Aloe vera – An Update for Dentistry

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Abstract

Aloe vera is a natural product that is now a day frequently used in the field of cosmetology. Though there are various indications for its use, controlled trials are needed to determine its real efficacy. The aloe vera plant, its properties, mechanism of action and clinical uses are briefly reviewed in this article.


Key words:

Introduction

The Aloe vera plant has been known and used for centuries for its health, beauty, medicinal and skin care properties. The name Aloe vera derives from the Arabic word “Alloeh” meaning “shining bitter substance,” while “vera” in Latin means “true.” 2000 years ago, the Greek scientists regarded Aloe vera as the universal panacea. The Egyptians called Aloe “the plant of immortality.” Today, the Aloe vera plant has been used for various purposes in dermatology.¹

History

Aloe vera has been used for medicinal purposes in several cultures for millennia: Greece, Egypt, India, Mexico, Japan and China. Egyptian queens Nefertiti and Cleopatra used it as part of their regular beauty regimes. Alexander the Great, and Christopher Columbus used it to treat soldiers’ wounds. The first reference to Aloe vera in English was a translation by John Goodyew in A.D. 1655 of Dioscorides’ Medical treatise De Materia Medica. By the early 1800s, Aloe vera was in use as a laxative in the United States, but in the mid-1930s, a turning point occurred when it was successfully used to treat chronic and severe radiation dermatitis.¹

Plant

The botanical name of Aloe vera is Aloe barbadensis miller. It belongs to Asphodelaceae (Liliaceae) family, and is a shrubby or arborescent, perennial, xerophytic, succulent, pea- green color plant. It grows mainly in the dry regions of Africa, Asia, Europe and America. In India, it is found in...
Anatomy

The plant has triangular, fleshy leaves with serrated edges, yellow tubular flowers and fruits that contain numerous seeds. Each leaf is composed of three layers: 1) An inner clear gel that contains 99% water and rest is made of glucomannans, amino acids, lipids, sterols and vitamins. 2) The middle layer of latex which is the bitter yellow sap and contains anthraquinones and glycosides. 3) The outer thick layer of 15–20 cells called as rind which has protective function and synthesizes carbohydrates and proteins. Inside the rind are vascular bundles responsible for transportation of substances such as water (xylem) and starch (phloem).

Aloe vera in dentistry

There are eight main uses of aloe vera in dental practice:

1. Periodontal surgery.
2. Applications to the gum tissues when they have been traumatized or scratched by toothbrush-dentifrice abrasion, sharp foods, dental floss, and toothpick injuries.
3. Chemical burns from accidents with aspirin.
4. Extraction sockets
5. Acute mouth lesions such as herpetic viral lesions, aphthous ulcers, canker sores & cracks occurring at the corners of our lips.
6. Chronic oral diseases Lichen Planus and Benign Pemphigus, gum problems associated with AIDS and Leukemia.
7. Migratory glossitis, geographic tongue and Burning Mouth Syndrome.
8. Denture patients with sore ridges and ill-fitting dentures & partials
9. Dental implants

Aloe vera in Endodontics

Aloe vera has antimicrobial effect against resistant microorganisms found in pulp space i.e. Candida albicans & Enterococcus faecalis. Water, chloroform & alcohol extracts of aloe vera derived from pulp are found to have Antibacterial efficacy & can be used as an intracanal medicament. Can be used in root canals assedative dressing & as file lubricant.

The nerve ends in a root canal are very sensitive. Aloe Vera greatly helps to lessen its sensitivity. This gel can be placed inside the pulp chambers while broaching to make aloe work in the pulp canals.

Aloe can also be used as canal lubricant. During closed dressings cotton pellet with CMCP drops could be added with a drop of aloe vera gel and then sealed with temporary restorations.

Soothing healer to Periodontal Disease

Sub gingival administration of Aloe vera gel results in improvement of periodontal condition & can be used as a local drug delivery system in periodontal pockets.

Pockets when filled with gel upto gingival margins & Copake placed over it shows reduction in pocket depth, gingival index and plaque index.

Gingival & Periodontal Diseases

Aloe Vera greatly reduces the instances of gum bleeding due to its soothing & healing properties, reduces swelling and soft tissue edema. Hence stops bleeding and restores gums to health. Reduces plaque & calculus formation. Aloe vera should be used as a mouthwash 1 tbsp. swish around the mouth & then swallow it three times a day.

Halitosis

Aloe vera is natural anti-fungal and antibacterial agent. It protects the sensitive tissue in the mouth, kills bacteria as well as fight tooth decay. Boosts body’s ability to create collagen, which strengthens weak and swollen gums. Take a 1/4 cup of pure Aloe Vera gel and dissolve it in about 1/2 cup of water or apple juice. Drink this to soothe acid indigestion, which is a very common cause of bad breath.

Denture Care

Smoothening aloe vera gel onto the denture once or twice a day. Aloe Vera has antifungal benefits so prevents fungal infections. It prevents
denture stomatitis. It can be used along with soft liners.5

**Denture Adhesives**

It is Sticky & viscous nature of gel. It strengthens gums, soothes & alleviates gum irritation like gum sores (ulcer). It has adequate adhesive strength to wet and dry conditions.

