Phosphoric Acid Containing Chlorhexidine Compromises Bonding of Universal Adhesive.

J Adhes Dent. 2018 Jun 14;:1-5

Authors: da Rosa LS, Follak AC, Lenzi TL, Rocha RO, Soares FZM

Abstract
PURPOSE: To examine the influence of phosphoric acid containing chlorhexidine on the dentin bond stability of a universal and a 2-step etch-and-rinse adhesive.
MATERIALS AND METHODS: Eighty sound bovine incisors were randomly assigned to 8 groups (n = 10) according to: phosphoric acid (37% phosphoric acid [CTR] or 37% phosphoric acid with 2% chlorhexidine [CHX]); adhesive (Scotchbond Universal Adhesive [SBU]or Adper Single Bond 2 [SB2]); and water storage time (24 h and 6 months). Both acids and adhesives were applied to flat dentin surfaces (following manufacturer’s instructions) upon which composite cylinders were built up (0.72 mm2). After storage in distilled water at 37°C for 24 h or 6 months, the composite cylinders were submitted to microshear bond strength (µSBS) testing. Bond strength data (MPa) were analyzed using three-way ANOVA and post-hoc Tukey’s test (α = 5%).
RESULTS: The interaction among factors was significant (p = 0.012). Both adhesives showed similar 24-h bond strengths regardless of the phosphoric acid. After 6 months, similar values were found for both materials when control phosphoric acid was used, but CHX phosphoric acid produced statistically significantly lower bond strengths for SBU. SB2 bond strength was not affected by acid type.
CONCLUSION: Phosphoric acid containing chlorhexidine induced premature bond strength degradation of Scotchbond Universal Adhesive.

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Efficacy of a Universal Adhesive in the Bond Strength of Composite Cements to Polymer-infiltrated Ceramic.

Efficacy of a Universal Adhesive in the Bond Strength of Composite Cements to Polymer-infiltrated Ceramic.

J Adhes Dent. 2017 Nov 17;1-8

Authors: Rohr N, Flury A, Fischer J

Abstract

PURPOSE: To investigate the effect of a universal adhesive on the bond strength of composite cements to a polymer-infiltrated ceramic network.

MATERIALS AND METHODS: Shear bond strength to a polymer-infiltrated ceramic network (Vita Enamic) and to its polymer and ceramic components was assessed on polished surfaces using either a conventional dual-curing resin (RelyX Ultimate) or self-adhesive composite cement (RelyX Unicem 2 Automix). Substrate surfaces were either not pretreated or a silane coupling agent (Vitasil), a universal adhesive (Scotchbond Universal Adhesive), or both were applied. Further, the shear bond strength to polymer-infiltrated ceramic network was evaluated after etching with 5% hydrofluoric acid (Vita Ceramics Etch) of 0, 15, 30, 60 or 120 s without or with application of silane, universal adhesive, or both (n = 10). Statistical analysis was performed using the Kruskal-Wallis test (p < 0.05) followed by post-hoc comparisons with Bonferroni correction.

RESULTS: No bond (0 MPa) was formed to the polished polymer-infiltrated ceramic network or to its components for either cement. Application of silane...
resulted in low mean bond strengths (4 to 5 MPa) to the ceramic. The universal adhesive bonded mainly to the polymer part of the polymer-infiltrated ceramic network. The best bonding performance for both cements was achieved when silane and universal adhesive were applied on the polymer-infiltrated ceramic network. Etching for 30 s or 60 s resulted in the highest mean shear bond strengths for all pretreatment groups (p < 0.05).

CONCLUSION: The best bonding performance of the self-adhesive dual-curing composite cement RelyX Unicem 2 Automix was found on the HF-etched polymer-infiltrated ceramic network. The conventional dual-curing composite cement RelyX Ultimate with Scotchbond Universal Adhesive may bond chemically to the polymer part of the polymer-infiltrated ceramic network. To achieve the highest bond strengths for both cements, the polymer-infiltrated ceramic network should be etched for 30 to 60 s, followed by the application of silane and universal adhesive.

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Role of Etching Mode on Bonding Longevity of a Universal Adhesive to Eroded Dentin.

