

A Comparative Study On The Effect Of Two Laser Treatments On The Shear Bond Strength Of Composite To Enamel And Dentin

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Abstract:

Great advances in laser technology have occurred in the field of dentistry.

The application of different lasers on hard tissue was investigated since 1964. But now having Er-YAG and Nd-YAG coupled with cooling streams of water, they can effectively remove the dental hard tissue forming a rough surface that might be suitable for resin bonding. In this study the shear bond strength of composite resin to acid, Er-YAG and Nd-YAG lasers etched enamel and dentin were measured and the topographical difference on enamel and dentin surfaces were further studied using the (SEM) on extracted human teeth. The Nd- YAG laser used on hard tooth structures in this study was at 320mJ/pulse at pulse frequency of 8 Hz. Also, Er-YAG was used at 200mJ/pulse at a rate of 3 Hz with cooling water spray for both. The control group was acid etched with 37% phosphoric acid for 15 seconds. Shear bond strength was tested at a crosshead speed of 2mm/min. There was no significant difference among the three groups of composite bonded to enamel. However, significant difference ($P < .05$) between acid versus Nd-YAG, and acid versus Er-YAG on dentin. When the bond strength of each group was compared between enamel and dentin, the dentin lazed with Nd-YAG was significantly lower in shear bond strength than enamel ($P < .05$). Enamel lazed with Nd-YAG and Er- Y AG showed similar topographical changes. In both conditions enamel exhibited raised flaky protuberances with cracking and crazing of the surface. The dentin lazed with Er-YAG exhibited more pronounced hills and valley like appearance more than dentin lazed with Nd-YAG.

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