



## EVALUATE THE EFFECTIVENESS OF SCALING AND ROOT PLANNING WITH AND WITHOUT ADJUNCTIVE ANTIBIOTICS IN PESHAWAR

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### ABSTRACT

#### Objective

To evaluate the clinical effectiveness of scaling and root planing (SRP) with and without adjunctive antibiotics systemic (amoxicillin + metronidazole) and local (minocycline microspheres) in the management of chronic periodontitis among patients in Peshawar

#### Methods

A randomized, single-blinded clinical trial was conducted with 90 systemically healthy participants diagnosed with chronic periodontitis. Subjects were divided equally into three groups: Group A (SRP alone), Group B (SRP + systemic antibiotics), and Group C (SRP + local antibiotics). Periodontal parameters including probing pocket depth (PPD), clinical attachment level (CAL), bleeding on probing (BOP), and plaque index (PI) were recorded at baseline, 3 months, and 6 months. Data were analyzed using ANOVA and post-hoc Tukey tests.

#### Results

At 6 months, Groups B and C showed significantly greater improvements in PPD and CAL compared to Group A ( $p < 0.01$ ). Mean PPD reductions were 1.2 mm in Group A, 1.8 mm in Group B, and 1.7 mm in Group C. CAL gains followed a similar pattern. Both adjunctive antibiotic groups also showed greater reduction in BOP and PI. No major adverse events were observed, though mild gastrointestinal effects were reported in the systemic antibiotic group.

## Conclusion

Adjunctive use of antibiotics, whether systemic or local, significantly enhances the clinical outcomes of SRP in chronic periodontitis patients. These findings support their selective use in moderate to severe cases, though antibiotic stewardship remains crucial, particularly in resource-limited settings like Peshawar.

## INTRODUCTION

Damage to tissues and loss of alveolar bone characterize periodontitis, an inflammatory disease that develops over time and is caused by bacterial biofilms that grow under the gum line [1,2]. Socioeconomic and sanitary factors contribute to the high prevalence of this condition in Peshawar, which is a major cause of tooth loss internationally [3]. Scaling and root planing, the gold standard in non-surgical treatment, is designed to stop the course of illness by removing calculus and bacterial deposits [4]. However, persistent infection may occur if deep or complicated pockets are not entirely eradicated by SRP [5].

Systemic or local antibiotics are utilized as adjuncts to improve outcomes. Periodontal infections can be treated with systemic antibiotics such as amoxicillin, metronidazole, or doxycycline [6], or with locally administered antimicrobials that allow for high concentrations at the site of treatment with less systemic side effects [7]. Nevertheless, it is imperative to assess the genuine advantages of these therapies in light of worries over antibiotic resistance and adverse consequences.

The purpose of this research is to compare the efficacy of SRP with and without systemic and local antibiotic adjuncts in decreasing PPD and increasing CAL in a patient cohort from Peshawar.

## METHODOLOGY

### Study Design

A randomized, controlled, single-blinded clinical trial was conducted at Khyber College of Dentistry, Peshawar, from January to December 2024. Ethical approval was obtained, and informed consent was gained from all participants.

### Participants

#### Inclusion criteria:

1. Adults aged 25–60 with chronic periodontitis ( $\geq 4$  ipsilateral sites with PPD  $\geq 5$  mm and CAL  $\geq 3$  mm) [8].
2. No systemic antibiotics (past 6 months), non-smokers, systemically healthy (excluding controlled diabetes, HbA1c  $< 7\%$ ) [9].

#### Exclusion criteria:

1. Pregnancy/lactation, allergies, antibiotic use (past 6 months), or periodontal surgery in 12 months.

### Interventions

Participants (n = 90) were randomly assigned to three equal groups:

- **Group A:** SRP alone.
- **Group B:** SRP + systemic antibiotics—amoxicillin 500 mg + metronidazole 500 mg TID for 7 days [10].
- **Group C:** SRP + local minocycline microspheres placed in  $\geq 5$  mm pockets (1 mg/site) [11].

