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### Aloe Vera - A Saving Grace for Periodontitis

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#### Abstract

Periodontal disease has been on the rise in recent years. Various therapeutic modalities are being studied and implemented to manage and control periodontitis. The primary goal is the elimination of microbes and to curb the progression of the invading disease process. The first line of approach is always the non-surgical periodontal therapy. This involves the use of various mechanical and chemical adjuvants, which may sometimes show untoward side effects. An increasing interest in natural alternatives has been shown, as the adverse effects are less common and less severe. Aloe Vera, a widely popular medicinal plant, is one such wonderful, naturally available aid that has been of use

for ages. It has various healing properties, including anti-bacterial, anti-inflammatory, and immune-modulating properties. Ozone has been a tried and tested therapeutic aid in the field of periodontics and is used in various forms. The combination of aloe Vera and ozone has been thought to be more potent in the annihilation of bacteria and alleviation of symptoms. The present study involves the use of an ozonated aloe Vera gel as a topical agent and intra-pocket gel. The results showed a significant decrease in inflammation and bleeding, along with a decrease in the probing depth.

**Keywords:** Non-Surgical Periodontal Therapy, Scaling and Root Planing, Ozone, Aloe Vera, Periodontitis

#### Introduction

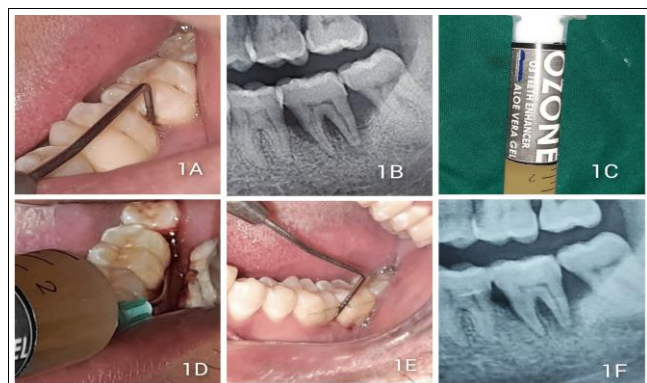
Various treatment modalities are used for the curbing of periodontal disease. The primary therapy is the control of the microbes involved in the progression and destruction of the periodontal structures. Both nonsurgical and surgical periodontal therapy strive to eliminate these. An adjunctive pharmacotherapeutic aid complements this traditional treatment. The use of systemic anti-microbials is riddled with the emergence of resistance, and thus alternative local drug therapies using naturally occurring compounds like aloe vera, turmeric, and olive oil are being advocated of late. Aloe vera, a medicinal plant, produces a sticky gel-like substance from its leaves, which has various uses in the field of medicine and dentistry. Various studies have shown that this gel has anti-bacterial, anti-fungal, anti-oxidant and wound-healing effects <sup>[1]</sup>. It helps combat periodontal disease and helps improve the clinical parameters. Ozone is an oxygen compound, highly unstable and which has been gaining immense popularity in the field of dentistry. It has various properties, including anti-microbial, anti-inflammatory, oxidative, etc. <sup>[2]</sup>. It has been proven time and again that ozone decreases the microbial count in dental plaque. A topical Ozonated aloe vera gel was used for the treatment of subjects in the case series below.

#### Case Presentation

##### Case Report 1:

A 31-year-old male patient reported to the Department of Periodontics with the chief complaint of pain and a loosened tooth in the lower left back tooth region. On clinical examination, there was a deep pocket with a probing depth of 8 mm in relation to the left second mandibular molar- 37 (Fig 1A). The tooth was also Grade II mobile (Glickman's mobility Index). On radiographic examination, there was bone loss surrounding the tooth, also involving the furcation area (Fig 1B). In the first appointment, scaling and root planing were carried out for the patient. 0.12% Chlorhexidine mouthwash was also prescribed twice a day. In the second appointment, subgingival scaling was done. The teeth were splinted, followed by placement of ozonated aloe vera gel into the pocket of 37 both buccally and lingually (Fig 1C, 1D). The Sulcus was filled till the gel overflowed from the Sulcus. The area was then covered using a periodontal pack. The patient was recalled at 1 week for

removal of the periodontal dressing and to check for any allergic or adverse reactions. The patient was recalled at 3 months. On evaluation of the clinical parameters, there was a significant reduction in the inflammation and bleeding in that area, along with a reduction in the probing depth to 5mm (Fig 1E). The radiograph also showed an improvement in the bone density (Fig 1F). The patient also reported no pain or discomfort.



**Fig 1:** Use of Ozonated aloe vera gel as a local drug

### Case Report 2:

A 21-year-old female patient reported to the Department of Periodontics with the chief complaint of bleeding gums and bad breath for 4 months. On examination, there were sparse deposits that didn't correlate with the amount of inflammation present (Figures 2A-2C).

A treatment plan consisting of only initial periodontal therapy was explained to the patient. Scaling and root planing were done; a Chlorhexidine mouthwash to be rinsed with twice daily was prescribed to the patient. The patient was asked to report at the end of 3 weeks for a follow-up. An insignificant difference was observed in the inflammatory status of the gingiva in spite of the removal of local factors. A topical application of ozonated aloe vera gel was done on the facial aspect of the maxillary and mandibular gingiva. The gel was applied to the surface of the gingiva by means of a cotton pellet and allowed to remain in place for 10-15 minutes. The patient was then asked to rinse with plain water. The use of mouthwash was discontinued for a period of 2 weeks. At the 15-day recall post-application, there was a significant improvement in the inflammatory component (Figures 2D-2F). The patient also observed that there was less bleeding than earlier.



