



Pocket-Specific Healing: Redefining Periodontal Therapy with Curenext and Orngreat Gels

Veda Sri Gutta¹, P. Lakshmi Preethi², Venkata Naga Sri Harsha Anumolu³, M. Sathish⁴, M.V. Ramoji Rao⁵, Lingam Venkata Sai Pavan Kumar⁶, B. Gayathri⁷

¹Department of Periodontics and Implantology,

^{2,3,4} Associate Professor, Department of Periodontics and Implantology, ⁵ Professor and HOD, Department of Periodontics and Implantology, ^{6,7} Postgraduate student, Department of Periodontics and Implantology,

Drs. Sudha & Nageswara Rao Siddhartha Institute of Dental Sciences, Andhra Pradesh, India

Corresponding Author: Veda Sri Gutta

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ABSTRACT

Introduction: Periodontal disease is a chronic inflammatory disease of periodontium. Conventional therapy (SRP) is the gold standard to manage chronic periodontitis. However, it does not remove all pathogenic bacteria successfully from the subgingival sites. Local drug delivery systems have been found beneficial due to direct access to target site which is usually non-responsive to conventional therapy. Curcumin has been generating much interest in the field of periodontics as it has anti-inflammatory, antimicrobial properties. Ornidazole, a member of the nitroimidazole class of antibiotics, specifically targets anaerobic microorganisms. It acts by inhibiting DNA synthesis leading to strand breakage and cell death. Hence, it has both antimicrobial and mutagenic effects.

Objective: To evaluate the efficacy of subgingivally delivered Curenext gel and Orngreat gel in the treatment of chronic periodontitis.

Methodology: Twenty chronic periodontitis patients with pocket depth of ≥ 5 mm bilaterally at least in one site were included in the study. After a thorough nonsurgical periodontal therapy, Orngreat gel and curenext gel were subgingivally delivered into the pocket sites, and the clinical parameters such as plaque index, gingival index and probing depth were evaluated at baseline and at 4 weeks.

Results: The curenext group had a substantial decrease in pocket PD, plaque index, and gingival index at the one-month evaluation when compared to the orngreat group.

Conclusion: Curcumin was shown to have a more profound effect on chronic periodontitis when compared to ornidazole, thus giving us a more favorable treatment outcome when used as a local drug delivery agent.

Keywords: Local drug delivery, Curenext, Orngreat, Periodontal pocket.

I. INTRODUCTION

Periodontal disease is a chronic inflammatory condition affecting the supporting structures of the teeth, caused by microbial biofilms that trigger host immune responses, leading to tissue destruction and tooth loss. Conventional treatment, including scaling and root planing, aims to reduce bacterial load, but often fails in deep or difficult-to-access periodontal pockets, resulting in incomplete healing or recurrence.

To improve outcomes, local drug delivery systems have been developed to provide high concentrations of therapeutic agents directly within the periodontal pocket. Gel-based formulations are especially effective, as they adhere to the pocket lining, allow sustained release, and promote site-specific healing, complementing conventional mechanical therapy. **Curenext** is a curcumin-based gel designed for localized periodontal therapy. **Curcumin**, its active component, exhibits anti-inflammatory, antioxidant, antimicrobial, and regenerative properties, making it particularly effective in managing periodontal disease. It works by modulating the host inflammatory response, specifically by inhibiting NF- κ B and other inflammatory signaling pathways, which reduces the production of pro-inflammatory cytokines such as IL-1 β , TNF- α , and IL-6. Additionally, curcumin suppresses matrix metalloproteinases (MMPs), enzymes responsible for collagen breakdown, while promoting collagen synthesis and tissue repair, supporting regeneration of periodontal structures. It also has antimicrobial activity against key periodontal pathogens, including *Porphyromonas gingivalis* and *Aggregatibacter actinomycetemcomitans*, and disrupts biofilm formation within periodontal pockets. Its antioxidant effect helps neutralize reactive oxygen species generated during inflammation, preventing further tissue damage.



