

Can Positive Therapeutic Outcomes in Risk-Associated Chronic Periodontitis be Sustained Nonsurgically?

Abstract

One of the most haunting questions that progressive clinicians have today is, "Can we really have great results using nonsurgical periodontal therapeutics exclusively without surgical intervention?" The following case study proposes a clinical pathway

for nonsurgical treatment of chronic periodontitis that seems to offer great promise. The case study also seeks to address the aforementioned question as it relates to risk-associated cases of chronic periodontitis.

One of the therapeutic goals of periodontal maintenance is to prevent or minimize recurrence of disease progression in patients who have been previously treated for periodontitis.¹ To that end, I became very curious about the particular patient I based a Case Study on in the January 2003 issue of *Contemporary Oral Hygiene*.² Could the positive therapeutic outcomes that were achieved and sustained for 4.5 months posttreatment in the case discussed in *Perio Pathways* (see page TK) be sustained (and perhaps further improved) over longer periods of time? In tracking this patient, I performed periodontal maintenance according to the American Academy of Periodontology's recommendations for periodontal maintenance at 11, 14, and 20 months posttreatment (Figures 1-3) that included¹:

1. reviewing and updating of medical history, medication history, and risk questionnaire. Nothing remarkable was noted as a change in medical status or risk profile for this patient.
2. an extraoral examination. The findings were normal at each periodontal maintenance visit.
3. an intraoral examination that included soft-tissue evaluation and oral cancer screening. The findings were normal at each periodontal maintenance visit.
4. A hard-tissue examination that included tooth mobility, fremitus, occlusal disharmonies, parafunctional habits, coronal and root caries assessment, identification of restorative and prosthetic defects, iatrogenic factors, open contacts, and malpositioned teeth. Multiple areas of root caries and caries around the margins of many of the abutment teeth were discovered during the hard-tissue examination performed at the patient's 5th periodontal maintenance visit. The dentist confirmed the findings and it was recommended to the patient that she would need a new restorative treatment plan, which would likely include replacement of much of the overcontoured crown and bridge.
5. data collection related to periodontal findings, which included assessing probing depths, bleeding on probing, recession, clinical attachment levels, the presence of plaque and calculus, furcation involvement, and the presence of

6. resampling subgingival plaque for microbiological retesting, when appropriate. It is also suggested that reculturing at intervals of periodontal maintenance visits would be useful in assessing treatment outcomes.³
7. vertical bitewing radiographs, as appropriate. Vertical bitewing radiographs were taken at the patient's 5th periodontal maintenance visit.
8. an assessment of the patient's personal oral hygiene with the use of disclosing tablets and face mirror to "tour" the mouth for evidence of residual plaque. Plaque and calculus levels were generally light; very heavy stain from smoking was generalized but most pronounced on the anterior teeth.
9. a review and modification (when necessary) of the patient's self-care routine. This patient was highly compliant to recommendations for self-care routines, including twice-daily use of Waterpik® Dental Systems (Waterpik Technologies, Inc, Newport Beach, Calif, www.waterpik.com), and the use of an automatic toothbrush.
10. counseling on modification/elimination of the patient's risk factors, ie, recommendations for smoking cessation programs and referral for stress management therapy. Five published and randomized controlled trials demonstrated that an oral cancer screening with feedback about oral problems related to oral snuff and chewing tobacco use, coupled with cessation advice, self-help materials, and brief cessation counseling by a dental hygienist promote long-term tobacco cessation.^{6,7} After repeated cessation advice, the patient finally agreed to consider a smoking cessation program on her 5th periodontal maintenance visit. She was still unreceptive to stress management therapy.
11. supragingival and subgingival ultrasonic debridement followed by manual instrumentation on a site-specific basis was performed at each periodontal maintenance visit with no complications.
12. polishing using a prophy jet to completely remove tobacco stain was performed at each periodontal maintenance visit with no complications.
13. counseling on the continued uses of Periostat® (CollaGenex Pharmaceuticals, Inc, Newtown, Pa, www.collagenex.com), with new prescriptions as needed. The patient has an excellent understanding of the etiological rationale for taking Periostat. She knows that as long as she continues to smoke, Periostat may be the only thing that can be done to target her nonmicrobial risk. As a result, she is very compliant with her Periostat regimen.

