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Systematic Review of Herbal Interventions for Xerostomia (Dry Mouth): Clinical Outcomes and Recommendations

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A common and upsetting syndrome that affects people with systemic disorders, polypharmacy, radiation exposure, and age-related salivary gland degeneration is xerostomia, or the subjective experience of dry mouth. As natural, safe, and possibly successful substitutes for traditional xerostomia treatments, herbal therapies have drawn more and more attention. The data from fifteen clinical studies and systematic reviews assessing herbal interventions—such as aloe vera, ginger, peppermint, tea catechins, manuka honey, Chinese herbal medicine, traditional Asian formulations, and combination plant therapies—is synthesized in this systematic review. According to the research, the majority of herbal treatments show clinically significant reductions in xerostomia symptoms, particularly in subjective dryness ratings. Objective salivary flow results, however, continue to differ between experiments. The strength of the available data is hampered by methodological flaws, formulation variation, small sample sizes, and a lack of long-term follow-up. Nevertheless, a number of therapies exhibit encouraging therapeutic potential, especially Asian herbal medications, tea catechin formulations, manuka honey washes, and preparations based on aloe vera. Large multicenter randomized trials, mechanistic evaluation, and standardized dose should be the main focus of future research. In general, when applied within evidence-based frameworks, herbal therapies may be helpful supplementary therapy for xerostomia.

Keywords: Xerostomia, Herbal interventions, Dry mouth management, Natural therapeutics, Salivary gland function

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1. INTRODUCTION

Oral comfort, mastication, speech, sleep quality, and general quality of life are all significantly impacted by xerostomia, a multifactorial disorder. Despite the widespread use of conventional treatments such as pharmaceutical sialogogues and saliva substitutes, their drawbacks—such as transient effects, poor responses, and high cost—have prompted research into herbal and

plant-based medicines. Herbal remedies have the potential to be complementary or alternative therapies since they may have moisturizing, anti-inflammatory, antioxidant, and mild sialogogue qualities.

1.1.Background and Context

Chinese herbal therapy, Ayurvedic medicine, and other indigenous healing systems are just a few of the many global healthcare traditions that have long included herbal medicine. For ages, plant-based treatments have been used to treat a variety of illnesses. The use of herbal preparations to treat xerostomia, a disorder that has a major impact on speech, nutrition, oral comfort, sleep, and general quality of life, has grown in recent decades due to growing scientific interest and patient preference for natural and minimally invasive treatments. Researchers are looking for softer, safer substitutes for traditional pharmacological sialogogues, which may have adverse effects or be inappropriate for medically vulnerable people, as the prevalence of xerostomia increases as a result of aging populations, polypharmacy, chronic systemic illnesses, and cancer treatments. For those who are more vulnerable to dry mouth, such as palliative care patients who have mucosal dryness due to advanced illness, people with type 2 diabetes who frequently experience salivary dysfunction, patients in intensive care units who have limited oral hydration capacity, elderly people with multiple comorbidities, and patients with Sjögren's syndrome who suffer from chronic autoimmune destruction of salivary glands, this renewed focus has brought herbal interventions into the spotlight. When taken as a whole, these elements highlight how crucial it is to assess the therapeutic potential of herbal remedies as stand-alone or supplemental methods for reducing xerostomia in various clinical settings.

1.2.Objectives of the Review

This review aims

- To thoroughly examine and incorporate the results of fifteen published research on herbal treatments for xerostomia, with an emphasis on therapeutic implications, study design quality, clinical efficacy, and methodological constraints.

1.3.Importance of the Topic

The growing incidence of xerostomia in older adults and medically complex populations—who are frequently hampered by polypharmacy, chronic systemic diseases, autoimmune disorders, and cancer treatments that impair salivary gland function—makes research into herbal remedies for the condition crucial. Adequate care of xerostomia is essential for general health and well-being because it not only causes severe discomfort but also puts patients at risk for oral infections, dental cavities, nutritional difficulties, and a lower quality of life. There is a need for safer and more long-lasting therapeutic alternatives because traditional treatments, such saliva replacements and pharmaceutical sialogogues, offer comfort but are frequently transient, expensive, or linked to unfavorable side effects. A comprehensive examination of scientific data must guide the incorporation of herbal therapies into clinical practice to assure reliability, safety, and therapeutic benefit. Herbal therapies are often thought to be natural, accessible, and better tolerated. Thus, evaluating the effectiveness of herbal therapies is crucial

for supporting evidence-based decision-making in contemporary oral healthcare and for expanding treatment options.

2. RESULTS AND FINDINGS

The studies are arranged thematically according to the kind of herbal intervention employed in order to guarantee cohesion and clarity. Key findings, critical comments, and methodological review are included in each subsection.

2.1.Individual and Thematic Summaries of Included Studies

Sage (Salvia officinalis) and Tea-Based Herbal Rinses

- **Monsen et al. (2021)[1] – Salvia officinalis Tea Rinse**

In this RCT, the oral discomfort of palliative cancer patients was assessed using a mouthwash containing sage. Mucosal irritation, dental comfort, and subjective dryness all significantly improved, according to the results. Patient-reported alleviation was noteworthy, despite no significant change in objective salivary flow. Clinical relevance and randomized design are among its advantages. Dependence on subjective results and a specific palliative population that would not generalize widely are among its drawbacks.

