



Title	Reversal of compromised bonding in NaOCl or H2O2 treated etched dentin
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Reversal of compromised bonding in NaOCl or H₂O₂ treated etched dentin.*Lai SCN¹, Mak YF¹, Cheung GSP¹, Osorio R², Toledano M², Carvalho R³, Tay FR¹, Pashley DH⁴ (¹Univ. of Hong Kong, ²Univ. of Granada, ³Univ. of São Paulo, ⁴Medical College of Georgia)

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This study examined the hypothesis that decrease in bond strength in sodium hypochlorite (NaOCl) or hydrogen peroxide (H₂O₂) treated etched dentin is caused by the oxidizing action of these chemicals. Acid-etched, deep coronal human dentin were bonded with Single Bond (3M, St. Paul, MN) after treatment with different chemical solutions for 60s each: [1] distilled water; [2] 5.25% NaOCl; [3] 10% H₂O₂; [4] 10% sodium ascorbate (SA); [5] 5.25% NaOCl followed by 10% SA; and [6] 10% H₂O₂ followed by 10% SA. Resin-dentin interfaces of these six groups were demineralized and processed for TEM examination. Restored teeth were trimmed to dumbbell-shaped specimens (n= 14-15) and evaluated for tensile bond strength. Failure modes and surface areas were further assessed using SEM. All specimen surface areas were statistically adjusted by Least Square Means to the correlated bond strengths at 0.8 mm². One way ANOVA and SNK test revealed that NaOCl, H₂O₂ or SA when used alone, produced significant (p < 0.05) reduction in resin-dentin bond strengths. When SA, a reducing agent, was used after NaOCl or H₂O₂, reduction in tensile bond strengths were effectively reversed. TEM and SEM showed that deproteinization of the demineralized collagen matrix was incomplete with NaOCl and absent with the use of H₂O₂. Failure modes were almost exclusively mixed failures in all groups. However, variation in extent of resin infiltration and resin tag integrity could be discerned along fractured hybrid layers. It is concluded that reduction in resin-dentin bond strengths in NaOCl and H₂O₂ treated etched dentin cannot be attributed to incomplete deproteinization. This is more likely related to changes in the redox potential of the bonding substrate that affect the polymerization of adhesive resin components. (Supported by DE06427 from the NIDCR)

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