

Does at-home, vital tooth bleaching with carbamide peroxide deliver greater patient satisfaction than treatment with hydrogen peroxide?

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Abstract

Introduction The current increasing demand for tooth-bleaching procedures has led to a variety of products becoming available. This review aims to determine whether treatment with hydrogen peroxide (HP) or carbamide peroxide (CP) bleaching products deliver greater overall patient satisfaction when used for at-home, vital tooth bleaching (on teeth with a living pulp).

Methods Searches were conducted in The Cochrane Central Register of Controlled Trials and The Database of Systematic Reviews; MEDLINE and Embase (via Ovid); Scopus; and Web of Science. Two review authors independently assessed trials for eligibility and the included trials were assessed for risk of bias.

Results Nine RCTs were included. Five of included trials were judged to be at high risk of bias. There was weak evidence to conclude whether at-home, vital tooth bleaching with CP or HP provides greater patient satisfaction. There is some evidence that both CP and HP cause dental sensitivity; however, the degree of this could not be determined.

Conclusions It is advised that dental practitioners ensure patients are fully informed about the risk of side effects of at-home, vital tooth bleaching, including dental sensitivity, in order to manage expectations and provide greater post-operative patient satisfaction.

Introduction

In recent years, there has been an increasing trend in the number of patients seeking cosmetic dental procedures, commonly tooth whitening.¹ This rise could be attributed to the increase in social media usage over the past 10 years, influencing social norms regarding body image and redefining the determinants of what is regarded to be an 'acceptable' dental appearance.² The belief that whiter teeth signify a higher social status, improved health and greater beauty could explain the increasing desire for tooth bleaching treatment.³ This has led to a wide variety of products being available, both over-the-counter and dentist-prescribed, with the most common being carbamide peroxide (CP) and hydrogen peroxide (HP). This has resulted in some uncertainty amongst dental professionals as to which treatments they should be recommending and prescribing to their patients. Here we aim to conduct a systematic review of the literature in this field, to answer the PICO question, 'Does at-home, vital tooth bleaching with CP deliver greater patient satisfaction than treatment with HP?' (Figure 1).

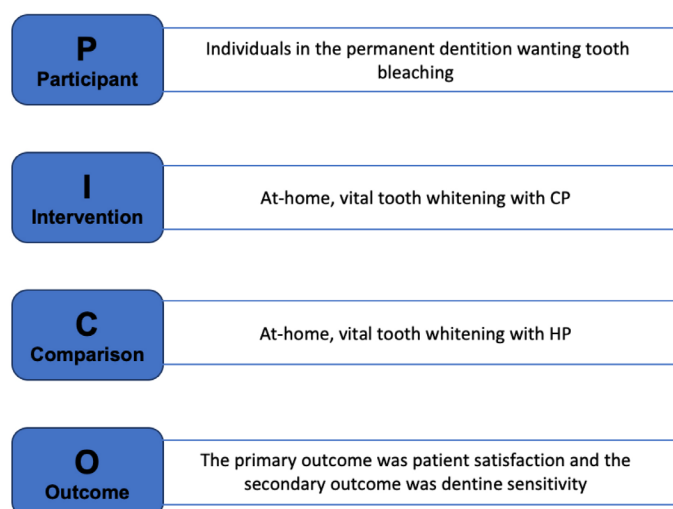


Figure 1. Depiction of the PICO-style question answered throughout the systematic review.

Methods

Searches were conducted in The Cochrane Central Register of Controlled Trials and The Database of Systematic Reviews; MEDLINE on Ovid; Scopus; Embase on Ovid; and Web of Science.

To produce a manageable sample size for this review, search results were limited to include:

- Papers written in English Language
- *In vivo* studies
- Trials published in the last 5 years
- Randomised control trials (RCTs)

Study participants included individuals of any age in the permanent dentition (with adult teeth) seeking at-home, vital tooth bleaching treatment. Studies investigating the effect of vital tooth bleaching on participants with congenitally discoloured teeth, tetracycline staining and fluorosis were excluded.

Nine RCTs comparing the use of HP, CP or both in at-home, vital tooth bleaching were included (Figure 2).⁴⁻¹² Two review authors independently assessed trials for eligibility and the included trials were assessed for risk of bias.

