

# Oral Ulceration and Indian Herbs: A Scoping Review

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## Abstract

Oral ulcers are one of the most prevalent oral mucosal diseases. The etiology of oral mucosal ulcers still has to be discerned as a variety of precipitating factors and causes have been implicated. Unless associated with some underlying systemic component, the condition generally takes 10 to 14 days to resolve, sometimes to recur soon. During the active disease phase, it affects eating, drinking and swallowing, thus affecting the quality of life. The treatment is generally symptomatic and is limited to the use of analgesics, antibiotics and topical application of steroids. The use of these over-the-counter drugs can sometimes lead to severe adverse effects. Herbal medications provide a safer and efficacious alternative to synthetic drugs. This article aims to review the most commonly used herbal medicines and investigate their efficacy in treating oral ulcers.

## Keywords

- ▶ oral ulcers
- ▶ herbal remedies
- ▶ traditional medicine
- ▶ herbs in dentistry

## Introduction

An oral ulcer is caused by the erosion or loss of the upper mucosal layer. It is one of the most frequently encountered pathological conditions of the oral cavity. These sores are generally painful and are found most frequently on the inside of the lips and cheeks. The etiology of oral ulcers is not yet clear and a variety of conditions are believed to play a role in their occurrence. A variety of viral, fungal, treponemal, autoimmune, nutritional deficiencies, hormonal changes, psychological stress, malignancy and other factors have been implicated in their causation. The nature, site, duration and frequency of oral ulcers are sometimes determined by the underlying systemic condition if any (e.g., inflammatory bowel disease, cyclic neutropenia).<sup>1,2</sup> Trauma from a sharp tooth or an overhanging restoration, aggressive tooth brushing, smoking crack cocaine, cocaine use or local application of aspirin could also result in ulcer formation. Recurrent aphthous ulcers (RAUs) are the most common form of ulcers among the ulcerative conditions of the oral cavity. Recurrent aphthous stomatitis (RAS) is an acute and extremely painful condition involving nonkeratinized oral mucosa. These ulcers are usually round with a slightly raised margin and

surrounded by an erythematous halo. Based on their size and number, these ulcers can be classified into the following<sup>3-5</sup>:

- *Minor ulcers*: These are usually small, ranging from 2 to 8 mm in diameter and may take up to 10 to 14 days to clear up.
- *Major ulcers*: These are bigger, deeper with raised and irregular borders, often 1 cm or more. Healing time ranges from several weeks to months.
- *Herpetiform ulcers*: These are a cluster of smaller ulcers, as small as the size of a pinhead.

Minor aphthous ulcers are the commonest form of aphthous ulcers (80%) followed by major aphthous ulcers, with the least common being herpetiform ulcers.<sup>6,7</sup> Ulcerative conditions of the oral cavity have multiple etiologies, but management usually aims at reduction of pain, shortening of duration, prevention of secondary infection and recurrence. The treatment options may involve the use of local anesthetic agents for topical application, systemic and topical steroids, mouth rinses, antibiotics in case of secondary infection, cauterization, lasers, or a combination of these. However, frequent use of the medicaments over a prolonged period may lead to fungal infection and development of drug resistance and

sometimes might even cause severe adverse effects, which can lead to life-threatening consequences.<sup>8</sup>

To find safer alternatives, herbal remedies are being used by herbalists and indigenous healers in many countries for the treatment of ulcers. The rich heritage of our native herbal medicine is now getting global attention. Various herbs such as *Azadirachta indica* (neem), aloe vera gel, turmeric and licorice have been used since time immemorial for the treatment of mouth ulcers. The research has shown that the basis of the pharmacological and healing properties of herbs is naturally present biologically active compounds such as flavonoids, tannins and gums.<sup>9</sup> Clinical studies on the use of herbs have shown promising results in terms of reduction in size, discomfort, duration and recurrence of ulcers. Prolonged use of herbal medicaments is also considered safe and efficacious.<sup>10-13</sup>

Although herbal medicines are widely used and numerous studies have been conducted in this regard, there is no consensus on the medicament of choice for the treatment of oral ulcers. This review is aimed at compiling a set of herbs with antiulcer properties and to help extend the application of principles of holistic healing in dentistry.

