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### **Combined Effects of Laser/Remineralization Agents on Orthodontic Bracket's Bond Strength**

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**Objectives** To evaluate the effects of a Er;Cr:YSGG laser alone or combined with different remineralization agents on orthodontic bracket's enamel bond strength.

**Methods** Eighty-four extracted bovine teeth were randomly divided into 6 groups of 14 teeth each; group I: Casein phosphopeptide-amorphous calcium phosphate (CPP-ACP, Tooth Mousse), group II: Fluoride varnish(Cervitec F), group III: Er;Cr:YSGG laser, group IV: CPP-ACP application after laser irradiation, group V: Fluoride varnish application after laser irradiation and group VI: No treatment(control). Er;Cr:YSGG laser(Waterlase MD,) was used in non-contact mode with swiping motion with a 1-2 mm distance from enamel surface (0.25 W, 20 Hz, 10% air, 0% water).

After the brackets were bonded, all specimens were kept in artificial saliva for 24 h, then subjected to thermocycling (5°C-55°C, 5000 cycles). Shear bond strength(SBS) test was performed using Universal Testing Machine with a crosshead speed of 1mm/min. The amount of adhesive remaining on the tooth surface after debonding was evaluated using ARI index under a stereomicroscope(X40). Data was analyzed using Welch ANOVA, followed by Games Howell test. ARI data was analyzed by the Kruskal-Wallis test( $p < 0.05$ ).

**Results** ANOVA revealed statistical significance difference between the groups( $p < 0.001$ ). While the use of Er,Cr:YSGG laser with fluoride varnish resulted in a significantly lower bond strength values than control and other preventive treatments( $p < 0.05$ ), no statistically significant difference was observed between control and the rest of the treatments( $p > 0.001$ ). The difference among different groups was insignificant( $p > 0.05$ ). There was no significant differences in ARI values between control and other groups( $p = 0.061$ ).

**Conclusions** Er,Cr:YSGG laser irradiation combined with fluoride varnish as a preventive enamel treatment endanger the orthodontic brackets' bond strength. The use of laser, fluoride varnish and CPP-ACP alone or combined used of laser with CPP-ACP did not significantly affect the SBS of orthodontic brackets.