Denture Cleansing the Natural Way: A Review

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ABSTRACT

Dentures are used to replace the missing teeth and are specially used by the elderly population. Though it helps in the function of digestion and improves the facial appearance, its cleansing should be given utmost importance. Denture hygiene, if unmaintained, leads not only to oral diseases but also to systemic diseases. The conventional cleansers come with a certain degree of side effects along with the high price. So the use of natural denture cleansers may be a boon.Various researches have shown the efficacy of the natural herbs in single or multi component form. Herbs are rich in phytotherapeutic compounds like polyphenols, flavonoids, aromatic compounds, organic acids, silica, resins, vitamins and tannins. This review highlights some of the researches validating the herbal way to clean the denture cleansers and keep the oral cavity healthy. Most of the herbs used contain a number of antioxidants and may further enhance the immunity system and boost the systemic health as well. Hence, backed with proper evidences through researches, herbal denture cleansers may be a readily available tool for cleansing dentures and a promising source of generating healthy smiles of the elderly.

Key words: Biofilm, chewing stick, elderly, plaque, stomatitis.

INTRODUCTION

Oral health is an integral part of the health of any person. It includes healthy teeth, gums and the oral facial system as a whole. The actions like smiling, chewing, speaking, breathing all are a part of the oral facial system. It showcases the overall health and well-being of a person. Healthy teeth and gums are not only important for eating and proper mastication, providing nutrition for the whole body, but also for aesthetic reasons. Proper dentition helps to enhance the facial appearance and boost confidence as well in all ages. Hence, a regular visit to the dentist, be it for a child or even an elderly, is seen as a part of the general checkup of a person.

In case of the geriatric population, the maintenance of good oral health is even more important. The gradual loosening of teeth in old age is not only an obstacle for chewing but is also a cause of social stigma. The edentulousness (loss of all teeth), an irreversible geriatric condition, is negatively associated with self-image and quality of life especially in developing countries.[1,2] The use of dentures helps to remove the gaps due to the missing teeth and sustain oral health. The factors that may affect the use of dentures in the elderly include awareness, financial conditions, traditions, beliefs, convenience, self-denial and even the difficulty and expense to maintain the dentures. Although dentures tend to positively contribute to oral function and general well-being, poor denture hygiene puts the wearer at risk of denture

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stomatitis, oral malodor, caries and periodontitis on the remaining teeth, and systemic infections associated with oral bacteria.[3,4,5,6] The dentures, though a great restorative tool, maintaining them requires proper cleansing regularly, which may be quiet tiresome to the elderly.

Various microbes including bacteria and fungi adhere to the surface of dentures inside the oral cavity making it colonized with plaque biofilm. Hence, denture cleansing is an important aspect of systemic infective disease prevention, in addition to oral hygiene care, because effective oral care has been reported to reduce the incidence of systemic diseases, such as aspiration pneumonia and influenza, and promote the maintenance and improvement in the quality of life of dependent older adults.[7,8,9,10]

UN is celebrating the Decade of Healthy Ageing (2021-2030) which highly signifies the collaborative efforts at a global level to upgrade the lives of the elderly. According to WHO, the global population over 60 years will nearly double from 12% to 22% between 2015 and 2050. Out of which, 80% of this elderly population will be living in low and middle income countries in 2050.[11] This shows that the number of denture users will tend to increase. This means that in the coming years, the consumers of dental cleansers will also rise.

DENTURE HYGIENE

The dentures are cleaned by mechanical, chemical or concomitant use of both methods. Mechanical usually consists of using a soft bristle brush with water or soap as the stiffness of the toothbrush affects the surface roughness of dentures.[12] Brushing reduces biofilm formation and eliminates debris on the denture surface.[13] The chemical method includes immersing the denture in cleanser solutions to remove stains and plaque. Combination method was the most efficient method for denture cleansing followed by mechanical and then chemical.[14]

Prolonged use of commercially available denture cleansers may bring about hypersensitivity, staining of teeth and even burning sensation. So, the use of natural products as denture cleansers might be a better option in terms of its cost, feasibility, non-toxicity, chemical-free, stability, acceptability, aesthetics and almost no side-effect. The phytochemicals present in herbs offer a wide range of synergistic effects like anti-inflammatory, antiviral, antibacterial, antifungal, antioxidant, anticariogenic, wound healing, immune-modulatory, anti-carcinogenic etc. These have been used since times immemorial and can be extrapolated as safe.

Herbs like Neem, Miswak have been used traditionally and methods of oil pulling and gargling have been in practice for better oral health since ages ago. Researches have shown that these herb contain scraping, cleansing, deodorizing, antiseptic, anti-ulcer, wound healing, mucous membrane protecting, and antimicrobial properties. The judicious use of herbs for denture cleanser will be a blessing, as the bioactive phyto-constituent will provide a natural milieu to combat the oral bacteria.

MATERIALS & METHODS

Published information from several articles were collected and analysed . Recent related articles of Pubmed, Scopemed and other databases were rationally reviewed and taken into study for the manuscript. The search criteria were restricted to the roles of natural denture cleansers in light of published experimental and clinical outcomes in this regard.