## Materials and Methods

The literature review was started with a defined background to review the studies involving interventions using herbal medicaments for mouth ulcers. The review was conducted using electronic databases PubMed, Google Scholar, Cochrane Database, Science Direct, Springer Link, and Scopus. The articles published in English from the year 1985 to March 2020 were screened for clinical trials conducted to evaluate the efficacy of herbal drugs in treating oral ulcers. The search strategy involved the use of the following keywords: “herbs,” “plants,” medicinal plants,” “herbal compounds,” “herbal remedies,” “Indian herbs,” “oral ulcers,” and “mouth ulcers.” The studies were selected using the previously described protocol titles and abstracts of clinical trials were then screened. The full-texts of relevant studies were read independently. References of selected studies were then hand-searched to find relevant studies that might have been missed. ► **Table 1** describes the form and dosages of various herbs from the clinical trials used for the treatment of oral ulcers.

## Discussion

The major reason for a growing trend towards the preferred use of traditional and alternative therapy for various diseases is people getting more proactive towards prevention and self-care. Recently, there has been a surge in the sales of products labeled as natural and herbal, but the marketing strategy behind it implying “natural means safe” may not always turn out to be true. Although herbal products are safe and have negligible adverse effects, there are several case reports of overdose and unintentional injuries caused by unqualified practitioners using herbal products.<sup>38</sup> The focus of scientific drug research has always been on the drugs of synthetic origin. Lack of a sufficient number of high-quality evidence-based

clinical trials, standardization of drugs, presence of heavy metals, undisclosed source of the herb, licensing, formulation, composition, labeling and quality control are the reasons being quoted since years against the use of herbal drugs in India. Companies abroad are spending millions of dollars on research to obtain patents for our traditional herbal medicines. The safety profile of natural products, especially herbal medicines as compared to their synthetic counterparts is the main reason behind their increasing popularity amongst the researchers in recent decades. Treatment for oral ulcers has always been challenging. The herbal medicine could emerge as one of the best alternative options for the management of mouth ulcers due to naturally occurring tannins, quinones, flavones, flavonoids and gallic acid constituents.<sup>39</sup> A spectrum of medicinal properties of these herbs such as being anti-inflammatory, antiseptic, antibacterial, antiviral, antimicrobials, antifungal, analgesic and anti-plaque altogether make these herbs a one-stop solution for almost all kinds of ulcers with different or unknown etiologies. They act by maintaining a healthy microbiome, reducing microbes and improving immunity underway, thus preventing oral dysbiosis and recurrence. Various clinical trials have also shown the herbs to be effective in terms of decreasing pain intensity, lesion diameter, erythema and exudation compared with that of the control group.<sup>14,40</sup>

Research trials are now also being conducted to incorporate herbs in different drug delivery systems such as oral patches, dissolvable patches, bioadhesive patches, gels, mucoadhesive films and mouthwashes for the delivery of natural remedies at the site and increase their substantivity.<sup>15,41,42</sup> The mucoadhesive systems help in prolonging the duration of action at the ulcer site by increasing the contact time of the drug with mucous membrane and thus the bioavailability. Also, mucoadhesive system along with stimuli-sensitive drug delivery approach using thermoreversible polymers has been found to improve the effectiveness of the drugs and patient compliance.<sup>42</sup>

A comprehensive review of trials conducted to evaluate the clinical efficacy of natural herbs and synthetic over-the-counter drugs for the treatment of oral ulcers is as follows.

