

## RESEARCH ARTICLE

# The Role of Curcumin and Neem in the Form of Mouthwash in the Treatment of Aphthous Ulcer in the Oral Cavity

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## ABSTRACT

**Background:** Aphthous ulcers are common painful lesions that affect the oral mucosa. Traditional treatments often include topical agents to reduce inflammation and promote healing. Curcumin and neem are two natural compounds with known anti-inflammatory and antimicrobial properties, which may offer therapeutic benefits in the treatment of aphthous ulcers.

**Materials and Methods:** Aphthous ulcers were the target of this research, which sought to determine if a mouthwash containing curcumin and neem was effective in treating them. About 100 people with aphthous ulcers were part in a randomized controlled experiment. Participants were divided into two groups: one receiving the curcumin and neem mouthwash and the other receiving a placebo mouthwash. Treatment was administered twice daily for two weeks. Pain scores, ulcer size, and healing time were recorded at baseline and throughout the study period.

**Results:** When compared to the placebo group, the group that received the mouthwash containing curcumin and neem showed a substantial decrease in pain levels ( $p < 0.05$ ). In the treatment group, the size of the ulcer reduced by 50%, whereas in the control group, it fell by 20% ( $p < 0.01$ ). Ulcers in the treatment group healed an average of seven days faster than in the control group, which took twelve days.

**Conclusion:** According to the results of this research, a mouthwash that contains curcumin and neem might help alleviate discomfort, speed up the healing process, and ultimately speed up the treatment of oral aphthous ulcers. We need more studies to figure out what's going on and how to make the best treatments.

**Keywords:** Aphthous ulcers, Curcumin, Neem, Mouthwash, Inflammation, Healing.

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## INTRODUCTION

The most prevalent oral mucosal disease is aphthous ulcers, sometimes called recurrent aphthous stomatitis (RAS). These painful ulcers may be round or oval in shape and impact the non-keratinized mucosa of the mouth.<sup>1</sup> These ulcers can significantly impair the quality of life due to pain and discomfort during eating, speaking, and oral hygiene practices.<sup>2</sup> Traditional treatment options for aphthous ulcers include topical corticosteroids, analgesics, and antimicrobial agents to reduce inflammation, relieve pain, and promote ulcer healing.<sup>3</sup> However, these treatments may have limitations such as adverse effects or limited efficacy.<sup>4</sup>

Curcumin, a bioactive compound derived from the rhizome of *Curcuma longa*, has gained attention for its

potent anti-inflammatory, antioxidant, and antimicrobial properties.<sup>5</sup> Studies have demonstrated its efficacy in various inflammatory conditions, including oral mucosal lesions.<sup>6</sup> Neem (*Azadirachta indica*), a tree native to the Indian subcontinent, is another natural product known for its antimicrobial and anti-inflammatory effects.<sup>7</sup>

The combination of curcumin and neem in the form of a mouthwash presents a promising therapeutic approach for aphthous ulcers. Curcumin's anti-inflammatory properties may help alleviate pain and reduce inflammation, while neem's antimicrobial activity could aid in preventing secondary infections and promoting ulcer healing.<sup>8</sup>

Despite the potential benefits, limited research has been conducted on using curcumin and neem mouthwash specifically

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for treating aphthous ulcers. Therefore, The purpose of this research is to determine if a mouthwash that contains curcumin and neem is effective in alleviating pain and, speeding up the healing process, and improving outcomes in individuals with aphthous ulcers.

## MATERIAL AND METHODS

The effectiveness of a mouthwash containing curcumin and neem in treating aphthous ulcers was examined in this research using a randomized, double-blind, placebo-controlled clinical trial design. A total of 100 participants aged 18 to 65 years with diagnosed aphthous ulcers were recruited from the outpatient department of a dental clinic. Informed consent was obtained from all participants before enrollment.

Participants were randomly assigned to one of two groups: the treatment group receiving the curcumin and neem mouthwash or the control group receiving a placebo mouthwash. The mouthwash solutions were identical in appearance and taste to maintain blinding. Each participant was given 10 mL of mouthwash and told to rinse their mouth twice a day for two weeks.

At the beginning of the study, baseline data, including ulcer size (measured in mm using a calibrated probe) and pain scores (assessed using a visual analog scale) were recorded for each participant.

### Follow-up Assessments

Ulcer size and pain scores were reassessed at days 3, 7, and 14 of the study period.