RESULTS & DISCUSSION

Different studies have been conducted to scientifically validate herbs as natural denture cleansers. A study on 50 patients with complete denture was conducted to evaluate the anticandidal effect of some natural materials in the form of denture cleansing tablets. The count

was lowest by *Triphala* (a mixture of *Terminalia chebula*, *Terminalia bellerica*, *Emblica officinalis*) followed successively by Aloe vera, Cashew leaf and water. Mouth rinsing with a 10% solution of the extract of *T. chebula* inhibited the salivary bacterial count and glycolysis of salivary bacteria for up to 90 min post rinsing and proved its anticariogenic effect.[15,16] A study has shown that a 10% concentration of *Phyllanthus emblica* mouthwash is an effective plaque controlling agent.[17] Aloe vera contains salicylic acid, urea nitrogen, cinnamic acid and Sulphur which has a strong inhibitory action on microbes, thereby preventing buildup of plague and reducing denture biofilm to an optimal level.[18] The denture plaque control is a key aspect in denture-induced stomatitis associated with opportunistic microbial infections.[19] Salt is well known for its antibacterial action against *C. albicans, Legionella pneumophila, Pseudomonas aeruginosa, S aureus* among which the first one is the most sensitive. So the antimicrobial action of saturated solution is well appreciated for oral hygiene as well.[20]

A study showed that Co–Cr denture base observed roughness values and number of *Candida albicans* colonies in the denture cleansers less than the group of distilled water, and this action was most marked with soda+thymol oil cleanser group.[21]

Propolis, a naturally occurring resinous substance produced by honey bees, has recently been proposed as an alternative to anti-plaque rinse. [22] Meta-analysis research on Propolis has validated its overall positive use in oral health. Its use reduced *Candida* and *Streptococcus mutans* count and overall oral infection, supragingival plaque index including other signs of dental stomatitis. Denture wearers, patients, undergoing prolonged antibiotic treatment or using inhaled corticosteroid for asthma, and patients undergoing chemotherapy or radiotherapy reportedly have a higher incidence of oral candidiasis.[23] The research showed that Propolis mouthwash was equally effective to standard mouthwashes like chlorhexidine and nystatin.[24]

A randomized crossover clinical trial, evaluated 50 patients with complete dentures and diagnosed with denture stomatitis. Participants were instructed to brush their dentures (brush and soap) and soak them in 0.85% saline, 0.1% sodium hypochlorite, 0.2% sodium hypochlorite, or 8% *R. communis*. All tested solutions were effective in reducing signs of denture stomatitis, but both sodium hypochlorite solutions were the most effective solutions for the biofilm control.[25] Another study has shown that the 10% concentration of plant and 0.25% sodium hypochlorite were effective in biofilm removal, alleviation of symptoms of denture stomatitis, and reducing the fungal count. It had a potent antimicrobial activity, was aesthetically and equally accepted by the patients and had minimal reoccurrence of the clinical features of denture stomatitis. Researches on the effectiveness of Castor (*Ricinus communis*) oil has proven that it is a potent medium for root canal irrigation, an effective toothbrush for mechanical cleansing of complete dentures, a refreshing mouth rinse and a sanitizer.[26, 27, 28] Hence, the Castor plant can be routinely used to maintain denture hygiene.[29]

Studies on pomegranate has shown that its extract reduces the adherence of the microorganisms to the surface of tooth and helps in removing plaque.[30] A study showed significant improvements in pocket depth and attachment level on local delivery with *Centella asiatica* and *Punica granatum* extracts following scaling and root planning.[31] A trial has shown that a dental gel with *Azadiracta indica* significantly reduced plaque index and bacterial load in comparison to positive controls (Chlorhexidene 0.2%).[32]

Green tea mouthwash has been shown to effectively reduce plaque accumulation,

and is free from side effects as of chemical mouthwashes.[33] Turmeric based mouthwash significantly reduces the total microbial count in the oral cavity.[34] A herbal mouthwash based on clove showed improvement in cases of chemotherapy-induced oral mucositis.[35]

10% water extract of Miswak (*Salvadora persica)* used clinically as an irrigant in the endodontic treatment of teeth with necrotic pulps proved as an effective antimicrobial agent.[36] Recent research has shown that the use of Miswak 5 times a day may prove better reduction of plaque and gingivitis than the use of a conventional toothbrush, leading to improved interproximal oral health.[37] Another study showed that the chewing sticks of Miswak provided higher mechanical and chemical cleansing of oral cavity and contained a great potential to replace a toothbrush.[38] A 50% concentrated extract of Miswak and Neem showed its antimicrobial property by being effective on *Strep. mutans* and *Strep. faecalis*.[39]

A compound herbal dentifrice containing 91% *Acacia catechu*, 2.7% *Menthol* and 6.3% *Camphor* showed significant reduction in dental calculus, gingivitis and plaque within a duration of 15 days.[40]

Oil pulling is another method described in the Ayurveda literature as a part of daily regimen. Edible Sesame oil is swished inside the mouth. Sesame oil removes the toxins in the oral cavity and kills the yeast and diminishes candidiasis.[41, 42] Scientific evidence to show the natural antimicrobial effect of Jasmine (*Jasmine sambac*) oil in the prevention or treatment of oral infections have been generated.[43] The oil of *Nigella sativa* accelerates the healing of oral ulcers by inhibiting the growth of pathogens and prevents further damage of the oral milieu.[44] Eugenol, a phenolic compound present in aromatic oil extract from clove, is an immune system stimulant.[45] Clove oil has a wide spectrum of potencies for relieving oral ailments like sore gums, halitosis, tooth ache, dental caries and oral ulcers. The anti-inflammatory outcomes of both in vitro and in vivo models have been affirmed by recent researches.[46]

CONCLUSION

Elaborate studies need to be conducted to substantiate the efficacy of the herbs as denture cleansers. The most effective dosage form (as cleansing tablets, wipes, oils, mouthwashes, decoction solutions etc.) and the correct dose response relationship needs to be established along with the mode of action so that they can be endorsed at an international level. Multi centric trials to know the potency of these herbs as single or adjunct to the conventional methods need to be conducted.

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