Formulated as a gel, Curenext allows sustained, site-specific drug delivery, maintaining high therapeutic concentrations directly within the periodontal pocket, enhancing clinical outcomes such as pocket depth reduction, improved attachment levels, and gingival healing, making it an effective adjunct to conventional mechanical therapy.

Ornigreat is a gel-based local drug delivery system containing **Ornidazole** (1% w/w), a nitroimidazole antibiotic effective against anaerobic periodontal pathogens. It also include chlorhexidine gluconate (0.25% w/w), a broad-spectrum antiseptic. The active ingredients are suspended in a bioadhesive gel matrix with polymers and stabilizers, allowing adhesion to the pocket lining and sustained, controlled release. Once applied into the periodontal pocket, Ornigreat targets both microbial and host-mediated factors. Ornidazole kills anaerobic pathogens by disrupting bacterial DNA, while chlorhexidine controls plaque and residual bacteria. The gel also reduces inflammation by lowering pro-inflammatory cytokines (IL-1 β , TNF- α , IL-6) and suppressing matrix metalloproteinases (MMPs), while promoting fibroblast activity and collagen synthesis. Its bioadhesive, sustained-release formulation ensures prolonged pocket contact, enhancing healing, reducing pocket depth, and improving clinical attachment when used with conventional therapy.

Therefore, the aim of the present study was to "evaluate the efficacy of subgingivally delivered Curenext gel and Ornigreat gel in the treatment of chronic periodontitis."

II. MATERIALS & METHODS

To achieve the primary objective of the study, 20 subjects with chronic periodontitis presenting to the Department of Periodontics at Drs. Sudha and Nageswara Rao Siddhartha Institute of Dental Sciences were enrolled. The study was approved by the Institutional Ethical Committee. Written informed consent was obtained from all participants prior to data collection.

Inclusion Criteria:

- Patients aged 25–60 years with chronic periodontitis.
- Presence of bilateral periodontal pockets ≥ 5 mm in at least one site.
- Systemically healthy individuals willing to provide written informed consent.

Exclusion Criteria:

- Uncontrolled systemic diseases.
- Pregnant women and lactating mothers.
- Usage of antibiotics 1 month prior to the study.
- Allergy to curcumin, ornidazole, or any component of the study gels.
- Smokers or tobacco users.

Study design:

Twenty patients with chronic periodontitis and bilateral periodontal pockets ≥ 5 mm in at least one site were enrolled. All patients underwent a thorough nonsurgical periodontal therapy (NSPT), which included scaling and root planing using ultrasonic and hand instruments to remove supra- and subgingival plaque and calculus. Following NSPT, the test sites received subgingival application of Ornigreat gel and Curenext gel. The gels were delivered using a syringe with a blunt cannula, ensuring placement directly into the periodontal pockets. Care was taken to avoid contamination of adjacent tissues, and the gels were allowed to remain in situ for sustained local action. Oral hygiene instructions were reinforced to ensure optimal plaque control throughout the study period.

Clinical parameters:

Plaque Index, Gingival Index, and Probing Depth, were recorded at baseline and 4 weeks post-treatment by a single calibrated examiner. Changes in parameters were analyzed to assess the efficacy of the gels in reducing inflammation and improving periodontal healing.





Curenex Group



Baseline



Curenex gel placed subgingivally



4 weeks

Ornigreat Group



Baseline



Ornigreat gel placed subgingivally.



4 weeks

Statistical Analysis

The collected data were entered into Microsoft Excel. The mean & standard deviation were calculated. Descriptive statistics and inferential statistics such as independent t test were performed. Intergroup comparison was done with independent t-test.

III. RESULT

Intragroup Comparison of GI, PI, and BOP at Baseline and 4 weeks: [Table 1] Both Curenext and Orngreat groups showed significant improvements in Gingival Index (GI), Plaque Index (PI), and Probing Depth (PD) from baseline to 4 weeks ($p < 0.001$).

