polymers seemed to benefit from low-energy electron-beam irradiation (25 kGy). Using an energy dose of 200 kGy, all blends showed deteriorated mechanical properties resulting from chain breakage.

Nevertheless, all investigated polymers had undesirable colour changes after electron-beam irradiation. **CONCLUSIONS:** Mechanical properties of experimental polymethyl-methacrylate could be changed using electron-beam irradiation. Because of discolorations caused by the irradiation levels investigated, these levels cannot be recommended for practical applications.

PMID: 17514520 [PubMed - indexed for MEDLINE]