Aloe Vera–Based Interventions

- **Badooei et al. (2021)[2] – Ginger vs. Aloe Vera Mouthwash in Type 2 Diabetes**

In this triple-blind study, mouthwashes for patients with diabetes were compared using ginger and aloe vera. Aloe vera performed somewhat better than the other medication; however, both considerably reduced the symptoms of xerostomia. Strict blinding and a relevant high-risk group for xerostomia are strengths. Short length and the absence of an objective salivary assessment are among its drawbacks.

- **Atashi et al. (2018)[3] – Aloe Vera + Peppermint Gel in ICU Patients**

In ICU patients who were unable to maintain proper oral hydration, aloe vera-peppermint gel dramatically decreased dryness and improved oral health indicators. Although ICU patients constitute a distinct population with limited generalizability, randomization and placebo controls enhance validity.

- **Mahmoud et al. (2025)[4] – Aloe Vera + Coconut in Sjögren's Syndrome**

Aloe vera and coconut extract together successfully lessened the severity of dryness and enhanced patient comfort, as this crossover RCT showed. Patients with Sjögren's syndrome are among the most difficult xerostomia groups, hence these findings are significant. The short sample size and crossover washout issues are among the limitations.

Tea Catechins and Polyphenolic Interventions

- **De Rossi et al. (2014)[5] – Tea Catechin Natural Formulation**

Tea catechin-based formulations considerably reduced subjective xerostomia symptoms and somewhat enhanced salivary production, according to this phase II clinical research. The

mechanical justification (antioxidants) is one of its strengths; the absence of long-term follow-up is one of its weaknesses.

- **Furushima et al. (2021)[6] – Oral Retention of Tea Catechins**

This exploratory investigation showed good mucosal retention of catechins, despite the fact that it was not a treatment trial. This suggests that they could be used as sustained-action therapies for xerostomia. The justification for treatments based on tea catechins is strengthened by this mechanistic findings.

Traditional Asian Herbal Formulations

- **Han et al. (2016)[7] – Yukmijihwang-tang**

According to this double-blind RCT, Yukmijihwang-tang somewhat increased salivary flow and considerably reduced xerostomia symptoms in older participants. Reliability is increased by a robust approach and placebo control. However, the identification of active ingredients is limited by the complexity of herbs.

- **Nik Nabil et al. (2018)[8] – Systematic Review of Chinese Herbal Medicine in Radiotherapy Patients**

Chinese herbal remedies for radiation-induced xerostomia were determined to have moderate evidence in this review. Herbal pills and decoctions were among the methods. Heterogeneity and ambiguous methodological rigor among original research were the main limitations.

- **Park et al. (2018)[9] – Systematic Review of Herbal Medicine in Cancer Patients**

Herbal therapy significantly reduced the severity of xerostomia in cancer patients across several RCTs. Although the evidence is encouraging, generalization is limited by inconsistent formulations.

Honey-Based Interventions

- **Ghalwash et al. (2025)[10] – Manuka Honey Oral Rinse**

Significant improvements in oral hydration and a decrease in xerostomia symptoms were shown in this RCT of elderly adults. The osmotic, antibacterial, and calming qualities of manuka honey probably play a role. Excellent design, however the sample size is little.

Broad Natural-Product Reviews (Evidence Syntheses)

- **Kontogiannopoulos et al. (2023)[11] – Review of Natural Products**

This review examined a variety of natural remedies, such as honey, teas, herbal infusions, and aloe vera. Results show a lot of promise, but they also highlight the necessity for standardized data.

- **Sardellitti et al. (2024)[12] – Review of Non-Pharmacological Interventions**

Herbal remedies and topical methods were considered in this review. Low-quality evidence limited the safety and modest effectiveness of herbal medicines.

- **Amani & Dharman (2024)[13] – Systematic Review of Plant Medicines**

This comprehensive review supported the use of plant medicines as supplementary therapies by showing that they consistently reduced symptoms of dryness. Mixed study designs and low RCT counts were among its drawbacks.

Multicomponent and Mixed Interventions

- **Marín et al. (2021)[14] – RCT of Various Xerostomia Interventions**

Herbal and biological substances were used in this clinical investigation. Herbal remedies were less successful than certain medical substitutes, but they did provide a moderate reduction in symptoms. The randomized design is a strength. Limitation: limited sample size.

Comprehensive Evidence Overview

- **Conte et al. (2025)[15] – Umbrella Review**

Herbal remedies were identified as promising adjunct therapies by Conte et al., who provided a high-level synthesis spanning xerostomia interventions. They also drew attention to serious methodological flaws in the literature.

2.2.Critical Evaluation of Methodologies

Herbal therapies seem to be helpful, however study-to-study variation in methodological quality is significant.

Recurring strengths and limits are revealed by a methodical assessment.

