

SL 15.28

The Effect of Nd:YAG Laser Irradiation on the Adhesion Property of Dental Polymethylmetacrylate to Carbon Fiber

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It is suitable to use of carbon fiber in fiber reinforced dental posts, but due to low adhesion of PMMA to carbon fiber it isn't applicable to fabrication of dental PMMA reinforced by carbon fiber. There are many methods used to overcome these problems such as, silanation, surface modification and etc. At present work fiber surface modification was used to improve adhesion properties of dental PMMA to carbon fiber. Surface modification was carried out by fundamental harmonic of Pulsed Nd:YAG Laser with the wavelength of 1064 nm. The effect of laser irradiation on the adhesion of dental PMMA to carbon fiber and mechanical properties of fiber reinforced specimens were considered via scanning electron microscopy (SEM) and impact test method respectively. The results showed that laser ablation caused micro irregularities on the fiber surface. These irregularities improved the retention of PMMA to the surface of carbon fiber. The impact test results verified that laser ablation improved polymer adhesion to fiber surface.