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Combinations of etchants, composite resins, and bracket systems: An important choice in orthodontic bonding procedures

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ABSTRACT

The objectives of this investigation were: (1) to compare the shear bond strengths (SBS) of metal, ceramic, and plastic brackets using different concentrations of maleic and phosphoric acid gels and aqueous solutions, and (2) to determine if a relationship exists between the type of acid etchant and the location of resin after debonding. A sample of 210 bovine incisors was divided among three different bracket groups (Victory series metal, Transcend 6000 ceramic, Spirit MB plastic). Prior to bonding, enamel was acid-etched using 37% phosphoric acid (H_3PO_4) gel and aqueous solution, 10% maleic acid gel and aqueous solution, 10% H_3PO_4 gel and aqueous solution, or 2% H_3PO_4 aqueous solution. SBS testing and the adhesive remnant index (ARI) score provided insight into the effects of the bonding process on enamel. Resin tags associated with each etchant type were inspected under scanning electron microscopy (SEM). Statistical analyses (level of significance, $p=0.05$) of the data showed significant differences among groups. It was concluded that specific acid-composite-bracket combinations are recommended for use in clinical orthodontic practice in order to achieve efficient bonding.

KEY WORDS: Orthodontic bonding, Acid concentrations.

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