

Insights into the clinical effectiveness of whitening products - Part 1: Dentist-supervised-at-home bleaching product

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ABSTRACT

This section of the report is about the success of a dentist-supervised-at home tooth whitener, giving the results of a clinical study. Opalescence PF 10% was applied for 14 days and the colour change followed over a 14 month period. It could be concluded that: a) Opalescence is a good tooth whitener, b) the time of re-bleaching should actually depend on the colour choice expressed by the patient. Overall re-bleaching should only be done after six months and not on a monthly basis, otherwise enamel damage may become a problem. Remember that peroxide, which is responsible for the bleaching process, is a strong oxidizing agent. Furthermore, A2 and darker teeth showed more aesthetically observable colour changes.

INTRODUCTION

Today it is known that tooth discolouration varies in appearance, etiology, localization, severity and adsorption to tooth structure which can be intrinsic, extrinsic or a combination of the two.¹

Intrinsic discolouration is mainly caused by the incorporation of chromatogenic material in enamel and dentine, exposure to high fluoride levels from different sources, tetracycline intake and others.² Extrinsic stain (as the word implies) comes mainly from the consumption of all kinds of foodstuff with different colouring pigments like carrots, wine (mainly red wine), coffee, tea, etc.

Tooth whitening in cosmetic dentistry has experienced a revolution in the last decade. Film stars in particular took the leading role in whitening their teeth on a regular basis, which influenced many in the general public. The different ways in which teeth can be whitened include dentist-supervised-home-bleaching (nightguard vital bleaching), in-office or power bleaching, a combination of in-office and take-home bleaching as well as over-the-counter whitening products, for use at home.^{3,4}

METHODS AND MATERIALS

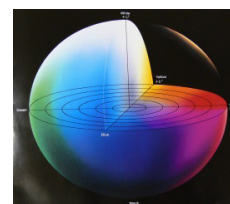
This part of the report is about the success of a well-known at-home tooth whitener i.e. Opalescence PF 10%, containing carbamide peroxide, potassium nitrate and sodium fluoride (Ultradent Products, Inc., Utah, USA). The relative effect on darker vs lighter teeth will be discussed. Students with two sound central maxillary incisors (teeth 11 and 21), and otherwise in good dental and medical health and not on any

medical treatment were selected. Customized bleaching trays were made for each patient. The bleach was administered nightly for a 14 day treatment period as described by the manufacturers and the colour change was monitored with a spectrophotometer over a 14 month period.

RESULTS AND DISCUSSION

With the spectrophotometer one can quantify colours by measuring them numerically in a three dimensional colour space ($L^*a^*b^*$).⁵ The total colour included three components which are defined as a^* , b^* and L^* .

The a^* value varies (see figure) from a negative side (more greenish) to the positive side (more reddish), while the b^* value varies from the more blue side (negative side) to the more yellow side (positive side). The L^* value varies from a more black side (negative side) to a more white side.



For Opalescence the L^* values (black/white) decreased with time, losing 10.6% after six months. However, after 14 months the decrease in the L^* value was 52.4% of the value recorded 14 days after treatment. The a^* values (green/red) were better (more greenish) after the 14 day treatment. The improvement remained after six months but after 14 months, the value had declined to a level worse than at the beginning (more reddish). The b^* value showed the least loss, decreasing about 9% after six months and about 8% after 14 months (more yellowish). Some 20% of the subjects experienced tooth sensitivity right at the start of the treatment phase. When other tooth whitening products were assessed, we also experienced that tooth sensitivity can be rated as a minor problem.

CONCLUSION

Thus it can be concluded: a) Opalescence is a good tooth whitener, b) the time of re-bleaching should actually depend on the choice of that colour which is more important to the person. Overall re-bleaching should only be done after at least months and not on a monthly basis, otherwise enamel damage may become a problem. Remember that peroxide, which is responsible for the bleaching process, is a strong oxidizing agent. Furthermore, A2 and darker teeth showed more aesthetically observable color changes.

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