Quality Resource Guide

Non-Surgical Periodontal Treatment

Author Acknowledgements

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The following commentary highlights fundamental and commonly accepted practices on the subject matter. The information is intended as a general overview and is for educational purposes only. This information does not constitute legal advice, which can only be provided by an attorney.

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The content of this Guide is subject to change as new scientific information becomes available.

Educational Objectives

Following this unit of instruction, the learner should be able to:

1. Understand the role of the microbial biofilm in the pathogenesis and treatment of periodontal disease and the potential impact of recent findings about the microbiome on the future of care.
2. Understand the hierarchy of levels of evidence, and specifically the evidence available relative to non-surgical therapy.
3. Identify common non-surgical approaches to periodontal therapy, and their relative benefits.
4. Recognize factors important to treatment decisions relative to non-surgical therapy.
5. Better understand the management of patients with periodontitis.

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Introduction

Periodontitis is a destructive inflammatory disease leading to the loss of the connective tissues supporting the teeth. The destruction of these tissues, the periodontal ligament and supporting bone, has been attributed to the development and maturation of a microbial plaque, or biofilm. The maturation of this biofilm coincides with alterations in the sulcular environment resulting in an increasingly pathogenic biofilm thought critical to the disease process. With the destruction of tissues of the periodontal attachment apparatus there is often an accumulation of significant mineralized deposits, calculus, along the root surface. Subgingival calculus contributes to progression of the disease process by supporting this pathogenic environment, and its removal, along with the disruption of the associated biofilm on the root surface, is critical to treatment success.

In addition to the development of the pathogenic microbial environment, the response of the individual patient to the presence of these pathogens is also a critical factor leading to this tissue destruction. While the exact contribution of these "host" factors is not well understood for an individual patient, it is clear that there are several factors that increase the risk of periodontitis. Probably the best appreciated of these factors is tobacco smoking. Additional factors that contribute to the increase in prevalence and/or severity of the disease include diabetes mellitus as well as other systemic conditions that can compromise the immune response of the individual. It is in these more compromised patients that traditional approaches to care must be viewed with great caution (**Figure 1**).

Non-surgical periodontal therapy has become an increasingly appreciated aspect of dental care for more than 60 years (Waurhaug 1956). From our appreciation of plaque accumulation causing gingival inflammation, to the contribution of the host response, we continue to refine our understanding of the disease process and the benefits of non-surgical treatment, as well as to expand the technologies available to assist in this treatment. This Quality Resource Guide will highlight the progress we have made in our understanding of periodontitis and non-surgical therapy.

Evidence-Based Dentistry

Evidence-based dentistry is dependent upon a thorough evaluation of research that allows the practitioner to provide the most appropriate application of current scientific knowledge to patient care. The long history of non-surgical therapy as an important treatment option has led to the extensive investigation of numerous considerations related to non-surgical treatment. The development of this body of evidence has provided the basis for strong scientific support for the evidence-based use of non-surgical therapy.

The hierarchy of levels for strength of scientific evidence for individual studies range from case reports and expert opinions as initial, but weak, evidence for treatment approaches, to randomized controlled trials as one of the strongest levels of evidence (**Figure 2**; Oxford Center for EBM). One way to further strengthen the level of scientific evidence is through a systematic review of the available individual studies.

The strength and outcome of a systematic review is dependent on the specific characteristics of the studies being included, such as type and size of the study, and what specifically is being reported. In this way multiple systematic reviews on a given topic may offer different answers. Additionally, systematic reviews offer an assessment of biases for each included study that may alter the perceived value of the systematic review outcomes.

