

Original Research

Assessment of the efficacy of chlorhexidine chip as an adjunct to scaling and root planning for the treatment of chronic periodontitis

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ABSTRACT:

Background: Careful removal or inhibition of pathogenic micro organisms with locally delivered antimicrobials, along with scaling and root planning (SRP) is an effective approach for the management of chronic periodontitis. **Aim:** The evaluation efficacy of chlorhexidine chip as an adjunct to scaling and root planning for the treatment of chronic periodontitis patients. **Materials and Methods:** A total of 50 chronic periodontitis patients (aged 20-65 years) having pocket depth of ≥ 5 mm in molar teeth were selected and randomly divided into two groups: Group 1: Scaling and root planning (SRP), Group 2: SRP along with chlorhexidine chip. At the screening visit, complete history taking, periodontal examination and full-mouth supragingival scaling was carried out for each patient. At the baseline visit (on the 7th day), all clinical parameters were recorded at selected sites. All patients in both the groups received complete subgingival scaling and root planing. Then, in group B, 2.5 mg chlorhexidine gluconate (Pericol CG) was inserted at the selected site. The clinical and microbial parameters were recorded at baseline, 1 and 3 months post treatment as above. **Results:** There was a significant difference in all the parameters in both the groups. Group B showed better results than group A. **Conclusion:** Local drug delivery using chlorhexidine chip enhances the benefit of SRP in the treatment of chronic periodontitis. **Key words:** Chlorhexidine chip, periodontitis, root planning, scaling.

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INTRODUCTION:

Periodontal infection is a complex multi factorial disease characterized by destruction of periodontal tissues and loss of the connective tissue attachment. Plaque samples from diseased periodontal tissues reveal high percentage of Gram-negative, anaerobic putative bacteria. Increased levels of *Porphyromonas gingivalis* (Pg), *Bacteroides forsythus* and *Treponema* species are associated with chronic periodontitis.¹

Thorough scaling and root planning (SRP) is essential for prevention of recolonization in the subgingival area by periodontal pathogens. In any case mechanical therapy may be unsuccessful to eradicate the pathogenic microbes totally due to their position in the gingival tissues or in areas out of reach to periodontal instrumentation. The

utilization of a few antimicrobial agents became important as chemical agents prevent early microbial recolonization guaranteeing, the most obvious opportunity for clinical upgradation. These chemical agents gain access into the periodontal pocket through both systemic as well as local routes of delivery. Since, systemic use of antibiotics has several side-effects, existing research is now focused on the role of topical/local antimicrobial agents in the treatment of periodontitis.²

Local administration of antimicrobial medications in periodontal pockets such as rinsing, irrigation and local injections were previously used. Although antibacterial mouthwashes are efficient in controlling supragingival

plaque, but their effect on the subgingival flora is very much limited.^{3,4,5,6}

Antimicrobial agents such as tetracycline, metronidazole, doxycycline, minocycline or chlorhexidine¹ are administered directly into the periodontal pocket sites to inhibit periodontal pathogenic bacteria, associated inflammatory response and periodontal tissue destruction. Chlorhexidine being a broad spectrum antibacterial and antifungal agent is very effective in treating periodontal disease.⁶ Of all the chemical plaque control agents, chlorhexidine has proven to be the most effective, safe and clinically effective in reducing plaque and gingivitis and is the time-tested gold standard for the treatment of periodontal diseases. The aim of the present study was to evaluate efficacy of chlorhexidine chip as an adjunct to scaling and root planning for the treatment of chronic periodontitis patients.

MATERIALS AND METHODS

A total of 50 chronic periodontitis patients (aged 20-65 years) having pocket depth of ≥5 mm in molar teeth were selected among the patients visiting the dental OPD and randomly divided into two groups:

Group 1: Scaling and root planning (SRP)

Group 2: SRP along with chlorhexidine chip

Inclusion criteria

- Patients with probing pocket depth of ≥5 mm in one or both sides of the arches.
- Patients with absence of any periapical/pulpal alteration on qualifying teeth.

