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Effect of oil pulling in promoting oro dental hygiene: A systematic review of randomized clinical trials

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ABSTRACT

Aim: To critically appraise and evaluate the evidence from randomized clinical trials (RCTs) examining the effectiveness of oil pulling on oro dental hygiene.
Methods: We conducted electronic searches in Medline, Embase, Amed, The Cochrane Library and Cinahl databases from inception to February 2015, and assessed reporting quality using the Cochrane risk of bias criteria. We included RCTs that compared oil pulling using conventional cooking oils with a control intervention. Our primary outcomes were measures of oro dental hygiene using validated scales.
Results: Electronic searches yielded 26 eligible studies, of which five RCTs comprising a total of 160 participants were included. The studies varied in reporting quality, lasted between 10 and 45 days, and compared oil pulling with chlorhexidine, placebo or routine dental hygiene practice. Three studies reported no significant differences in post intervention plaque index scores between oil pulling and control groups (Chlorhexidine mouthwash +/− Placebo): $p = 0.28$, 0.94, and 0.38, respectively. Two studies reported no significant difference in post-intervention modified gingival index score between oil pulling and Chlorhexidine mouthwash groups ($p = 0.32$ and 0.64).
Conclusion: The limited evidence to date from clinical trials suggests that oil pulling may have beneficial effects on oro dental hygiene as seen for the short period of time investigated. Given that this is a potentially cost-effective intervention, this practice might be of particular benefit. Future clinical trials should be more rigorous and better reported.

Contents

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1. Introduction

Periodontitis is the most common chronic inflammatory disease in humans, affecting 60% of people aged over 65 years.[1] Research has suggested that periodontitis may be an independent risk factor for Coronary Heart Disease[2] and cerebrovascular disease, in particular non-haemorrhagic stroke.[3] The underlying mechanisms are unclear, but patients with periodontitis have higher levels of circulating inflammatory mediators.[4] In addition, periodontal bacteria (increased in those with periodontitis) enter the circulation via mastication and tooth brushing, and disseminate to vascular endothelium generating a pro-atherogenic reaction.[5] The prevalence of periodontitis can be reduced by improving oral hygiene.

Oil pulling originates from ancient Ayurvedic medicine and typically involves swirling oil in the mouth for a period of 15 minutes, before spitting it out.[6] Advocates of this method believe that harmful bacteria are removed from the mouth resulting in improved gum and dental health, and additionally may confer some systemic benefits, such as reduced risk of heart disease.[7] The mechanism through which oil pulling achieves this function is poorly understood, though it has been postulated that sesame seed oil reacts with alkali in saliva, initiating a process of saponification (soap formation), with a resulting cleansing effect.[8] Sesame seed oil also contains lignans (sesamin, sesamolin, and sesaminol) possessing anti-oxidant and health-promoting properties.[9] Furthermore, oil may act as a viscous barrier against plaque formation and bacteria aggregation.[8]

Some of the purported benefits of oil pulling have not been well substantiated in the medical literature; limited scientific reviews have been performed to accredit this method.[10–12] Oil pulling is a cheap and widely available intervention; however to date no systematic reviews have been performed in this area. Therefore, the objective of this review is to critically appraise and evaluate the evidence from published RCTs examining the effects of oil pulling on oro dental hygiene.

2. Methods

We conducted electronic searches in the following databases: Medline, Embase, Amed, The Cochrane Library and Cinahl. Each database was searched from inception up to February 2015. The search terms used were oil pulling, oil swishing, oil gargling, kavala graha, snighda gandoosha, sesame seed oil, sunflower oil, coconut oil, olive oil, corn oil, cottonseed oil, palm oil, peanut oil, rapeseed oil, safflower oil, soybean oil and derivatives of these [A comprehensive search strategy has been included as a web Appendix A]. No age, language or time restrictions were imposed. Google Scholar was also searched for relevant internet proceedings, and we hand searched the bibliography of located articles. Two reviewers (OG and IO) independently screened abstracts and determined eligibility with disagreements resolved by discussion.

We included RCTs of oil pulling compared with a control intervention in subjects aged at least 16 years old. The oil used could include any of the conventional cooking oils, such as olive oil, sunflower oil and sesame seed oil. The oil had to be orally administered, pulled, and not swallowed. Studies were included irrespective of intervention duration. Studies in which oil pulling was combined with other types of intervention other than tooth-brushing were excluded.

Our primary outcomes were validated scales measuring oro dental hygiene such as the Plaque Index (PI) score, Gingival Index (GI); benzoyl-DL-arginine-naphthylamide (BANA) test, or objective and subjective organoleptic breath assessments (ORG1 and ORG2 respectively). The BANA test detects three micro-organisms (*Porphyromonas gingivalis*, *Tannerella forsythia* or *Treponema denticola*) implicated in oral malodour. ORG1 involves the subject slowly releasing breath through the mouth from a distance of 10 cm from the examiner's nose, with intensity ratings scored by the examiner. ORG2 requires the subject to lick their wrist and smell it after it has dried. Secondary outcomes included quality of life (if reported using validated measures), levels of systemic inflammatory markers, measures of cardiovascular disease and adverse events.

Data from each included study was extracted according to participant characteristics, type of intervention and comparator, and results. One reviewer (OG) extracted the data. The results were independently verified by two other reviewers (MM and IO). Disagreements were resolved through discussion.

The reporting quality of the included studies was determined using the Cochrane risk of bias criteria,[13] which examines the following domains: method of sequence generation, concealment of allocation, blinding of care providers and participants (including care-givers), blinding of outcome assessors, incomplete outcome data (attrition and ITT analysis), selective outcome reporting and other bias, such as sample size calculation and funding disclosure. Two reviewers (OG and ES) independently assessed the risk of bias in the included studies. Disagreements were resolved through discussion.

We had planned to statistically pool the results of included studies. However, because of the discrepancies in outcome measures and high heterogeneity, meta-analysis was considered inappropriate.

3. Results

Our electronic searches identified 180 non-duplicate results, out of which 26 eligible studies were identified (Fig. 1). Eleven studies,[14–24] were excluded because conventional oil pulling was not part of the intervention, and four[25–28] because they were not RCTs. One study[29] was excluded because conventional cooking oil was not used as intervention, and another[30] because it was a nonhuman study. One study[31] was excluded because another intervention was used in conjunction with oil, and two[32,33] because we were unable to obtain the full text. A further study[34] was excluded because we were unable to contact the author to clarify whether the paper met our inclusion criteria. Thus, five studies (Asokan