



# Evidence-based clinical practice guideline on the nonsurgical treatment of chronic periodontitis by means of scaling and root planing with or without adjuncts

Christopher J. Smiley, DDS; Sharon L. Tracy, PhD; Elliot Abt, DDS, MSc, MS; Bryan S. Michalowicz, DDS; Mike T. John, Dr med dent, PhD, MPH; John Gunsolley, DDS, MS; Charles M. Cobb, DDS, PhD; Jeffrey Rossmann, DDS, MS; Stephen K. Harrel, DDS; Jane L. Forrest, EdD; Philippe P. Hujoel, DDS, MSD, MS, PhD; Kirk W. Noraian, DDS, MS, MBA; Henry Greenwell, DMD, MSD; Julie Frantsve-Hawley, PhD; Cameron Estrich, MPH; Nicholas Hanson, MPH

In 2011, the Council on Scientific Affairs (CSA) of the American Dental Association (ADA) resolved to develop a clinical practice guideline on nonsurgical treatments including scaling and root planing (SRP) with or without adjuncts for patients with any severity of chronic periodontitis on the basis of an evidence-based systematic review<sup>1</sup> of the literature. We evaluated the following professionally applied or prescribed medical adjuncts: locally applied antimicrobials (chlorhexidine chips, doxycycline hyclate gel, and minocycline microspheres), nonsurgical use of lasers (diode, both photodynamic therapy [PDT] and non-PDT; Nd:YAG [neodymium:yttrium-aluminum-garnet]; and erbium), systemic antimicrobials, and systemic subantimicrobial-dose doxycycline (SDD). We considered systemic antimicrobials and systemic SDD separately because the latter appears to inhibit mammalian collagenase activity (matrix metalloproteinase 8) and not function as an antibiotic.<sup>2,3</sup> We did not consider experimental adjuncts, adjuncts not currently available in the United States, nonprescription (over-the-counter) adjuncts, or surgical treatments.

We addressed the following clinical questions, formatted in the Patient-Intervention-Comparator-Outcome style:

## ABSTRACT

**Background.** A panel of experts convened by the American Dental Association Council on Scientific Affairs presents an evidence-based clinical practice guideline on nonsurgical treatment of patients with chronic periodontitis by means of scaling and root planing (SRP) with or without adjuncts.

**Methods.** The authors developed this clinical practice guideline according to the American Dental Association's evidence-based guideline development methodology. This guideline is founded on a systematic review of the evidence that included 72 research articles providing clinical attachment level data on trials of at least 6 months' duration and published in English through July 2014. The strength of each recommendation (*strong, in favor, weak, expert opinion for, expert opinion against, and against*) is based on an assessment of the level of certainty in the evidence for the treatment's benefit in combination with an assessment of the balance between the magnitude of the benefit and the potential for adverse effects.

**Practical Implications and Conclusions.** For patients with chronic periodontitis, SRP showed a moderate benefit, and the benefits were judged to outweigh potential adverse effects. The authors voted *in favor* of SRP as the initial nonsurgical treatment for chronic periodontitis. Although systemic subantimicrobial-dose doxycycline and systemic antimicrobials showed similar magnitudes of benefits as adjunctive therapies to SRP, they were recommended at different strengths (*in favor* for systemic subantimicrobial-dose doxycycline and *weak* for systemic antimicrobials) because of the higher potential for adverse effects with higher doses of antimicrobials. The strengths of 2 other recommendations are *weak*: chlorhexidine chips and photodynamic therapy with a diode laser. Recommendations for the other local antimicrobials (doxycycline hyclate gel and minocycline microspheres) were *expert opinion for*. Recommendations for the nonsurgical use of other lasers as SRP adjuncts were limited to *expert opinion against* because there was uncertainty regarding their clinical benefits and benefit-to-adverse effects balance. Note that *expert opinion for* does not imply endorsement but instead signifies that evidence is lacking and the level of certainty in the evidence is low.

**Key Words.** Antibiotics; evidence-based dentistry; lasers; minocycline; periodontitis; practice guidelines; root planing; chlorhexidine.

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■ Question 1: In patients with chronic periodontitis, does SRP (hand or ultrasonic), when compared with no treatment, supragingival scaling and polish (prophylaxis), or debridement, result in greater improvement of clinical attachment level (CAL)?

■ Question 2: In patients with chronic periodontitis, does the use of locally delivered antibiotics or antimicrobials, systemic antibiotics, combinations of locally delivered and systemic antibiotics, agents for biomodification or host modulation, or nonsurgical lasers as adjuncts to SRP, compared with SRP alone, result in greater improvement of CAL?