SRP was delivered via ultrasonic and hand scaling across 2–4 visits. Local antibiotics in Group C were applied on visit 2. Home oral hygiene counseling and 0.12% chlorhexidine rinses were recommended for 2 weeks. Follow-up at 3 and 6 months.

### Outcome Measures

Primary outcomes:

- PPD (mm)
- CAL (mm)

Secondary outcomes:

- Bleeding on probing (BOP %), plaque index (PI)
- Adverse events

Measurements were taken by a blinded periodontist using a UNC-15 probe at six sites per tooth.

### Statistical Analysis

Sample size was calculated to detect a 1.0 mm difference in CAL with 80% power,  $\alpha=0.05$ . Data were analysed using ANOVA with post-hoc Tukey tests. Significance at  $p<0.05$ .

## RESULTS

### Baseline

No differences in age, sex, HbA1c, PPD, CAL, BOP, or PI among groups ( $p>0.2$ ).

### Primary Outcomes

**PPD reductions** at 6 months:

- Group A:  $-1.2 \pm 0.4$  mm
- Group B:  $-1.8 \pm 0.5$  mm ( $p<0.01$  vs A)
- Group C:  $-1.7 \pm 0.6$  mm ( $p<0.01$  vs A;  $p=0.65$  vs B)

**CAL gains** at 6 months:

- A:  $+1.0 \pm 0.3$  mm
- B:  $+1.5 \pm 0.4$  mm ( $p<0.01$  vs A)
- C:  $+1.4 \pm 0.4$  mm ( $p<0.01$  vs A;  $p=0.65$  vs B)

**3-month results** mirrored 6-month trends but with smaller differences.

### Secondary Outcomes

BOP and PI decreased significantly across all groups, with greater reduction in B and C ( $p<0.05$ ). No serious adverse events. Four subjects in Group B reported mild gastrointestinal discomfort; no allergic reactions noted.

## DISCUSSION

Consistent with worldwide findings [6,7], this Peshawar-based investigation shows that SRP combination with either systemic or local antibiotics produces better clinical outcomes than SRP alone. Consistent with previous meta-analyses [5,12], the addition of about 0.6 mm to the PPD decrease and CAL gain validates the therapeutic importance of supplementary antibiotics in deep pockets ( $>5$  mm) [13].

There was no statistically significant difference between the two treatments, but systemic amoxicillin metronidazole seemed to have a little better efficacy than local therapy. Brazilian and European populations also showed similar results [14,15]. This finding is in keeping with earlier locoregional investigations [16] and Herrera & Sanz (2002), which found that minocycline administered locally reduced systemic exposure while still achieving the desired effect.

It has been suggested that SRP alone may be enough for glycaemic management in diabetic individuals, as concomitant antibiotics did lead to a small decrease in HbA1c ( $\sim 0.2\%$ ) in the short term, but the benefits faded by 6 months [9,17].

Problems with antibiotic resistance are still present. To reduce the likelihood of antibiotic resistance without sacrificing treatment efficacy, the World Health Organization recommends sparing use of local antibiotics [6,7]. Antibiotic management is important in Peshawar because of the prevalence of both prescription and over-the-counter antibiotics as well as the new trends in antibiotic resistance [18].

Disadvantages include a lack of follow-up after six months, a single-center design, and the smoking exclusion. Similar to systemic antibiotic reviews [19,20], future trials should investigate the outcomes of flap surgery, the cost-effectiveness, and microbiological profiles.

## CONCLUSION

Periodontal results (PPD and CAL) are considerably better in Peshawar patients with chronic periodontitis when SRP is combined with adjuvant antibiotics, whether they are systemic or local. Antibiotic stewardship is essential, however both systemic amoxicillin metronidazole and minocycline given locally work well. Particularly in those with diabetes and pockets that are shallow to moderate, SRP alone can be beneficial. Considering supplementary antibiotics for deeper or persistent locations could offer valuable clinical benefits, particularly in areas with limited access to experts.

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