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Review Article

Role of Herbal Intervention in Reducing Pain and Discomfort in Oral Lichen Planus. A Systematic Review

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ABSTRACT

Introduction: Oral lichen planus is a chronic autoimmune disorder that necessitates prompt treatment aimed at alleviating its symptoms. Evidence to support the efficacy of any singular treatment for oral lichen planus is minimal. Among all possible treatments, steroids are considered the gold standard in oral lichen planus therapy due to their effectiveness. This, however, comes with adverse effects that may exacerbate the patient's already miserable life. Herbal interventions (HIs) were tried in the treatment of OLP as safer alternatives. The most appropriate study to evaluate their efficacy would be a randomized controlled trial (RCT). The present systematic review aims to compare with those of steroids in OLP-related randomized controlled trials**.**

Methodology: PubMed, MEDLINE, the Cochrane Central Register of Controlled Trials, Scopus, and grey literature were searched in this study. Eight studies are perhaps available for review. The registration number of the article on Prospero is CRD420251111982

Results: Within each study, significant reductions in clinical severity were observed in the groups; between-group differences were not noteworthy.

Conclusion: The effectiveness of herbal therapy in OLP must be considered cautiously due to the high risk of bias present in the studies.

Keywords: Herbal intervention, Oral lichen planus, Randomized controlled trial, Steroid

Authors' Contribution:
All authors contributed equally to the conception, literature search, manuscript drafting, editing and review

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Article info:
Received: September 23, 2025
Accepted: March 10, 2026

Cite this article Haroon A, Shafiq S, Kiani MN, Ali M, Riaz S, Jamil M. Role of Herbal Intervention in Reducing Pain and Discomfort in Oral Lichen Planus: A Systematic Review. J Islamabad Med Dental Coll. 2026; 15(1): *83-90.*
DOI: https://doi.org/10.35787/jimdc.v15i1.1460

Funding Source: Nil
Conflict of interest: Nil

Introduction

The chronic autoimmune condition known as oral lichen planus (OLP) is mediated by T cell activity and is characterized by periods of exacerbation and remission OLP,[1-5] however, does frequently associate with systemic comorbidities such as diabetes mellitus or hypertension; thus, it is more prevalent among females. OLP can generally present as one of seven related lesions: plaque, reticular, papular, atrophic, erosive, or bullous.[6,7] The atrophic and erosive presentations are often accompanied by acute burning pain due to exacerbations.[8] Several treatment modalities have been proposed.[9,10] The corticosteroid regimen remains the traditional first-line therapy;[11] however, the chronic nature of the disorder, associated comorbid systemic diseases, as well as the frequent and long-term courses of steroids, have resulted in significant complications in a certain percentage of patients.[12-14] Complications from long-term use of steroids include systemic side effects, secondary candidiasis, taste changes,

and mucosal atrophy, which, for some patients, may increase burning sensations from the chronic application of topical corticosteroids.[15,16] There is, therefore, an immediate need to develop safer modalities with similar or improved efficacy compared to corticosteroids.

Methodology

The review included quasi-randomized trials, non-randomized studies, crossover designs, case reports, and split-mouth trials. Interventions comprised herbal and corticosteroid treatments, administered topically, systemically, or intralesional at any dosage. Studies were eligible if they included a corticosteroid comparison arm; those without such a comparator were excluded, though trials could include multiple herbal interventions or an additional placebo arm. Participants were patients of any age, sex, or ethnicity with histopathologically verified, symptomatic oral lichen planus (OLP). Exclusions comprised cases of idiopathic, plaque-type, or asymptomatic OLP, lichenoid drug reactions, dysplasia, and patients who missed follow-up or recall visits. The primary outcome assessed was symptom relief specifically, reductions in pain, burning, or discomfort measured using validated scales such as the Visual Analog Scale (VAS) or Numerical Rating Scale (NRS). Systematic searches were conducted in PubMed, MEDLINE, the Cochrane Central Register of Controlled Trials, and Scopus to identify relevant randomized controlled trials published between January 2000 and October 2018. Two reviewers independently screened titles and abstracts based on a predefined search strategy. After removing duplicate records, full texts of potentially eligible studies were obtained and evaluated against the eligibility criteria. Any disagreements between reviewers were resolved through consultation with a third reviewer. Data extraction was performed independently by two reviewers, M and S, using a standardized, pre-tested form, with discrepancies resolved by a third reviewer, A. The quality of the included randomized controlled trials was assessed using the Cochrane risk-of-bias tool.

