Acrylic removable appliances: comparative evaluation of different postpolymerization methods.

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INTRODUCTION: In orthodontics, the polymeric part of removable orthodontic appliances could be a hazard for patients because high residual monomer contents can lead to allergic reactions. In addition, water uptake, color stability, and mechanical properties are influenced by the degree of conversion. The aim of this investigation was to evaluate the effectiveness of different postpolymerization methods on the properties of removable orthodontic appliance resins. METHODS: A total of 300 rectangular specimens (5 postpolymerization groups: 20 per group) were manufactured of Orthocryl (n = 100, Dentaurum, Ispringen, Germany), Palapress (n = 100, Heraeus-Kulzer, Wehrheim, Germany), and Pro Base Cold (n = 100, Ivoclar-Vivadent, Schaan, Liechtenstein). The first 2 postpolymerization groups were postcured in a stove (10 minutes at 40 degrees C or 80 degrees C). The third resin group was postcured in a microwave at 600W for 5 minutes, and the fourth polymer group was postcured in a microwave at 600W for 10 minutes. Twenty conventionally cured samples (cold-curing under pressure: water bath 40 degrees C, 25 minutes, 2.2 bar) were the control group. Water sorption, fracture toughness, and Vickers hardness were measured. RESULTS: Fracture toughness and Vickers hardness of the resins are slightly increased after curing. Heat as a secondary curing method decreases water uptake of resins used for removable orthodontic appliances. CONCLUSIONS: Heat postpolymerization appears to improve the properties of removable orthodontic appliance resins.

PMID: 17346579 [PubMed - indexed for MEDLINE]