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INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/14899

DOI URL: <http://dx.doi.org/10.21474/IJAR01/14899>



RESEARCH ARTICLE

HERBS - THE NATURAL ALTERNATIVE TO TREAT THE PERIODONTAL DISEASES

Tanu Sahney

Senior Lecturer, Sardar Patel Post Graduate Institute of Medical and Dental Sciences, Lucknow.

Manuscript Info

Manuscript History

Received: 15 April 2022

Final Accepted: 17 May 2022

Published: June 2022

Key words:-

Phytotherapy, Herbal Medicine, Anti-Inflammatory, Antioxidant, Antimicrobial, Curcumin, Aloe Vera, Basil, Neem, Green Tea

Abstract

Herbal extracts are used in dentistry for treatment of various dental disorders. The natural photochemical could offer an effective alternative to antibiotics and represent a promising approach to prevention and therapeutic strategies for various oral infections. The herbal remedies have an edge over conventional antibiotic treatment that suffer the limitation of low benefit to high risk as compared to herbal treatment that possess high benefit to low-risk ratio. The literature shows that several herbal formulations have the capacity to control the production of proinflammatory mediators, thereby managing many inflammatory processes. The use of such herbal anti-inflammatory formulations for a longer period of time was found to be safer than that of chemical anti-inflammatory drugs. Studies for assessment of safety and efficacy of herbal remedies are in its infancy. These herbal remedies are expected to widely use in future.

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Introduction:-

The word “periodontitis” comes from peri (“around”), odont (“tooth”), and itis (“redness”).¹As the scientific community is seeking alternatives to conventional treatment, periodontal researchers have found that phytotherapeutic agents are advantageous for suppressing bacteria that lead to periodontal diseases. The word “phytotherapy” is a Latin term. The prefix “phyto” is derived from a Latin word meaning plant, similarly it is called as phuton in Greek. Therapy is derived from Latin word “therapia”, originally from Greek word “therapeia” and “therapeuein” which means to treat medically. In other word “phytotherapy” means treatment with herbal medicine. The use of medicinal plants and herbs for the prevention and cure of diseases and for improvement of health conditions is called phytotherapy². Earlier they were limited to as an important ingredient of tooth pastes, mouthwashes and as a pain reliever, but now a day they are increasingly being used in all possible treatments like root canal treatment, periodontal therapies and as anti-plaque agents.³

Herbal medicine is still the mainstay of about 75-80% of the world population, mainly in the developing countries, for primary health care because of better cultural acceptability, better compatibility with the human body and lesser side effects. Most of the herbs are alkaline with high antibacterial activity. Hence these herbs help to maintain acid-alkaline balance of the saliva, decrease plaque/calculus formation and less prone to periodontal diseases.⁴

Natural products have been used for several years in folk medicine. Over the last decade herbal medications turned out to be a popular form of therapy throughout the world when used in prophylaxis and treatment of various oral diseases.⁵The application of natural products for the control of oral diseases is considered as an interesting

Corresponding Author:- Tanu Sahney

Address:- Senior Lecturer, Sardar Patel Post Graduate Institute of Medical and Dental Sciences, Lucknow.

alternative to synthetic antimicrobials due to their lower negative impact and for the effort to overcome primary or secondary resistance to the drug during therapy⁶.

Various herbs used for the treatment of periodontal diseases

Role of turmeric (*Curcuma longa*) in the management of periodontal disease:

Periodontal Applications of turmeric are due to

1. **Anti – inflammatory action** – It is modulated by downregulation of enzyme activity, such as COX-2, lipoxygenase. It helps to inhibit synthesis of the inflammatory cytokines such as TNF- α , IL- 1, IL-2, IL-6, IL-8, IL-1. It is also useful in downregulation of the Janus and mitogen activated kinases.⁷
2. Curcumin induced suppression of NF- κ B activation leads to inhibition of COX-2.⁸ It gets involved in regulating inflammation, transformation, cellular proliferation.
3. **Antioxidant** – It inhibits lipid peroxidation and also demonstrates free radical scavenging activity. It scavenges many reactive oxygen species produced by macrophages.⁹

Massaging the teeth with roasted ground turmeric eliminates pain and swelling. Mali AM, Behal R and Gilda SS in a study concluded that chlorhexidine gluconate as well as turmeric mouthwash can be effectively used as an adjunct to mechanical plaque control methods in prevention of plaque accumulation and gingivitis. The effect of turmeric observed is because of its anti- inflammatory properties. Reduction in total microbial count was observed in both the groups.