- GI decreased from 1.58 → 0.65 in Curenext and 1.60 → 0.80 in Orngreat, indicating reduced gingival inflammation.
 - PI reduced from 2.15 → 0.68 in Curenext and 2.18 → 0.75 in Orngreat, reflecting effective plaque control.
 - PD declined from 6.05 → 3.05 mm in Curenext and 6.12 → 3.20 mm in Orngreat, showing improved periodontal healing.
- Curenext demonstrated slightly greater reductions in all parameters, suggesting enhanced therapeutic efficacy, likely due to its combined antimicrobial and anti-inflammatory action. Both gels were effective as local drug delivery adjuncts to nonsurgical periodontal therapy.

Intergroup Comparison of GI, PI, and BOP at Baseline and 4 weeks: [Table 2]

- At baseline, no statistically significant differences were observed between the Curenext and Orngreat groups for Gingival Index (GI), Plaque Index (PI), or Probing Depth (PD) ($p > 0.05$), indicating comparable periodontal status between groups.
- At 4 weeks, both groups showed

significant clinical improvement; however, the Curenext group demonstrated significantly greater reductions in GI (0.65 ± 0.18 vs 0.80 ± 0.22 ; $p = 0.03$), PI (0.68 ± 0.20 vs 0.75 ± 0.23 ; $p = 0.04$), and PD (3.05 ± 0.38 mm vs 3.20 ± 0.40 mm; $p = 0.02$) compared to the Orngreat group.

➤ Overall, while both gels were effective as adjuncts to scaling and root planing, Curenext exhibited a marginally superior therapeutic effect, likely due to its combined antimicrobial, anti-inflammatory, and host-modulatory properties.



TABLES

Table 1: Intragroup Comparison of GI, PI, and BOP at Baseline and 4 weeks

Parameter	Group	Baseline (Mean ± SD)	4 Weeks (Mean ± SD)	p-value
Gingival Index (GI)	Curenext	1.58 ± 0.28	0.65 ± 0.18	<0.001
	Ornigreat	1.60 ± 0.30	0.80 ± 0.22	<0.001
Plaque Index (PI)	Curenext	2.15 ± 0.32	0.68 ± 0.20	<0.001
	Ornigreat	2.18 ± 0.35	0.75 ± 0.23	<0.001
Probing Depth (PD) (mm)	Curenext	6.05 ± 0.80	3.05 ± 0.38	<0.001
	Ornigreat	6.12 ± 0.78	3.20 ± 0.40	<0.001

Table 2: Intergroup Comparison of GI, PI, and BOP at Baseline and 4 weeks

Parameter	Time Point	Curenext (Mean ± SD)	Ornigreat (Mean ± SD)	p-value
Gingival Index (GI)	Baseline	1.58 ± 0.28	1.60 ± 0.30	0.74
	4 Weeks	0.65 ± 0.18	0.80 ± 0.22	0.03*
Plaque Index (PI)	Baseline	2.15 ± 0.32	2.18 ± 0.35	0.68
	4 Weeks	0.68 ± 0.20	0.75 ± 0.23	0.04*
Probing Depth (PD) (mm)	Baseline	6.05 ± 0.80	6.12 ± 0.78	0.83
	4 Weeks	3.05 ± 0.38	3.20 ± 0.40	0.02*

FIGURES

Figure 1:

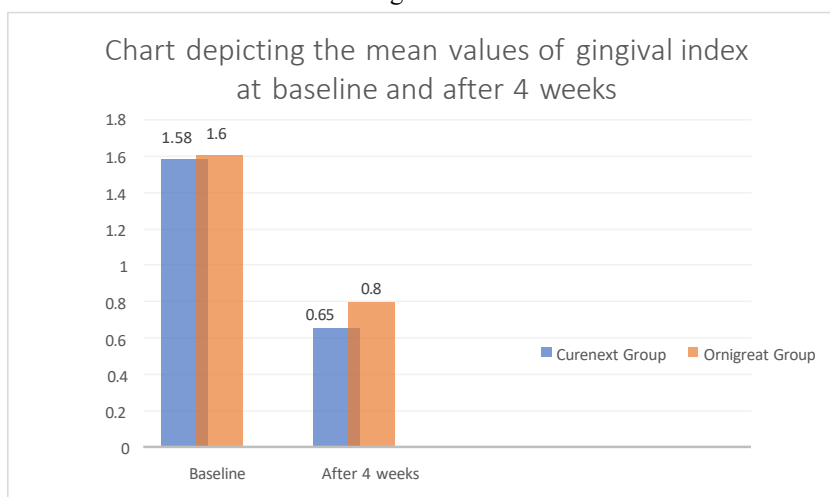




Figure 2:

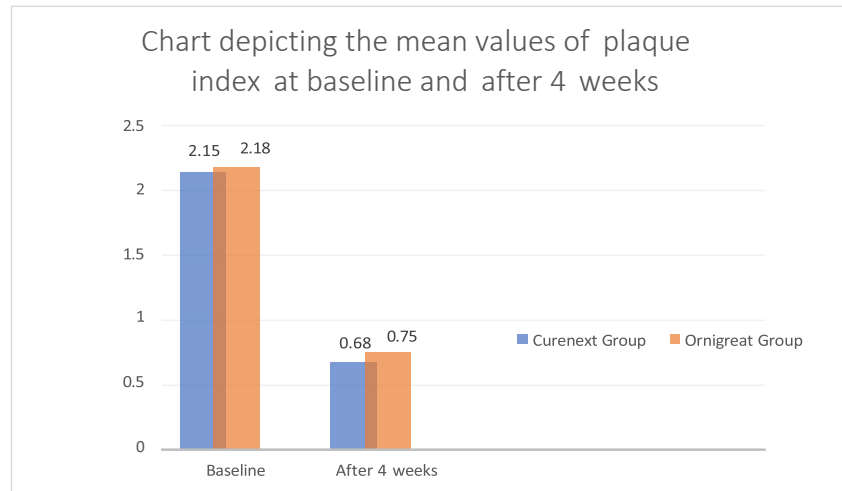
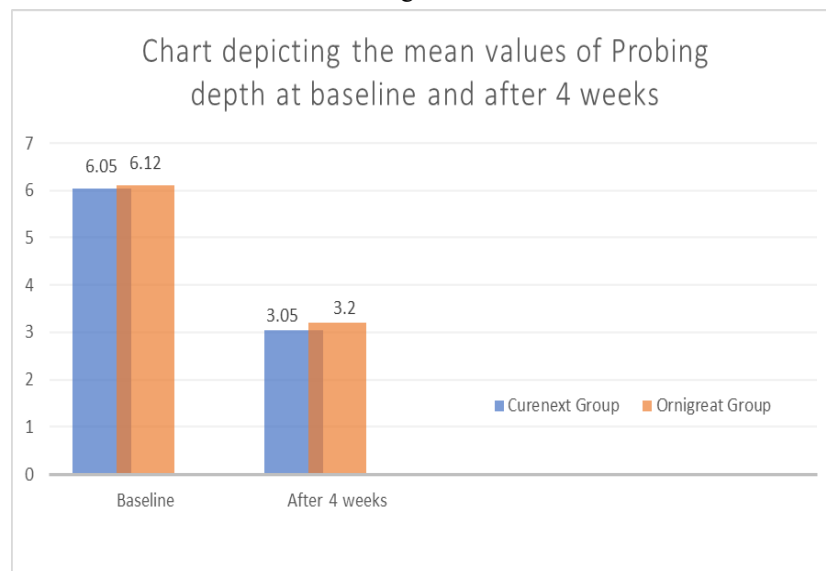


Figure 3:



IV. DISCUSSION

The primary goal of non-surgical periodontal therapy is to eliminate subgingival microbial biofilm and reduce the host's inflammatory response to halt periodontal breakdown. While scaling and root planing (SRP) remains the foundation of periodontal treatment, its effectiveness can be limited in deep pockets and inaccessible anatomical areas. Local drug delivery (LDD) systems have been recommended as adjuncts to SRP to improve clinical outcomes by delivering high concentrations of therapeutic agents directly into periodontal pockets, thereby minimizing systemic exposure and enhancing site-specific efficacy.

