

Full Length Research Paper

# The ablation threshold of Er:YAG laser and Er,Cr:YSGG laser in dental dentin

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Accepted 10 March, 2010

**This study aims to investigate the threshold dose for the ablation of dentin of human permanent tooth using erbium: yttrium-aluminium-garnet (Er:YAG, wavelength 2.94  $\mu\text{m}$ , pulse duration 100  $\mu\text{s}$ -50 ms) and erbium, chromium: yttrium-scandium-gallium-garnet (Er,Cr:YSGG, wavelength 2.79  $\mu\text{m}$ ; pulse duration 140  $\mu\text{s}$ ) lasers. A total of 70 dentin samples were subject to the experiment with varying laser energy densities ranging from 0 - 10  $\text{J}/\text{cm}^2$ . The treated dentin surfaces were examined through stereomicroscope and scanning electron microscope. The result of the experiment indicated that both Er:YAG and Er,Cr:YSGG lasers are effective in ablating human tooth dentin. The ablation thresholds for both lasers were determined by inspecting the scanning electron microscopy (SEM) micrographs. The ablation threshold value for Er:YAG laser in dental dentin is 2.97–3.56  $\text{J}/\text{cm}^2$ , and for Er,Cr:YSGG laser, it is 2.69 - 3.66  $\text{J}/\text{cm}^2$ .**

**Key words:** Dentin, Er:YAG laser, Er,Cr:YSGG laser, ablation, ablation threshold.