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Clinical Outcomes Of Curcumin And Ornidazole Gel As Adjuncts To Nonsurgical Periodontal Therapy

¹Payal Ramteke*, ²Abhay Kolte, ³Suchita Sharma, ⁴Arif Awati, ⁵Shivani Kondhalkar, ⁶Bhuvan Nagpal

¹Assistant Professor, Department of Dentistry, GGMC and JJ Hospital, Mumbai, Maharashtra.

²Professor and Head, Department of Periodontology, Ranjeet Deshmukh Dental College and Research Centre, Nagpur, Maharashtra.

³Associate Professor, Department of Prosthodontics and Crown and Bridge and Oral Implantology, Rajasthan Dental College and Hospital, Jaipur, Rajasthan

⁴Assistant Professor, Department of Oral Medicine and Radiology, Al- Ameen Dental College and Hospital, Bijapur, Karnataka.

⁵Assistant Professor, Department of Periodontology, Sinhgad Dental College and Hospital, Pune, Maharashtra

⁶Director & Sr. Oral Pathologist, Centre for Oral Pathology and Maxillofacial Diagnostics, Hisar, Haryana.

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ABSTRACT

Background: Local drug delivery systems are frequently used as adjuncts to scaling and root planing (SRP) to improve clinical outcomes in the management of chronic periodontitis. Curcumin, a naturally derived anti-inflammatory and antimicrobial agent, has emerged as a potential alternative to conventional antimicrobials such as ornidazole.

Aim: To comparatively evaluate the clinical efficacy of curcumin gel and ornidazole gel as adjuncts to nonsurgical periodontal therapy in patients with chronic periodontitis.

Materials and Methods: This randomized split-mouth clinical study was conducted on twenty systemically healthy individuals of both sexes aged 30–45 years, diagnosed with chronic periodontitis and presenting with bilateral periodontal pockets ≥ 5 mm. Following full-mouth scaling and root planing, curcumin gel and ornidazole gel were locally delivered into periodontal pockets in symmetric quadrants. Clinical parameters including plaque index (PI), probing pocket depth (PPD), and clinical attachment level (CAL) were recorded at baseline and at 30 days post-treatment.

Results: Both treatment groups showed significant improvement in all clinical parameters at the 1-month follow-up. However, sites treated with curcumin gel demonstrated a statistically greater reduction in PPD and PI, along with superior CAL gain, compared to sites treated with ornidazole gel.

Conclusion: Within the limitations of the present study, curcumin gel showed more favorable clinical outcomes than ornidazole gel when used as an adjunct to scaling and root planing. Curcumin may therefore be considered an effective and biocompatible adjunct in the nonsurgical treatment of chronic periodontitis.

Introduction

Chronic periodontitis is a prevalent inflammatory disease characterized by the progressive destruction of the supporting structures of the teeth, ultimately leading to tooth loss if left

untreated.¹ The disease results from a complex interaction between pathogenic microorganisms in the dental biofilm and the host immune response, producing sustained inflammation and tissue breakdown. Effective control of microbial plaque remains the cornerstone of periodontal

therapy.^{2,3}

Scaling and root planing (SRP) is the gold standard nonsurgical approach for the management of chronic periodontitis and is effective in reducing microbial load and periodontal inflammation. However, mechanical debridement alone may be insufficient to completely eliminate pathogenic bacteria, particularly in deep periodontal pockets, furcation areas, and anatomically complex root surfaces. Residual microorganisms may persist in these sites, compromising long-term treatment outcomes.^{4,5}

To overcome these limitations, adjunctive therapies such as local drug delivery systems have been introduced to enhance the efficacy of SRP. Local delivery allows high concentrations of therapeutic agents to be administered directly into periodontal pockets while minimizing systemic exposure and adverse effects. Among the various agents available, antimicrobials such as ornidazole have been widely used due to their effectiveness against obligate anaerobic periodontal pathogens.^{6,7}

Recently, there has been growing interest in herbal and naturally derived therapeutic agents owing to their anti-inflammatory, antimicrobial, antioxidant, and biocompatible properties. Curcumin, a polyphenolic compound derived from *Curcuma longa*, has demonstrated significant antimicrobial and anti-inflammatory effects, along with the ability to modulate host immune responses and promote wound healing. These properties make curcumin a promising adjunct in periodontal therapy.⁸

Although both curcumin and ornidazole have been individually shown to improve periodontal outcomes when used as local drug delivery agents, limited clinical evidence is available directly comparing their effectiveness in the treatment of chronic periodontitis. Therefore, the present study was undertaken to comparatively evaluate the clinical efficacy of curcumin gel and ornidazole gel as adjuncts to scaling and root planing in the management of chronic periodontitis.

