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Research Paper

Neem Toothpaste: A Review of The Literature

Dental Science

KEYWORDS : Neem, Toothpaste, Periodontitis

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ABSTRACT

Ayurveda has been used in medicine for decades and has emerged as a perfect source for novel therapeutic agents especially in oral diseases such as periodontal diseases.Periodontitis is characterized by inflammation and destruction of supporting tissues of the teeth. One of the herbal agents Azadirachtaindica also known as neem is being used in India and Indian subcontinent for thousands of years as a promising tool for maintaining healthy periodontium because of its chemopreventive action.Neem leaves, barks or twigs have been tried in treatment of gingivitis and periodontitis as a part of various toothpastes such as neem active and dabur herbal and proven to be successful.But still, its use of treatment for periodontitis is not very clear and as a result this study was commissioned to provide a comprehensive systematic review of the efficacy of neem toothpaste as an antimicrobial agent.We have systematically reviewed for articles with toothpastes containing neem. Electronic databases (Cochrane central register of controlled trials, MEDLINE, PUBMED, ENBASE) were screened for studies from March and April 2014.Cross referencing was done to review further articles. The search was limited to English language. Neither the author nor journals were blinded to reviewers. Gray literature was screened systematically. Review process was done by 2 reviewers. If data were missing or any methodological issues were to be addressed the study author contacted via email and this information was added to data extraction.We found 24 articles where 21 are related to neem used in various form other than dentifrice. A total of four articles including an invitro study, one cross sectional study and two randomized controlled trials were evaluated. out of two randomized controlled trials, one randomized controlled trial had toothpaste containing exclusively neem as a primary ingredient.There is a growing clinical evidence supporting the herbal components in toothpaste, but more randomized controlled trials are required to support this. To conclude neem containing toothpastes proven have beneficial for teeth and gums but there is lack of scientific evidence. Further systematic studies are required on this aspect.

INTRODUCTION

Maintenance of health is mostly achieved by keeping the residual mass of microorganisms under control and a dynamic equilibrium between the periodontal microflora and host generally results in a healthy clinical state of periodontium with minimal inflammatory changes in marginal gingival tissues.

Periodontal diseases(also called periodontitis) are those diseases that affect one or more of the periodontal tissues: alveolar bone, periodontal ligament, cementum and gingiva and occurs when bacteria in plaque infect the gums and bones that anchor the teeth. So periodontitis is the primary cause of adult tooth loss.

Azadirachtaindica also known as neem has been used in Indian subcontinent for decades of years as a remarkable tool for maintaining healthy periodontium. Neem has been considered to have an astringent, antiseptic, insecticidal, antiulcer and for medical properties. Since ancient times, Ayurveda has recommended use of tender twigs of neem as effective dentifrice and it has proven credential for the same.[1]Throughout India,majority of people residing in village use neem twigs and leaves to brush their teeth, and keep their gums free of disease and infection even though they have limited access to modern dental care.

Neem oil suppresses various species of pathogenic bacteria such as *Staphylococcus aureus* and *Salmonella typhosa*. The ethanolic extract has shown inhibitory effect on *Escherichia Coli*.[2]The mechanism of anti inflammatory action of neem is by inhibiting prostaglandin E and 5 HT and thus inhibits the inflammation. The antibacterial action is due to the substance named"Azadiachtin" that is known to destroy bacterial cell wall and thus inevitably inhibit the bacterial growth also the breakdown of cell wall disturb osmotic pressure and leads to cell death. But still, its use of treatment for gingivitis and periodontitis is not very clear and as a result this study was commissioned to provide a comprehensive systematic review of the efficacy of neem toothpaste as an antimicrobial agent.

METHODS

Articles were systematically reviewed using electronic databases(Cochrane central register of controlled trials, MEDLINE, PUBMED, ENBASE) for studies from March and April 2014 using the flowing string of English text terms ' *neem*', '*antimicrobial*', '*gingivitis* and *'periodontitis'*. Articles for the review were selected on the basis of their compliance with following criteria:

- Relevant to the topic.
- Systematic review related to the abstract/title.
- Published in English.

Full copies of the articles were reviewed independently by two reviewers. Neither the author nor journals were blinded to reviewers. Gray literature was screened systematically. If data were missing or any methodological issues were to be addressed the study author contacted via email and this information was added to data extraction. Consensus and discussion resolved the disagreement between reviewers.

RESULTS

We found 24 articles where 21 are related to neem used in various form other than dentifrice. A total of four articles including aninvitro study, one cross sectional study and two randomized controlled trials were evaluated.Out of two randomized controlled trials, one randomized controlled trial had toothpaste containing exclusively neem as a primary ingredient.

STUDY SELECTION CHART

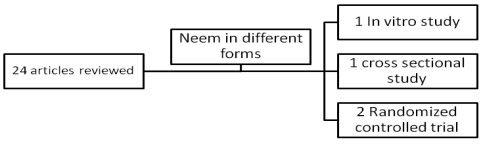

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Table 1 showing details of studies reviewed

STUDY	METHODS	PARAM-ETERS	TIME LINE	RESULTS
Jadge D.R. et al. [13] "Formulation of toothpaste from various extracts of tender twigs of neem."	In vitro study			Powered form of neem twigs were more effective compared to paste form on microbes.
Elavarasu S, et al.[14] "Evaluation of anti-plaque microbial activity of Azadirachtaindica (neem oil): a pilot study"	Cross sectional study		48 hours	The inhibition zone signifies the reduction of microorganisms on the agar plate after treating with neem oil.
George J et al. [15] "The efficacy of herbal toothpaste in control of plaque and gingivitis"	Randomized controlled trial	Plaque Index, Gingival Index and Salivary pH	30 days	No statistical significant difference between control and test (herbal toothpaste) group. To conclude herbal toothpaste are equally effective as compared to fluoridated toothpaste.
Rao S et al [16] A randomized single blind clinical trial to evaluate the safety and efficacy of Himalaya Herbal Dental Cream.	Randomized controlled trial	Plaque Index, Gingival Index and Bleeding Index.	6 weeks	Herbal cream is as effective as fluoride containing toothpaste.

DISCUSSION

There is a growing clinical evidence supporting the herbal components in toothpaste, but more randomized controlled trials are required to support this. Furthermore it is unclear whether neem is effective method of brushing as there are more superimposing factors. The studies we have included showed high risk of bias. Randomization procedures were not clear, allocation concealment remained unclear, blinding of the examiner were unclear. To conclude we need more calibrated, multi centred randomized studies with less homogeneity and less risk of bias will allow for better generalizability, thus giving better guidance to clinicians.

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