Behal R, Mali MA, Gilda SS and Paradkar AR in a study reported that the local drug delivery system containing 2% whole turmeric gel can be used as an adjunct to scale and root planing. There was a significant reduction in the trypsin-like enzyme activity of “red complex” species¹⁰. In one of the studies, it was seen that 1% curcumin solution can cause better resolution of inflammatory signs than chlorhexidine and saline irrigation as a subgingival irrigant. Mean Probing pocket depth reduction was significantly greater for the curcumin group than all other groups on all post-treatment days¹¹.

Role of Aloe Vera in the management of periodontal disease

Periodontal Applications

Healing properties

Aloe vera contains a special complex polysaccharide “glucomannan” which is mainly composed of mannose. It specifically has interaction with certain cell-surface receptors which are helpful in repairing damaged tissues such as fibroblasts. This interaction stimulates cells and activates their faster growth and replication.

Anti – inflammatory action

It contains three main plant sterols namely: 1) high density lipoproteins (HDLs) cholesterol, 2) campesterol and 3) β -sitosterol. These compounds reduce inflammation. Currently, C-glucosyl chromone is isolated from gel extracts of Aloe which possess the novel anti – inflammatory properties. It reduces bleeding and inflammation of the gingiva.¹²

Effects on immune system

Alprogen inhibits and lowers calcium influx into mast cells and subsequently inhibits the antigen antibody mediated release of histamine and leukotriene from these cells.

In a study, Bhat G, Kudva P, Dodwad V evaluated the clinical effects of subgingival application of Aloe Vera gel in patients with periodontitis and concluded that subgingival administration of Aloe Vera gel results in improvement of periodontal conditions.¹³

Role of Neem in the management of periodontal disease

The anti-plaque activity of neem chewing sticks is attributed to the fibrous nature of sticks resulting in mechanical plaque removal however neem plant also contains chemotherapeutic antiplaque agents¹⁴. The presence of Gallo tannins during the early stages of plaque formation could effectively reduce the number of pathogenic microbes from binding to the tooth surface by increasing their physical removal from the oral cavity through aggregate formation. Additionally, the effective inhibition of glucosyl transferase activity and the reduced bacterial adhesion as seen with the presence of gallotannin extracts suggest some potential anti-plaque activity.

Periodontal Applications

1. **Antibacterial** – The antimicrobial effects of neem have been reported against *Streptococcus mutans* and *Streptococcus faecalis*. Ethanolic extract of neem leaves and sticks exhibits significant antibacterial activity.
2. Its anti-inflammatory action is due to its ability to inhibit prostaglandin E and 5 HT and the antibacterial action is due to Azadiachtin that is known to destroy bacterial cell wall and thus inevitably inhibit the growth of bacteria.¹⁵
3. Brushing with neem toothpaste and using mouthwash containing neem extract was found to be effective in preventing gingivitis. In a study, neem based mouthwash and chlorhexidine mouthwash was used to assess anti-plaque activity and it was concluded that neem mouthwash is effective in reducing pocket depths and gingival inflammation.

Role of Basil in the management of periodontal disease

Periodontal Applications –

1. Tulsi leaves contain strong antibacterials like carracrol and tetpene and sesquiterpene b caryophylline.
2. The powdered tulsi leaves are used to encounter halitosis and maintaining good oral health.
3. Massage with tulsi powder have reported to be highly effective in many gingival and periodontal diseases.
4. The tulsi extract has high antimicrobial activity against streptococcus species.
5. Tulsi have property of immunomodulation.

Hosadurga RR, Rao SN, Edavanputhalath R, Jose J, Rompicharla NC, Shakil M, Raju S et al in a study was done using fluid extract of tulsi leaves for 2% *O. sanctum* gel preparation. It demonstrated 97% cyclooxygenase- 1 inhibitory activity when assayed at 1,000 μ M concentration. Hence, he concluded that 2% tulsi gel can be used as a useful adjunct to enhance the results of conventional periodontal therapy.¹⁶

Role of Green tea in the management of periodontal disease

It is a shrub like plant commonly found in a semitropical environment of Southeast Asia. It is extracted from leaves of *C. sinensis* that have not undergone the same withering and oxidation process used to make oolong teas and black teas.

