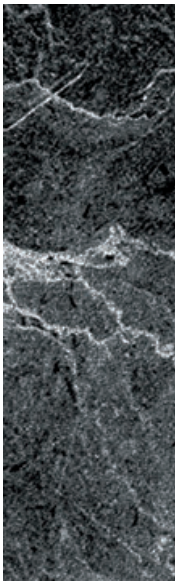

Ask the Experts

BONDING TO FLUOROSED TEETH

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QUESTION: Can composite reliably be bonded to fluorosed teeth, and which kind of adhesive should be used?

ANSWER: Dentists frequently encounter teeth with fluorosis that need to be restored with composites. This tooth developmental disorder is caused by an excessive intake of fluoride at the age of tooth development. Especially in areas with high concentrations of fluoride in the drinking water, fluorosis is common. However, it nowadays seems that fluoride intake from other sources, such as from dental hygiene or dietary products, might also lead to fluorosis.

Fluorosis mainly affects the enamel. Due to dysfunctional mineralization, which leads to outer hypermineralization and inner hypomineralization, mild cases of fluorosis are characterized by white opaque banding of the enamel. In more severe cases, the hypomineralization is so extensive that the enamel can be pitted or chipped. Dentin can also be affected in these more severe cases.

Several researchers have shown that composites can be bonded reliably and successfully to fluorosed enamel, especially when the enamel is only mildly or moderately affected.[1,2] However, as for normal unaffected teeth, it is always recommended to prepare the enamel by grinding away the outer surface using a diamond.[1] Grinding of enamel removes the outer hypermineralized 50–80 μm thick enamel layer in fluorosed teeth. The bond strength of composites to ground enamel of teeth with moderate fluorosis (chalky enamel with pitting) is similar to that of normal teeth.[1]

When using a self-etch adhesive for bonding to ground, mildly affected enamel, phosphoric-acid etching is not always necessary.[2] However, adhesion to moderately and severely affected enamel seems to improve with a separate acid etch-and-rinse step. In cases where one would bond to unground enamel (for example for laminate veneers, or when the restoration will be spread over the cavity margins onto unbeveled enamel), it is also advisable to acid-etch the enamel. Self-etch adhesives that are mildly acidic do not seem appropriate for

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bonding to fluorosed enamel, as they will yield a less microretentive surface that provides less retention.

Historically, it was deemed necessary to etch fluorosed enamel for a longer period. However, it seems that 15 to 30 seconds of phosphoric-acid etching is sufficient when applied to ground and even unprepared enamel in fluorosed teeth.

On the other hand, dentin of fluorosed teeth, especially when severely affected, has been shown to be more acid susceptible (and thus also more caries susceptible).[3] The use of a separate acid-etchant on fluorosed dentin is thus rather controversial. Depending on the degree of fluorosis, it has been shown that a two-step self-etch adhesive performs well. In addition, fluorosed dentin has been found to be more water permeable.[3] This indicates that it is always best to use a system with a separate hydrophobic bonding resin, which has low water permeability and thus will seal the dentin better.

To conclude, composites can be reliably bonded to fluorosed teeth, depending on the degree of fluorosis. It is recommended to always grind the enamel before bonding. Acid-etching is good for enamel bonding but not for dentin bonding in fluorosed teeth.[4] As a consequence, a good choice of adhesive would be a good two-step self-etch adhesive with an adjunctive acid-etching step for the enamel.

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SUGGESTED READING

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Editor's Note: If you have a question on any aspect of esthetic dentistry, please direct it to the Associate Editor, Dr. Edward J. Swift, Jr. We will forward questions to appropriate experts and print the answers in this regular feature.

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