

# Chlorhexidine mouthwash plaque levels and gingival health

## Abstracted from

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Chlorhexidine mouthrinse as an adjunctive treatment for gingival health.  
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## Question: Does chlorhexidine mouthwash used as an adjunct to oral hygiene procedures improve the control of plaque and gingivitis?

**Data sources** Cochrane Oral Health's Trials Register; Cochrane Central Register of Controlled Trials (CENTRAL) Medline; clinicaltrials.gov and the World Health Organization International Clinical Trials Registry Platform. There were no language or date restrictions on searches.

**Study selection** Randomised controlled trials (RCTs) assessing the effects of chlorhexidine mouthrinse used as an adjunct to mechanical oral hygiene procedures for at least four weeks on gingivitis in children and adults.

**Data extraction and synthesis** Two reviewers independently abstracted data and assessed risk of bias. Mean and standardised mean differences were used for continuous outcomes and risk ratios for dichotomous outcomes. Meta-analysis was carried out where studies of similar comparisons reported the same outcomes at the same time interval.

**Results** Fifty-one RCTs involving a total of 5,345 patients were included. Only one study was at low risk of bias, the other 50 were at high risk. For patients with mild gingivitis (gingival index [GI] 0 to 3 scale) four to six weeks' use of chlorhexidine mouthrinse reduced gingivitis by 0.21 (95% CI; 0.11 to 0.31) with a similar effect at six months. There were insufficient data to assess the effect on patients with moderate or severe gingival inflammation. For plaque there was a larger effect in favour of chlorhexidine mouthrinse at four to six weeks, SMD (standardised mean difference) = -1.45 (95% CI; -1.90 to -1.00), with a similarly large reduction at six months. A large increase in extrinsic tooth staining was seen with chlorhexidine use at four to six weeks, SMD = 1.07 (95%CI; 0.80 to 1.34) and seven to twelve weeks and six months. A range of other adverse effects were reported including taste disturbance/alteration, oral mucosa symptoms including soreness, irritation, mild desquamation and mucosal ulceration/erosions, and a general burning sensation or a burning tongue or both.

**Conclusions** There is high quality evidence from studies that reported the Löe and Silness Gingival Index of a reduction in gingivitis in individuals with mild gingival inflammation on average (mean score of 1 on the 0 to 3 GI scale) that was not considered to be clinically relevant. There is high quality evidence of a large reduction in dental plaque with chlorhexidine mouthrinse used as an adjunct to mechanical oral hygiene procedures for four to six weeks and six months. There is no evidence that one concentration of chlorhexidine rinse is more effective than another. There is insufficient evidence to determine the reduction in gingivitis associated with chlorhexidine mouthrinse use in individuals with mean GI scores of 1.1 to 3 indicating moderate or severe levels of gingival inflammation. Rinsing with chlorhexidine mouthrinse for four weeks or longer causes extrinsic tooth staining. In addition, other adverse effects such as calculus build up, transient taste disturbance and effects on the oral mucosa were reported in the included studies.

## Commentary

Chlorhexidine is a broad-spectrum antiseptic that was first introduced in the 1950s, and mouthwashes/rinses containing chlorhexidine have been extensively marketed. Typically, chlorhexidine is available in concentrations of 0.1%, 0.12% or 0.2% chlorhexidine digluconate as well as in low concentration ( $\leq 0.06\%$ ) rinse, and its antimicrobial properties reduce microbial biofilm, potentially reducing inflammation. The aim of this review was to assess the effectiveness of chlorhexidine mouthwash as an adjunct to mechanical oral hygiene procedures for controlling plaque and gingivitis. While toothbrushing and interdental cleaning are common methods of removing and or disrupting the biofilm many find it difficult to achieve and maintain effective plaque control, and mouthwashes are seen as a potential adjunct.

This review has been conducted following the Cochrane Collaboration's robust methodological approach. A large number of trials have been included, although almost all of them are considered to be at high risk of bias. This is largely due to concerns regarding blinding of participants, personnel and outcome assessors, because of the well known propensity of chlorhexidine to stain both teeth and oral tissues, successful blinding was considered to be unlikely. However, despite this the authors did not downgrade the GRADE assessment which was high for both gingival index and plaque at four to six weeks. Nineteen of the included studies acknowledged the manufacturers' support with 17 providing no indication of funding or support.

This paper is based on a Cochrane Review published in the Cochrane Library 2017, issue 3 (see [www.thecochranelibrary.com](http://www.thecochranelibrary.com) for information). Cochrane Reviews are regularly updated as new evidence emerges and in response to feedback, and the Cochrane Library should be consulted for the most recent version of the review.

The review considered that there was high quality evidence for a reduction in gingivitis in patients with mild to moderate disease although the level of reduction achieved was not considered to be clinically important. There was also a reduction in plaque levels at four to six weeks and six months. Most of the studies in the meta-analysis used a twice daily rinsing frequency and no evidence that one concentration of chlorhexidine rinse was more effective than another in reducing gingivitis and plaque was found.

There was moderate quality evidence that the use of chlorhexidine rinse for four weeks or more caused extrinsic tooth staining, an adverse effect that is well-known. Twenty-one out of the 51 studies, (43%), also reported at least one other adverse effect. Several other reviews<sup>1-4</sup> have considered this topic and they are discussed in this review. Despite methodological variations their findings are broadly similar and demonstrate a positive effect of chlorhexidine mouthwash on plaque and gingivitis. Consequently, chlorhexidine rinse is considered to be indicated for particular clinical situations for short-term use. Longer-term use in particular patient groups needs to be carefully balanced with the recognised adverse effects.

While chlorhexidine rinse is often considered to be a 'first choice' mouthwash, essential oil mouthwashes have also been shown to

have a statistically significant impact on plaque and gingival indices, and a recent review of these agents by Haas *et al.*<sup>5</sup> is considered on page 39-40 of this issue.

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1. Berchier CE, Slot DE, Van der Weijden GA. The efficacy of 0.12% chlorhexidine mouthrinse compared with 0.2% on plaque accumulation and periodontal parameters: a systematic review. *J Clin Periodontol* 2010; **37**: 829-839. Epub 2010 Jul 7. Review. PubMed PMID: 20618550.
2. Van Strydonck DA, Slot DE, Van der Velden U, Van der Weijden F. Effect of a chlorhexidine mouthrinse on plaque, gingival inflammation and staining in gingivitis patients: a systematic review. *J Clin Periodontol* 2012; **39**: 1042-1055.
3. Supranoto SC, Slot DE, Addy M, Van der Weijden GA. The effect of chlorhexidine dentifrice or gel versus chlorhexidine mouthwash on plaque, gingivitis, bleeding and tooth discoloration: a systematic review. *Int J Dent Hyg* 2015; **13**: 83-92.
4. Serrano J, Escibano M, Roldán S, Martín C, Herrera D. Efficacy of adjunctive anti-plaque chemical agents in managing gingivitis: a systematic review and meta-analysis. *J Clin Periodontol* 2015; **42**: S106-138.
5. Haas AN, Wagner TP, Muniz FW, Fiorini T, Cavagni J, Celeste RK. Essential oils-containing mouthwashes for gingivitis and plaque: Meta-analyses and meta-regression. *J Dent* 2016; **55**: 7-15.

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