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Bracket bonding with 15- or 60-second etching and adhesive remaining on enamel after debonding

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ABSTRACT

The purposes of this study were to (1) evaluate the shear bond strength of brackets fixed to enamel that has been etched for 15 or 60 seconds, (2) correlate etch time with amount of resin remaining on the enamel after debonding; and (3) evaluate enamel morphology after acid etching. Sixty recently extracted human premolars were randomly divided into two groups. Group 1 was etched for 15 seconds, and group 2 for 60 seconds. A 37% phosphoric acid solution was used for etching. The brackets were Mini-Taurus, and the bonding system was Mono-Lok2. After bonding, the teeth were held at 37°C and 100% humidity for at least 48 hours. To debond, a blade was placed at the ligature groove of the bracket. The force in Newtons required to dislodge the bracket was measured, employing a crosshead speed of 1 mm/min. Bond strength was calculated on the basis of bracket area. Immediately after removal of the bracket, the teeth were rinsed and dried using an air-water syringe, and the adhesive remnant index (ARI) was assessed. Enamel surfaces were analyzed using a scanning electron microscope (SEM). The results showed that shear bond strength was greater ($p=0.016$) when the enamel was etched for 60 seconds, and the amount of adhesive remaining on the teeth was also greater ($p=0.001$). There was no significant correlation between shear bond strength and the AR1 calculated in the total sample ($n=60$, $r=0.017$; $p>0.05$). SEM evaluation revealed that the shorter etching time created a less retentive enamel surface. Absolute enamel loss also decreased.

KEY WORDS: Brackets, Bond strength, Enamel etching, Debonding.

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