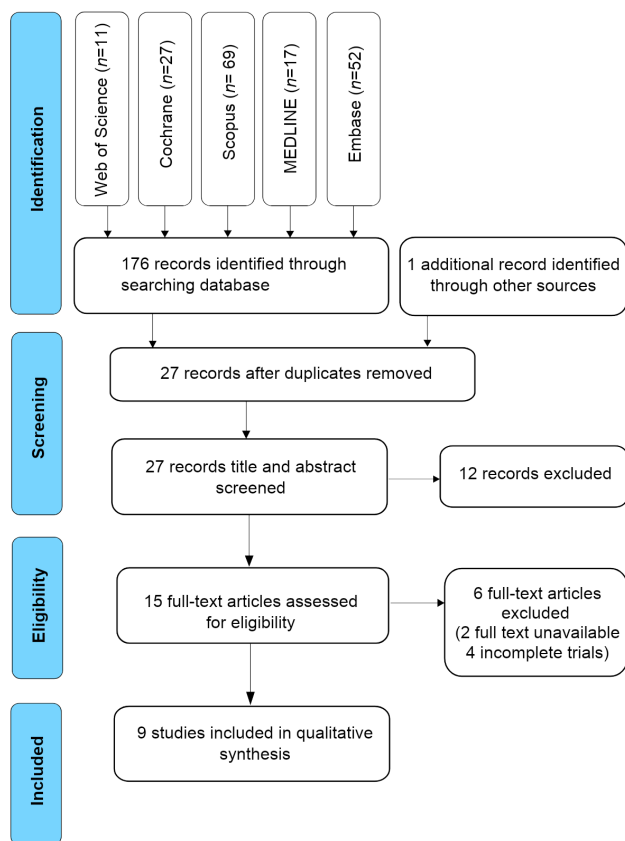


Figure 2. Flow chart of search strategy. A flow chart to show the search strategy used to identify articles with information on patient satisfaction and dental sensitivity following at-home, vital tooth whitening with either HP or CP. The search resulted in nine studies that were further critically appraised.

Results

Nine RCTs were included. Three directly relate to the review question and compare CP with HP, and the primary analysis is based on these trials. A further two assess CP alone and four assess HP alone. Five trials were judged to be at high risk of bias, due to either sponsorship, inadequate blinding or a lack of methodological transparency (**Figure 3**).

Treatment with both CP and HP produced similar results with regard to patient satisfaction. In general, participants were satisfied and accepting of bleaching protocols with either HP or CP, with customised trays (personalised to fit the participant) providing slightly greater satisfaction than stock trays (one-size-fits-all tray) or strips.⁶

Seven studies that directly measured sensitivity found an increase in sensitivity following treatment with both ingredients, with five finding this increase to be significant.^{5,7-9,12}

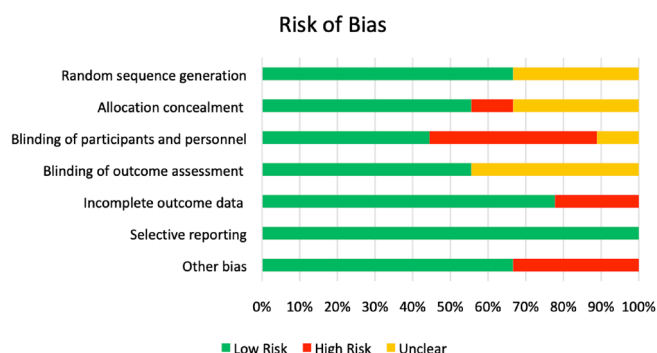


Figure 3. Risk of bias. The graph shows the authors' judgements of each risk of bias category presented as a percentage of all the included studies.¹³

Discussion

With regard to patient satisfaction, there is some evidence to suggest that satisfaction is greater when customised bleaching trays are used compared with stock trays or strips.⁶ It appears that treatment with CP more commonly utilises customised trays whereas HP is more often delivered as a strip, and so one could, therefore, infer that the application method generally used for CP is preferred with regard to comfort.

However, despite the level of patient satisfaction, it is important to note that the studies provide a moderate evidence base upon which to suggest that at-home vital tooth bleaching with either HP or CP will lead to a degree of increased post-operative dental sensitivity. However, the intensity and duration of the sensitivity were not explored.

One study reported that, despite treatment with CP improving patients' perceptions of their own appearance, the resulting sensitivity made maintaining oral hygiene measures more difficult.¹⁰ This raises concerns over whether it is ethical and justified to be prescribing treatments that may potentially compromise the oral health of a patient in exchange for improved aesthetics.

Overall, the relative strength of evidence is weak due to a small sample size and each study measuring patient satisfaction differently, hindering the ease with which direct comparisons can be made. Moreover, five trials were considered to be at high risk of bias due to sponsorship by the manufacturers of the bleaching products being tested, as well as inadequate blinding of participants and personnel (**Figure 3**).

Finally, due to the limited presentation of baseline characteristics of the study participants, we cannot be sure of the degree to which the studies are truly representative of the general population and, therefore, how readily the results can be applied.

Conclusions There is limited high-quality evidence to conclude whether at-home, vital tooth bleaching with CP or HP provides greater patient satisfaction. There is some evidence that both CP and HP cause dental sensitivity; however, the degree to which this is the case cannot be determined owing to inconsistencies in measuring sensitivity and the high risk of bias amongst trials. Therefore, we advise dental practitioners that it is prudent to ensure patients are fully informed about the risk of side effects of at-home, vital tooth bleaching, including dental sensitivity, in order to manage expectations and provide greater post-operative patient satisfaction. Due to the increasing popularity of this cosmetic treatment, further qualitative research is essential to confidently determine the optimal treatment protocol that provides the greatest patient satisfaction with the least side effects.

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Contribution statement Tilly Houston and Hannah Wilkins both analysed the data, wrote the article and approved the final version for inclusion. Both authors are the guarantors of this work.

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