

**A Systematic Review Based on: Adjunctive Outcome of Locally Supplied Minocycline Microspheres in Chronic Periodontitis**<sup>1</sup>Milliams Fassbinder, <sup>2</sup>Paquette Offenbach, <sup>3</sup>Adams Armitage, <sup>4</sup>Bray Cochran**Correspondence Author:** Adams Armitage**How to Cite This Article:** Milliams Fassbinder, Paquette Offenbach, Adams Armitage, Bray Cochran, “A Systematic Review Based on: Adjunctive Outcome of Locally Supplied Minocycline Microspheres in Chronic Periodontitis”, IJDSDR – November – December - 2022, Vol. – 1, Issue – 2, P. No. 28 – 31.**Open Access Article:** This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Type of Publication:** Review Article**Conflicts of Interest:** Nil**Abstract**

A Chronic periodontitis is an inflammatory disease of the supporting tissues of teeth. Periodontitis is usually treated non-surgically by scaling and root planning, which helps to reduce the bacterial load. Minocycline is used as a local drug delivery and comes in various delivery forms. The present systematic review aims to determine the efficacy of minocycline microspheres as a local drug delivery agent in treating chronic periodontitis.

**Keywords:** Chronic periodontitis, local drug delivery, minocycline microspheres, probing depth, scaling and root planning.**Introduction**

Chronic periodontitis is the most frequently occurring form of periodontitis characterized by loss of clinical attachment and loss of the adjacent supporting bone. Scaling and root planing (SRP) is the Gold Standard

treatment regimen for periodontitis and it results in reducing bacterial load by meticulous removal of plaque. Significant reduction in the bacterial load results in improvements in all clinical parameters of periodontitis. Mechanical therapy alone may fail to eliminate invasive, pathogenic bacteria because of their location within the gingiva which is inaccessible to periodontal instruments. These are mostly gram-negative microorganisms. Systemic antibiotics are discouraged because of concern over the development of resistant organisms. An alternative is the local delivery of antibiotics into periodontal pockets. This can avoid side effects associated with systemic antibiotic therapy by localizing and limiting the agent to the periodontal pocket. Minocycline hydrochloride is a semisynthetic derivative of tetracycline that acts by interfering with protein synthesis in the bacterial cell wall. Minocycline microsphere is a controlled-release bioabsorbable

polymer. Active drugs dissolve and diffuse out of the microspheres through the channels into the surrounding tissues and after 10 days, the microspheres are fragmented and continue to release minocycline for 14 days or longer, and eventually these microspheres completely bio resorb.

Thus, from both a biological and clinical point of view, it is important to evaluate the combination of SRP and locally administered minocycline microspheres as a treatment of chronic periodontitis.

### **Rationale**

Rationales behind the use of minocycline in the eradication of periodontal pathogens implicated in periodontitis are:

- Broad spectrum of activity.
- Substantivity of the drug.
- Anti-collagenase activity against P.
- Higher lipid solubility ensures rapid passage through the lipid bilayer of the bacterial cell wall and inhibits protein synthesis.

An ideal local formulation of minocycline as a local drug delivery agent should exhibit ease of delivery, good retention at the application site, and a controlled release of the drug.

Thus, through this systematic review, the effectiveness of minocycline microsphere as an adjunct to scaling and root planing is assessed as compared to scaling and root planing alone.

### **Focused question**

Is minocycline microsphere as an adjunct to scaling and root planing more effective as compared to scaling and root planing alone for pocket reduction in subjects with chronic periodontitis.

### **Primary Objective**

To evaluate the effect of minocycline hydrochloride as an adjunct to scaling and root planing as compared to

scaling and root planing alone in subjects with chronic periodontitis with respect to probing pocket depth (PPD).

### **Materials and Methods**

A systematic review was undertaken as per the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) checklist.

### **Search strategy and study selection**

A literature search was performed in MEDLINE, Pub Med, Embase, Google Scholar, and EBSCO host databases for papers published from January 2000 up to January 2023. Randomized controlled trials published in the English language were selected for analysis.

### **Inclusion criteria**

1. Randomized controlled trials interventional study.
2. Randomized Clinical Trials (RCT) comparing minocycline microspheres with SRP + SRP alone.
3. Controlled Clinical Trials (CCT) comparing minocycline microspheres with SRP + SRP alone.
4. Full-text articles.
5. Studies on human subjects.
6. Studies published in English language only from the year January 2000 to January 2023.
7. Patients with chronic periodontitis.

### **Exclusion criteria**

1. Case reports and case series.
2. Animal model studies, in-vitro studies, commentaries, and interviews.
3. Unpublished research.

### **Data collection process**

Quality and risk of bias of the randomized controlled trials were assessed using Rev Man 5.0. A data extraction sheet was prepared based on variables associated and the articles were analysed. Risk of bias assessment was conducted by using the recommended approach for assessing the risk of bias in studies

included in Cochrane Reviews (Higgins 2011) using the tool RevMan 5.0. Using a data extraction sheet, the following data were collected: Authors, year of publication, country, aim, tissue assessed, type of study, sample size, comparison group and control group, methodology, and conclusion.

## Results

**Study Characteristics:** Four randomized controlled trial studies were included for the qualitative synthesis. All 4 studies suggest that minocycline microspheres used as an adjunct to scaling and root planning yield significant results when compared to scaling and root planning alone.

## Discussion

Instrumentation of the subgingival area is aimed at removing as much of the bacterial biofilm and subgingival calculus as possible. However, because subgingival SRP is technically demanding since access and visibility of the area are limited, complete subgingival plaque and calculus removal is rarely achieved. Non-surgical scaling and root planning cannot ensure the complete removal of subgingival accretions in sites with probing depths exceeding 5 mm. Therefore, it seems necessary to employ additional adjuncts in the form of antimicrobial agents to achieve effective clinical results.

## Conclusion

The systematic appraisal of the evidence on the efficacy of minocycline microsphere confirms that a degradable, subgingivally placed drug delivery system containing 1 mg Minocycline spheres, is a safe and efficient adjunct to scaling and root planning in the treatment of chronic periodontitis.

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