

Influence of different power outputs of erbium, chromium: yttrium–scandium–gallium–garnet laser and acid etching on shear bond strengths of a dual-cure resin cement to enamel

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Abstract The purpose of the study was to determine if the irradiation of enamel with laser of different output powers might be viable alternatives to acid etching for the bonding of resin luting agents. Seventy-seven maxillary central incisors, extracted for periodontal reasons, were used. The enamel was etched with an erbium, chromium:yttrium–scandium–gallium–garnet (Er,Cr:YSGG) laser operated at one of six power outputs (0.5 W, 0.75 W, 1 W, 1.5 W, 1.75 W and 2 W) or with 38% phosphoric acid. Seventy teeth were used for the bond strength experiments, and the remaining seven (one specimen for each group) were used for scanning electron microscopy (SEM) to determine the topography and morphology of the treated enamel surface. The acid-etched group yielded the highest mean of shear bond strength (13.5 ± 2.8 MPa). The means of the shear bond strength for the teeth irradiated at 0.5 W, 0.75 W, 1 W, 1.5 W, 1.75 W and 2 W laser were 3.28 ± 2.4 MPa, 5.44 ± 3.4 MPa, 8.8 ± 4.5 MPa, 10.2 ± 4.0 MPa, 11.4 ± 4.8 MPa and 11.9 ± 4.3 MPa, respectively. Laser irradiation at 1.5 W, 1.75 W and 2 W produced a type III acid-etched pattern similar to that produced by acid etching. No significant enamel surface etching was obtained by 0.5 W or 0.75 W laser irradiation. Irradiation at 0.5 W and 0.75 W produced a type V acid-etched pattern. We concluded that the mean

shear bond strength and enamel surface etching obtained with Er,Cr:YSGG laser (operated at 1.5 W and 1.75 W for 15 s) is comparable to that obtained with acid etching.

Keywords Erbium, chromium:yttrium–scandium–gallium–garnet (Er,Cr:YSGG) laser system · Laser irradiation · Scanning electron microscopy (SEM) examination · Shear bond strength

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