In the original case study, I suggested that optimal therapeutic outcomes may only be possible by employing a treatment strategy that addressed the bacterial component, the host response component, and the risk component (smoking cessation, stress management counseling), of this multifactorial disease.²

I obtained new subgingival plaque samples on this patient during her 4th periodontal maintenance visit, which was approximately 14 months posttreatment. The laboratory analysis report included both cultivable microbiota and DNA hybridization probe reports that indicated that the sample was negative for *Porphyromonas gingivalis* and *Tannerella forsythensis*, which seems to suggest a more stable periodontal status for this patient.³⁻⁵ Low levels of *Prevotella intermedia/nigrescens* were recovered.



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Figure 1—11 months posttreatment.



Figure 2—14 months posttreatment.



Figure 3—20 months posttreatment.

the bacterial component, the host response component, and the risk component (smoking cessation, stress management counseling), of this multifactorial disease.² The original case study also stated, “In patients with severe and extensive periodontal disease, therapy designed to be ‘initial’ may become ‘definitive’ if, as cotherapists, we can successfully manage their disease.”² As I hope readers will agree, the update on this case study 20 months after definitive therapy seems to demonstrate that by employing therapeutic interventions that target both the microbial colonization of periodontal pockets and the host response (the intended utility of Periostat) we can sustain, and possibly enhance, positive therapeutic outcomes in even some of the most challenging cases.

Evidence of the ability to sustain positive therapeutic outcomes may be established by comparing clinical data at baseline and various periodontal maintenance visits. The clinical data I used to demonstrate the ability to sustain positive therapeutic outcomes includes parameters that are commonly accepted as indicators of periodontal stability. They include⁸:

- elimination of bleeding on probing.
- reduction of probing depths (reproducible probe readings by the attending dentist).
- gains in clinical attachment levels (or at least unchanged).
- absence of inflammation.
- restoration of gingival topography,

including knife-edge papilla, stippling, and pink color.

- decreased mobility on individual teeth.
- no detectable levels of subgingival microbes from the red or orange complexes.

Demonstrated Evidence of Outcome Stability

To assess the ability to sustain and enhance positive therapeutic outcomes, Figures 4 to 6 allow readers to review an historical account of the clinical data collected at baseline and each periodontal maintenance visit through 20 months posttreatment. As I hope readers will agree, what has happened in this case seems remarkable.

In Figure 4, various pie charts comparing the percentages of shallow (< 4 mm), moderately deep (4 mm to 6 mm), and deep (≥ 7 mm) probing depths recorded at baseline and periodontal maintenance visits demonstrate a shift in disease activity. As readers will note, 19% of the pockets were ≥ 7 mm and 19% were in the 4 mm to 6 mm category at baseline. The percentages of pockets within the ≥ 7 mm category were reduced from 19% at baseline to 2% at 4.5 months later and reduced even further to 1% at 8 months posttreatment, which has been sustained up to 20 months posttreatment. Ideally, all our patients will present with a whole pie chart with pocket depth in the < 4 mm category. What is impressive with this case is that the percentage of pockets that fall within this < 4 mm category continues to increase and is relatively sustained through 20 months.

In Figure 5, the percentage of sites that bled on probing are plotted to allow us to assess the trend in bleeding on probing. As readers will see, this clinical parameter changed significantly. At baseline, bleeding on probing was as high as 73%. Bleeding on probing was reduced to 0% at 4.5

months and sustained at 8, 11, and 14 months. At the last periodontal maintenance visit (20 months) there was a very small change at 2%. It appears that this clinical outcome has been sustained, but it will be important to monitor bleeding on probing against other changes.

A similar trend was observed in assessing the trend in the percentage of sites with pocket depths ≥ 5 mm that bleed on probing, which many clinicians consider an indication for placement of a site-specific antimicrobial (Figure 6).⁹ At baseline, this patient started out with 74% of sites that were ≥ 5 mm that simultaneously bled on probing. Atridox® (CollaGenex Pharmaceuticals, Inc, Newtown, Pa, www.collagenex.com) was placed throughout all 4 quadrants that demonstrated this parameter. The percentages of sites that fell into this category were dramatically reduced to 5% at 4.5 months posttreatment, reduced to only 1% at 8 months posttreatment, and further reduced to 0% at 11 months posttreatment. This outcome was sustained through 20 months post treatment.

