The Online
ANGLE ORTHODONTIST
An International Journal of Orthodontics and Dentofacial Orthopedics
79th Anniversary 1930-2009

The Angle Orthodontist: **Vol. 64, No. 5, pp. 377–382.**

Effect of H_3PO_4 concentration on bond strength

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ABSTRACT

Prior to bonding, the enamel surface of the tooth is normally etched using a solution of 37%–50% phosphoric acid (H_3PO_4) for 60 seconds. The purpose of this study was to evaluate the tensile bond strength, debonding interface distribution and enamel surface detachment of various concentrations of H_3PO_4 solution, from 2% to 8O%, applied for 15 seconds. Statistically significant differences in bond strength were found among the various concentrations tested: concentrations in the 10% to 60% range produced greater bond strengths than both the weaker and stronger concentrations. The weaker the bond strength, the greater the debonding interface between resin and enamel. The greater the bond strength, the greater the debonding interface between the bracket and resin. Enamel detachment occurred as the H_3PO_4 concentration rose above 30%. To obtain greater bond strength and less enamel detachment, 10%–30% concentrations of phosphoric acid for 15 seconds etching are suggested for clinical bonding.

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KEY WORDS: Phosphoric acid, Debonding interface, Etchant concentration, Bond strength.