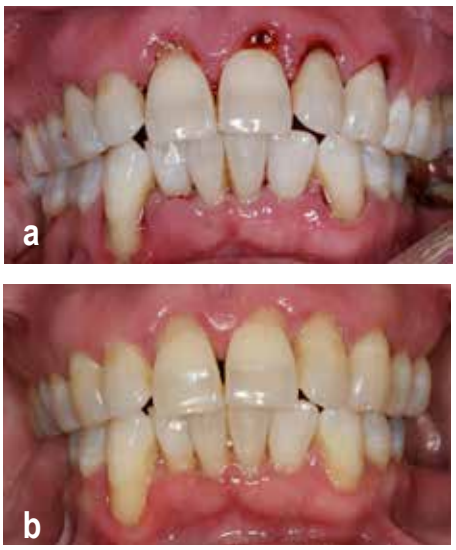
Systematic reviews are structured to objectively synthesize the findings of all relevant studies into a clinically meaningful result that can be applied to patient care. Often, the synthesis of this information utilizes a statistical approach to collectively analyze results from identified studies, called meta-analysis. Meta-analysis has the potential to identify significant findings from the collective evaluation of the studies that are not apparent within an individual study. There have been numerous systematic reviews relevant to non-surgical therapy that will form the basis of much of the current Guide.

Rationale for Treatment

Understanding the Etiology: The Oral Microbiome & Disruption of Microbial Biofilm

Plaque removal continues to be the ultimate goal underlying treatment success. The ability of supragingival plaque removal to resolve gingivitis is well established, and while it contributes to the long-term success of periodontal therapy, studies have demonstrated that supragingival plaque removal alone provides minimal benefits in the treatment of chronic periodontitis. It becomes

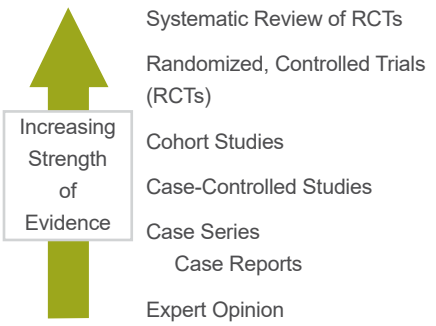
Figure 1



This diabetic patient with poor glycemic control (a) presented with stage II, grade C periodontitis with heavy bleeding on probing and other signs of inflammation; and (b) had significant clinical improvement following non-surgical debridement, with very little sign of inflammation.

Figure 2

Hierarchy of Scientific Evidence



critical that the removal of bacterial plaque, or more accurately, the disruption of the subgingival microbial biofilm, occur along the root surface to allow for successful treatment outcomes. While this has long been our approach to periodontal care, the emergence of the oral microbiome as a guiding influence offers the potential for novel approaches to care.

The biofilm is an ecologically unique and organized microbial system, or microbiome, that evolves in response to a multitude of environmental intrusions (Costalonga and Herzberg 2014). These intrusions or perturbations in the oral environment may include a number of factors such as diet, smoking, as well as oral hygiene and salivary changes associated with medications. Some of these factors may directly support the prominence of periodontal pathogens. The evolution toward a pathogenic microbial environment is referred to as dysbiosis. The dysbiosis occurs through site-specific alterations leading toward an oxygen-deprived environment with an increased complexity of the microbiome that appears to contribute to alterations and impairments in the host response.

The environmental alterations affect the microbial composition toward one favoring anaerobic organisms. The anaerobic environment within the biofilm allows for potentially symbiotic interactions between bacterial species, with the potential for specific pathogenic organisms to alter the biofilm and host response leading to tissue destruction. It appears that the alterations of the host response associated with this dysbiotic biofilm are critical to the transition from a gingivitis to a periodontitis with destruction of the supporting tissues (Kilian *et al.* 2016). As we do not yet have the ability to specifically guide or modify this pathogenic dysbiosis, the disruption of the biofilm along the root surface, in conjunction with calculus removal, remains critical to altering the environment away from one leading to tissue destruction.

In this light, the timing of therapy, especially maintenance therapy, relative to the evolution of the pathogenic biofilm is critical to clinical success. While this maturation process is not well understood, it appears that the re-establishment of a pathogenic biofilm occurs from 2 weeks to 3 months following debridement. The re-establishment of the biofilm appears to be influenced by the patient's oral hygiene following scaling and root planning. Therefore, the consideration of the patient's oral hygiene becomes important in calculating the frequency of professional maintenance (Ximenez-Fyvie, 2000).

As current literature supports continued management of the dental microbial biofilm through local measures, the microbial interactions with the patient are most recently being examined on a broader, more ecologic, scale, that is, looking at the broader microbial populations and the interactions between them (Dabdoub *et al.* 2013, Zarco *et al.* 2012, Klish et al. 2014). These studies are beginning to offer dramatic glimpses into our body's interactions with the microbial world, the microbiome, as these interactions appear to play a fundamental role in the maintenance of health and the development of disease. For example, the gut microbial flora has been implicated in the development of obesity and insulin resistance often associated with diabetes (Shen *et al.* 2013).