With mean clinical attachment level gain of 1.3 mm in the category of pockets with 4 mm to 6 mm depth at baseline, and clinical attachment level gain of 2.8 mm in the category of pockets ≥ 7 mm depth at baseline, these results are very impressive. In addition, mean pocket depth reduction of 1.9 mm in the 4 mm to 6 mm category and 3.7 mm in the ≥ 7 mm category is an excellent outcome. I

would like to claim that the success of this case had to do with my technical skills in scaling and root planing, but I think the most important variable was the patient’s compliance to a continuous, long-term regimen of Periostat.

The outcome of this case seems to mirror some of the recent research conducted to assess the use of Periostat as an adjunct to scaling and root planing in the clinical management of severe chronic periodontitis, discussed below.¹⁰ The research was conducted over a 9-month period at 6 different dental schools.¹⁰

The study was double-blind and placebo-controlled, with a study group composed of 210 patients who were between the ages of 30 and 75. The patients in the study were predominately periodontal maintenance patients from faculty practice. Thirty-two percent of the subjects were current smokers and 68% were nonsmokers.

At baseline, clinical attachment level and pocket depth were measured and recorded. All quadrants of all the patients in the study were treated by scaling and root planing and then randomly selected to receive either Periostat or placebo for 9 months.

The findings of this study may help explain why the patient in the case presented above has done so well over the last 20 months by revealing a hierarchical treatment response both in the percentage that achieved probing depth reduction and clinical attachment gains.

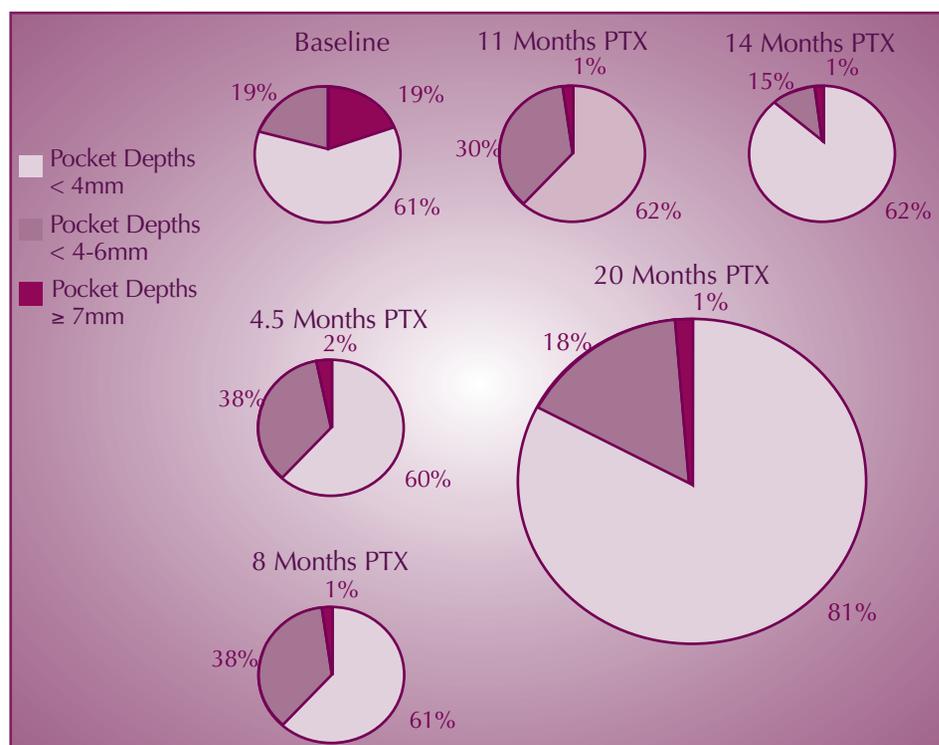


Figure 4—Comparison of pocket depth categories at various posttreatment (PTX) intervals demonstrating an overall reduction of the percentage of deep pockets (≥ 7 mm) and a significant increase in the percentage of pockets that had shallow (< 4 mm) depths.

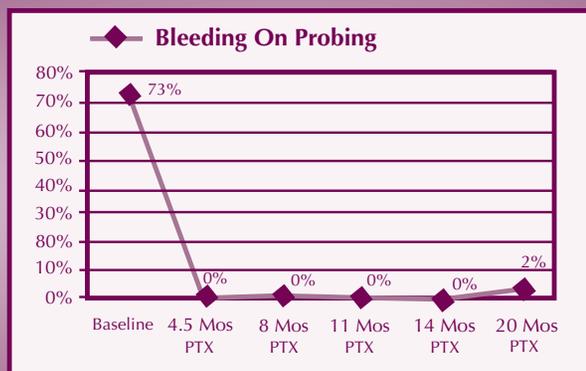


Figure 5—The percentage of pockets ≥ 5 mm with bleeding on probing start to rebound to baseline levels after 20 months posttreatment (PTX).

