

# Evaluation of different methods used for removal of discoloration from direct composite restoration

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## Background/purpose:

Few studies investigated the best method for removing stains from different types of resin-based composite restorations and compared them to the more recently introduced nano-composites. This study compared the effect of four methods for stain removal from composite resins; finishing with Sof-lex disks, using pumice and brush, bleaching with 10% carbamide peroxide and 38% hydrogen peroxide.

## Introduction:

Esthetic failure, especially discoloration, is one of the most common reasons for replacing tooth colored restorations (1). To maintain excellent esthetic properties, RBC restorations should have good color stability. Under oral conditions, the esthetic restorations could be exposed to combined effects of light, moisture, oral habits such as tobacco use and certain dietary patterns such as caffeine intake, which might lead to external discoloration. RBC restorations may also become discolored due to intrinsic factors such as hydrolysis of the organic matrix or loosening of the filler particles due to faulty silanation (2). The introduction of tooth whiteners or home bleaching has created a significant excitement among dentists and public. Nevertheless; questions have been raised regarding the effect of bleaching agents on physical properties, surface morphology and color of restorative materials (3).

## Materials and methods:

A total number of 60 composite disk specimens were prepared. Specimens were divided into 3 groups (n=20) according to the type of composite restoration used: Renamel, microfilled composite resin (Cosmedent, Chicago, IL, U.S.A.), Filtek Z250, micro-hybrid (3M/ESPE), and Nanocluster Filtek Supreme, Nanomer (3M/ESPE). Then every main group were further subdivide into 4 subgroups according to the type of method of discoloration removal that would use later (n=5). Specimens were immersed in a staining solution for 3 weeks. The stained surfaces of five specimens from each RBC material were treated with one of the treatment procedures. Colorimetric measurements were taken using spectrophotometer prior to and after staining, and then repeated after surface treatments. Color difference values were calculated using One-way ANOVA, Two-way ANOVA and Tukey's Post Hoc tests.

## Results:

One-way ANOVA indicated significant differences in color change of the three composite resin materials following staining. Filtek Z250 showed the least susceptibility to discoloration followed by Renamel. Filtek Supreme was the material most prone to discoloration. Two-way ANOVA and Tukey's Post Hoc showed that all stain removing procedures except polishing with pumice, were able to return Filtek Z250 to clinically acceptable color difference. While bleaching with 38% carbamide peroxide was not effective with Renamel. Only pumice and 10% carbamide peroxide were able to return Renamel to clinically acceptable color.

## Conclusion:

Compositions of resin-based composite resins play an important role in their susceptibility to stain and their amenability to stain removal procedures. Home bleaching showed good results for the three materials, while office bleach was the least effective

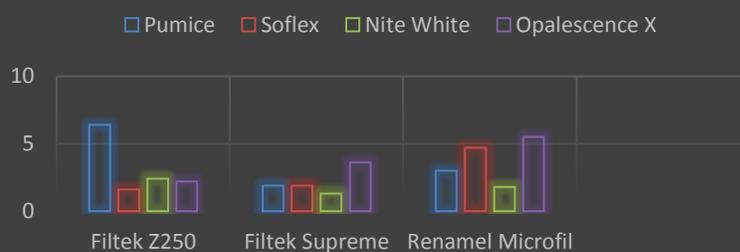
Material\Sade	Filler size \ content	Matrix Composition	Manufacture\Batch#
Filtek Z250 A2	0.01-3.5µm 60 vol.% zirconia\ silica	Bis- GMA, UDMA and Bis- EMA	3M\ESPEE Dental Products, St. Paul, MN, USA #1464
Filtek Supreme A2	5-20 nm. 60% aggregated zirconia\silica cluster (0.02-0.04 µm)	Bis- GMA, UDMA, TEGDMA and Bis- EMA	3M\ESPEE Dental Products, St. Paul, MN, USA #4821
Renamel Microfilled \ A2	0/02-0.04 µm 60 wt.% pyrogenic silicic acid	Multifunctional methacrylate Esters	Cosmedent Chicago, IL. USA. #7169

**Table 1:** The restorative materials used in this study

Materials	Batch #	Manufacturer
Opalescence Xtra Boost	BIZGO	Ultradent Product, South Jordan, UT, USA
Night White	06338170	Discus Dental, Culver City, CA, USA.
Sof-Lex	na	3M\ESPEE Dental Products, St. Paul, MN, USA
Pumice (fine)	na	Garreco Incorporated, Heper Springs, AR, USA
Lipton, yellow lable tea	na	Unilever, Dubi, UAE
Tasters chice coffee	na	Nestle USA Inc, Glendale, CA, USA
Ceres cranberry juice	na	Ceres Fruits Juice (Pty) Ltd, Ceres, South Africa

**Table 2:** Products and manufacturers of the stain removing procedures and staining solutions

**Fig 1.** ΔE values for the different RBC material after the four stain removal procedures



## References:

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- Turkun, L.S., Turkun, M., 2004. Effect of bleaching and repolishing procedures on coffee and tea stain removal from three anterior composite veneering materials. *J. Esthet. Restor. Dent.* 16, 290 – 302.
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