



COVER STORY

Effectiveness of systemic antimicrobial therapy in combination with scaling and root planing in the treatment of periodontitis

A systematic review

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Periodontal diseases are considered to be inflammatory diseases that affect the supporting tissues of the tooth and are caused by microorganisms that reside in the sub-gingival area.¹ The organization of the bacteria in the oral microbiota provides favorable conditions for its growth and maturation. The microbiota responsible for these diseases are complex;



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ABSTRACT

Background. The use of systemic antibiotics in conjunction with scaling and root planing (SRP) may improve the clinical outcome and even could be essential for a successful treatment of periodontitis. However, the effectiveness and clinical safety of this combination of therapy remain unclear. The authors of this study reviewed the available literature related to this hypothesis, evaluating the effectiveness of the use of systemic antimicrobials in combination with SRP versus SRP alone in the treatment of chronic periodontitis (CP) or aggressive periodontitis (AgP).

Methods. The authors used 3 electronic databases and hand searched articles published from April 2001 through October 2013 in selected journals. The authors selected clinical trials with a minimum of 6 months follow-up during which patients with either CP or AgP had been treated with systemic antibiotics plus SRP in comparison with SRP alone or with placebo. The authors analyzed the gain in clinical attachment level (CAL), reduction in probing pocket depth (PPD), reduction in bleeding on probing (BOP), and patient-related variables (that is, adverse effects).

Results. After the selection process, the authors included 23 clinical trials in this review. Assessment of the quality of the studies revealed the risk of bias as a common finding. Overall, there was a tendency toward improvement of the measured outcomes, CAL, PPD, and BOP in studies for which systemic antibiotics were used as adjunctive therapy with SRP.

Conclusion. Owing to the high level of heterogeneity of the studies included in this review, the authors could not establish definitive conclusions and guidelines regarding the use of adjunctive systemic antibiotics. However, within the limitations of this review, the use of systemic antibiotics with SRP may be beneficial for specific populations. Standardized clinical disease diagnostic criteria and additional randomized controlled clinical trials are necessary to verify the effectiveness of the use of adjunctive systemic antimicrobials with SRP.

Practical Implications. Owing to methodological differences and biases among clinical trials evaluating systemic antibiotics adjunctive to SRP, clinicians should base their decisions to prescribe on the results of weighing both benefits and risks for each patient.

Key Words. Periodontitis; antibiotics; scaling and root planing; systematic review.

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however, investigators have observed that only a small number of bacterial species are associated strongly with periodontal disease progression.^{2,3} Although these bacterial pathogens initiate the periodontal inflammation, the host response to these pathogens is equally if not more important in mediating connective tissue breakdown, including bone loss.^{4,5}

The standard treatment for periodontal disease remains nonspecific, consisting mainly of scaling and root planing (SRP) to reduce the total bacterial load.⁶ Although the results of some studies have proven that using this therapy is efficient,⁷⁻¹¹ the mechanical treatment may not be predictable for removing certain periodontal pathogens and some sites and patients may not respond adequately.¹² Investigators have reported factors that can influence these nonresponsive sites or patients, including the deep locations of pathogens, the ability of pathogens to invade soft tissues, and the limitations of periodontal mechanical treatment.¹³⁻¹⁵

For decades, researchers have discussed the use of systematic antimicrobials as part of the therapy used in the management of periodontal diseases.¹⁶⁻¹⁸ The authors of previous systematic reviews^{16,17,19} and meta-analyses^{18,20,21} have reported that antimicrobial agents systemically provide a significant clinical benefit. This antibiotic therapy has the advantage to reach microorganisms that are inaccessible to scaling instruments and local antibiotic therapy.²² Investigators have reported several benefits of the adjunctive antimicrobial, especially in cases of aggressive periodontitis (AgP), active periodontitis, severe chronic periodontitis (CP), and in periodontitis associated with specific microbiological profiles.^{16,19,23,24}

The aim of this systematic review is to update a previous systematic review¹⁶ and to evaluate critically the available literature with respect to the clinical effects of combined antibiotic therapy as an adjunct to SRP compared with a treatment of only SRP.

METHODS

We conducted this systematic review in accordance with the guidelines provided in the 2009 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement.²⁵ The study methodology, including the search strategy, inclusion criteria, and exclusion criteria, was similar to a previous systematic review.¹⁶

Focused question. First, we used a Population-Intervention-Comparison-Outcome question approach. In patients with CP or AgP, what is the clinical effect of systemic antimicrobial therapy in combination with SRP compared with a treatment of only SRP in the following mean treatment outcomes: clinical attachment level (CAL), probing pocket depth (PPD), bleeding on probing (BOP), and variables related to patient adverse events?

Search strategy. We used 3 Internet sources to search for appropriate studies that satisfied the study purpose.

We searched the relevant articles published from April 2001, which was the end date of the previous systematic review,¹⁶ through October 2013, in the following databases: PubMed (Medline), Excerpta Medica (Embase), and Cochrane Central Register of Controlled Trials (CENTRAL). In addition, we manually searched articles in the following journals: *Journal of Clinical Periodontology*, *Journal of Periodontal Research*, and *Journal of Periodontology*. To minimize the potential for reviewer bias, two masked reviewers (P.G.C. and J.S.) independently screened the articles, which were limited to articles written in English and Spanish, using the same criteria. We designed the search to include any published study that evaluated the adjunctive effect of combining systemic administration of antibiotics with SRP in the treatment of periodontitis.

We performed the search by using semantic fields, one of which was periodontal disease, and the other was antibiotic treatment. We included patients with CP or AgP on the basis of the criteria for the classification of periodontal diseases proposed by Armitage.¹ We also included studies whose authors described periodontal disease in the following forms: early-onset periodontitis, rapidly progressive periodontitis, adult periodontitis, “refractory” periodontitis, and recurrent periodontitis.

Within the semantic field “periodontal disease,” we added the following searches: “Periodontal AND Diseases” OR Periodontal diseases OR periodontitis, both in medical subject headings (MeSH) terms, as in “All fields.” In the semantic field of antibiotics, we added the following searches: “Anti bacterial AND agents OR anti bacterial agents OR antibiotics OR anti parasitic agents OR (anti parasitic AND agents) OR quinolones”, both in MeSH terms, as in All fields and Pharmacological action.

We used the following full search strategy (key words): ((((((“periodontal diseases”[MeSH Terms]) OR “periodontal diseases”) OR ((“periodontitis”[MeSH Terms]) OR “periodontitis”)) OR ((“periodontal” AND “diseases”))) AND (((((((((((“anti bacterial agents”[MeSH Terms]) OR “anti bacterial agents”) OR ((“anti bacterial”) AND “agents”)) OR “antibiotics”) OR “anti bacterial agents”[Pharmacological Action]) OR “antiparasitic agents”[MeSH Terms]) OR ((“antiparasitic”) AND “agents”)) OR “antiparasitic agents”) OR “antiparasitic agents”[Pharmacological Action]) OR

ABBREVIATION KEY. AgP: Aggressive periodontitis. AM: Amoxicillin. AZ: Azithromycin. BOP: Bleeding on probing. CAL: Clinical attachment level. CCT: Controlled clinical trial. CLAR: Clarithromycin. CP: Chronic periodontitis. DOX: Doxycycline. M: Metronidazole. MeSH: Medical subject heading. MOX: Moxifloxacin. NA: Not applicable. ORN: Ornidazole. PPD: Probing pocket depth. RCCT: Randomized controlled clinical trial. SRP: Scaling and root planing.

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