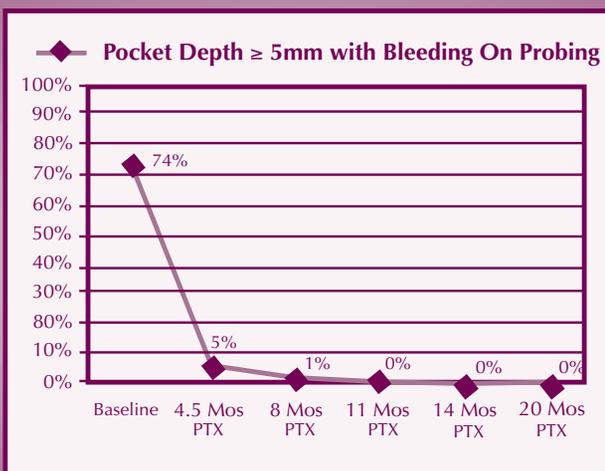


Figure 6—Possible of sustaining 0% bleeding on probing beyond 20 months.

- Nonsmokers receiving Periostat tended to demonstrate the greatest percentage of sites with pocket depth reduction.
- Smokers receiving Periostat had the next greatest percentage of sites with pocket depth reduction.
- Nonsmokers receiving the placebo drug did not respond as well as smokers who were receiving Periostat.
- Smokers receiving the placebo drug demonstrated the least percentage of sites with pocket depth reduction.
- Nonsmokers receiving Periostat tended to demonstrate the greatest percentage of sites with clinical attachment gain.
- Smokers receiving Periostat had the next greatest percentage of sites with clinical attachment gain.
- Nonsmokers receiving the placebo drug did not respond as well as smokers who were receiving Periostat.
- Smokers receiving the placebo drug demonstrated the least percentage of sites with clinical attachment gain.

It is widely accepted that smokers are not expected to respond as well to periodontal therapies as nonsmokers do.¹¹ Because of this, the findings of this study seem to be demonstrating something remarkable—smokers tak-

ing Periostat responded to treatment similarly to nonsmokers. These research findings offer great promise for smokers with chronic periodontitis because the use of Periostat in these cases might have the affect of “leveling the playing field” for them, allowing us to sustain and enhance positive therapeutic outcomes, similar to the response of nonsmokers.

Conclusion

While the prevalence of smoking has decreased among American women over the past 30 years, close to 27% of women still smoke, and surprisingly, the prevalence of smoking has dropped more significantly among men than women.¹² Combine this with the demographics and compromised health trends (osteoporosis/osteopenia, acquired immune diseases, xerostomia-inducing medications, etc) associated with an aging population, and it seems inevitable that cases of progressive, chronic periodontitis among women smokers, in particular postmenopausal women, may become increasingly common in general practice.

It has been estimated that about 42% of periodontitis cases (6.4 million cases) in the American adult population were attributable to current smoking status and about 11% (1.7 million cases) to former smok-

ing status.¹³ Furthermore, among current smokers, 75% of the periodontitis cases were deemed attributable to smoking.¹³ The effect of smoking on treatment outcomes appears to be dose dependent, with heavy smokers (>20 cigarettes/day) exhibiting greater disease progression than light smokers.¹⁴

Given the reality of smoking-related epidemiology, and its impact on everyday practice, we must consider more progressive disease management strategies for smoking-associated cases of chronic periodontitis. Research has shown that in smoker cases like this one, surgical interventions may not be good treatment options because of smokers' impaired wound healing ability.¹⁵ Therefore, we must look to safe and effective nonsurgical therapies that live up to their research claims in achieving and sustaining positive therapeutic outcomes. Host modulatory therapy, such as Periostat, is an adjunctive therapy that seems to be very promising by making a significant difference in long-term management of smoking-related cases like the one presented here.

Can positive therapeutic outcomes in risk associated chronic periodontitis be sustained nonsurgically? If we can continue this level of success long term, the answer may be, “yes.” **COH**

Disclosure

The author has occasionally received honoraria from CollaGenex Pharmaceuticals, Inc, to lecture and to write articles.

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