COMMENTARY

MORPHOLOGIC TEXTURE CHARACTERIZATION ALLIED TO CIGARETTE SMOKE INCREASE PIGMENTATION IN COMPOSITE RESIN RESTORATIONS

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This article is a valuable contribution on the topic of composite color change after smoke exposure and repolishing procedures. The authors must be complimented for their attention to detail in designing, performing, and writing their work.

When it comes to providing anterior resin composite esthetic restorations to patients who are smokers, dental practitioners have a great opportunity for raising awareness and advocating against smoking. Also, it is crucial to educate patients about smoking cessation, as smoking can compromise dental work, particularly the ones with high esthetic demands. The article calls attention to the fact that more than 1.2 billion people worldwide are tobacco consumers. Indeed, the World Health Organization projected 58.8 million deaths to occur globally in 2008, from which 5.4 million deaths are tobacco-attributed—more than tuberculosis, HIV/AIDS and malaria combined.[1] Tobacco is the single most preventable cause of death in the world today. The American Cancer Society estimated that in 2009 about 169,000 cancer deaths were expected to be caused by tobacco use, accounting for at least 30% of all cancer deaths in the United States.[2]

The article reiterates that direct resin composite restorations are susceptible to optical characteristics and appearance changes over time as a result of the smoking habit. Although enhancement and embellishment techniques such as surface texturization may result, in the short term, in high quality and superior esthetic features, it may also cause early discoloration in patients who smoke, potentially compromising restoration final optic and color results.

Texturized resin composite surfaces attained more pigments from cigarette smoke than smooth surfaces. Even after repolishing, the values never returned to baseline. The rationales discussed—that pigments accumulate more easily in rougher surfaces and the influence of potential thermal effects from smoking—are well-documented and relevant justification for the findings. Another factor one might consider is the characteristics of Filtek Supreme's filler particles and its influence on optical properties of the final restoration.

Nanohybrid resin composites have a broad distribution of particle sizes. Whereas a small fraction of filler particles are within the nanoparticle size range (less than 0.1 μm or 100 nm), a range of substantially larger filler particles is present. The fillers in Filtek Supreme are a combination of non-aggregated 20 nm silica, non-aggregated 4 to 11 nm zirconia filler, and loosely bound aggregated zirconia/silica nanocluster filler particles (comprised of 20 nm silica and 4 to 11 nm zirconia particles). Nanoclusters comprise about 90% of the filler in the Filtek Supreme A2 shade. As a result of the aggregation, the average cluster particle size of 0.6 to 10 μm, is significantly larger than some microhybrid composites.[3]

When subjected to abrasion, the resin between and around the particles can be lost, leading to protruding filler particles and macroclusters. Eventually the entire filler particle/macrocluster is plucked out from the surface, resulting in craters.[3] These bumps and craters create a roughened surface, resulting in loss of reflectivity of the composite surface and altering the optical properties compared with the smooth surface, thus altering luminosity values and contributing to pigment retention and increased yellowing/decreased luminosity.

Composite surface texturization is a useful procedure to achieve optimal esthetic results in direct restorations. However, for patients who smoke, selection of this technique must be carefully considered, as it can potentially accelerate composite discoloration. Communication with patients regarding the potential of early staining is recommended.

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