

## Admira – discolouration

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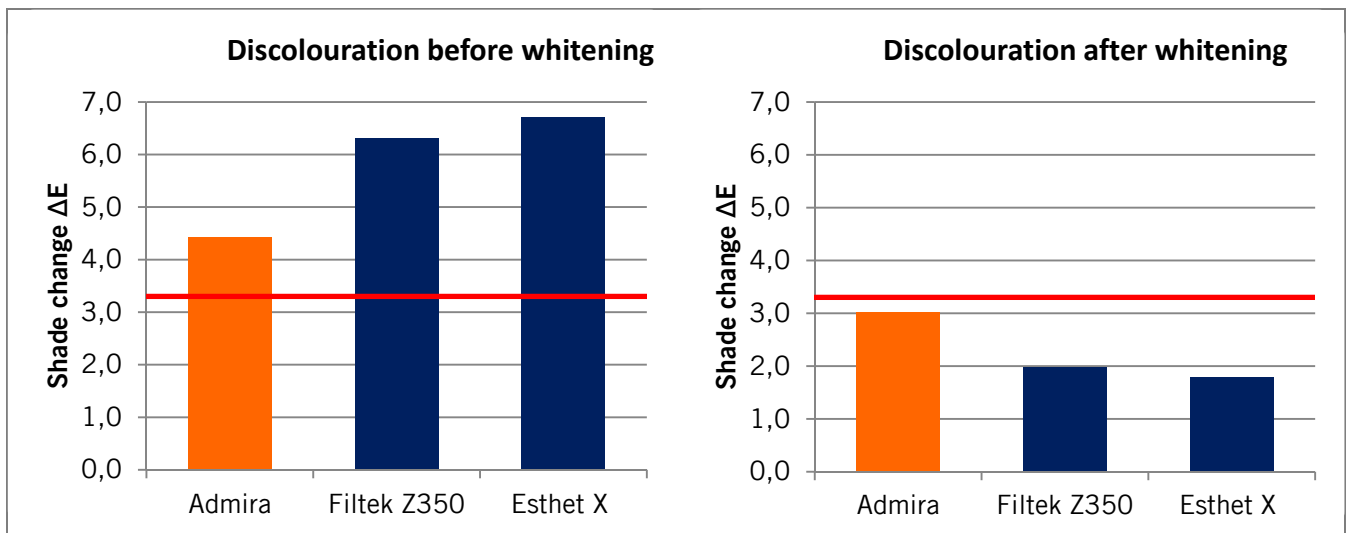
**With the restorative material Admira, a product in the ormocer class, VOCO provides a restorative material that features minimal shrinkage, high biocompatibility and high aesthetics, amongst other convincing properties. Admira is indicated for Class I to V restorations, core build-ups, inlays and the veneering of anterior teeth. The extent to which intensively coloured liquids in the daily diet cause discolouration of the restoration was examined in an *in vitro* study at the University of New Delhi.<sup>[1]</sup>**

Pruthi et al. examined the colour uptake properties of the ormocer Admira using commonly consumed intensively coloured test liquids. The excellent physical properties of Admira, such as the low water uptake, high marginal integrity or high surface hardness, are just some of the factors that reduce the occurrence of discolouration. However, discolourations are still generally unavoidable over the life of a restoration. The current study therefore additionally investigated to what extent variably strong discolourations can be lightened again or even completely corrected using a conventional whitening agent.

### Discolouration study

The test liquids used were customary Indian tea, a solution of the spice turmeric in water and standard Coca Cola. Three composites of different composition were employed as test materials. In addition to the ormocer Admira, the nanocomposite Filtek Z350 (3M ESPE) and the microhybrid Esthet X (Dentsply) were examined. All three composites were whitened with a 15 % solution of carbamide peroxide. The test specimens were prepared in a brass block form, according to standard procedures. The domestic Taj Mahal brand tea was made from boiling water and a customary portion of tea, and then cooled to room temperature. 1.5 g of turmeric powder was dissolved in boiling water, which was then also cooled to room temperature. The Coca Cola was obtained from a supermarket. All test liquids were freshly made or purchased daily. The prepared test specimens were placed into the test liquids for three hours at a time on 40 consecutive days, and subsequently analysed for discolourations in a spectrometer. The limit of the clinical acceptability of discolouration was determined by Pruthi et al. as approx.  $\Delta E = 3.3$ . This reference line is shown as a guide value in the following figures.

Figure 1a shows the change in shade of the three materials tested after 40 days in the different test liquids. It can clearly be seen that Admira, in comparison to its competitors, shows a distinctly lower rate of change in shade and that the discolouration, with a shade change of 4.4, is around 2.0 less than the shade change value in Filtek Z350 or Esthet X, which is around 6.4 for both competitor products. The shade change of a material is based, among other things, on its composition. In the current case it is clear that the ormocer Admira has a definite advantage over conventional nano and microhybrids, due to its different resin composition.



**Figure 1:** Shade changes  $\Delta E$  after storage for 40 days in tea, turmeric solution and cola, a) before whitening (left) and b) after whitening (right)

After exposure to the test liquids, the study further attempted to lighten the discoloured materials again using a whitening gel (15 % carbamide peroxide solution). The three materials were exposed to the whitening gel daily, over a period of 14 days, and the change in shade was subsequently measured. Figure 1b clearly shows that all three products are below the limit for clinical acceptability of colour change  $\Delta E = 3.3$  after whitening, and that whitening was therefore successful. With a total shade change of 3.0, Admira is a little over the values of the competitors, for which a total shade change after whitening of approx. 2.0 was measured. This result can in turn be ascribed to the properties and composition of the resin matrix of ormocers, of which Admira is one.

**Conclusion:** In this study, Admira shows the least discolouration of all the products. Minimal discolouration of Admira can be treated with whitening gels at any time, easily reaching a value below the clinically relevant shade change of 3.3. In using Admira, the dentist works with an aesthetic restorative material for anterior and posterior teeth which, in addition to minimal shrinkage and its biocompatibility also convinces with significantly lower susceptibility to discolouration in comparison to its competitors.

[1] G. Pruthi, V. Jain, H. C. Kanpal, P. Mathur, N. Shah, *Int. J. Dent.* **2010**, ID 695748.