

## Influence of etching time on bond strength in dentin irradiated with erbium lasers

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**Abstract** The purpose of this in vitro study was to evaluate the effect of etching time on the tensile bond strength (TBS) of a conventional adhesive bonded to dentin previously irradiated with erbium:yttrium–aluminum–garnet (Er:YAG) and erbium, chromium:yttrium–scandium–gallium–garnet (Er,Cr:YSGG) lasers. Buccal and lingual surfaces of 45 third molars were flattened until the dentin was exposed and randomly assigned to three groups ( $n = 30$ ) according to the dentin treatment: control (not irradiated), irradiated with Er:YAG (1 W; 250 mJ; 4 Hz;  $80.6 \text{ J/cm}^2$ ) laser or Er,Cr:YSGG (4 W; 200 mJ; 20 Hz;  $71.4 \text{ J/cm}^2$ ) laser, and into three subgroups ( $n = 10$ ) according to acid etching time (15 s, 30 s or 60 s) for each experimental group. After acid etching, the adhesive was applied, followed by the construction of an inverted cone of composite resin. The

samples were immersed in distilled water ( $37^\circ\text{C}$  for 24 h) and subjected to TBS test [50 kilogram-force (kgf), 0.5 mm/min]. Data were analyzed by analysis of variance (ANOVA) and Tukey statistical tests ( $P \leq 0.05$ ). Control group samples presented significant higher TBS values than those of all lased groups. Both irradiated groups exhibited similar TBS values. Samples subjected to the different etching times in each experimental group presented similar TBS. Based on the conditions of this in vitro study we concluded that Er:YAG and Er,Cr:YSGG laser irradiation of the dentin weakens the bond strength of the adhesive. Moreover, increased etching time is not able to modify the bonding strength of the adhesive to irradiated dentin.

**Keywords** Erbium:yttrium–aluminum–garnet (Er:YAG) · Erbium, chromium:yttrium–scandium–gallium–garnet (Er,Cr:YSGG) · Tensile bond strength · Dentin · Laser

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