

Simple methods to enhance bond strength of self-adhesive resin cements

Q How can we improve the bond strength between resin cements and the tooth substrate when cementing indirect restorations with self-adhesive resin cements?

A The use of self-adhesive resin cements is accomplished by a simple clinical step, in which the simultaneous demineralization/infiltration of the bonding substrate takes place. However, the self-adhesive resin cements have lower bond strength than conventional resin cements that rely on the application of etch-and-rinse adhesive systems.¹⁻³ In order to increase the bond strength of the self-adhesive resin cements, we suggest the following clinical guidelines.

1. Acid-etch enamel with phosphoric acid selectively. The selective enamel etching can enhance microscopic irregularities produced by the stronger acid compared to that produced by the cement itself. However, remember “not” to etch dentin surface. It can produce thick collagen matrix that viscous cements cannot penetrate easily, thus leaving weak interface.²⁻⁴
2. Apply an additional coat of adhesive system. It provides hydrophilic character and high flow to the dentin, thus improving the limited penetration of the self-adhesive resin cements due to their high viscosity.^{3,5}
3. Use mild etchant, such as polyacrylic acid and EDTA, as a cavity cleanser. It partially removes the smear layer, leaving the dentin mineral phase, thus enhancing the chemical reaction between the cement and the substrate. However, penetration potential into the smear layer removed surface depends on the viscosity of the self-adhesive resin cements.^{1,6}
4. Avoid using chlorhexidine (CHX) prior to cementation. There are two mechanisms compromising bonding, chemically and physically. (1) the presence of chlorine suggests a chemical interference that hampers the resin cements' effectiveness in bonding with dentin when CHX solutions were used, and (2) the precipitates act as a physical barrier, limiting the resin cement's interaction with the surface, minimizing the potential for bonding.⁷
5. If you want to use sodium hypochlorite (NaOCl) during post cementation, we suggest relatively short time (5 - 15 seconds) of application to reduce the negative effect of super-oxide radicals generated by NaOCl. However, NaOCl eliminates organic components from the smear layer, increasing exposed mineral components and decreasing water content at the same time. This action of NaOCl may aid the hydrophobic self adhesive resin cements to chemically interact with hydroxyapatite and improve the surface wettability, leading to the establishment of adhesion to dentin.⁸

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