**Aloe in Canker & Cold Sores**

Accelerates healing & reduces pain associated with canker sores. Does not have a bad taste or sting when applied. Richard L. Wynn, PhD, mentions a study done on a patient. Patient drank 2.0 ounces of aloe vera juice daily & topical application of aloe vera lip balm. Oral lesions clear up in 4 weeks & complete success was achieved. It can be taken both as aloe vera juice & aloe vera gel.6

**Aloe vera as a Tooth Gel**

It cleanses & soothes teeth & gums and effective in fighting cavities. Anthraquinones helps in healing & arresting pain. Less harsh on teeth as it does not have the abrasive elements and hence is a better alternative for people with sensitive teeth or gums.

Study by Stanford University revealed that aloe vera tooth gel is equivalent, and at times more effective, than the commercial brands, in controlling cavity-causing organisms.

**Aloe vera as a mouthwash**

Mouthwash prevent radiation-induced mucositis by its wound healing and anti-inflammatory mechanism. It reduces oral candidiasis of patients undergoing head and neckradiotherapy due to its antifungal & immunomodulatory properties. Effective substitute for TA in the treatment of Oral lichen planus.

1-3 tablespoon of aloe vera juice to be used as a mouthwash, then swallowed three time daily.7

**Aloe vera patches in Extraction Socket Patches**

In the study, they compared the incidence of alveolar osteitis in patients treated with either clindamycin-soaked Gelfoam or SaliCept. SaliCept Patch is a freeze-dried pledget that contains Acemannan Hydrogel (Carrington Laboratories) obtained from the clear inner gel of Aloe vera 78/95 sites (8%) gel foam group & 11/958 (1.1%) in salicept group developed Alveolar Osteitis. It also promotes the healing when placed inside extraction sockets.

The gums are almost like the skin, only tenderer. Just like the way aloe helps in treating a wound, it also would ingum abrasions.

After extraction, gauze saturated with Aloe vera when placed in socket and asked by the patient to bite on it, has shown improved healing & formation of blood clot.8

**Dental Implants**

Aloe vera gel placed around dental implants are found effective to reduce inflammation. Aloe vera reduces inflammation by its antimicrobial & anti-inflammatory effects.9

**Active components with its properties:**

Aloe vera contains 75 potentially active constituents: vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids and amino acids.

**Mechanism of actions**

1. **Healing properties:** Glucomannan, a mannose-rich polysaccharide, and gibberellin, a growth hormone, interacts with growth factor receptors on the fibroblast, thereby stimulating its activity and proliferation, which in turn significantly increases collagen synthesis after topical and oral Aloe vera.

2. **Effects on skin exposure to UV and gamma radiation:** Aloe vera gel has been reported to have a protective effect against radiation damage to the skin. Exact role is not known, but following the administration of aloe vera gel, an antioxidant protein, metallothionein, is generated in the skin, which scavenges hydroxyl radicals and prevents suppression of superoxide dismutase and glutathione peroxidase in the skin.

3. **Anti-inflammatory action:** Aloe vera inhibits the cyclooxygenase pathway and reduces prostaglandin E2 production from arachidonic acid.

4. **Effects on the immune system:** Alprogen inhibit calcium influx into mast cells, thereby inhibiting the antigen-antibody-mediated
release of histamine and leukotriene from mast cells.

5. **Laxative effects**: Anthraquinones present in latex are a potent laxative. It increases intestinal water content, stimulates mucus secretion and increases intestinal peristalsis.\(^\text{17}\)

6. **Antiviral and antitumor activity**: These actions may be due to indirect or direct effects. Indirect effect is due to stimulation of the immune system and direct effect is due to anthraquinones. The anthraquinonealoin inactivates various enveloped viruses such as herpes simplex, varicella zoster and influenza.

7. **Moisturizing and anti-aging effect**: Mucopolysaccharides help in binding moisture into the skin. Aloe stimulates fibroblast which produces the collagen and elastin fibers making the skin more elastic and less wrinkled. It also has cohesive effects on the superficial flaking epidermal cells by sticking them together, which softens the skin

8. **Antiseptic effect**: Aloe vera contains 6 antiseptic agents: Lupeol, salicylic acid, urea nitrogen, cinnamonic acid, phenols and sulfur. They all have inhibitory action on fungi, bacteria and virus.

### Side effects\(^1\)

**Topical**: It may cause redness, burning, stinging sensation and rarely generalized dermatitis in sensitive individuals. Allergic reactions are mostly due to anthraquinones, such as aloin and barbaloin. It is best to apply it to a small area first to test for possible allergic reaction.

**Oral**: Abdominal cramps, diarrhea, red urine, hepatitis, dependency or worsening of constipation. Prolonged use has been reported to increase the risk of colorectal cancer. Laxative effect may cause electrolyte imbalances (low potassium levels).

### Contraindication

Contraindicated in cases of known allergy to plants in the Liliaceae family.

### Pregnancy and breastfeeding

Oral aloe is not recommended during pregnancy due to theoretical stimulation of uterine contractions, and in breastfeeding mothers, it may sometime cause gastrointestinal distress in the nursing infant.

### Interactions

Application of aloe to skin may increase the absorption of steroid creams such as hydrocortisone. It reduces the effectiveness and may increases the adverse effects of digoxin and digitoxin, due to its potassium lowering effect. Combined use of Aloe vera and furosemide may increase the risk of potassium depletion. It decreases the blood sugar levels and thus may interact with oral hypoglycaemic drugs and insulin.

Thus, though Aloe vera has wide spectrum of the properties and uses, some of them could be myths and some of them could be real magic. In future, controlled studies are required to prove the effectiveness of aloe vera under various conditions.

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