Periodontal disease and the role of the microbial biofilm represents only one component of the broader oral microbiome, and the host interactions required for maintaining health or leading to disease. It is clear that a number of perturbations to the oral microbiome, including smoking, diabetes, salivary gland dysfunction, and dietary habits, may alter the microbiome toward a dysbiotic one. This broader perspective offers the potential for very different therapeutic approaches toward the management of oral pathologies, including periodontal disease, caries, and autoimmune conditions in the near future. These advances will guide us toward a broader and more personalized approach to prevention and disease management, for example, the use of probiotic therapy.

Assessing the Need for Periodontal Therapy

Non-surgical (phase I) therapy needs to be individualized both to the patient and to the sites affected. Individualized treatment requires the consideration of numerous risk factors, and allows for the ongoing evaluation of progress as these factors are addressed. Numerous local factors may contribute to inflammation, increased probing depths and attachment loss (**Table 1**). Assessment of a patient with periodontitis should include at a minimum, the documentation of probing depths around all teeth, tissue inflammation (*e.g.*, bleeding on probing) and oral hygiene, and local factors (**Figure 3**). One of the most critical local factors affecting the success of non-surgical therapy is the site anatomy. For example, initial probing depths greater than 4-5mm may provide compromised access for a non-surgical approach that necessitates more advanced therapy. The need for advanced therapy may also become apparent in sites with furcation involvement having both vertical and horizontal components compromising access.

Table 1

Local Factors Influencing the Need for Periodontal Therapy

Plaque and Calculus

Restorative Factors

- Caries
- Overhangs
- Over contoured margins
- Open contacts

Anatomic Factors

- Root concavities
- Grooves and fractures
- Cervical enamel projections

Figure 3

Visible soft tissue inflammation associated with the maxillary central incisor is contrasted with tissue health on the lateral incisor. The subgingival crown margin appears to be an important local factor in this soft tissue response.

A non-surgical phase of therapy provides the practitioner an opportunity to evaluate patient compliance, reinforce oral hygiene, and the overall responsiveness of the patient to therapy. With re-evaluation following the non-surgical therapy, a more accurate assessment of the soft and hard tissues as well as a clearer view of the true surgical needs of the patient may be obtained. Most often the re-evaluation of therapy occurs 1 to 2 months following the completion of treatment. This re-evaluation needs to recognize specific sites with continued signs of inflammation (bleeding on probing) and no resolution in probing depths as sites requiring additional therapy. It then becomes incumbent upon the provider to assess these problematic sites for additional treatment needs, ranging from localized debridement to referral for specialist intervention.

It is also important to recognize that there are a small percentage of periodontitis patients, perhaps 10-20%, who do not respond favorably to periodontal therapy. These refractory patients demonstrate continued periodontal breakdown, even in the absence of local factors, and may benefit from specialist care. Many of these patients have systemic factors that negatively impact their responses to treatment. Smoking and diabetes mellitus are two established factors that can compromise long-term success to therapy.

Non-Surgical Treatment Approaches

Mechanical Debridement

The gold standard for non-surgical therapy continues to be mechanical debridement of the root surface by scaling and root planing. The success of this treatment approach has been well documented in recent systematic reviews (Heitz-Mayfield *et al.* 2002; Suvan 2005). Traditionally, this has been accomplished through the use of hand instruments, including curettes and scalers, but may also be successfully accomplished using power-driven instrumentation. Power-driven instrumentation includes sonic and ultrasonic scalers (**Table 2**).

Several systematic reviews have documented that both manual instrumentation and power-driven instrumentation can provide effective treatment (Van der Wajden and Timmerman 2002; Hallmon and Rees 2003; Walmsley *et al.* 2008). One recent review evaluated 41 studies related to scaling and root planing using power-driven devices, and conducted a scientific analysis based on 14 studies comparing power-driven instruments to hand instrumentation (Walmsley *et al.* 2008). This analysis was unable to discriminate any benefit for one power-driven device over another or for any device over hand instrumentation.