**Fig 2:** Use of ozonated aloe vera gel as a topical agent

### Discussion

Periodontal disease involves the destruction of the hard and soft tissues of the oral cavity. The primary causative factor remains the local factors harboring various microbes. These microbes release various noxious substances which

ultimately lead to the annihilation of the periodontium. Scaling and root planing is considered as the gold standard in the treatment of periodontitis. It has various clinical benefits including reduction of the microbial load, a decrease in the inflammatory component, and improvement in the clinical parameters [3]. Numerous studies have shown that this non-surgical therapy is insufficient for complete elimination of the microbes. These microbes have the ability to reside in deep pockets, invade the underlying connective tissue and rarely may reach the bone [4]. Here they remain inaccessible for instrumentation and thus may cause renewal of inflammation.

Various anti-microbials come into play for the eradication of these organisms. Systemic anti-microbials, though act in an effective manner have side effects like hypersensitivity, GIT disturbance, emergence of resistance which make them a poor choice for therapy in periodontics. Local drugs are an alternative and maintain effective drug concentration at the required site [5]. Since ages, herbal plants have been advocated for use in the field of medicine and dentistry alike. Aloe vera is a medicinal plant which has anti-bacterial, anti-inflammatory, wound healing, anti-oxidant properties. The gel eliminates the bacteria that are involved to cause inflammation through which enhances the wound healing process [6].

Ozone is an allotropic form of oxygen present naturally in the Earth's atmosphere. It is an unstable molecule and rapidly releases nascent oxygen to form gaseous oxygen. This nascent oxygen is highly reactive and causes destruction of the microbial cells. The use of ozone is on a rapid rise in the field of dentistry. It has various actions including an immune-stimulating effect, bio-synthetic effect, anti-microbial effect [7]. Ozone is a broad-spectrum antimicrobial agent (like chlorhexidine), which proved to be able to reduce the periodontitis bacterial burden [8]. Brauner [9] has demonstrated that the combination of professional tooth cleaning and daily rinsing of the mouth with ozone water can improve clinical findings in cases of gingivitis and periodontitis.

Ramzy *et al* [10] used ozonized water as a sub-gingival irrigant in 22 patients suffering from aggressive periodontitis. A highly significant improvement regarding pocket depth, plaque index, gingival index and bacterial count was seen. Kshitish D [11] *et al* compared sub-gingival irrigation using Chlorhexidine and ozone in chronic periodontitis patients. A significant improvement in the clinical parameters was seen with ozone compared to the Chlorhexidine. The percentile reduction in A.a.comitans was much more appreciable with ozone. A study carried out by Bhat G [12] exhibited a significant decrease in pocket depth and the relative decrease in gingival and plaque indices and concluded that subgingival administration of Aloe vera gel improved the periodontal condition. Pradeep AR *et al* [13] evaluated the clinical and microbiologic effects of a commercially available dentifrice containing aloe vera on the reduction of plaque and gingival inflammation in patients with gingivitis. The improvements were comparable to those achieved with toothpaste containing triclosan. Abdelmonem HM [14] also proved that subgingival administration of Aloe vera gel in addition to scaling and root planing (SRP) results in improvement of periodontal condition. Sethi S *et al* [15] assessed the efficacy of aloe vera gel in chronic periodontitis patients. The results showed treatment with aloe vera gel as an adjunct to SRP showed

almost similar results to cases treated with SRP alone without any statistically significant differences. Pradeep AR *et al* <sup>[16]</sup> held a randomized clinical trial in which the efficacy of aloe vera gel as a local drug was tested in patients with Type 2 diabetes and chronic periodontitis. There was an improved reduction in the bleeding, plaque scores and also an improvement in the CAL with a reduction in probing depth at the end of 3 months. Maweri *et al* <sup>[17]</sup> carried out to determine the efficacy of aloe vera mouthwash versus chlorhexidine on plaque and gingivitis revealed Aloe vera was safe and well-tolerated by the patients. The present study used a novel Ozonated aloe vera gel which is one of its kind. Not many studies have been performed on the efficacy of this gel in the field of periodontics. The Ozonated gel showed a significant improvement in the clinical parameters including bleeding and probing depths. Considering these, direct delivery of these agents.

### Conclusions

Aloe vera, a common household plant is commonly used for various cosmetic and medicinal purposes. It's usage in the dental and periodontal practice is relatively new. Ozone, a naturally bio-active molecule is a well-known and researched about anti-oxidant. The combination of ozone and aloe vera is thought to be potent in the elimination of microbes and alleviating the symptoms. In the current study, the use of locally delivered Ozonated aloe vera gel proved to play a major role in the resolution of the inflammatory component. Further studies are necessary to justify its role in reducing the microbial count.

### Additional Information

#### Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. Conflicts of interest: In compliance with the ICMJE uniform disclosure form, all authors declare the following: Payment/services info: All authors have declared that no financial support was received from any organization for the submitted work. Financial relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. Other relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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