This clinical practice guideline is intended to assist general practitioners with decision making about the use of SRP, as well as locally delivered and systemic adjuncts, for patients with periodontitis. This guideline does not address surgical periodontal treatments. Not all patients with chronic periodontitis respond adequately to nonsurgical treatment with or without adjuncts, and the practitioner should consider surgical or other more complex interventions or referral to a specialist when appropriate. The recommendations in this document do not purport to define a standard of care. Rather, as part of the evidence-based dentistry approach, these recommendations should be integrated with each practitioner's professional judgment and each patient's needs and preferences.

## BACKGROUND

Chronic periodontitis is a prevalent condition, affecting 47.2% of the adult US population aged 30 years or older.<sup>4</sup> Chronic periodontitis results in the loss of tooth-supporting connective tissue and alveolar bone and, if untreated, is a major cause of tooth loss in adults.<sup>5</sup> According to the Centers for Disease Control and Prevention and American Academy of Periodontology case definitions,<sup>6</sup> the prevalences of moderate and severe periodontitis are estimated as 30.0% and 8.5%, respectively, among US adults.<sup>7</sup>

Clinicians are challenged daily with managing periodontitis of varying extent and severity. Treatment options range from SRP to SRP with adjunctive treatments to surgical interventions. In developing these practice guidelines, we considered only studies that included SRP as part of the test or active control group. Within this guideline, SRP is defined as noted in the Code on Dental Procedures and Nomenclature.<sup>8</sup>

■ D4341, Periodontal scaling and root planing: "Root planing is the definitive procedure designed for the removal of cementum and dentin that is rough and/or permeated by calculus or contaminated with toxins or microorganisms."

SRP should be differentiated from supra- or subgingival debridement as noted in the Code on Dental Procedures and Nomenclature<sup>8</sup>:

■ D4355, Full mouth debridement: "The gross removal of calculus that interferes with the ability of the dentist to

perform a comprehensive oral evaluation. This preliminary procedure does not preclude the need for additional procedures."

## METHODS

The authors constitute a multidisciplinary panel of subject matter experts and ADA staff methodologists convened by the ADA CSA. The accompanying systematic review<sup>1</sup> provides the evidence base for this guideline.

**Choice of outcomes measure: CAL.** A patient-centered outcome such as functional dentition (tooth loss) or patient satisfaction may provide preferable evidence on periodontal treatment effectiveness; however, periodontal researchers have reported mostly on surrogate outcomes such as probing depth (PD) and CAL. PD is measured from the gingival margin, and the measurement is affected by gingival recession or inflammation, but CAL is measured from a fixed reference point (typically the cemento-enamel junction) and is a more valid metric and a more stable indicator of improvement in periodontal health than PD. We chose to use CAL as the primary outcome to assess periodontal therapies for the following reasons: it is used to measure the clinical effect of SRP<sup>9,10</sup>; gains in clinical attachment account for roughly 50% of PD reduction after SRP of periodontal pockets with PDs of 4 to 6 millimeters and 7 mm or more<sup>9,10</sup>; Imrey and colleagues<sup>11</sup> recommended that CAL or alveolar bone support be used as a primary outcome in nonsurgical interventional trials of periodontitis, and they also advocated using CAL as an a priori secondary outcome in trials in which bone loss was the primary outcome; and the US Food and Drug Administration (FDA) generally has adopted these recommendations in their product and drug approval process for adjuncts. Regardless of the debate regarding use of CAL versus PD, the reference standard for measuring stability or progression of periodontitis remains CAL.<sup>12,13</sup>

**Interpretation of mean change in CAL between treatment and control.** In assessing the effectiveness of SRP alone (question 1), we compared mean change in CAL between SRP and controls. To assess adjuncts (question 2), we compared mean changes between groups receiving SRP and those receiving SRP plus an adjunct. For the purposes of interpreting the results, we made a clinical relevance scale before reviewing the results (Table 1). These changes in CAL are not intended

**ABBREVIATION KEY.** ADA: American Dental Association. AE: Adverse effect. CAL: Clinical attachment level. CSA: Council on Scientific Affairs. FDA: Food and Drug Administration. Nd:YAG: Neodymium:yttrium-aluminum-garnet. PD: Probing depth. PDT: Photodynamic therapy. SDD: Sub-antimicrobial-dose doxycycline. SRP: Scaling and root planing.

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