### Turmeric (Curcumin)

The most active constituent and major curcuminoid found in turmeric is curcumin. Various medicinal properties listed for curcumin are analgesic, antioxidant, antiseptic, antibacterial, anti-inflammatory and immunomodulatory. Clinical trials have proved its effectiveness in treating RAS as well as radiation-induced oral mucositis.<sup>17,18,43,44</sup> Curcumin inhibits biosynthesis of inflammatory prostaglandins, which is responsible for its anti-inflammatory properties.<sup>14</sup>

Daddy et al<sup>15</sup> compared turmeric with triamcinolone for the treatment of minor oral RAS and both were found to have similar effectiveness in alleviating pain and reducing the ulcer size. The authors concluded that turmeric can be used for treating minor RAS, meanwhile triamcinolone cannot be advocated for the long-term management of oral ulcers.

**Table 1** Herbs for oral ulcers: form and dosages used in clinical trials

Serial no.	Herb	Image	Medicinal properties	Portion	Form	Dosage	Studies
1.	Turmeric ( <i>Curcuma longa</i> )		Analgesic Anti-inflammatory Antiseptic Anticarcinogenic Antioxidant Antibacterial Immunomodulatory	Dried rhizome	Mouthwash Powder/oil/ mucoadhesive gel Curenex oral gel (Abbott Pharmaceuticals)	Topical application (curcumin) TDSx 7 days	Pandharipande et al <sup>14</sup>
						Turmeric powder BD for 5 d <sup>15</sup>	Daddy et al <sup>15</sup>
						Curcumin Gel BD for 2 wk <sup>16</sup>	Manifar et al <sup>16</sup>
						500 mg of turmeric extract gargles TDS until radiotherapy completion <sup>12</sup>	Arun et al <sup>17</sup>
						10 ml of turmeric solution swished x 2 minutes, repeated 4 times; (done 6 times 1 hr before radiotherapy, 1,2,4,6 hours interval after radiotherapy) for 6 weeks	Rao et al <sup>18</sup>
2.	Aloe vera ( <i>Aloe barbadensis miller</i> )		Wound healing Anti-inflammatory Antibacterial Antifungal Antioxidant Antitumor Immune boosting	Freshly purified leaf juice extract/ leaves	Gel	0.5% Acemannan in carbopol TDS for 7 d <sup>19</sup>	Bhalang et al <sup>19</sup>
						Topical application of Gel TDS for 10 d <sup>20</sup>	Babae et al <sup>20</sup>
						Forever Bright Aloe vera Gel TDS for 7 d <sup>21</sup>	Giroh et al <sup>21</sup>
						Mucoadhesive Gel QID for 5 d <sup>22</sup>	Mansour et al <sup>22</sup>
3.	Licorice ( <i>Glycyrrhiza glabra</i> )		Antithrombotic Anti-inflammatory Antioxidative Antiallergenic Antimicrobial Antidepressive Antidiabetic	Root extract	Bioadhesive discs Patch with extract Root/patches Mucoadhesive gel	Mucoadhesive Licorice based patches x 7–8 days	Martin et al <sup>23</sup>
4.	Myrrh ( <i>Commiphora Myrrha</i> )		Anti-inflammatory Antioxidant Antiseptic Immune boosting	Extract	Gel	Myrrh based Gel 3–4 times daily for 5 d <sup>22</sup>	Mansour et al <sup>22</sup>

(Continued)

Table 1 (Continued)

