



Cochrane
Library

Cochrane Database of Systematic Reviews

Interventions for the management of dry mouth: non-pharmacological interventions (Review)

Furness S, Bryan G, McMillan R, Birchenough S, Worthington HV

Furness S, Bryan G, McMillan R, Birchenough S, Worthington HV.

Interventions for the management of dry mouth: non-pharmacological interventions.

Cochrane Database of Systematic Reviews 2013, Issue 9. Art. No.: CD009603.

DOI: 10.1002/14651858.CD009603.pub3.

www.cochranelibrary.com

[Intervention Review]

Interventions for the management of dry mouth: non-pharmacological interventions

Susan Furness¹, Gemma Bryan¹, Roddy McMillan², Sarah Birchenough³, Helen V Worthington¹

¹Cochrane Oral Health Group, School of Dentistry, The University of Manchester, Manchester, UK. ²Eastman Dental Hospital, London, UK. ³Bradford Teaching Hospitals NHS Foundation Trust, Bradford, UK

Contact address: Susan Furness, Cochrane Oral Health Group, School of Dentistry, The University of Manchester, Coupland III Building, Oxford Rd, Manchester, M13 9PL, UK. Susan.Furness@manchester.ac.uk, suefurness@gmail.com.

Editorial group: Cochrane Oral Health Group.

Publication status and date: Edited (no change to conclusions), published in Issue 9, 2013.

Citation: Furness S, Bryan G, McMillan R, Birchenough S, Worthington HV. Interventions for the management of dry mouth: non-pharmacological interventions. *Cochrane Database of Systematic Reviews* 2013, Issue 9. Art. No.: CD009603. DOI: 10.1002/14651858.CD009603.pub3.

Copyright © 2013 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

ABSTRACT

Background

Xerostomia is the subjective sensation of dry mouth. Common causes of xerostomia include adverse effects of many commonly prescribed medications, disease (e.g. Sjogren's Syndrome) and radiotherapy treatment for head and neck cancers. Non-pharmacological techniques such as acupuncture or mild electrostimulation may be used to improve symptoms.

Objectives

To assess the effects of non-pharmacological interventions administered to stimulate saliva production for the relief of dry mouth.

Search methods

We searched the Cochrane Oral Health Group's Trials Register (to 16th April 2013), the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2013, Issue 3), MEDLINE via OVID (1948 to 16th April 2013), EMBASE via OVID (1980 to 16th April 2013), AMED via OVID (1985 to 16th April 2013), CINAHL via EBSCO (1981 to 16th April 2013), and CANCERLIT via PubMed (1950 to 16th April 2013). The *meta*Register of Controlled Clinical Trials (www.controlled-trials.com) and ClinicalTrials.gov (www.clinicaltrials.gov) were also searched to identify ongoing and completed trials. References lists of included studies and relevant reviews were also searched. There were no restrictions on the language of publication or publication status.

Selection criteria

We included parallel group randomised controlled trials of non-pharmacological interventions to treat dry mouth, where participants had dry mouth symptoms at baseline.

Data collection and analysis

At least two review authors assessed each of the included studies to confirm eligibility, assess risk of bias and extract data using a piloted data extraction form. We calculated mean difference (MD) and 95% confidence intervals (CI) for continuous outcomes or where different scales were used to assess an outcome, we calculated standardised mean differences (SMD) together with 95% CIs. We attempted to extract data on adverse effects of interventions. Where data were missing or unclear we attempted to contact study authors to obtain further information.

Main results

There were nine studies (total 366 participants randomised) included in this review of non-pharmacological interventions for dry mouth which were divided into three comparisons. Eight studies were assessed at high risk of bias in at least one domain and the remaining study was at unclear risk of bias.

Five small studies (total 153 participants, with dry mouth following radiotherapy treatment) compared acupuncture with placebo. Four were assessed at high risk and one at unclear risk of bias. Two trials reported outcome data for dry mouth in a form suitable for meta-analysis. The pooled estimate of these two trials (70 participants, low quality evidence) showed no difference between acupuncture and control in dry mouth symptoms (SMD -0.34, 95% CI -0.81 to 0.14, P value 0.17, $I^2 = 39%$) with the confidence intervals including both a possible reduction or a possible increase in dry mouth symptoms. Acupuncture was associated with more adverse effects (tiny bruises and tiredness which were mild and temporary). There was a very small increase in unstimulated whole saliva (UWS) at the end of 4 to 6 weeks of treatment (three trials, 71 participants, low quality evidence) (MD 0.02 ml/minute, 95% CI 0 to 0.04, P value 0.04, $I^2 = 57%$), and this benefit persisted at the 12-month follow-up evaluation (two trials, 54 participants, low quality evidence) (UWS, MD 0.06 ml/minute, 95% CI 0.01 to 0.11, P value 0.03, $I^2 = 10%$). For the outcome of stimulated whole saliva (SWS, three trials, 71 participants, low quality evidence) there was a benefit favouring acupuncture (MD 0.19 ml/minute, 95% CI 0.07 to 0.31, P value 0.002, $I^2 = 1%$) an effect which also persisted at the 12-month follow-up evaluation (SWS MD 0.28 ml/minute, 95% CI 0.09 to 0.47, P value 0.004, $I^2 = 0%$) (two trials, 54 participants, low quality evidence).

