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The *Australian Dental Journal* publishes selected abstracts in each issue for our readers' interest. A detailed description of the activities of the Cochrane Oral Health Group, written by the Review Group Co-ordinator, Dr Emma Tavender, was published in the June 2004 issue of the Journal (*Aust Dent J* 2004;49:58-59). Also, for explanations of abbreviations and terminology please see Appendix 1 on page 59 of the aforementioned article.

EDITOR

## Home-based chemically-induced whitening of teeth in adults

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### Abstract

**Background:** During the last decade tooth whitening products have become widely available in the USA for sale over-the-counter or dispensed by dentists for use at home. With the current rapid growth in demand for tooth whitening it is imperative that the dental community base its recommendations to patients on sound scientific evaluations conducted in well-designed and independent studies.

**Objectives:** To evaluate the effectiveness (versus a placebo or another active product) and side effects of over-the-counter or dentist-dispensed chemically-based tooth whitening products designed for home use.

**Search strategy:** We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2005, Issue 3); MEDLINE (January 1966 to September week 2 2005); and EMBASE (1988 to week 39 2005). The tables of content of selected dental journals published since 1995 were searched for additional references. Written requests for additional studies and information were mailed to experts in this area of research. After a final set of studies was identified, the list of references reported in the included reports was reviewed to identify additional studies. Studies published in English and non-English were considered in this review. Selection criteria randomized controlled trials and quasi-randomized controlled trials of dentist-dispensed or over-the-counter tooth

whitening products with a chemical action (rather than abrasive action), for home use.

**Data collection and analysis:** Screening of titles and abstracts, data extraction and quality assessment were undertaken independently and in duplicate.

**Main results:** A total of 416 articles were identified, 25 of which met the inclusion criteria and presented data that could be used in the analysis. All included trials measured effectiveness immediately after 2 weeks of product application. Only 13 studies reported outcome data 1 week after the 2-week application period, and of those only six reported outcome data after 1 month or longer. Four of the included trials were assessed as at moderate risk of bias and the remainder at high risk of bias. All trials were sponsored by the manufacturers of tooth whitening products.

Six trials compared different whitening products (gel in trays, paint-on films and whitening strips) with placebo/no treatment and all analyses showed the products to be effective, although most comparisons were based on single trials.

Nineteen trials compared different whitening products with each other. There was only one meta-analysis which included more than one trial which showed statistically significant differences between the different whitening products. Strips (5.5% to 6.5% hydrogen peroxide (HP)) are more effective than gel in tray at 10% carbamide peroxide (CP) mean difference 1.82

(95% confidence interval (CI) 0.26 to 3.38). All of these trials were assessed as of high risk of bias.

'Mild' to 'moderate' tooth sensitivity and gingival irritation were the most common side effects. The whitening strips and products with high concentrations of HP caused more users to complain from tooth sensitivity. The protocols for preparation of participants prior to bleaching were inconsistent among the studies. Data on baseline scores of whiteness were not reported by the majority of the studies. The current evidence base on tooth whitening products suffers from methodological and publication biases.

**Authors' conclusions:** There is evidence that whitening products work when compared with placebo/no treatment. There are differences in efficacy between the

products, mainly due to the levels of active ingredients, hydrogen peroxide and carbamide peroxide. All trials were however short term and the majority of the studies were judged to be at high risk of bias and were either sponsored or conducted by the manufacturers. There is a need for pragmatic long-term and independent clinical studies that include participants representing diverse populations. There is also a need to evaluate long-term harms. Several studies reported (where measured) the common side effects of tooth sensitivity and gingival irritation, and people should be informed of this.

**Key Words Plus:** Carbamide peroxide; clinical-evaluation; hydrogen-peroxide; potassium-nitrate; bleaching agents; tooth whiteners; colour-change; at-home; gel; efficacy.

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## COMMENTARY

Tooth whitening procedures are increasingly in demand from patients, and the dental profession continues to embrace and recommend various tooth whitening procedures to patients, despite the clinical outcomes being highly unpredictable and variable. The aim of this Cochrane Review is to provide practitioners with some evidence regarding the use of over-the-counter (OTC) and dentist dispensed whitening products for at-home use in adults. The review is limited to at-home use products and does not cover in-office treatments and should not be used as an indicator of the performance of any in-office treatments. The authors note that of the 416 relevant articles identified, only 25 (6%) met the inclusion criteria for review and all of these research articles were sponsored by manufacturers of the whitening products. The review reports that there is evidence that home-use whitening products are effective when compared with placebo or no treatment, however there is no clear indication of how effectiveness is evaluated. The difference in efficacy of the products appears to be related to levels of the active ingredients. An important comment made in the review is that studies reviewed suffered from methodological and publication biases which make comparative analysis between products difficult.

While this review identifies that whitening products can be effective, all oral health care professionals need to be careful in their recommendation of at-home use tooth whitening products and advise patients on the variability and unpredictable nature of the final tooth outcome. There are a multitude of factors which may influence the final result of any tooth whitening procedure, which have not been a consideration of this review, and it is difficult to isolate all these factors unless very large clinical trials are undertaken. The abstract identifies the importance of informing patients of the common side effects of tooth sensitivity and gingival irritation and this is an essential responsibility of all oral health professionals. In many instances with OTC products the individual may decide to proceed with using the product without consultation from any dental professional. For those patients requesting advice and evidence on the use of at-home use tooth whitening products, this Cochrane Abstract, while not conclusive, does provide a basis to commence informed discussion.

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