Serial no.	Herb	Image	Medicinal properties	Portion	Form	Dosage	Studies
5.	Honey		Antibacterial Anti-inflammatory Immune boosting Antifungal	Gel/100% pure natural honey	Honey and tulsi ice chips	Topical application TDS for 5 d <sup>24</sup>	Halim et al <sup>24</sup>
						Topical application QID for 5 d <sup>25</sup>	El-Haddad et al <sup>25</sup>
						Swish honey tulsi ice chips 5 mins before the each dose of methotrexate; Replenish chips before previous ice has melted x 30 mins	Mishra and Nayak <sup>26</sup>
						Topical application TDS for 7 d <sup>14</sup>	Pandharipande et al <sup>14</sup>
						Local Application TDS for 3 d <sup>27</sup>	Mohamed and Al-Douri <sup>27</sup>
						Rinse and swallow 20 ml pure honey 15 mins before, 15 mins and 6 hrs after the radiation	Motallebnejad et al <sup>28</sup>
6.	Propolis (bee glue)		Anti-inflammatory Antioxidant Immunostimulant Wound healing Antibacterial Antiviral Antifungal Antitumor	Beewax/resin	Oromucoadhesive films/ Capsule/paste	2 cm <sup>2</sup> mucoadhesive film for 20s BD for 10 days <sup>29</sup>	Arafa et al <sup>29</sup>
7.	Lady mantle ( <i>Alchemilla vulgaris</i> )		Wound healing	Extract + glycerin	3% Aphtarine gel	Topical application TDS for 2-3 d <sup>31</sup>	Shrivastava and John <sup>31</sup>
8.	<i>Echinacea</i> ( <i>Echinacea purpurea</i> )		Anti-inflammatory Common cold Respiratory tract Infection viruses Ulcers such as syphilis Abscesses ulcers Swelling of the tonsils	Echinacea	Liquid/tablets	Immustin Tablets- Three tablets in a day for 5 wk <sup>32</sup>	Khozeimeh et al <sup>32</sup>
9.	Guava ( <i>Psidium guajava</i> )		Antioxidant Antibacterial Anti-inflammatory Anticancer Antifungal Antimicrobial Antitumor Antiallergic Antihyperglycemic Antimutagenic	Leaves	Leaves/powder/ gel/guava leaves mouthwash	Gargle 250 mL for 3 min TDS for 7 d <sup>33</sup>	Guintu and Chua <sup>33</sup>

(Continued)

**Table 1** (Continued)

Serial no.	Herb	Image	Medicinal properties	Portion	Form	Dosage	Studies
10.	<i>Chamomilla</i> ( <i>Matricaria Chamomilla</i> )		Anti-inflammatory Antibacterial Antifungal Antiviral Analgesic Antispasmodic Smooth muscle-relaxing action	Fluid extract	Tincture mouthwash Ointment Strong tea made from chamomile flowers	Chamomile tincture 10 drops TDSx 6 days  Chamomile tea three to four times per day <sup>2</sup>	Seyyedi et al <sup>34</sup>  Subiksha <sup>2</sup>
11.	Ginger ( <i>Zingiber officinale</i> )		Anti-inflammatory Antinausea Digestion aid Antioxidant Metabolism	Ginger's Alcoholic Extract.	Mucoadhesive Base	Daily for 20 min after every meal and before going to bed for 7 d <sup>35</sup>	Haghpanah et al <sup>35</sup>
12.	Triphala ( <i>Emblca officinalis</i> , <i>Terminalia bellirica</i> , <i>Terminalia chebula</i> )		Antibacterial Antifungal Antiviral Antioxidant Diabetes	Extract	Mouthwash Mixed with honey for local application	10 mL twice daily x 30 s x 7-21 d as an antimicrobial mouthwash	Sen et al <sup>36</sup>
13.	Tulsi ( <i>Ocimum sanctum</i> / holy basil)		Anti-inflammatory Antioxidant Antibacterial Immunomodulatory Analgesic Anticancer Antiasthmatic Antidiabetic Hepatoprotective	Leaves	Honey and tulsi ice chips	Swish honey tulsi ice chips 5 mins before the each dose of methotrexate; Replenish chips before previous ice has melted x 30 mins <sup>36</sup>	Mishra and Nayak <sup>26</sup>
14.	Neem ( <i>Azadirachta indica</i> )		Anti-inflammatory Antihyperglycemic Antiulcer Antifungal Antibacterial Antiviral Antioxidant Antimutagenic Anticarcinogenic	Leaves	Oil	10 mL BD for 10 d <sup>37</sup>	Lahankar et al <sup>37</sup>

Abbreviations: BD, two times a day; QID, four times a day; TDS, three times a day.