Results

For the systematic review, six articles were excluded after screening for eligibility criteria, and eight articles were finally considered. The search strategy included key concepts such as “Oral lichen planus” and “lichen planus, oral” for identifying relevant studies, while interventions were explored under two main categories: herbal therapy and steroids. Herbal therapy keywords included terms such as herbal therapy, herb therapy, phytotherapy, plant extracts, medicinal plants, herbalism, and specific agents like curcumin, aloe vera, anthocyanins, quercetin, lycopene, propolis, honey, and Chinese herbs. Steroid-related terms included corticosteroids, triamcinolone acetonide, clobetasol propionate, dexamethasone, prednisolone, and betamethasone. Data extraction was carried out systematically, covering aspects such as study setting, study population, participant demographics and baseline characteristics, details of herbal and steroid interventions, methodology, recruitment and completion rates, outcome measurement scales, outcome indicators with measurement times, acceptability and adverse effects, and risk of bias assessment. The studies involve 8 randomized controlled trials conducted in secondary care centers, where clinically and histopathologically confirmed cases of oral lichen planus (OLP) were enrolled. These trials included a total of 354 patients (117 males and 237 females), aged 18 to 75 years, with a clear female predominance. Each study recruited an average of 44 participants. The most common affected sites are the buccal mucosa, tongue, and gingiva, with lesion types including mixed, erosive, atrophic, and reticular forms. Most treatments were topical steroids, with one trial using dexamethasone gel combined with oral prednisolone; triamcinolone and dexamethasone preparations were most frequently used, and two studies included placebo groups

