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summary

Adjunctive subantimicrobial-dose doxycycline without oral hygiene instruction gives mixed results compared with scaling and root planing alone

Caton JG, Ciancio SG, Blieden TM, Bradshaw M, Crout RJ, Hefti AF, et al*. Treatment with subantimicrobial dose doxycycline improves the efficacy of scaling and root planing in patients with adult periodontitis. J Periodontol 2000; 71:521–532*

Objective To assess the efficacy and safety of subantimicrobial-dose doxycycline (SDD) in conjunction with subgingival scaling and root planing (SRP) in patients with adult periodontitis.

Design Randomised, double-blind, placebo-controlled, parallel-group trial in five United States dental schools.

Intervention Following SRP but no oral hygiene instruction, 30–75-year-old patients with clinical attachment level (CAL) and probing depth (PD) between 5 and 9 mm inclusive and bleeding on probing (BOP) in at least two sites in two quadrants were randomly allocated to receive either doxycycline hyclate 20 mg *bid* or placebo *bid* for 9 months. Detailed exclusion criteria are given and all examiners received training prior to the study.

Outcome measures CAL, PD, BOP and microbial assessments were taken at baseline and 3-monthly intervals. Patients recorded adverse events in diaries.

Results Absolute changes in CAL and PD were significantly greater with SDD (Table 1) than with placebo although the proportion of sites showing improvements were not statistically different. BOP remained high in all groups. Improvements occurred without detrimental shifts in normal periodontal flora.

Table 1 Changes in clinical attachment level (CAL), probing depth (PD) and bleeding on probing (BOP) after subantimicrobial-dose doxycycline (SDD)

	Mean CAL change (mm)/person (SD)		Mean PD change (mm)/person (SD)		BOP/person (% sites)	
	SDD	Placebo	SDD	Placebo	SDD	Placebo
n	90	93	90	93	93	90
Baseline PD 4–6 mm	1.03 (0.05)	0.86 (0.05)	0.95 (0.05)	0.69 (0.05)	64	79
n	79	78	79	78	79	78
Baseline PD ⩾7 mm	1.55 (0.05)	1.17 (0.05)	1.68 (0.12)	1.2 (0.12)	75	80

Conclusions The adjunctive use of SDD with SRP is more effective than SRP alone and may represent a new approach in long-term management of adult periodontitis.

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Commentary

Adjuncts to periodontal therapy have mainly been antibiotics but their lack of efficacy (whether systemically or locally delivered) and the risk of encouraging resistant bacteria limits the use of these drugs for routine forms of periodontal disease. A fascinating alternative approach is instead to try to change the tissue's response to the bacteria. Non-steroidal anti-inflammatory drugs can reduce bone loss, but their use is also limited by potentially serious side effects. Recently, the tetracycline class of drugs used at concentrations too low to kill bacteria has been found to reduce tissue breakdown by a different mechanism to that used for killing bacteria.[1] This study is the first major test of this approach as an adjunct to SRP. Indeed, the product is now commercially available in the US and UK.

The study involved twice-daily medication for 9 months with either active drug or placebo. Although adequate time for root planing was allowed, it is curious that no oral hygiene instruction was given to patients since this is a fundamental aspect of periodontal therapy.[2] The results show some effect of the active drug compared with the placebo control group, with modest but statistically significant differences reported for pocket depth (0.26–0.48 mm) and CAL (0.17–0.38 mm), depending on initial severity. For some sites with improving probing depth or attachment level, there was a trend for greater improvements with the active drug but, despite the size of the study, no statistical differences were detected.

So how does this fit into periodontal therapy? Two sets of results give some cause for concern about adopting this treatment. One is the high percentage of BOP sites at the end of the study (even for shallow sites). The other is the limited improvement in pocket depth for root planing alone, especially at the initially-deepest sites, where the greatest improvements are usually noted (1.2 mm improvement at 9 months). This value is low compared with a recent comprehensive review of non-surgical therapy, which estimated a

probing-depth change of 2.2 mm for sites that were initially $\geqslant 7$ mm.[3] Although a comparison with previous studies (historical controls) must be viewed with caution, this result, combined with the limited improvements in bleeding, suggests inadequately-treated periodontitis. I would speculate that the lack of oral hygiene instruction is the cause, although no plaque scores are offered in the paper to examine this hypothesis. It is encouraging that no real effect on the microbial flora attributable to the drug was noted, and few adverse effects were reported by the participants.

Changing the host's response to bacteria may prove a promising approach in periodontics and, in many respects, this is a carefully conducted and analysed study. This trial does not tell us, however, whether adjunctive drug use in combination with normal periodontal therapy is beneficial. Furthermore, we will need to see what happens to patients when they discontinue the drug and whether any advantages are maintained.

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