Deshmukh and Bagewadi<sup>42</sup> conducted a randomized clinical trial comparing the efficacy of curcumin with that of triamcinolone acetonide for the treatment of minor RAS. A significant difference was found in terms of reduction of size, pain intensity, duration and number of lesions in both the groups. No allergic reactions were reported for both of these gels.

Manifar et al<sup>16</sup> in a similar randomized, placebo-controlled trial compared curcumin gel to placebo for the treatment of minor aphthous ulcers. It was found that the use of curcumin gel resulted in a definite reduction in the pain intensity and the size of the lesion as compared with the placebo.

Pandharipande et al<sup>14</sup> concluded from their study that curcumin was slightly more effective than honey for the treatment of aphthous ulcers and that both honey and curcumin could be used as an alternative treatment modality in the management of RAS.

### Aloe Vera (*Aloe barbadensis*)

Aloe vera gel is known to contain anthraquinones, vitamins, choline, folic acid, amino acids and minerals. Aloe has shown to have anti-inflammatory, antiviral, antitumor, antiseptic, moisturizing and healing properties and has been used in the management of RAS, herpes simplex and herpes zoster infection.<sup>19,45-47</sup>

Babae et al<sup>20</sup> conducted a clinical trial to evaluate the therapeutic effects of aloe vera gel and found that 2% oral gel effectively decreased not only the wound size and pain score but also the duration of healing in patients with minor RAS.

In a double-blind, randomized clinical trial, the use of aloe vera gel and 0.12% chlorhexidine (CHX) gel was evaluated for the prevention of traumatic ulcers in patients with fixed orthodontic appliances. At the end of the study, aloe vera was

found to provide better results than CHX gel with no adverse effects. The authors concluded that aloe vera gel could be used as an effective preventive measure for traumatic ulcers during fixed orthodontic treatment.<sup>48</sup>

Giroh et al<sup>21</sup> did a comparative evaluation of aloe vera and triamcinolone acetonide 0.1% (Kenacort) in the management of RAS and found Kenacort paste to be more effective than aloe vera gel in decreasing the ulcer size. In contrast, aloe vera gel had a better response in terms of pain reduction and burning sensation. The authors concluded that aloe vera could emerge as a promising agent in treating oral lesions, especially for patients who are allergic to steroid medications.

Another randomized double-blind, vehicle-controlled study compared the clinical effectiveness of aloe vera and myrrh-based oral mucoadhesive gels in the management of minor RAS. It was observed that aloe vera performed better at decreasing ulcer size, erythema, and exudation, whereas myrrh was better at pain reduction.<sup>22,49</sup>

### Licorice (*Glycyrrhiza glabra*)

An active ingredient found in licorice root is glycyrrhiza extract, which has anti-inflammatory properties and is used to calm and soothe the affected area. Licorice has been found to be effective in the treatment of herpes labialis and radiation-induced mucositis.<sup>50,51</sup> Recent research has suggested that licorice due to its bioactive ingredients such as glycyrrhizin, glabridin, licochalcone A, licoricidin, and licorisoflavan A has specific potential for treating oral diseases.<sup>52</sup>

Martin et al<sup>23</sup> conducted a clinical trial to compare the effect of glycyrrhiza herbal extract in dissolving oral patch and placebo on aphthous ulcers and found that there was 90% reduction in the ulcer size as compared with 68.5% in the placebo group.

Moghadamnia et al<sup>53</sup> evaluated licorice bioadhesive hydrogel patches for their efficacy in pain control and effect on the healing time of RAU. The authors found that licorice bioadhesive was effective in reducing the pain intensity and decreasing the inflammatory halo as well as the necrotic center of aphthous ulcers. Although the results were not found to be statistically significant.

