No evidence to support the use of low-dose doxycycline as an adjunct to nonsurgical therapy in smokers

Does low-dose doxycycline improve clinical outcomes when smokers have periodontal therapy?

Needleman I, Suvan J, Gilthorpe MS, *et al.* *A randomized-controlled trial of low-dose doxycycline for periodontitis in smokers. J Clin Periodontol 2007; vol:34 325-333*

Design This was a randomised, placebo-controlled trial with 6 months of follow-up.

Intervention Patients received nonsurgical periodontal therapy and 3 months of the test treatment (low-dose doxycycline; LDD) or control (inactive identical placebo).

Outcome measure The primary outcome was the change in the clinical attachment level (CAL) recorded from the cemento-enamel junction to the base of the probing pocket using a graduated UNC-15 probe (Hu Friedy, Chicago, Illinois, USA). Secondary outcomes included pocket depth, gingival recession and bleeding on probing recorded at six sites per tooth with the manual probe and ICTP (terminal carboxytelopeptide of type 1 collagen).

Results The velocity of change was statistically significantly greater for the test group for CAL [–0.19 mm/ month; 95% confidence interval (CI), –0.34– –0.04; P 0.012] and probing depth (0.30 mm/ month; 95% CI, –0.42– –0.17; P 0.001). No differences were observed, however, for absolute change in clinical or biochemical markers at 6 months.

Conclusions Nonsurgical periodontal therapy in smokers can produce a substantial improvement in periodontal health but there is no evidence to support the use of LDD as an adjunct to their nonsurgical therapy. Quitting tobacco use continues to be of fundamental importance in improving the periodontal health of these individuals.

Commentary

The finding that smokers have enhanced periodontal inflammatory responses (e.g. Kinane and Chestnutt, 2000)[1] led these authors to determine whether the anti-inflammatory could improve the results of periodontal therapy. Needleman et al selected an unusual anti-inflammatory agent, low dose doxycycline. This agent acts as an anti-microbial at high doses (e.g. 100 mg), but as an anti-inflammatory agent at low doses (20 mg). This occurs through the binding of calcium. The removal of calcium inhibits proteolytic enzymes, and thus decreases the inflammatory response.

The results of the well-conducted, well-controlled, and well-presented clinical trial indicate that low-dose doxycycline does not improve the results of periodontal therapy when provided to smokers.

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These results are not surprising. Periodontal disease is a bacterial infection,[2,3] with reactionary subsequent inflammatory and immunological responses.[4] Thus, to improve the outcome of care in smokers, there are two conceptual interventions: eliminate smoking, and/ or eliminate the causative bacteria.

Tobacco cessation counselling, in conjunction with pharmacological intervention, can be successfully employed, but success in a dental setting has not yet been documented.[5] Thus, if one expects to have an impact on periodontal health, one should consider eliminating the causative bacteria.

Conversely, Winkel et al.[6] found that the antimicrobial agents metronidazole plus amoxicillin, taken for 7 days (with scaling and root planning) is effective in reducing or eliminating the periodontal infection. In an extraordinarily controversial but well-conducted trial, Lopez et al.[7] found that the same antimicrobial agents alone were more effective in reducing and/ or eliminating the infecting organisms than traditional scaling and root planning alone.

For smokers specifically, the adjunctive use of metronidazole plus amoxicillin in conjunction with scaling and root planning demonstrates a clinical benefit (e.g. Pahkla et al. 2006).[8]

All this said, at the end of the day (and the end of life), smoking has a demonstrated harmful effect on health. This, coupled with the association of periodontal disease with systemic disease, suggests that clinicians might begin to consider, systemic use of metronidazole plus amoxicillin for the treatment of periodontal disease and, second, guiding patients who smoke to smoking cessation clinics.

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