Although both manual and power-driven instruments can be effective, there is evidence that suggests greater benefit for the use of sonic or ultrasonic instrumentation rather than hand instrumentation in furcation areas. The power-driven instruments with specially designed tips appear to better debride these minimally accessible and often convoluted surfaces (Leon and Vogel 1987; Oda and Ishikawa 1989).

Subgingival Irrigation

The use of subgingival irrigation is promoted as an adjunctive treatment to mechanical debridement, thought to aid removal of microbial components from the sulcus and the root surface. Based on current knowledge, the use of subgingival irrigation (using water, chlorhexidine, or hydrogen peroxide) along with mechanical debridement provides no additional clinical benefit over mechanical debridement alone (Hallmon and Rees 2003). It is possible that the presence of the biofilm minimizes the ability of irrigating agents to penetrate into the matrix and affect the associated pathogens beyond the mechanical disruption of the biofilm.

Systemic Antibiotics

The infectious nature of periodontitis suggests that systemic antibiotics may provide a useful therapeutic option for patient care. Several systematic reviews have investigated this possibility (Haffajee *et al.* 2003; Herrera *et al.* 2008; Zandbergen *et al.* 2013). Consistent with our understanding of the etiologic basis of periodontitis, the use of systemic antibiotics was shown in these reviews to provide an improvement in clinical measurements of probing depth and attachment loss when used in conjunction with mechanical debridement or surgical therapy. However, the use of antibiotics must be considered relative to the risks.

Two recent systematic reviews evaluated the use of systemic antibiotics with scaling in patients with diabetes or with smokers. As these patient groups represent potentially vulnerable populations, the benefits may seem to outweigh the risks. This report found that there was a modest improvement of 0.2 mm in probing depth reduction with the adjunctive use of antibiotics for diabetic patients (Santos *et al.* 2015) and no clear benefit for patients who smoke (Albandar 2012).

In general, systemic antibiotics are reserved for more severe or aggressive forms of the disease (Rajendra and Spivakovsky 2016). A number of antibiotics have been studied alone and in combination; the antibiotic regimens found to be efficacious in systematic review were tetracycline used at 250 mg qid for 14-30 days, and metronidazole used at 200-400 mg tid for 7-14 days (Hafajee *et al.* 2003). More recent recommendations reinforce the importance of initiating antibiotic therapy with debridement to enhance disruption of the biofilm (Herrera *et al.* 2008).

Table 2

Strength of Evidence Supporting the Use of Non-Surgical Therapy for Chronic Periodontitis

STRONG
- Subgingival Mechanical Debridement
  - Hand-instruments
  - Sonic scalers
  - Ultrasonic scalers

MODERATE (as adjunctive therapy)
- Local delivery antimicrobials
- Systemic antibiotics

QUESTIONABLE
- Full-mouth debridement protocol
- Subgingival laser treatment

NOT USEFUL
- Subgingival irrigation

It must be cautioned that the use of systemic antibiotics must be considered relative to the overall benefit of the patient. Systemic antibiotics have the potential to create bacterial resistance, or lead to allergic or other adverse drug reactions. The potential for important systemic alterations in the microbiome with the use of systemic antibiotics will become an increasingly important consideration (Macfarlane 2014). At the present time, there remains a need to identify the specific patients based on microbiome who may benefit from specific antibiotic regimens in conjunction with periodontal therapy, with the potential to enhance the benefits of antibiotic therapy relative to the risks for the patient.

Local Delivery Antimicrobials

Local delivery of antimicrobial agents into the sulcus provides an attractive alternative to the use of systemic antibiotics. It allows for a more focused delivery providing a site-specific application while minimizing the systemic concerns. It also provides the potential for the application of an increased concentration of antimicrobial to the microbial biofilm, which may increase its effectiveness. The biofilm provides a relatively complex environment with the potential to limit exposure of microbes to chemotherapeutic agents applied to the surface of the biofilm in the absence of mechanical debridement (Pavia *et al.* 2003).

