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WILEY

[Intervention Review]

Chlorhexidine mouthrinse as an adjunctive treatment for gingival health

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ABSTRACT

Background

Dental plaque associated gingivitis is a reversible inflammatory condition caused by accumulation and persistence of microbial biofilms (dental plaque) on the teeth. It is characterised by redness and swelling of the gingivae (gums) and a tendency for the gingivae to bleed easily. In susceptible individuals, gingivitis may lead to periodontitis and loss of the soft tissue and bony support for the tooth. It is thought that chlorhexidine mouthrinse may reduce the build-up of plaque thereby reducing gingivitis.

Objectives

To assess the effectiveness of chlorhexidine mouthrinse used as an adjunct to mechanical oral hygiene procedures for the control of gingivitis and plaque compared to mechanical oral hygiene procedures alone or mechanical oral hygiene procedures plus placebo/control mouthrinse. Mechanical oral hygiene procedures were toothbrushing with/without the use of dental floss or interdental cleaning aids and could include professional tooth cleaning/periodontal treatment.

To determine whether the effect of chlorhexidine mouthrinse is influenced by chlorhexidine concentration, or frequency of rinsing (once/day versus twice/day).

To report and describe any adverse effects associated with chlorhexidine mouthrinse use from included trials.

Search methods

Cochrane Oral Health's Information Specialist searched the following databases: Cochrane Oral Health's Trials Register (to 28 September 2016); the Cochrane Central Register of Controlled Trials (CENTRAL; 2016, Issue 8) in the Cochrane Library (searched 28 September 2016); MEDLINE Ovid (1946 to 28 September 2016); Embase Ovid (1980 to 28 September 2016); and CINAHL EBSCO (Cumulative Index to Nursing and Allied Health Literature; 1937 to 28 September 2016). We searched ClinicalTrials.gov and the World Health Organization International Clinical Trials Registry Platform for ongoing trials. No restrictions were placed on the language or date of publication when searching the electronic databases.

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Selection criteria

We included randomised controlled trials assessing the effects of chlorhexidine mouthrinse used as an adjunct to mechanical oral hygiene procedures for at least 4 weeks on gingivitis in children and adults. Mechanical oral hygiene procedures were toothbrushing with/without use of dental floss or interdental cleaning aids and could include professional tooth cleaning/periodontal treatment. We included trials where participants had gingivitis or periodontitis, where participants were healthy and where some or all participants had medical conditions or special care needs.

Data collection and analysis

Two review authors independently screened the search results extracted data and assessed the risk of bias of the included studies. We attempted to contact study authors for missing data or clarification where feasible. For continuous outcomes, we used means and standard deviations to obtain the mean difference (MD) and 95% confidence interval (CI). We combined MDs where studies used the same scale and standardised mean differences (SMDs) where studies used different scales. For dichotomous outcomes, we reported risk ratios (RR) and 95% CIs. Due to anticipated heterogeneity we used random-effects models for all meta-analyses.

Main results

We included 51 studies that analysed a total of 5345 participants. One study was assessed as being at unclear risk of bias, with the remaining 50 being at high risk of bias, however, this did not affect the quality assessments for gingivitis and plaque as we believe that further research is very unlikely to change our confidence in the estimate of effect.

Gingivitis

After 4 to 6 weeks of use, chlorhexidine mouthrinse reduced gingivitis (Gingival Index (GI) 0 to 3 scale) by 0.21 (95% CI 0.11 to 0.31) compared to placebo, control or no mouthrinse (10 trials, 805 participants with mild gingival inflammation (mean score 1 on the GI scale) analysed, high-quality evidence). A similar effect size was found for reducing gingivitis at 6 months. There were insufficient data to determine the reduction in gingivitis associated with chlorhexidine mouthrinse use in individuals with mean GI scores of 1.1 to 3 (moderate or severe levels of gingival inflammation).

Plaque

Plaque was measured by different indices and the SMD at 4 to 6 weeks was 1.45 (95% CI 1.00 to 1.90) standard deviations lower in the chlorhexidine group (12 trials, 950 participants analysed, high-quality evidence), indicating a large reduction in plaque. A similar large reduction was found for chlorhexidine mouthrinse use at 6 months.