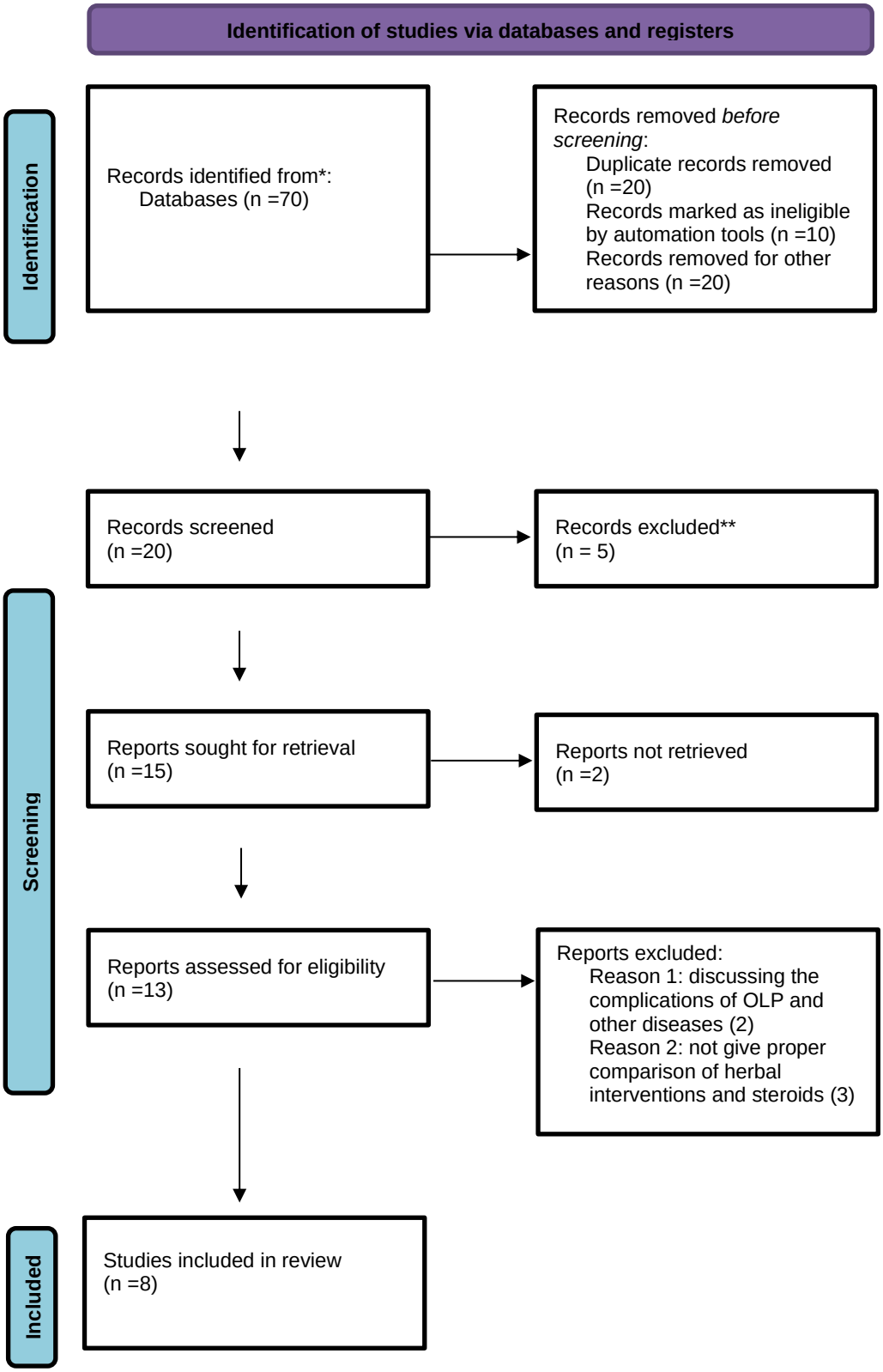

Figure 1. Prisma flow chart showing the selection of articles

Table I: RCTs Comparing Herbal vs Steroid Therapies in Oral				
Study (Year)	**Groups & Participants**	**Herbal Intervention (dose & duration)**	**Steroid/Other Therapy**	**Clinical Findings (Pain, Lesion Severity & Side Effects)**
Mansourian et al., 2011 [18]	G1 = 23	Aloe vera rinse, 2 tablespoons for 2 min, four times daily for 1 month	Triamcinolone acetonide 0.1%, thin topical layer, four times daily for 1 month	No side effects reported. Both groups had similar outcomes in pain (VAS) and lesion response (Thongprasom grading).
Sanatkhani et al., 2014 [19]	G1 = 15 (herbal + steroid) G2 = 15 (steroid only)	Cedar honey 20 ml, swished and swallowed, three times daily for 4 weeks	Dexamethasone rinse 0.5 mg QID + Fluconazole 100 mg once daily for 4 weeks	Mild burning was observed in the herbal group. Pain reduction (VAS, pain index) and lesion grading (Thongprasom, severity index) showed no meaningful difference between groups.
Amirchaghmaghi et al., 2015 [20]	G1 = 15 (herbal + steroid) G2 = 15 (steroid + placebo)	Quercetin 250 mg, two capsules twice daily for 4–8 weeks	Dexamethasone rinse 0.5 mg QID + Nystatin 100,000 U suspension	No safety concerns. Pain scores (VAS, pain index) and lesion changes (severity index) were not significantly different between arms.
Kia et al., 2015 [21]	G1 = 25 (herbal) G2 = 25 (steroid)	Curcuminoid 5% paste, applied three times daily for 4 weeks	Triamcinolone acetonide 0.1% paste, three times daily for 4 weeks	Herbal group reported burning, itching, mild swelling, dry mouth, and gingival staining; steroid group had burning and mucosal peeling. Outcomes (VAS, Thongprasom, improvement index) showed no significant variation.
Zhou et al., 2016 [22]	A = 17 (topical steroid) B = 22 (herbal + topical steroid) C = 17 (systemic steroid) D = 17 (herbal + systemic steroid)	Total glucosides of paeony, 200–400 mg three times daily for 6 months	Topical: Dexamethasone acetate 0.1% twice daily Systemic: Prednisolone 15 mg daily with taper	Diarrhea occurred in herbal groups. Combined arms (herbal + steroid) showed significant improvements in pain (VAS) and lesion grading (Thongprasom) compared with steroid-only arms (A vs B, C vs D). Effective rates were higher in combined therapy.
Amirchaghmaghi et al., 2016 [23]	G1 = 12 (herbal + steroid) G2 = 8 (steroid + placebo)	Curcuminoid tablets 500 mg, four tablets twice daily for 4 weeks	Dexamethasone rinse 0.5 mg QID + Nystatin 100,000 U suspension	Well tolerated. Both groups showed similar pain relief (VAS) and lesion improvement (Thongprasom).
Thomas et al., 2017 [24]	G1 = 25 (steroid) G2 = 25 (herbal A) G3 = 25 (herbal B, higher dose)	Curcuma longa gel 10 mg, three times daily for 3 months (G2) Curcuma longa gel 10 mg, six times daily for 3 months (G3)	Triamcinolone acetonide 0.1% paste, TDS with tapering	No safety concerns. Pain (Numeric Rating Scale) and lesion outcomes (MOMI, Thongprasom) did not differ significantly across groups.
Arbabi-Kalati & Farahmand, 2017 [25]	G1 = 15 (herbal + steroid) G2 = 15 (herbal only)	Lycopene 15 mg capsule once daily for 1 month	Triamcinolone acetonide 0.1% paste, four times daily for 1 month	No adverse events noted. Pain (NRS) and lesion grading (Thongprasom) were comparable between both groups.

