Characteristics of adhesive bonding with enamel deproteinization

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Objective: To evaluate the effect of using sodium hypochlorite (NaOCl) on the bond characteristics of orthodontic metal brackets bonded to enamel surface using three adhesive systems.

Methods: One hundred twenty premolars were selected and randomly divided into two equal groups of 60 teeth each (Groups I and II). The teeth of Group I were left untreated while those of Group II were exposed to 5.25% NaOCl for 1 minute. The teeth in either group were randomly subdivided into three equal subgroups of 20 teeth each (A, B and C), according to the type of adhesive system used to bond the brackets. In Subgroup A, phosphoric acid + Transbond XT primer and adhesive were used. In subgroup B, Transbond Plus self-etching primer (SEP) + Transbond XT adhesive were utilized. In subgroup C, phosphoric acid + SmartBond LC adhesive were used. The shear bond strength (SBS) and the degree of adhesive penetration to enamel surface were assessed. Data analyses were performed using ANOVA, post-hoc (LSD), t and chi-square test.

Results: Transbond XT had significantly higher SBS than SmartBond LC (p < 0.05). Phosphoric acid provided significantly higher SBS and degree of adhesive penetration than SEP (p < 0.05). NaOCl significantly increased SBS and degree of adhesive penetration in Subgroups B and C (p < 0.05).

Conclusion: Adhesion quality of Transbond XT adhesive is better than SmartBond LC. Phosphoric acid is more effective than SEP. NaOCl enhances the bond characteristics.

Keywords: Orthodontic brackets. Sodium hypochlorite. Electron microscopy.