Material and Method

A single-blind, randomized clinical study was conducted to evaluate and compare clinical healing following a single intrasulcular application of commercially available curcumin gel (*Curcuma longa* extract 10 mg; Curenex, Abbott Healthcare Limited, Mumbai, India) and ornidazole gel (1.0% ornidazole with 0.25% chlorhexidine gluconate as a preservative; Ornigreat, Mankind Pharma Limited, New Delhi, India) in periodontal pockets previously treated with scaling and root planing (SRP).

The sample size was determined based on a statistician's recommendation to achieve adequate statistical power. Accordingly, twenty patients (10 males and 10 females)

aged 30–45 years, diagnosed with chronic periodontitis and presenting with periodontal pockets >5 mm, were recruited from patients attending the Department of Periodontics.

Written informed consent was obtained from all participants prior to enrollment. The study protocol was reviewed and approved by the Institutional Ethics Committee, and the study was conducted in accordance with ethical guidelines.

Systemically healthy patients diagnosed with chronic periodontitis and presenting with periodontal pocket depths of 5–7 mm in at least three nonadjacent sites located in different quadrants of the mouth were included in the study. Only patients with a minimum of 20 natural teeth who were cooperative, motivated, and willing to follow oral hygiene instructions were selected. Written informed consent was obtained from all participants prior to their inclusion in the study. Patients who had received antibiotic therapy within the previous one month, pregnant or lactating women, and individuals with a history of tobacco smoking were excluded from the study.

All participants enrolled in the study underwent supragingival scaling and received standardized oral hygiene instructions prior to the commencement of the study. Customized acrylic stents were fabricated for the selected test sites to ensure reproducibility and standardization of clinical measurements. Following isolation with cotton rolls and gentle air drying, the assigned test gels were administered into the periodontal pockets, after which a periodontal dressing was placed.

For each participant, two experimental sites with probing pocket depths (PD) >5 mm located in symmetric quadrants were selected after scaling and root planing. These sites were randomized at the split-mouth level using a coin toss and allocated into two groups. Group I received ornidazole gel, which was delivered directly into the periodontal pocket using a syringe. Group II received curcumin gel, which was placed into the periodontal pocket until complete filling was achieved. Subgingival drug delivery in both groups was performed using a 2-ml disposable syringe fitted with a blunt needle bent at an angle of 130°, ensuring atraumatic placement of the gel without damaging the periodontal tissues.

Following application of the local drug delivery system, the treated sites were secured with a periodontal pack. Participants were instructed to avoid chewing hard foods that could traumatize the gingiva and to refrain from brushing the treated areas for 12 hours. They were further advised not to floss or use interproximal cleaning aids for 10 days and to avoid the use of any mouthwash throughout the study period. Periodontal dressing was removed on the seventh day.

Clinical parameters, including plaque index, probing pocket depth, and relative attachment level, were recorded at baseline and at 30 days by a single examiner who was blinded to the treatment allocation. No adverse effects such as pain

or discomfort were reported by any participant, and healing was uneventful in all cases.

Statistical Analysis

The collected data were compiled and analyzed using statistical software. Descriptive statistics, including mean and standard deviation, were calculated for all clinical parameters. Intragroup comparisons between baseline and 1-month values were performed using the paired t-test, while intergroup comparisons between the curcumin and ornidazole groups were carried out using the unpaired t-test. A *p*-value of <0.05 was considered statistically significant.

Result

All twenty participants completed the study, and no dropouts

or adverse effects were reported. Baseline values of plaque index, probing pocket depth, and clinical attachment level were comparable between the two groups (*p* > 0.05).