Reduction in pain scores were checked from baseline to day 14. Changes in ulcer size and healing time were also accessed.

Statistical tests were used to examine the data. T-tests or Mann-Whitney U tests were used for continuous variables, and for categorical variables, Chi-square tests were used. Statistical significance was determined by  $p$ -values  $> 0.05$ .

## RESULT AND DISCUSSION

Over the course of the trial, individuals in the treatment group reported significantly lower pain ratings than those in the control group ( $p < 0.05$ ), according to the data. At each follow-up evaluation, there were statistically significant differences between the treatment group and the control group in terms of the rate of ulcer size reduction ( $p < 0.01$ ) (Tables 1 and 2).

These findings suggest that the curcumin and neem mouthwash effectively alleviated pain and accelerated the healing process of aphthous ulcers in the oral cavity. Further

**Table 2:** Comparison of pain scores and ulcer size between treatment and control groups

Day of assessment	Pain score (Mean $\pm$ SD)	Ulcer size (Mean $\pm$ SD)
Day 3	Treatment: 4.2 $\pm$ 0.8	Treatment: 5.2 $\pm$ 1.0
	Control: 6.5 $\pm$ 1.2	Control: 6.1 $\pm$ 1.3
Day 7	Treatment: 2.1 $\pm$ 0.5	Treatment: 3.5 $\pm$ 0.8
	Control: 5.2 $\pm$ 0.9	Control: 5.9 $\pm$ 1.1
Day 14	Treatment: 0.5 $\pm$ 0.3	Treatment: 1.2 $\pm$ 0.4
	Control: 3.8 $\pm$ 0.7	Control: 4.8 $\pm$ 0.9

analysis of secondary outcomes and subgroup analyses may provide additional insights into the mechanisms of action and potential benefits of this treatment approach.

## DISCUSSION

Research like this suggests that a mouthwash with curcumin and neem might help heal aphthous ulcers.

When comparing the treatment group to the control group, participants in the treatment group reported much less pain and smaller ulcers. These findings point to the possibility that curcumin and neem's anti-inflammatory and antibacterial characteristics are responsible for the therapeutic benefits. Turmeric (*C. longa*) contains the bioactive compound curcumin, which has been studied in considerable detail on its anti-inflammatory benefits.<sup>1</sup> It has been shown to modulate various inflammatory pathways and inhibit the production of pro-inflammatory cytokines, thereby reducing inflammation and pain.<sup>2</sup> Additionally, curcumin's antioxidant properties may promote tissue repair and regeneration, facilitating the healing process of oral ulcers.<sup>3</sup>

Neem (*A. indica*) is another natural product with potent antimicrobial and anti-inflammatory effects.<sup>4</sup> The antibacterial activity of neem extracts has been shown to be effective against several pathogens, including fungi and bacteria that are often linked to oral diseases.<sup>5</sup> Furthermore, neem's anti-inflammatory properties may help alleviate symptoms associated with oral mucosal lesions, such as pain and swelling.<sup>6</sup>

The combination of curcumin and neem in a mouthwash formulation offers a synergistic approach to addressing the multifactorial etiology of aphthous ulcers. By simultaneously targeting inflammation and microbial colonization, this treatment modality may provide more comprehensive relief of symptoms and promote faster healing of ulcers.

Although the study's findings are encouraging, it's vital to keep in mind that there are some caveats. Both the sample size and the length of the investigation were somewhat limited. To assess the long-term effectiveness and safety of neem and curcumin mouthwash in the treatment of aphthous ulcers, bigger sample size studies are required. Additionally, future research could explore the mechanisms of action underlying the observed therapeutic effects and investigate potential interactions with other medications or treatments.

**Table 1:** Baseline characteristics of participants

Characteristic	Treatment group (n = 50)	Control group (n = 50)
Age (years), Mean $\pm$ SD	35.4 $\pm$ 8.2	36.1 $\pm$ 7.9
Gender (Male/Female)	25/25	27/23
Ulcer Size (mm), Mean $\pm$ SD	6.8 $\pm$ 1.5	6.5 $\pm$ 1.3
Pain Score (0-10), Mean $\pm$ SD	7.2 $\pm$ 1.1	7.4 $\pm$ 1.0"

## CONCLUSION

Finally, this research provided further evidence that a mouthwash containing curcumin and neem might be an effective therapy for oral aphthous ulcers. If we want to confirm these results and make treatment regimens better for real people, we need to do further study.

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