There have been numerous investigations of the benefits of specific local delivery antimicrobials that have been reviewed systematically (Hanes and Purvis, 2003; Bonito *et al.* 2005). These studies evaluated several antibiotic agents, minocycline and doxycycline, and the non-specific antimicrobial, chlorhexidine. It appears that these agents contribute to clinical improvements when used in conjunction with mechanical debridement. A recent systematic review supported the adjunctive use of local antimicrobials in deep or refractory periodontal sites (Matesanz-Perez *et al.* 2013). However, it must be cautioned that the true benefit relative to the cost of these agents remains to be determined.

Full-Mouth Debridement Therapy

The importance of eliminating the infectious component of the disease, has led to the development of a more aggressive approach to non-surgical therapy. In this approach, full-mouth scaling is accomplished typically within a 24-hour period to prevent reinfection of treated sites from non-treated areas. This is in contrast with conventionally timed treatment that may have weeks between treatments in different areas of the mouth. This protocol is often enhanced further with the use of local antimicrobial rinses or antibiotics following full-mouth scaling. Interestingly, looking at several recent systematic reviews, it appears that the proposed benefits of this more aggressively timed and thorough debridement does not offer advantage over a conventionally timed approach to scaling. Furthermore, the use of a local antimicrobial rinse along with the full-mouth debridement does not appear to add any benefit beyond that found for conventional scaling (McLaughlin and Duane, 2016; Eberhard *et al.* 2015).

Lasers

The use of laser therapy to treat diseased root surfaces provides an interesting adjunctive or alternative approach to mechanical debridement that has been evaluated in several recent systematic reviews (Kellesarian *et al.* 2017; Slot *et al.* 2014;). Two recent systematic reviews found that laser therapy (used as an adjunct to mechanical debridement in most of the studies investigated) produces similar levels of effectiveness to that of mechanical debridement alone, noting only slight improvements in gingival health and bleeding on probing following the use of lasers that were viewed as of questionable clinical significance.

Several types of lasers have shown promise in the therapeutic debridement process while minimizing detrimental effects to the root surface. The Er:YAG laser has the best evidence to date, and appears capable of removing mineralized deposits and providing clinical improvements similar to mechanical debridement. A recent systematic review of the Er:YAG laser adjunctive to mechanical debridement did show some added benefits in reducing probing depths after 3 months, but no lasting benefits after 6 and 12 months (Ma et al., 2018). However, the amount of benefit with Er:YAG adjunctive therapy remains in question (Zhou et al., 2019).The pulsed Nd:YAG laser may have the potential to disinfect the root surface, but does not appear to be effective at removing mineralized deposits. There is very limited scientific support for the marketing claims that patients treated with a laser have less post-treatment discomfort than those treated with mechanical debridement. This is clearly an area for continued investigation.

Non-Surgical Treatment Decisions

Treatment success is dependent upon sufficient root surface debridement to allow for the return of tissue health. The physiologic response requires the diminished presence of periodontal pathogens, resolution of inflammation, and the adaptation of the periodontal tissues to the root surface. The clinical endpoints typically targeted by this treatment are reductions in sites with bleeding on probing and in probing depth and clinical attachment levels.

One of the most critical aspects of treatment success is the appropriate application of the therapy. Relative to non-surgical therapy, supragingival prophylaxis alone, as discussed above, does not provide adequate care for periodontitis. Accessing the subgingival pocket is imperative to success. This may be accomplished non-surgically or may require a limited surgical approach to better access isolated sites. The presentation of a more generalized or severe pattern of disease may require surgical therapy.

Surgical therapy may be required to obtain certain treatment goals, such as regeneration of a vertical bony defect, but its use relative to existing probing depths is less obvious. A recent review of three systematic reviews provides some guidance in the treatment decision between a non-surgical and a surgical approach (Heitz-Mayfield 2005).