At the 1-month follow-up, both groups showed statistically significant improvement in all clinical parameters compared to baseline (*p* < 0.05). In the ornidazole group, reductions were observed in plaque index (2.21 ± 0.34 to 1.48 ± 0.29), probing pocket depth (6.12 ± 0.54 mm to 4.72 ± 0.49 mm), and clinical attachment level (6.48 ± 0.61 mm to 5.32 ± 0.57 mm). The curcumin group demonstrated greater reductions in plaque index (2.19 ± 0.31 to 1.12 ± 0.26) and probing pocket depth (6.10 ± 0.50 mm to 4.10 ± 0.44 mm), along with superior clinical attachment gain (6.45 ± 0.58 mm to 4.88 ± 0.52 mm). (Table 1)

Intergroup comparison revealed significantly greater improvement in all parameters in the curcumin group compared to the ornidazole group at 1 month (*p* < 0.05). (Table 2)

Table 1: Intragroup Comparison of Clinical Parameters at Baseline and 1 Month

Clinical Parameter	Group	Baseline (Mean ± SD)	1 Month (Mean ± SD)	p-value
Plaque Index (PI)	Ornidazole	2.21 ± 0.34	1.48 ± 0.29	p-value
	Curcumin	2.19 ± 0.31	1.12 ± 0.26	<0.05*
Probing Pocket Depth (mm)	Ornidazole	6.12 ± 0.54	4.72 ± 0.49	<0.05*
	Curcumin	6.10 ± 0.50	4.10 ± 0.44	<0.05*
Clinical Attachment Level (mm)	Ornidazole	6.48 ± 0.61	5.32 ± 0.57	<0.05*
	Curcumin	6.45 ± 0.58	4.88 ± 0.52	<0.05*

Table 2. Intergroup Comparison of Clinical Parameters at 1 Month

Clinical Parameter	Ornidazole (Mean ± SD)	Curcumin (Mean ± SD)	p-value
Plaque Index (PI)	1.48 ± 0.29	1.12 ± 0.26	<0.05*
Probing Pocket Depth (mm)	4.72 ± 0.49	4.10 ± 0.44	<0.05*
Clinical Attachment Level (mm)	5.32 ± 0.57	4.88 ± 0.52	<0.05*
Plaque Index (PI)	1.48 ± 0.29	1.12 ± 0.26	<0.05*

*=Significant

Discussion

Chronic periodontitis is a multifactorial inflammatory disease in which microbial plaque plays a primary etiologic role, leading to progressive destruction of the periodontal supporting tissues.⁹ Scaling and root planing remains the cornerstone of nonsurgical periodontal therapy; however, its effectiveness may be limited in deep periodontal pockets where complete elimination of pathogenic microorganisms is difficult.¹⁰ To overcome these limitations, local drug delivery systems have been widely advocated as adjuncts to SRP, as they provide high concentrations of therapeutic agents directly at the site of infection while minimizing systemic side effects.¹⁰

In the present study, both curcumin gel and ornidazole

gel, when used as adjuncts to SRP, resulted in significant improvements in plaque index, probing pocket depth, and clinical attachment level at the 1-month follow-up. These findings support the effectiveness of local drug delivery agents in enhancing periodontal healing following nonsurgical therapy.

The ornidazole group demonstrated significant clinical improvement, which may be attributed to its antimicrobial activity against obligate anaerobic bacteria commonly associated with periodontal disease. Ornidazole disrupts microbial DNA synthesis, thereby reducing bacterial load within periodontal pockets.^{11,12} The observed reductions in probing depth and improvements in clinical attachment level in this group are consistent with previous studies that have reported favorable outcomes with nitroimidazole derivatives

used as local drug delivery agents.

Notably, the curcumin group exhibited significantly greater improvement in all evaluated clinical parameters compared to the ornidazole group. Curcumin possesses a broad range of biological properties, including anti-inflammatory, antimicrobial, antioxidant, and immunomodulatory effects. Its ability to inhibit pro-inflammatory mediators, reduce oxidative stress, and modulate host immune response may explain the superior clinical outcomes observed in this study. In addition, curcumin has been reported to promote wound healing and tissue regeneration, which could contribute to enhanced clinical attachment gain.¹³⁻¹⁶

The greater reduction in plaque index observed in the curcumin group may also be related to its antimicrobial efficacy against periodontal pathogens, along with its substantivity within the periodontal pocket. Unlike conventional antimicrobials, curcumin is biocompatible and associated with minimal adverse effects, which further supports its use as a potential alternative adjunct in periodontal therapy.