In the present study, both Curenex and Orngreat groups exhibited statistically significant

intragroup improvements in Gingival Index (GI), Plaque Index (PI), and Probing Depth (PD) at 4 weeks compared with baseline ($p < 0.001$), which aligns with previous clinical evidence on LDD agents. Randomized controlled trials have shown that the subgingival application of curcumin gel as an adjunct to SRP significantly reduces periodontal indices compared to SRP alone. Specifically, Menezes et al. (2019) reported a significant reduction in PI and PD with curcumin gel adjunctive therapy compared with control sites, highlighting curcumin's beneficial effect on periodontal healing. Systematic reviews also suggest that locally delivered curcumin can contribute to notable probing depth reductions, although variable outcomes in GI and PI have been reported depending on the study design and curcumin



formulation used. Further, BMC Oral Health recently documented that adjunctive curcumin gel significantly improved clinical parameters including PI, GI, and PD compared to SRP alone, supporting the present findings of greater clinical gains when curcumin is used systemically or locally.

The intergroup analysis in our study showed no significant differences at baseline, confirming that the two groups had comparable periodontal status prior to treatment. At 4 weeks, however, the Curenext group demonstrated significantly greater reductions in GI, PI, and PD compared with the Ornidazole group ($p < 0.05$). This enhanced effect may be explained by the multifaceted therapeutic properties of curcumin. Curcumin has been extensively studied for its anti-inflammatory, antioxidant, and antimicrobial activities, and its capacity to downregulate pro-inflammatory cytokines and mediators such as nuclear factor- κ B and IL-1 β , which are central to periodontal tissue destruction. The combined antimicrobial and host-modulatory activity of curcumin likely contributes to greater clinical improvement than antimicrobial agents alone.

Ornidazole gel, composed of 1% ornidazole with chlorhexidine, primarily exerts its effect through antimicrobial activity against anaerobic bacteria, which are key etiologic agents in chronic periodontitis. Ornidazole has demonstrated effectiveness in reducing periodontal indices when used adjunctively with SRP in experimental studies, showing significant improvements in GI, PD, and clinical attachment levels compared to SRP alone. Comparative studies such as Ravishankar et al. (2017) directly evaluated curcumin versus ornidazole gel in a split-mouth design and found that curcumin produced significantly greater reduction in PD and PI than ornidazole at one month, consistent with the present results. Although not all studies report significant intergroup differences between different antimicrobial gels, evidence supports that ornidazole gel as an LDD agent enhances clinical outcomes beyond mechanical therapy, particularly in reducing microbial load and inflammation.

The greater reduction in PD observed with Curenext suggests enhanced periodontal healing and improved clinical attachment levels, which may result from curcumin's dual antimicrobial and host-modulatory actions, compared to the predominantly antimicrobial effect of ornidazole. Curcumin's ability to stimulate antioxidant defenses and influence host inflammatory pathways may provide an edge over agents that lack direct effects on the host immune response.

Despite these positive outcomes, the study

has limitations, including a relatively short follow-up period and moderate sample size. Further long-term studies with larger cohorts and adjunctive microbiological and biochemical evaluations are warranted to confirm the sustained benefits of these LDD agents and to characterize their effects on specific periodontal pathogens and host inflammatory mediators.

In summary, while both Curenext and Ornidazole gels significantly improved clinical periodontal parameters when used as adjuncts to SRP, Curenext demonstrated a marginally superior effect in reducing gingival inflammation, plaque accumulation, and probing depth at 4 weeks. This suggests that curcumin-based LDD systems may provide added therapeutic advantages in periodontal therapy due to their combined antimicrobial and host-modulatory properties.

V. CONCLUSION

Subgingival application of Curenext and Ornidazole gels as adjuncts to scaling and root planing significantly improved periodontal health. Curenext provided greater reduction in inflammation and pocket depth, highlighting the benefit of combining antimicrobial and host-modulatory effects in local drug delivery therapy.

Declaration by Authors Ethical Approval: Approved
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