Treatment success is most often determined by measuring changes in clinical attachment levels or probing depths. Improvements in clinical attachment levels (measured from the CEJ) following treatment represent healing of the tissues along the root surface. By the nature of the treatment approaches, non-surgical therapy provides greater improvements in clinical attachment levels in all but the deeper pockets

(**Table 3**), and surgical therapy provides greater reductions in probing depths in all but perhaps the shallowest pocket depths. Improvements in probing depth reflect a combination of tissue healing and reductions in tissue edema, but also need to be considered relative to the long-term management of the patient. That is, sites with deeper probing depths that go unresolved with non-surgical treatment may be at greater risk for future breakdown. This breakdown may be identified by increases in probing depth/attachment loss, often with persistent bleeding on probing. It is these more vulnerable sites that may benefit most from surgical therapy. The benefit is consistent with the nature of the surgical procedure that is tissue reduction, but must be considered relative to the gingival margin position, and its impact on esthetics, root sensitivity, and the overall goals of treatment for the individual patient (**Table 4**). It must be emphasized that the patient's desires and goals are often more related to psychosocial factors such as comfort and anxiety than to disease management (Patel *et al.* 2006).

Non-surgical root surface debridement may also be compromised in areas with probing depths of 4 mm or less. Numerous factors can impact the ability to disrupt this microbial biofilm in sites with even relatively shallow pocket depths. These include local factors such as the amount of attachment loss, the shape and contours of the root surface, furcation involvement, restorative contours and margins (Tonetti *et al.* 1998).

Tobacco smoking presents a unique but important consideration for treatment planning and success. In fact, patients who smoke 10 or more cigarettes per day are considered diagnostically more vulnerable to rapid periodontal breakdown (Grade C). Smoking patients have been shown to be less responsive to both non-surgical and surgical therapy than non-smoking patients. However, for smoking patients, non-surgical therapy may offer a better treatment option to minimize disease progression than surgical therapy, while allowing the encouragement of smoking cessation prior to surgical therapy (Labriola 2005). It is important to recognize that patients who continue smoking following active therapy also have an increased risk for disease progression and tooth loss during maintenance therapy (Chambrone et al. 2010).

Periodontal Maintenance

The development and maturation of the microbial biofilm as a major etiologic factor in the progression of periodontal disease requires periodic mechanical therapy to disrupt the biofilm, reduce local irritants and inflammation. Current standards of maintenance therapy include the use of supra- and subgingival debridement, along with oral hygiene instruction, and possible local delivery antimicrobials as part of periodontal maintenance. In addition, maintenance therapy offers continued opportunities to manage other important factors to patient wellbeing, such as support, guidance and counseling for smoking cessation. Together, this type of treatment regimen appears to be effective for the majority of periodontitis patients, although the relative importance of each component remains to be established (Pastagia *et al.* 2006). Similarly, the appropriate frequency of maintenance visits has been only weakly justified, but most often ranges between 3 to 6 month intervals, dependent on the levels of disease present, and appears to be most successful in patients with the highest levels of oral hygiene.

Table 3

Treatment Recommendations Based on Findings from Systematic Reviews*

Initial Probing Depths (mm)	Heitz-Mayfield 2002	Hung & Douglass 2002	Antczak-Bouckoms 1993
1 - 3 (shallow)	S/RP	S/RP	S/RP
4 - 6 (moderate)	S/RP	S/RP	S/RP
> 6 (deep)	Sx	No clear difference	No clear difference

* Preferred treatment reported with goal to gain in clinical attachment levels

Table 4

Treatment Planning Considerations

Periodontal Assessment

Goals of Treatment

- Reduce gingival inflammation
- Pocket depth reduction
- Improved or stable clinical attachment levels

Patient Concerns

- Discomfort
- Esthetics
- Root sensitivity

Smoking

Root Anatomy and Other Local Factors

Medical/Psychological Factors

Summary

Our understanding of the approaches necessary to establish and maintain oral health continues to grow. The host-microbiome interactions appear to have important effects at both the local and systemic level. These and other breakthroughs offer the potential for dramatic changes in our management of periodontal disease in the future. The growth of evidence-based dentistry, grounded in the scientific interpretation of the literature, will continue to guide us through the increasing number of well-designed clinical studies. It is certain that a non-surgical approach provides an important component of periodontal therapy, and that sites with probing depths greater than 4-6 mm following non-surgical therapy may benefit from a surgical approach. However, at the present time, the determination of optimal therapy for a patient requires the provider to consider these issues in light of the outcomes upon which they are based (probing depth and clinical attachment level), relative to numerous issues of importance to the patient for which there is no clear scientific evidence guiding care for that specific patient's circumstances. These may include concerns for esthetics and root sensitivity, as well as smoking, medical and emotional factors. In the end, the practitioner must weigh all the factors impacting the patient's care in determining the optimal approach to treatment.

