

عنوان مقاله:

Effect of CO₂ Laser and Fluoride Varnish Application on Microhardness of Enamel Surface Around Orthodontic Brackets

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Abstract Introduction: Orthodontic treatment has many advantages such as esthetic improvement and self-esteem enhancement; yet it has some disadvantages such as increasing the risk of formation of white spot lesions, because it makes oral hygiene more difficult. It is rational to implement procedures to prevent these lesions. The present study was aimed to assess the effect of CO₂ laser and fluoride varnish on the surface of the enamel surface microhardness around the orthodontic braces. **Methods:** Eighty extracted premolar teeth were selected, scaled, polished with nonfluoridated pumic and metal brackets were bonded to them. Then, they were randomly allocated to 5 groups: control (neither fluoride nor laser is used on enamel surfaces), fluoride (4 minutes fluoride varnish treatment of the enamel surfaces), CO₂ laser (10.6 μm CO₂ laser irradiation of the teeth), laser-fluoride (fluoride application after laser irradiation) and fluoride-laser (fluoride was applied and then teeth were irradiated with laser). After surface treatment around brackets on enamel, the samples were stored in 0.1% thymol for less than 5 days and then they were exposed to a 10-day microbiological caries model. Microhardness values of enamel were evaluated with Vickers test. One sample of each group (5 teeth from 80 samples) was prepared for SEM (scanning electron microscopy) and the data from 75 remaining teeth were analyzed with analysis of variance (ANOVA) and chi-square tests (α = 0.05). **Results:** Microhardness mean values from high to low were as follow: fluoride-laser, laser-fluoride, laser, fluoride and control. Microhardness in fluoride-laser group was significantly higher compared with that of the control group. Distribution adhesive remnant index (ARI) scores were significantly different between groups and most of bond failures occurred at the enamel-adhesive interface in groups 2 to 5 and at the adhesive-bracket interface in the control group. **Conclusion:** Combination of fluoride varnish and CO₂ laser irradiation can reduce enamel demineralization around orthodontic brackets. **Keywords:** CO₂ laser Fluoride varnish Demineralization Orthodontic bracket

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