Clinical Tips for Durable Dentin Bonding

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Abstract

In dentin bonding, contemporary dental adhesive systems rely on formation of the hybrid layer, a biocomposite containing dentin collagen and polymerized resin adhesive. They are usually able to create at least reasonable integrity of the hybrid layer with high immediate bond strength. However, loss of dentin bonded interface integrity and bond strength is commonly seen after aging both in vitro and in vivo.

This is due to endogenous collagenolytic enzymes, matrix metalloproteinases, and cysteine cathepsins, responsible for the time dependent loss of hybrid layer collagen.

In addition, the hydrophilic nature of adhesive systems creates problems that lead to suboptimal hybrid layers. These problems include, for example, insufficient resin impregnation of dentin, phase separation, and a low rate of polymerization, all of which may reduce the longevity of the bonded interface.

Several approaches to retain the integrity of the hybrid layer and to improve the long-term dentin bond strength have been tested. This presentation will include basic concepts of dentin bonding and bonding strategies plus criteria of durable bonding.