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POST-TEST

Internet Users: This page is intended to assist you in fast and accurate testing when completing the "Online Exam." We suggest reviewing the questions and then circling your answers on this page prior to completing the online exam.

(1.5 CE Credit Contact Hour) Please circle the correct answer. 70% equals passing grade.

1. **Surgical treatment is indicated for all patients with sites having probing depths greater than 6 mm.**
   a. True
   b. False

2. **Each of the following study characteristics typically affects the inclusion of a study in a systematic review EXCEPT one. Which one is the EXCEPTION?.**
   a. Bias determination
   b. Design of study
   c. Number of participants
   d. Specific outcomes reported

3. **Disruption of the microbial biofilm is critical to successful periodontal treatment no matter how it is accomplished.**
   a. True
   b. False

4. **Which of the following are the best-established systemic condition that leads to periodontitis?**
   1. Heart disease 2. Diabetes 3. Smoking 4. Genetics
   a. 1 and 2 only
   b. 2 and 3 only
   c. 1 and 3 only
   d. 2 and 4 only

5. **The development of chronic periodontitis is dependent upon which of the following?**
   a. Biofilm maturation
   b. Host inflammatory response
   c. Both a and b
   d. None of the above

6. **Approximately what percentage of periodontitis patients are refractory (do not respond well) to treatment?**
   a. 20
   b. 30
   c. 40
   d. 50

7. **The periodontitis diagnosis grading for a patient smoking one pack of cigarettes per day would be:**
   a. A
   b. B
   c. C

8. **Laser monotherapy provides clinically important improvement compared with scaling and root planing.**
   a. True
   b. False

9. **The use of a full-mouth debridement approach along with local antimicrobial rinse works better than traditional scaling and root planing in the treatment of patients with periodontitis.**
   a. True
   b. False

10. **Biofilm maturation is most critical to disease etiology because it leads to increases in which of the following?**
    a. Number of subgingival microbes
    b. Pathogenic microbial complexes
    c. Calculus formation
    d. Aerobic environment

Registration/Certification Information (Necessary for proper certification)

Name (Last, First, Middle Initial): _____

PLEASE PRINT CLEARLY

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City: _____ State: _____ Zip: _____

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Date of Birth: _____ Email: _____

State(s) of Licensure: _____ License Number(s): _____

Preferred Dentist Program ID Number: _____ ☐ Check Box If Not A PDP Member

AGD Mastership: ☐ Yes ☐ No

AGD Fellowship: ☐ Yes ☐ No Date: _____

Please Check One: ☐ General Practitioner ☐ Specialist ☐ Dental Hygienist ☐ Other

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Evaluation - Non-Surgical Periodontal Treatment 5th Edition

Providing dentists with the opportunity for continuing dental education is an essential part of MetLife's commitment to helping dentists improve the oral health of their patients through education. You can help in this effort by providing feedback regarding the continuing education offering you have just completed.

Please respond to the statements below by checking the appropriate box, using the scale on the right.

	1 = POOR 1	2	3	4	5 = Excellent 5	
1. How well did this course meet its stated educational objectives?	☐	☐	☐	☐	☐	
2. How would you rate the quality of the content?	☐	☐	☐	☐	☐	
3. Please rate the effectiveness of the author.	☐	☐	☐	☐	☐	
4. Please rate the written materials and visual aids used.	☐	☐	☐	☐	☐	
5. The use of evidence-based dentistry on the topic when applicable.	☐	☐	☐	☐	☐	☐ N/A
6. How relevant was the course material to your practice?	☐	☐	☐	☐	☐	
7. The extent to which the course enhanced your current knowledge or skill?	☐	☐	☐	☐	☐	
8. The level to which your personal objectives were satisfied.	☐	☐	☐	☐	☐	
9. Please rate the administrative arrangements for this course.	☐	☐	☐	☐	☐	

10. How likely are you to recommend MetLife's CE program to a friend or colleague? *(please circle one number below:)*

10	9	8	7	6	5	4	3	2	1	0
extremely likely					neutral					not likely at all

What is the primary reason for your 0-10 recommendation rating above?

11. Please identify future topics that you would like to see:

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