Two small studies, both at high risk of bias, compared the use of an electrostimulation device with a placebo device in participants with Sjögren's Syndrome (total 101 participants). A further study, also at high risk of bias, compared acupuncture-like electrostimulation of different sets of points in participants who had previously been treated with radiotherapy. None of these studies reported the outcome of dry mouth. There was no difference between electrostimulation and placebo in the outcomes of UWS or SWS at the end of the 4-week treatment period in the one study (very low that provided data for these outcomes. No adverse effects were reported.

A single study at high risk of bias, compared the stimulatory effect of powered versus manual toothbrushing and found no difference for the outcomes of UWS or SWS.

Authors' conclusions

There is low quality evidence that acupuncture is no different from placebo acupuncture with regard to dry mouth symptoms, which is the most important outcome. This may be because there were insufficient participants included in the two trials to show a possible effect or it may be that there was some benefit due to 'placebo' acupuncture which could have biased the effect to the null. There is insufficient evidence to determine the effects of electrostimulation devices on dry mouth symptoms. It is well known that dry mouth symptoms may be problematic even when saliva production is increased, yet only two of the trials that evaluated acupuncture reported dry mouth symptoms, a worrying reporting bias. There is some low quality evidence that acupuncture results in a small increase in saliva production in patients with dry mouth following radiotherapy.

There is insufficient evidence to determine the effects of electrostimulation devices on dry mouth symptoms or saliva production in patients with Sjögren's Syndrome. Reported adverse effects of acupuncture are mild and of short duration, and there were no reported adverse effects from electrostimulation.

PLAIN LANGUAGE SUMMARY

Non-drug treatments for dry mouth symptoms

Review question

This review, carried out by authors of the Cochrane Oral Health Group, has been produced to assess the effects of non-drug treatments used to stimulate saliva production for the relief of dry mouth (xerostomia) symptoms.

Background

Dry mouth is a common problem with an estimated incidence of between 10% and 26% in men and between 10% and 33% in women, which may or may not be due to reduced saliva secretion. Common causes of dry mouth include the side effects of many commonly prescribed medications, diseases (such as Sjögren's syndrome where the immune system destroys tissues in the glands which produce saliva) and radiotherapy treatments for head and neck cancers.

Saliva moistens the skin in the mouth and helps to maintain oral health. The presence of saliva facilitates speech, acts to wash away food residue from around the teeth, neutralises potentially damaging food and bacterial acids, enhances a person's ability to taste the food, and generally lubricates the mouth. Saliva also acts to soften food, making it easier to chew and swallow. Enzymes in saliva start the digestion of starch and fats, and other substances in saliva, such as epidermal growth factors, promote tissue growth, differentiation and wound healing. The antibacterial, antifungal and antiviral agents in saliva balance the oral flora and help to prevent oral infections, while the minerals in saliva help to maintain tooth enamel.

Non-drug treatments such as acupuncture, mild electrical stimulation, lasers, tooth brushing and other stimulation techniques are used to improve dry mouth symptoms.

Study characteristics

The evidence on which this review is based was up-to-date as of 16 April 2013.

Nine studies were included in this review. A total of 366 adult participants took part in these trials, with an average of 40 participants per trial, and an age range from 12 to 77 years. The causes of dry mouth were radiotherapy for oral cancers in four trials, Sjögren's syndrome in three trials, medication-related in one trial, and in the remaining trial participants had a range of causes of dry mouth.

The included studies were divided into three groups, according to the interventions evaluated.

1. Five small studies with a total 153 participants evaluated acupuncture.
2. Three studies evaluated electrostimulation devices.
3. One study evaluated a power toothbrush.

Key results

The five studies evaluating the effects of acupuncture in people who had dry mouth were generally of poor quality. There was no evidence of a difference in dry mouth symptoms, but there was some evidence of a small increase in saliva production which persisted for a year after the end of the acupuncture treatment. There may not have been enough people included in the trials to show a difference in dry mouth, or it may have been that both the real acupuncture and the 'placebo' acupuncture had some beneficial effect. Acupuncture was associated with more adverse effects (tiny bruises and tiredness which were mild and temporary).

The studies evaluating the effects of electrostimulation devices were poorly conducted and reported, and provided insufficient evidence to determine the effects of these devices on either dry mouth or saliva production.

The single small study of a powered versus a manual toothbrush also found no difference for either dry mouth or saliva production.

None of the included studies reported the outcomes of duration of effectiveness, quality of life, patient satisfaction, or oral health assessment.

Quality of the evidence

These studies were generally of poor quality (low and very low).