

Enamel bond strength with acid etching and/or Er,Cr:YSGG laser etching

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I. Objective

The Er,Cr:YSGG hydrokinetic laser system has been successful in the ablation of dental tissues. It has been reported that this system is also useful for preparing tooth surfaces for bonding, but results to date have been controversial. This study examined the shear bond strength to enamel surface treated with Er,Cr:YSGG laser and/or acid etching.

II. Materials and Methods

Forty extracted sound upper premolars were used. The teeth were embedded in autopolymerizing acrylic resin with the buccal surfaces facing up and the surface is slightly flattened for button placement. The teeth were randomly divided into four groups of ten specimens. Each ten teeth received following surface treatment before the bonding of orthodontic buttons : (1) 37% phosphoric acid (2) laser radiation at power output of 1 W (3) laser radiation at power output of 2 W (4) laser radiation at power output of 2 W followed by 37% phosphoric acid.

Buttons were bonded with Transbond XT (3M, Unitek) and shear bond strength was determined with a universal testing machine. In addition, SEM were evaluated. The data were analyzed with one-way analysis of variance and Tukey HSD tests ($p < 0.05$).

III. Results

The bond strengths to tooth surfaces were 15.39 ± 1.52 MPa for etched with 37% phosphoric acid, 14.93 ± 1.67 MPa for 2 W Er,Cr:YSGG laser followed by 37% phosphoric acid, 13.64 ± 1.34 MPa for 2 W Er,Cr:YSGG laser and 13.55 ± 1.77 MPa for 1 W Er,Cr:YSGG laser. However, no statistically significant difference was found among groups.

IV. Conclusion

The result of the present study showed etching of enamel surface with an Er,Cr:YSGG laser yielded similar, but lower and less predictable bond strength than did acid etching with 37% phosphoric acid.