A wide range of herbal interventions (HI) were tested, such as curcuminoids, aloe vera, cedar honey, quercetin, paeony glucosides, and lycopene, administered orally (as tablets, capsules, or pills) or

topically (gels, pastes, mouthwashes). One study examined different dosing patterns of curcuma longa, while some studies also used antifungals or sodium bicarbonate rinses as adjuncts. Outcomes measured included burning sensation and pain, generally assessed using VAS, NRS, or pain index, and clinical response was evaluated using grading systems like Thongprasom criteria, MOMI, or severity indices. Lesion size was measured with probes or grids. Follow-up periods varied, with six studies lasting four weeks, one lasting three months, and another six months.

Assessment of Risk of Bias: The eight RCTs were assessed using the Cochrane tool for risk of bias across five domains: selection, performance, attrition, reporting, and other bias. Judgments were categorized as low, unclear, or high. The methods of random allocation included electronic random number generators, random number tables, or simple randomization; block randomization, and quota sampling. Overall, the classification of the studies the risk of bias was low, moderate, or high.

Discussion

A new therapeutic approach is compared with the standard intervention or well-recognized active treatment with evidence of efficacy. Corticosteroids are regarded as the standard treatment for oral lichen planus (OLP), as there is much literature on their effectiveness as treatment, even though there is a long list of side effects that can happen while using this medication.[26,27] Recently, there has been a growing trend for natural approaches in therapy. Herbal remedies have gained popularity for medical conditions, including OLP, as they are easy, affordable, and safe. OLP, a chronic autoimmune disease, causes severe dysfunction in daily living and often affects psychological well-being. The greatest problem that patients face is recurrent painful lesions with symptomatology continuing to affect the quality of life. Therefore, evidence from clinical trials, clinicians, and researchers supports strategies. It is also important to understand that a single herb has various active compounds

Adjuvants are used to create synergistic effects for faster symptom relief. In all, seven RCTs with herbal interventions (HIs) and standard corticosteroid interventions (SIs) [28,29] reported nonsignificant differences between the two arms. [18-21,23-25] Of these, four RCTs tested HI as an adjunct with corticosteroids.[19,20,23,25] Since these studies yielded nonsignificant results, the question remains whether herbal medicines truly provided any significant enhancement of steroid effects. If the results had been statistically significant, one could have inferred a synergistic advantage. Three other trials distinguished herbal treatment from steroid treatment. Again, none of this support the conclusion that the HI were in ameliorating OLP symptoms. These trials incorporated herbal agents, aloe vera mouthwash, curcuminoid paste, and curcuma longa extract gel.[18,21,24] Curcumin is known to possess antioxidant, anti-inflammatory, antimicrobial, anticancer abilities.[28] Its safety has a long history; however, it can have transient side effects such as diarrhea.[29] Aloe vera acts in part through the inhibition of cyclooxygenase, which also inhibits leukocyte adhesion molecules and tumor necrosis factors.[30] Additionally, it possesses antioxidant properties.[31]

