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Laser etching of enamel for direct bonding

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ABSTRACT

The application of laser irradiation to etch dental enamel in preparation for direct bonding of orthodontic appliances has been studied. Forty extracted human teeth were divided into four groups of 10 teeth. Within each group, five teeth were subjected to a 30 sec acid etch of the buccal enamel surface; the other five in each group were etched with a laser. Four power settings on the laser etching unit were used: 80mJ, 1W, 2W and 3W. After etching, brackets were adhered to the prepared buccal enamel surfaces with composite resin. Shear bond strength was tested 7 days later.

The findings showed that an acceptable shear bond strength, viz. ≥0.6kg/mm, could be achieved at laser power settings of 1 to 3W but not at the lowest setting (80 mJ). However, the mean shear bond strengths obtained with laser treatment of the enamel at 80mJ, 1W and 2W were lower ($p<0.01$ or 0.001) than that achieved with acid etching.

KEY WORDS: Lasers, Etching, Direct bonding.

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