

Evaluation of Mechanical Properties and Surface Roughness of Nanofilled and Microhybrid Composites

Authors : Solmaz Eskandarion, Haniyeh Eftekhari, Amin Fallahi

Abstract : Introduction: Nowadays cosmetic dentistry has gained greater attention because of the changing demands of dentistry patients. Composite resin restorations play an important role in the field of esthetic restorations. Due to the variation between the resin composites, it is important to be aware of their mechanical properties and surface roughness. So, the aim of this study was to compare the mechanical properties (surface hardness, compressive strength, diametral tensile strength) and surface roughness of four kinds of resin composites after thermal aging process. Materials and Method: 10 samples of each composite resins (Gradia-direct (GC), Filtek Z250 (3M), G-aenial (GC), Filtek Z350 (3M- filtek supreme) prepared for evaluation of each properties (totally 120 samples). Thermocycling (with temperature 5 and 55 degree of centigrade and 10000 cycles) were applied. Then, the samples were tested about their compressive strength and diametral tensile strength using UTM. And surface hardness was evaluated with Microhardness testing machine. Either surface roughness was evaluated with Scanning electron microscope after surface polishing. Result: About compressive strength (CS), Filtek Z250 showed the highest value. But there were not any significant differences between 4 groups about CS. Either Filtek Z250 detected as a composite with highest value of diametral tensile strength (DTS) and after that highest to lowest DTS was related to: Filtek Z350, G-aenial and Gradia-direct. And about DTS all of the groups showed significant differences ($P < 0.05$). Vickers Hardness Number (VHN) of Filtek Z250 was the greatest. After that Filtek Z350, G-aenial and Gradia-direct followed it. The surface roughness of nano-filled composites was less than Microhybrid composites. Either the surface roughness of GC Ganiaal was a little greater than Filtek Z250. Conclusion: This study indicates that there is not any evident significant difference between the groups among their mechanical properties. But it seems that Filtek Z250 showed slightly better mechanical properties. About surface roughness, nanofilled composites were better than Microhybrid.

Keywords : mechanical properties, surface roughness, resin composite, compressive strength, thermal aging

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020