RCTs comparing all forms of therapies (including herbal ones) to a placebo or another active treatment were included of earlier systematic evaluations of interventions for the treatment of OLP. They claimed that there was insufficient data to draw any conclusions on the superiority or efficacy of a specific strategy in lowering OLP symptoms and indicators.[32,33] Only RCTs that compared HIs to standard medication (corticosteroids) for patients with OLP were included in the current systematic review. Apart from the two RCTs on curcumin and aloe vera, the remaining RCTs in the current evaluation likewise provided questionable data supporting the efficacy of herbal therapy. The findings of the present

systematic review further highlight the complexity of managing oral lichen planus (OLP), particularly due to its multifactorial etiology and chronic inflammatory nature. Although corticosteroids remain the cornerstone of therapy, their long-term use is often associated with undesirable local and systemic side effects, necessitating the exploration of alternative therapeutic strategies.[34] Herbal interventions (HIs), owing to their anti-inflammatory, antioxidant, and immunomodulatory properties, have been increasingly investigated as potential substitutes or adjuncts to steroid therapy. However, the current body of evidence remains inconclusive regarding their definitive clinical superiority.[35]

One important observation from the included randomized controlled trials (RCTs) is the variability in study design, dosage regimens, duration of treatment, and outcome assessment methods. This heterogeneity limits the ability to perform direct comparisons across studies and weakens the overall strength of evidence. For instance, pain reduction was assessed using different scales such as the Visual Analog Scale (VAS) and Numerical Rating Scale (NRS), while lesion severity was evaluated using diverse indices like the Thongprasom grading system and MOMI. Such methodological inconsistencies may contribute to the lack of statistically significant differences observed between herbal and steroid treatment groups.[32,33]

Moreover, the pharmacological mechanisms underlying herbal therapies are diverse and often involve multiple bioactive compounds acting synergistically. Curcumin, one of the most extensively studied herbal agents, exerts its therapeutic effects by modulating inflammatory pathways, including inhibition of nuclear factor-kappa B (NF-κB) and reduction of pro-inflammatory cytokines.[28] Similarly, aloe vera demonstrates wound healing and anti-inflammatory properties through its effects on cyclooxygenase pathways and immune modulation.[30,31] Despite these promising mechanisms, clinical translation into consistent therapeutic outcomes remains limited, possibly due to variations in bioavailability, formulation, and patient compliance.

Another critical factor influencing treatment outcomes is the chronic and relapsing nature of OLP. Even when symptomatic relief is achieved, recurrence is common, which complicates the evaluation of long-term efficacy of both herbal and steroid therapies. Additionally, psychological stress and systemic comorbidities have been implicated in disease exacerbation, suggesting that a multidisciplinary approach may be necessary for optimal management.[36]

The role of combination therapy (herbal plus corticosteroid) also warrants further discussion. While some studies suggested improved outcomes with combined regimens, these findings were not consistently statistically significant.[19,20,23] This raises the possibility that herbal agents may act more effectively as supportive therapies rather than standalone treatments. Furthermore, the placebo effect cannot be ruled out in subjective outcomes such as pain perception, emphasizing the need for well-designed, double-blinded trials

Risk of bias remains another limitation in the included studies. Although some trials reported adequate randomization methods, issues such as small sample sizes, lack of blinding, and short follow-up durations were common. These factors reduce the reliability and generalizability of the findings. Future research should focus on large-scale, multicenter RCTs with standardized protocols, longer follow-up periods, and robust outcome measures to establish clearer evidence regarding the efficacy of herbal interventions.

In addition, emerging therapeutic approaches such as calcineurin inhibitors and biologics are gaining attention as alternatives to corticosteroids.[9] These modalities may offer improved safety profiles and targeted mechanisms of action, although cost and accessibility remain limiting factors, particularly in low-resource settings. Therefore, herbal therapies

may still hold value as cost-effective and culturally acceptable treatment options, especially in developing countries.

Overall, while herbal interventions demonstrate potential benefits in reducing symptoms of OLP, the current evidence does not support their superiority over conventional corticosteroid therapy. Instead, they may serve as adjunctive treatments in selected cases. Continued research integrating molecular insights, clinical outcomes, and patient-centered approaches is essential to develop more effective and safer management strategies for OLP.

Conclusion

It has been observed that the existing systematic review does not find sufficient evidence to support most other herbal therapies, although two RCTs involving curcumin and aloe vera as herbal therapies have reported positive results in addressing the signs and symptoms of OLP. More studies under typical conditions (RCTs with low risk of bias) are required to confirm their usefulness.

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