

3rd Euro Congress and Expo on

Dental & Oral Health

June 16-18, 2015 Alicante, Spain

To investigate the mechanical properties of compomer restorative materials modified with bioactive glass and hydroxyapatite particles

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High fluoride releasing restorative materials generally have lower mechanical properties. Therefore they are preferred in primary teeth and non-stress bearing cavities in permanent teeth.

Aim: The aim of this study was to evaluate the mechanical properties of compomer restorative materials modified with bioactive glass (BAG) and hydroxyapatite (HA) particles.

Material and methods: 1%, 2%, 3% and 4% w/w HA and BAG particles were added mechanically to the compomers. The specimens were prepared for measurement of compressive strength, flexural strength and fracture toughness. The specimens were assigned to 9 experimental groups. SEM was utilized to study surfaces of the specimens in the fracture toughness test. The statistical analyses were performed by Oneway Anova, Tukey HSD and paired sample t tests.

Results: Compressive strength and flexural strength of control group was significantly higher than other groups, except 4% HA added compomers ($p < 0.01$). It was found that BAG particles decreased the compressive strength of compomers. The addition of 1% HA and 4% BAG resulted in a decrease of the elastic modulus. The addition of 3% HA, 3% and 4% BAG significantly increased the fracture toughness of the material ($p < 0.05$, $p < 0.01$). SEM images of the experimental compomers showed a heterogeneous surface. Nano-HA particles were not distributed homogeneously in the matrix and some agglomeration occurred. BAG and HA modified specimens showed rough surface texture. In conclusion, the results of the study demonstrated that the addition of BAG and HA into compomers could affect the mechanical properties of the material depending on the amount of additive.

Key Words: bioactive glass, hydroxyapatite, compomer, mechanical properties

Biography

Elif Sepet is working as professor in Department of Pedodontics, Department of Pedodontics, Faculty of Dentistry, Istanbul University, Istanbul from 2004- present. Worked as Associate professor in Department of Pedodontics, Faculty of Dentistry, Istanbul University, Istanbul during October 1998

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