### Purple Cone Flower (*Echinacea purpurea*)

The chemical components of *Echinacea* plant such as alkaloids, polysaccharides, and chicoric acid have immunomodulatory and anti-inflammatory properties.<sup>54-57</sup> Khozeimeh et al<sup>32</sup> studied the effectiveness of *Echinacea* when taken in the form of tablets on aphthous ulcers. The drug reduced the number of lesions, pain intensity, improved healing and increased the duration between the recurrences. These effects were similar to prednisolone and colchicine (hastened healing and reduced pain) but fewer as compared with them.

### Honey

Honey results in an increased rate of tissue regeneration and suppression of inflammation, edema, exudation and malodor in wounds as evidenced in various clinical observations and trials.<sup>27,43,58</sup> Halim et al<sup>24</sup> in their study found that local application of honey was effective in treating minor RAS. It was found to have a comparable effect to that of salicylate gel. Authors thus concluded that honey could be used as an alternative treatment of oral ulcers for their patients since honey is available worldwide and cheaper.

El-Haddad et al<sup>25</sup> in a parallel, blinded, randomized controlled trial compared the clinical efficacy of topical corticosteroid treatment with that of honey for the management of recurrent minor aphthous stomatitis and found that honey was an effective and safe option in reducing the intensity of pain, ulcer size, and erythema.

A study also compared cryotherapy treatment in pediatric oncology patients using flavored ice cubes (honey and tulsi) and plain ice cubes. It was found that flavored ice cubes were more effective than plain ice cubes in the reduction of oral mucositis in the patient receiving methotrexate. They concluded that flavored ice cubes can be incorporated into routine practice in pediatric oncology in patients undergoing chemotherapy to prevent occurrence.<sup>26</sup>

In another randomized single-blind clinical trial, Motallebnejadet al<sup>28</sup> concluded that the topical application of natural honey is effective in managing radiation-induced mucositis.

### Bee Glue (Propolis)

The propolis extract has anti-inflammatory, antimicrobial, antioxidant, immuno-stimulant, and wound healing activities.<sup>59,60</sup>

Arafa et al<sup>29</sup> evaluated the effect of oromucoadhesive films of propolis on aphthous ulcers. It was found that the application of propolis films resulted in reduction in ulcer size, prolonged duration of pain relief and reduced healing time in patients with RAUs, which ultimately resulted in a very high level of patient satisfaction, proving the success of this new drug delivery system.

The study by Samet et al<sup>30</sup> also proved that propolis was effective in preventing recurrence of lesions and improving the quality of life in patients suffering from RAS.

Heyam and Rasool<sup>40</sup> evaluated the use of olive oil based propolis paste for patients with RAU. It was observed that olive oil based propolis formula was significantly more effective in reducing the size of the lesion, duration for complete healing, pain and bioadhesion time to the buccal mucosa as compared with sesame-based formula and the placebo formula. No allergic reaction or any other side effects were observed with its use. It was found to be stable and free of microorganisms for over 6 months of storage.

### Lady Mantle (*Alchemilla vulgaris*)

Shrivastava and John<sup>31</sup> in their open label study on lady mantle (*Alchemilla vulgaris*) revealed that topical application of Aphtarine gel (commercial preparation of *Alchemilla vulgaris* in glycerin) on minor mouth ulcers reduced discomfort and helped in achieving complete healing in majority of patients within 3 days period; no adverse effects were reported. The authors concluded that Aphtarine is safe, well-tolerated, and highly effective, promising new treatment for healing oral ulcers.

