COMMENTARY

INFLUENCE OF $NaHCO_3$ POWDER ON TRANSLUCENCY OF MICROFILLED COMPOSITE RESIN IMMERSED IN DIFFERENT MOUTHRINSES

Dorothy McComb, BDS, MScD, FRCD(C)*

This paper reminds us that direct composite restorations are vulnerable to their environment, that changes in optical characteristics and appearance may occur over time, and that extrinsic factors can contribute to these changes. Although this study only investigated changes in optical translucency, and only for one commercial microfilled composite, the results indicate that mouthrinses have the potential to significantly affect composite appearance. Whereas composite discoloration under various conditions has been extensively studied, few studies are available on changes in opacity or translucency over time. Studies have elucidated the level of color change necessary for clinical perceptibility ($\Delta E = 3.3$), but there is no such understanding for changes in translucency.[1] Nevertheless, it is well understood that, ideally, esthetic materials need to provide and maintain both optimal shade and translucency.

The results of this study show excellent optical stability in water for the proprietary microfill tested, a material that has been in popular clinical use for many years. The translucency of both the unpolished samples, cured against a Mylar strip, and air-polished samples showed no change in translucency when stored for up to 4 months in distilled water. The material only became significantly more opaque when exposed to three different types of mouthrinses, and this effect was more pronounced when the composite was submitted to air polishing using sodium bicarbonate particles. Although there were statistically significant differences in effect between the three different proprietary mouthrinses, these small numerical differences are unlikely to be clinically significant. The main message is that mouthrinses as a group, even with differing chemical compositions, can change the esthetic properties of a resin composite to a degree that may be clinically perceptible. The acceptability, or otherwise, of any opacity changes, for a particular patient will depend on the specific clinical situation. Personal experience suggests that lack of opacity in resin composites is more of a clinical problem than lack of translucency.

Unacceptable composite discoloration and loss of esthetics can occur through extrinsic factors and/or intrinsic factors. It is well accepted that certain foods and drinks such as coffee, cola, and red wine, as well as tobacco use, may result in extrinsic composite discoloration, particularly if the surface is rough. The type and quality of the resin matrix, the degree of resin conversion, and the quality of the filler/matrix bonding are factors involved in development of intrinsic discoloration. Incomplete conversion of the resin matrix can increase water sorption, and it has been shown that the pH[2] and alcohol content[3] of foods and drinks can affect color stability by altering the resin sorption characteristics. Multiple factors are involved, and differences in proprietary products have been documented, with some commercial products showing far more discoloration and opacity variations than others.[1] For hybrid composites, the smoother the surface finish, the better the resistance to discoloration.[4] In a comparison of various tooth stain removal procedures, air-powdered devices, which propel sodium bicarbonate particles in water to create a slurry, produced the roughest surfaces on polished composites.[5] Surface roughness can influence not only the surface gloss but also the perceived shade of tooth-colored materials.[6] It is likely that all of these factors are involved in the optical changes reported for resin composites, and more research is necessary to elucidate the relationships involved. Interestingly, a more recently developed silorane-based resin composite showed the best overall optical stability during accelerated photoaging when compared with a set of representative dimethacrylate conventional composites.[7]

Current direct composite materials offer a wide range of shades and opacities that can provide excellent clinical results. The long-term success of such restorations depends on both the initial esthetic result and the long-term stability, as it has been documented that lack of adequate esthetics or discoloration can be the reason for replacement of a significant proportion of restorations.[8] To ensure optimal long-term outcomes, it is recommended that dentists choose

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clinically proven materials, ensure maximum polymerization, and provide a smooth surface finish. Patients receiving extensive direct composite esthetic treatments need to be aware that prolonged or repeated contact with colored beverages, alcoholic solutions, and/or chemical mouthrinses may cause deterioration in their appearance. If air-polishing devices are used for stain removal, the composite surface may benefit from repolishing.

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*Professor and Head, Restorative Dentistry, and Director of Comprehensive Care, Faculty of Dentistry, University of Toronto, Toronto, ON, Canada