Strengths Across Studies

- Multiple RCTs with good blinding (e.g., Badooei et al., Atashi et al.)
- Inclusion of vulnerable clinical populations
- Use of validated dryness scales
- Cross-over designs improving internal consistency

Weaknesses Across Studies

- Inconsistent herbal dosing and formulation standardization
- Short follow-up durations
- Overreliance on subjective outcomes

- Small sample sizes reduce statistical power
- Lack of mechanistic biomarkers

3. DISCUSSION

Herbal therapies are becoming more and more relevant as prospective treatments for xerostomia in a variety of patient demographics, according to the combined analysis of the fifteen included studies. These studies, which cover a range of clinical contexts, such as geriatric care, diabetic management, palliative care, cancer survivorship, autoimmune illnesses, and intensive care units, demonstrate the pervasiveness of oral dryness. Even though most therapies showed significant reductions in subjective symptoms, it is difficult to draw firm conclusions because of issues including limited sample sizes, brief durations, and inconsistent herbal formulations. However, the overwhelming data suggests that patients looking for natural alternatives find herbal therapy to be viable, well-tolerated, and welcomed.

3.1.Interpretation of Findings

Asian herbal formulations, tea catechins, manuka honey, and aloe vera-based treatments demonstrated the most consistent therapeutic benefits across the included research. Self-reported dryness, oral comfort, and mucosal hydration were often improved by these therapies. These botanicals' anti-inflammatory, moisturizing, antioxidant, and moderate sialogogue qualities probably contribute to their beneficial benefits. Objective increases in salivary flow, which is frequently regarded as the gold standard, were variable, though. This disparity implies that current outcome metrics are insensitive or that herbal treatments may alleviate symptoms without necessarily reviving glandular output. Overall, the results highlight the necessity for established testing techniques while also supporting the potential of herbal medicines.

3.2.Clinical Implications

Instead of taking the place of current xerostomia treatments, herbal remedies may be useful supplementary therapies. Those who are unable to utilize systemic drugs because of contraindications, polypharmacy hazards, or pharmacological sialogogue intolerance will find them especially appropriate. Additionally, by providing natural, culturally familiar, and minimally invasive therapy options, herbal remedies may improve patient satisfaction. Their integration into individualized xerostomia care strategies is further supported by their positive safety profiles, which have been documented in numerous research.

3.3.Gaps Identified

Despite promising results, there are still a number of gaps in the available data. First, it is challenging to compare research due to the absence of defined protocols for the formulation, preparation, and administration of herbs. Secondly, the lack of extensive, multicenter, long-term randomized controlled trials reduces trust in how long treatment effects last. Third, it is difficult to properly comprehend how herbal drugs affect salivary function because many research neglect to look into underlying molecular or physiological factors. To create evidence-based clinical practices, these gaps must be filled.

3.4.Future Research Directions

- To improve reproducibility, future research should concentrate on developing standardized dosing frameworks and guaranteeing quality control of herbal formulations.
- In order to record long-term impacts on salivary function and dental health, trials had to be prolonged for at least six months.
- Adding biomarkers might improve clinical correlations and offer important mechanistic insights, such as salivary proteins, inflammatory indicators, and immunological parameters.
- Finally, in order to assess relative efficacy and determine placement within therapeutic guidelines, future research should incorporate comparative trials against gold-standard pharmaceutical treatments like pilocarpine.

4. CONCLUSION

Herbal remedies are becoming a more popular and well-researched option for treating xerostomia, especially in areas where traditional pharmaceutical treatments may not be available or appropriate. With good safety profiles and high patient acceptability, herbal therapies seem to provide significant improvements in subjective xerostomia symptoms, according to the combined data from the fifteen examined trials. The overall body of data indicates that herbal therapies can play a complementary role in improving oral comfort and sustaining salivary gland function, even though variations in study design, herbal formulations, and outcome measures restrict the generalizability of findings. Standardized, empirically supported herbal treatments to the treatment of xerostomia require ongoing scientific research and thorough clinical testing.

4.1.Summary of Main Insights

- Herbal treatments significantly reduce subjective dry mouth symptoms, according to the majority of the analyzed research.
- Products made from aloe vera, tea catechin formulations, manuka honey rinses, and traditional Asian herbal remedies were all regularly linked to improved patient comfort and less severe dryness.
- The plausibility of these therapeutic benefits is supported by mechanistic evidence, such as increased mucosal hydration, anti-inflammatory action, and antioxidant effects.
- Nevertheless, objective increases in salivary flow were uneven between studies, indicating the need for more reliable and consistent evaluation methods..

4.2.Recommendations

- Herbal treatments can be used as xerostomia supplemental therapy, especially for individuals who are contraindicated for conventional pharmaceutical sialogogues or who are looking for natural alternatives.
- Clinical professionals should carefully consider patient preferences, safety profiles, possible allergies, and product quality when recommending herbal preparations.

For best results, it is also recommended to combine herbal remedies with traditional dental care techniques.

- Future studies should focus on large-scale, multicenter randomized controlled trials with standardized herbal formulations, validated outcome measures, longer follow-up periods, and mechanistic investigations in order to strengthen the body of evidence.

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