- Patients without any history of drug allergy to chlorhexidine.
- Patients not using any medicated toothpaste/antibacterial mouthwash/antibiotics or any anti-inflammatory drug before the commencement of study for at least the past 3 months.

Exclusion criteria

- Pregnant/nursing women.
- Patients wearing any orthodontic appliance or other restorative appliance that can impinge on the tissues being assessed.
- Patients on medication that may influence the pattern of tissue response.
- Patients having soft or hard tissue tumors of the oral cavity.
- Patients on any drug/alcohol abuse.

The study protocol was approved by the institutional ethical committee. The patients were duly informed about the study and their signed consent was obtained.

At the screening visit, complete history was taken, periodontal examination and full-mouth supragingival scaling was carried out for each patient. At the baseline visit (on the 7th day), all clinical parameters were recorded at selected sites. All patients in both the groups received complete subgingival scaling and root planning. Then, in group B, chlorhexidine chip (Pericol CG) was inserted at the selected site. The clinical and microbial parameters were recorded at baseline, 1 and 3 months post-treatment as above.

RESULTS:

Table 1: Comparison of gingival index for selected tooth site at baseline, 1 and 3 months within the groups

| Groups | Interval | Mean±SD (mm) | P value |
|---------|-----------------------|--------------|---------|
| Group 1 | Baseline | 1.2±2.18 | 0.0154 |
| | Ist month | 0.6±1.1 | |
| | 3 rd month | 0.41±3.3 | |
| Group 2 | Baseline | 1.2±1.25 | 0.001 |
| | Ist month | 0.4±1.9 | |
| | 3 rd month | 0.28±1.12 | |

Table 2: Comparison of gingival index for selected tooth site at baseline, 1 and 3 months between the groups

| | Group 1 | Group 2 | |
|-----------------------|--------------|--------------|---------|
| Interval | Mean±SD (mm) | Mean±SD (mm) | P value |
| Baseline | 1.2±2.18 | 1.2±1.25 | 0.07 |
| Ist month | 0.6±1.1 | 0.4±1.9 | 0.002 |
| 3 rd month | 0.41±3.3 | 0.28±1.12 | 0.001 |

Table 3: Comparison of probing pocket depth for selected tooth site at baseline, 1 and 3 months within the groups

| Groups | Interval | Mean±SD (mm) | P value |
|---------|-----------------------|--------------|---------|
| Group 1 | Baseline | 7.2±3.14 | 0.001 |
| | Ist month | 4.8±1.1 | |
| | 3 rd month | 3.9±2.25 | |
| Group 2 | Baseline | 7.5±1.89 | 0.0024 |
| | Ist month | 3.9±1.79 | |
| | 3 rd month | 2.8±2.2 | |

Table 4: Comparison of probing pocket depth for selected tooth site at baseline, 1 and 3 months between the groups

| | Group 1 | Group 2 | |
|-----------------------|--------------|--------------|---------|
| Interval | Mean±SD (mm) | Mean±SD (mm) | P value |
| Baseline | 7.2±3.14 | 7.5±1.89 | 0.061 |
| Ist month | 4.8±1.1 | 3.9±1.79 | 0.011 |
| 3 rd month | 3.9±2.25 | 2.8±2.2 | 0.001 |

Table 5: Comparison of clinical attachment level for selected tooth site at baseline, 1 and 3 months within the groups

| Groups | Interval | Mean±SD (mm) | P value |
|---------|-----------------------|--------------|---------|
| Group 1 | Baseline | 4.0±1.12 | 0.016 |
| | Ist month | 3.1±1.99 | |
| | 3 rd month | 2.3±2.13 | |
| Group 2 | Baseline | 4.3±2.57 | 0.0011 |
| | Ist month | 2.5±3.1 | |
| | 3 rd month | 1.1±1.18 | |

Table 6: Comparison of clinical attachment level for selected tooth site at baseline, 1 and 3 months between the groups

| | Group 1 | Group 2 | |
|-----------------------|--------------|--------------|---------|
| Interval | Mean±SD (mm) | Mean±SD (mm) | P value |
| Baseline | 4.0±1.12 | 4.3±2.57 | 0.057 |
| Ist month | 3.1±1.99 | 2.5±3.1 | 0.001 |
| 3 rd month | 2.3±2.13 | 1.1±1.18 | 0.001 |