J Adhes Dent. 2017 Feb 10;

Authors: Forgerini TV, Ribeiro JF, Rocha RO, Soares FZ, Lenzi TL

Abstract
PURPOSE: To assess the immediate and six-month microshear bond strength (μSBS) of a universal adhesive applied using different etching strategies on sound
MATERIALS AND METHODS: Eighty bovine incisors were polished to obtain flat buccal dentin. Forty teeth were submitted to a pH-cycling model to simulate artificial erosion (3x/day cola drink for 7 days). Teeth from both dentin conditions (sound and eroded) were randomly assigned to four groups according to the adhesive and etching approach: a universal adhesive in self-etch and etch-and-rinse modes (Scotchbond Universal Adhesive), and as controls a two-step etch-and-rinse adhesive (Adper Single Bond Plus), and a two-step self-etch adhesive (Clearfil SE Bond). Four composite restorations (Z250) were built up on each dentin surface, using the area delimitation technique. Half of the specimens were evaluated in the μSBS test after 24 h of water storage, and the other half were evaluated six months later. Data (MPa) were analyzed with three-way repeated measures ANOVA and Tukey’s post-hoc tests (α = 0.05).

RESULTS: The μSBS values of all adhesives significantly decreased after six months of aging (p = 0.01). Lower μSBS values were obtained in eroded dentin (p = 0.04). The universal adhesive showed similar μSBS to the selfetch adhesive used as control, irrespective of the etching strategy. However, Scotchbond Universal Adhesive applied in self-etch mode performed better than the control etch-and-rinse adhesive (p = 0.02).

CONCLUSION: The universal adhesive does not provide the same bonding efficacy on eroded dentin as on sound dentin, and its performance does not depend on the etching mode.

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Is There a Best Protocol to Optimize Bond Strength of a Universal Adhesive to Artificially Induced Caries-affected Primary or Permanent Dentin?

J Adhes Dent. 2016 Aug 16;

Authors: Nicoloso GF, Antoniazzi BF, Lenzi TL, Soares FZ, Rocha RO

Abstract

PURPOSE: To evaluate whether the etch-and-rinse or self-etching mode of a universal adhesive is the best protocol to optimize bond strength to primary and permanent artificially-induced caries-affected dentin.

MATERIALS AND METHODS: Flat midcoronal dentin surfaces were exposed in 24 primary and 24 permanent molars and submitted to pH cycling for 14 days to induce artificial caries-affected dentin. For each tooth type (primary and permanent), the teeth were randomly assigned to 4 different groups according to the adhesive systems and bonding strategy: a universal adhesive, Scotchbond Universal Adhesive, in self-etching and etch-and-rinse modes; a twostep etch-and-rinse adhesive, Adper Single Bond 2 (control); and two-step self-etching system, Clearfil SE Bond (control). After bonding and restorative procedures, specimens were sectioned to obtain rectangular sticks (0.8 mm²) that were submitted to microtensile tests (crosshead speed: 1 mm/min). The data were analyzed using two-way ANOVA (α = 0.05).

RESULTS: The universal adhesive showed bond strengths similar to those of the control groups, irrespective of the bonding strategy. Likewise, statistically similar bonding performance was observed for all adhesives to either artificially-induced caries-affected primary or permanent dentin.

CONCLUSION: The new universal adhesive, Scotchbond Universal Adhesive, can be used in both application modes in artificially-induced caries-affected primary and permanent dentin, as the bond strength was not influenced by the different substrates or application mode.
Bonding Performance of a Multimode Adhesive to Artificially-induced Caries-affected Primary Dentin.

J Adhes Dent. 2015 Apr 21;

Authors: Lenzi TL, Raggio DP, Soares FZ, Rocha RO

Abstract

PURPOSE: To investigate the bonding of a new universal adhesive applied using different etching strategies on sound and caries-affected dentin of primary teeth.

MATERIALS AND METHODS: Flat dentin surfaces from 50 primary molars were randomly assigned to 10 groups according to substrate (sound dentin [SD] vs caries-affected dentin [CAD] pH cycled for 14 days) and bonding approach (Scotchbond Universal Adhesive: self-etching, vs dry or wet-bonding etch-and-rinse strategies; Adper Single Bond Plus [two-step etch-and-rinse adhesive] and Clearfil SE Bond [two-step self-etching system] as controls). After 24 h of water storage, bonded sticks with cross-sectional areas of 0.8 mm² were tested for microtensile bond strength (μTBS). Two sticks from each tooth were immersed in silver nitrate solution in order to evaluate nanoleakage (NL) with SEM. The μTBS means were analyzed using two-way ANOVA and Tukey’s tests. For NL, the Kruskal-Wallis and Mann-Whitney tests were used (α = 0.05).

RESULTS: The influence of the etching strategy on the bonding performance of the universal adhesive was substrate dependent. The self-etching approach
resulted in lower μTBS values and higher silver nitrate uptake into hybrid layers for Scotchbond Universal Adhesive on SD, while no difference among experimental groups was observed in CAD.

CONCLUSION: It is preferable to use the universal adhesive following either a dry- or wet-bonding etch-and-rinse approach on both sound and caries-affected primary dentin.

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