### Guava (*Psidium guajava*)

*Psidium guajava* has been used for the herbal management of various oral diseases such as toothache, sore throat, and inflamed gums, and ulcers. A decoction of guava leaves also has been used as mouthwash.<sup>61</sup> Shaikh et al and Thombre et al in two different studies formulated and evaluated aqueous gel of powdered guava leaves for mouth ulcer treatment and observed that powdered guava leaves contained flavonoids and showed a significant antioxidant effect. The herbal formulation was found to be stable, safe and effective as compared with synthetic formulations for the treatment of mouth ulcers.<sup>13,62</sup>

Guintu and Chua<sup>33</sup> in their randomized prospective open label clinical study found that guava leaves mouthwash was effective in reducing the pain intensity and resulted in faster healing of aphthous ulcers.

### Chamomile (*Matricaria chamomilla*)

Chamomile is one of the most ancient medicinal herbs. The dried flowers of chamomile contain terpenoids and flavonoids, which contribute to its medicinal properties.<sup>63</sup> Seyyedi et al<sup>34</sup> in a triple-blind, placebo-controlled randomized clinical trial found that chamomile mouth rinse was effective in reducing pain and burning sensation without producing any adverse side effects. The authors concluded that chamomile could be advised as an effective alternative treatment for RAS.

Ramos-e-Silva et al<sup>64</sup> in their study concluded that the fluid extract from *Chamomilla recutita* had a good analgesic effect.

### Ginger (*Zingiber officinale*)

Ginger is one of the most common herbs in traditional medicine. Some studies have also confirmed and demonstrated the anti-inflammatory effect of ginger.<sup>65-67</sup> Haghpanah et al<sup>35</sup> concluded from their study that bioadhesive film of ginger was capable of relieving pain in patients with RAS, but the change in the ulcer diameter, inflamed halo, and healing time were not significantly different from that of placebo.

### Triphala (*Embllica officinalis*, *Terminalia bellirica*, *Terminalia chebula*)

Triphala has been a boon for oral and systemic health. Sen et al<sup>36</sup> in a detailed review of has mentioned Triphala as antiplaque, antifungal, antiulcer because of the naturally present tannins and phenolic compounds. When used as a mouthwash, it forms a biofilm and due to its antioxidant activity, it protects the gums and oral mucosa from free radicals. It can also be a potential antiulcer medicament. Mohanpriya and Ramaswamy<sup>68</sup> found that Triphala when mixed with honey and applied to aphthous ulcers of the mouth helps in the healing of the ulcers.

### Neem (*Azadirachta indica*)

The phytochemical constituents of *Azadirachta indica* (neem) are nimbidin, nimbin, nimbolide, Azadirachtin, gallic acid, epicatechin, catechin, and margolone. All of these constituents exhibit a potent antibacterial activity. Traditionally, neem has been used for the treatment of inflammation, infections, fever, skin diseases, and dental problems.<sup>69</sup> Lahankar et al<sup>37</sup> in their study used "Haridradi Tail" a medicated oil preparation containing *Curcuma longa*, *Azadirachta indica*, *Glycyrrhiza glabra*, *Sesamum indicum*, and *Nelumbo nucifera* for the management of RAS. The preparation was found to be highly effective in providing symptomatic relief for ulcers on buccal mucosa, palate and enlargement of lymph nodes.

### Conclusion

The review gives us a clear understanding that the naturally occurring constituents of medicinal herbs are definitely able to resolve oral ulcers irrespective of their etiology and prevent their recurrence. The healing ability of these herbs besides stepping up the immunity is responsible for their unmatched ability to cure the disease holistically. The use of this readily available, natural and safe resource as a part of dental practice definitely holds great potential for a "natural and green dental practice." Although the majority of studies have been conducted on RAUs, few have also shown efficacy in oral mucositis patients undergoing chemotherapy and traumatic ulceration. Due to the lack of sufficient clinical trials, we cannot still pinpoint the best herb to cure oral ulcers, but we are certainly on the way to herbalism in dentistry.

This review might provide the dentists a rich source and a road map for herbal alternatives for the treatment of oral ulcers in their practice and also a baseline for the researchers to carry on further research and to bridge the gaps between clinical and experimental dentistry.

#### Conflict of Interest

None declared.

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