DISCUSSION:

The present study was undertaken to evaluate the efficacy of subgingivally placed controlled-release degradable chlorhexidine chip (Periocol CG) as an adjunct to scaling and root planing in the management of chronic periodontitis. Three months had been selected as the time duration of the study because effects of locally delivered controlled-release chlorhexidine have been shown to be evident up to 11 weeks after administration,^{8,9} and 3 months correspond to the typical recall interval for periodontal patients.¹⁰

On Comparison of gingival index within group 1 and group 2 from baseline (on the 7th day), at 1 month and 3 months (table 1) significant reduction was present. On inter group comparison (table2) at baseline gingival index was similar in both the groups and no significant difference was seen. This reduction was more at 1 month and 3 months in group 2 on comparison with group 1. Our observations are in accordance with the studies done by Soskolne *et al*⁸ and Jeffcoat *et al*¹⁰ who also showed better results with SRP along with chlorhexidine chip compared with SRP alone attributing it to the beneficial anti plaque properties of chlorhexidine. Kumar AJ *et al*¹ involved three groups in their study that is Group 1. Scaling and root planning (SRP), Group 2. SRP along with chlorhexidine chip and Group 3.Only chlorhexidine chip When the gingival index scores were compared, all the groups had greater reduction in the scores and showed highly significant differences between baseline to 3 months this is similar to our observations but in contrast to our study No significance was observed between the groups, indicating similar inhibition of bacterial growth and gingival inflammation in both groups.

On Comparison of pocket depth within group 1 and group 2 from baseline (on the 7th day), at 1 month and 3 months (table 3) significant reduction was present.

On inter group comparison (table 4) at baseline pocket depth was similar in both the groups and no significant difference was seen. This reduction in pocket depth was more at 1 month and 3 months in group 2 on comparison with group 1. Our results are in accordance with those of Grover V *et al*⁷ Rodrigues *et al*¹¹ who found a statistically significant difference in mean pocket depth reduction between the scaling and root planing group in the combination group. According to Soskolne *et al*⁸ if, after definitive periodontal therapy, there are still residual pockets of ≥5 mm remaining, then combined routine periodontal maintenance therapy along with the chlorhexidine chip is advisable.

On Comparison of clinical attachment level within group 1 and group 2 from baseline (on the 7th day), at 1 month and 3 months (table 5) significant reduction was present. On inter group comparison (table 6) at baseline clinical attachment level was similar in both the groups and no significant difference was seen. This reduction in clinical attachment level was more at 1 month and 3 months in group 2 on comparison with group 1. The findings of our study are in partial accordance with those of Azmak *et al*¹² who observed a significant improvement in the clinical attachment level in both the scaling and root planing plus chlorhexidine chip group and the scaling and root planing alone group at 1 month, 3 months and at 6 months as compared with baseline. Similar findings were reported by Jeffcoat *et al*¹⁰ who observed improved attachment levels over the 9-month period for the scaling and root planing plus chlorhexidine chip group and a significant improvement compared with the scaling and root planing alone group at 9 months.

Amongst 50 patients 4 patients complained about antagonistic impacts like gingival pain and tender gums in patients of group 2, though in group 1 there was not in

any case that side-effects due to the treatment procedure were present. Adverse effects occurring in the main seven day stretch of the investigation had all the ear marks of being related with chip placement at baseline after scaling and root planing. None of the changes discovered on oral examination were of a serious and irreversible nature.

CONCLUSION:

The results of this study demonstrate that Chlorhexidine chip containing 2.5 mg chlorhexidine gluconate (Pericol CG) is an effective adjunctive treatment to scaling and root planing in the treatment of chronic periodontitis. It gives a safe, easily applied single-dose means of achieving significantly better clinical results than scaling and root planing alone. The adjunctive use of the chlorhexidine chip with scaling and root planing resulted in a clinically meaningful improvement in pocket depth reduction and clinical attachment level gain compared with scaling and root planing alone.

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