Extrinsic tooth staining

There was a large increase in extrinsic tooth staining in participants using chlorhexidine mouthrinse at 4 to 6 weeks. The SMD was 1.07 (95% CI 0.80 to 1.34) standard deviations higher (eight trials, 415 participants analysed, moderate-quality evidence) in the chlorhexidine mouthrinse group. There was also a large increase in extrinsic tooth staining in participants using chlorhexidine mouthrinse at 7 to 12 weeks and 6 months.

Calculus

Results for the effect of chlorhexidine mouthrinse on calculus formation were inconclusive.

Effect of concentration and frequency of rinsing

There were insufficient data to determine whether there was a difference in effect for either chlorhexidine concentration or frequency of rinsing.

Other adverse effects

The adverse effects most commonly reported in the included studies were taste disturbance/alteration (reported in 11 studies), effects on the oral mucosa including soreness, irritation, mild desquamation and mucosal ulceration/erosions (reported in 13 studies) and a general burning sensation or a burning tongue or both (reported in nine studies).

Authors' 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.

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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 4 to 6 weeks and 6 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 4 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.

PLAIN LANGUAGE SUMMARY

Chlorhexidine mouthrinse to reduce gingivitis and plaque build-up

Review question

Does the use of chlorhexidine mouthrinse (a broad spectrum antiseptic) in addition to other conventional tooth cleaning help to control and improve gingivitis (inflammation of the gums)? Does the frequency of rinsing or the concentration of the solution affect the result and are there any undesirable side effects?

Background

Gingivitis is a reversible condition when gums become red, swollen and can bleed easily. Gingivitis is also very common - studies suggest that as many as 50% to 90% of adults in the UK and USA suffer from it. In susceptible people gingivitis may lead to periodontitis, which is not reversible. In periodontitis inflammation is accompanied by loss of ligaments and bone supporting the teeth. If untreated it may eventually lead to tooth loss. Severe periodontitis is the sixth most widespread disease globally.

It is recognised that maintaining a high standard of oral hygiene is important for the prevention and treatment of gingivitis. Toothbrushing is the main method for maintaining good oral hygiene. Other cleaning methods commonly used include dental floss, interdental brushes and scaling and polishing carried out by a dental professional. Some people have difficulty controlling plaque build-up and preventing gingivitis using only conventional tooth cleaning. Therefore people sometimes use mouthrinses containing chlorhexidine in addition to conventional tooth cleaning. These mouthrinses are readily available over the counter; prescriptions generally not being required outside the USA.

Study characteristics

We included 51 studies that analysed a total of 5345 participants. The evidence in this review is up to date as of 28 September 2016. Generally study participants were children and adults who had gingivitis or periodontitis, were able to use usual tooth cleaning methods and were healthy. We did not exclude studies where some or all participants had medical conditions or special care needs as we considered the use of mouthrinses with chlorhexidine to be particularly relevant to them. The included studies assessed the effects of chlorhexidine mouthrinse used for at least 4 weeks in addition to conventional tooth cleaning on gingivitis in children and adults.

Key results

There is high-quality evidence that the use of mouthrinses containing chlorhexidine in addition to usual toothbrushing and cleaning for 4 to 6 weeks or 6 months leads to a large reduction in the build-up of plaque. There is also high-quality evidence of a moderate reduction in gingivitis in people with a mild level of it, although because the level of disease was already low this is not considered clinically important. The nature of the available evidence does not allow us to determine the level of reduction of gingivitis in people with moderate to severe levels of it.

There was no evidence that one concentration or strength of chlorhexidine rinse was more effective than another.

Rinsing for 4 weeks or longer causes tooth staining, which requires scaling and polishing carried out by a dental professional. Other side effects have been reported, including build-up of calculus (tartar), temporary taste disturbance and temporary shedding of/damage to the lining of the mouth.

Quality of the evidence

One study was assessed as being at unclear risk of bias, with the remaining 50 being at high risk of bias, however this did not affect the quality assessments for gingivitis and plaque as we believe that further research is very unlikely to change our confidence in the estimate of effect.

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