The split-mouth design used in the present study helped minimize interindividual variability and allowed direct comparison of the two agents under similar oral conditions. However, certain limitations should be acknowledged. The relatively small sample size and short follow-up period may limit the generalizability of the results. Furthermore, microbiological and radiographic assessments were not included, which could have provided additional insight into the mechanisms underlying the observed clinical improvements.

Conclusion

Within these limitations, the findings of the present study suggest that curcumin gel is more effective than ornidazole gel as an adjunct to scaling and root planing in the management of chronic periodontitis. Further long-term studies with larger sample sizes and additional outcome measures are recommended to validate these results and to establish curcumin as a routine adjunct in nonsurgical periodontal therapy.

References

Könönen E, Gursoy M, Gursoy UK. Periodontitis: A Multifaceted Disease of Tooth-Supporting Tissues. *J Clin Med*. 2019 Jul 31;8(8):1135.
Eke P.I., Dye B.A., Wei L., Thornton-Evans G.O., Genco R.J. Prevalence of periodontitis in adults in the United States: 2009 and 2010. *J. Dent. Res*. 2012;91:914–920.

Kassebaum N.J., Bernabé E., Dahiya M., Bhandari B., Murray C.J., Marcenes W. Global burden of severe periodontitis in 1990–2010: A systematic review and meta-regression. *J. Dent. Res*. 2014;93:1045–1053.
Sanz I, Alonso B, Carasol M, Herrera D, Sanz M. Nonsurgical treatment of periodontitis. *J Evid Based Dent Pract*. 2012 Sep;12(3 Suppl):76-86.
Yashima A, Gomi K, Maeda N, Arai T. One-stage full-mouth versus partial-mouth scaling and root planing during the effective half-life of systemically administered azithromycin. *J Periodontol*. 2009 Sep;80(9):1406-13.
Amato M, Santonocito S, Polizzi A, Tartaglia GM, Ronsivalle V, Viglianisi G, Grippaudo C, Isola G. Local Delivery and Controlled Release Drugs Systems: A New Approach for the Clinical Treatment of Periodontitis Therapy. *Pharmaceutics*. 2023 Apr 21;15(4):1312.
Deasy P.B., Collins A.E., MacCarthy D.J., Russell R.J. Use of strips containing tetracycline hydrochloride or metronidazole for the treatment of advanced periodontal disease. *J. Pharm. Pharmacol*. 1989;41:694–699.
Amerikanou C, Papada E. Plant-Derived Natural Products and Their Biomedical Properties: Recent Advances and Future Directions. *Life (Basel)*. 2023 Oct 23;13(10):2105.
Gasner NS, Schure RS. Periodontal Disease. 2025 May 12. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. PMID: 3211947
Cobb CM. Clinical significance of non-surgical periodontal therapy: an evidence-based perspective of scaling and root planing. *J Clin Periodontol*. 2002 May;29 Suppl 2:6-16.
Pradeep AR, Kalra N, Priyanka N, Naik SB. Microbiological outcomes of systemic ornidazole use in chronic periodontitis. Part II. *J Int Acad Periodontol*. 2012 Apr;14(2):50-4.
Gautami. S. Penmetsa, Bhavana. P, Arunbhupati. P, Meghana. K, Kausalya. P, Venkatalakshmi. M. Comparative Evaluation of the Clinical efficacy of 3% Satranidazole and 1% Ornidazole (Ornigreat™) gel through local drug delivery system in the treatment of Chronic periodontitis. *Research J. Pharm. and Tech*. 2020; 13(8):3675-3680.
Varghese M, Nagarathna CV, Scaria L. Curcumin and metronidazole in periodontal therapy. *Int J Res Ayurveda Pharm* 2014;5:680-4.
Ravishankar PL, Kumar YP, Anila EN, Chakraborty P, Malakar M, Mahalakshmi R. Effect of local application of curcumin and ornidazole gel in chronic periodontitis patients. *Int J Pharma Investig* 2017;7:188-92.
Mottlerlini R, Foresti R, Bassi R, Green CJ. Curcumin, an antioxidant and anti-inflammatory agent, induces heme oxygenase-1 and protects endothelial cells against oxidative stress. *Free Radic Biol Med* 2000;28:1303-12.
Gupta HL, Bhatt S, Patel V, Gill S, Bai PK, Sagar S. Effect of immediate versus delayed chlorhexidine rinse on post-extraction pain: a randomized clinical study. *Academia Journal of Medicine*. 2026;9(1):48-51.