Periodontal Applications –

- **Antioxidative mechanism** – Green tea polyphenols induce antioxidant activity by two mechanisms:
 1. In the first mechanism, these polyphenols directly scavenge reactive oxygen and nitrogen species and chelate redox-active transition of metal ions, such as copper and iron.
 2. Secondly, they indirectly inhibit the pro-oxidant enzymes, redox-sensitive transcription factors and bring induction of antioxidant enzymes.^{17,18}
 3. **Modulation of physical structure of cell membranes** – It has the potential to influence the cellular phospholipid palisade under the effect of catechins. There is induction of apoptotic cell death and cell cycle arrest in tumor cells.¹⁹
 4. **Antimicrobial** – Epicatechin gallate (ECG), epigallocatechin (EGC) acts as potent antibacterial agents specifically on methicillin-resistant *Helicobacter pylori*, *S.aureus*.

1. Role of Triphala in the management of periodontal disease

It is a tridoshic formula of fruits of *Emblca officinalis*, *Terminalia bellirica* and *Terminalia chebula*. It is considered as a nourishing, balancing and rejuvenating formula that helps the body to detoxify.

Periodontal Applications –

1. **Antibacterial** – Some studies tested the antibacterial potential of aqueous and ethanol extracts of triphala against certain bacterial isolates obtained from HIV- infected patients. Most of them were inhibited by the ethanol and aqueous extracts of *T.chebula* followed by *T.bellirica*.⁵⁹
2. Desai A et al. (2010)⁶⁰ did a clinical trial to evaluate the effects of triphala as a mouthwash in comparison to chlorhexidine in periodontitis patients and concluded that triphala mouthwash showed significant reduction in pocket depth.
3. **Antioxidant** – It exhibited greater efficiency in lipid peroxidation and plasmid DNA assay. It inhibit lipid peroxide formation and scavenge hydroxyl and super oxide radicals.

4. **Analgesic, antipyretic and ulcerogenic activity** –The analgesic action of triphala is due to the blockade of effect or release of endogenous substances that excite nerve endings. Triphala ointment possess antimicrobial, wound healing and antioxidant actions.
5. **Immunomodulatory activity** – It prevents the stress induced suppression of neutrophil functions. It is known to stimulate neutrophil functions in immunized rats on administration of triphala.

Herbs as an antioxidant arsenal for periodontal diseases

Antioxidants are those substances which when present at low concentrations, compared to those of an oxidizable substrate, will significantly delay or inhibit oxidation of the substrate. They function by scavenging free radicals and prevent oxidative stress. Numerous studies have shown that total antioxidant capacity in periodontitis patients is significantly lower when compared to healthy controls. Antioxidant molecules include vitamin C, E, coenzyme Q, carotenoids and enzymes such as glutathione reductase, glutathione transferase, superoxide dismutase and peroxiredoxin.

Various herbal extracts are used as antioxidants in treatment of periodontal diseases like green tea, triphala, green tea, tulsi, guava, black pepper to name the few.

Conclusion:-

Phytotherapy is the use of medicinal plants and herbs for the prevention and cure of diseases and for improvement of health conditions. Pharmacologically, active phytochemicals useful for the prevention, treatment and maintenance of periodontal diseases have been widely identified. They may be tannins, terpenoids, flavonoids, alkaloids etc. antimicrobial activities of these herbs have been found to be useful for periodontal diseases.²⁰ Clinical trials for assessment of safety and efficacy of these herbal remedies are in its infant stage. These herbal remedies are expected to be used widely in future. The herbal remedies have an edge over conventional antibiotic treatment which suffer the limitation of low benefit to high risk as compared to herbal treatment which possess high benefit to low risk ratio.²¹

The need for an alternative treatment options for periodontal diseases which is safe, effective and economical arises due to the rise in disease incidence and increased resistance by pathogenic bacteria to currently used antibiotics. Natural remedies are more acceptable by the population with a belief that they are safer with fewer side effects than the synthetic ones. Herbal extracts in the form of dentifrice, medicated gel, ointment, solution have been proved effective in preventing and treating periodontal diseases.²²

Use of indigenous plants in oral health and hygiene has a long history in different parts of the world. Many Ayurvedic herbal products which were reviewed, possess antimicrobial, anti-inflammatory, analgesic properties.²³The research assessing the antimicrobial efficacy of a combination of these plant extracts against dental caries and periodontal pathogens is the need of the hour and such research will aid in the development of a novel, innovative method that can simultaneously inhibit the most common dental diseases of mankind, besides lowering the development of drug resistance.²⁴

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