

# Tetracycline: A Clinical Study to Determine its Effectiveness as Long-Term Adjuvant

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A RANDOM DOUBLE BLIND CROSSOVER study of patients on the effects of tetracycline therapy over a 3-month period revealed that there were no significant differences between the placebo group and tetracycline-treated groups in relation to (1) Gingival Index, (2) Debris Index and (3) Papillary Bleeding. A marked improvement in the Gingival Index occurred after 3 months of treatment in each group resulting from curettage and home care. Papillary bleeding was significantly reduced after 3 months of treatment in the tetracycline group and similar trends were observed in the placebo group. The Debris Index in both experimental and placebo groups showed no significant change after treatment for 3 months. The data suggest that tetracycline therapy does not appreciably alter either the Gingival Index, Debris Index, or the Papillary Bleeding Index over a 3-month period.

Tetracycline hydrochloride is administered by some periodontists in small doses over long periods of time as adjuvant to conventional therapy. There are no studies on humans to determine the effectiveness of this regimen. It is the purpose of this study to determine whether the use of low doses of tetracycline over long periods of time as adjunctive to conventional therapy is helpful. The study is a double blind crossover project on patients treated in a hospital dental service with random selection of patients receiving either tetracycline or placebo capsules.

## TETRACYCLINES

Tetracyclines are the most frequently used agent in acne because they decrease the concentration of free fatty acids in sebum secreted to the skin surface. This treatment is suppressive rather than curative and should be reserved for those patients with inflammatory lesions. Infections caused by pneumococci can be treated with the tetracyclines when sensitivity tests indicate the presence of a susceptible strain. Similarly these drugs may be used when penicillin cannot be given to patients with gonococcal, meningococcal, or spirochetal infections.

Tetracyclines also are useful in treating mixed bacterial sinusitis. Many infections caused by *Escherichia coli* respond to the tetracyclines, but occasionally resistant strains emerge rapidly. The tetracyclines may be of value in certain malabsorption syndromes such as Whipple's disease.

Scopp et al.<sup>1</sup> in a double blind clinical study showed no difference between placebo and 1000 mg per day of tetracycline administered for 5 days during periodontal surgery. Epstein and Scopp<sup>2</sup> in a sensitivity study on 13 humans to determine the effectiveness of antibiotics in the management of the periodontal abscess found tetracycline to be least effective.

Ciancio<sup>3</sup> has recently published an excellent review on the use of tetracycline in dentistry including its indications, contraindications, interactions and possible avenues for humans research. Stahl<sup>4,5</sup> in earlier literature suggested beneficial effects for tetracycline in long Evans strain rats showing earlier crestal bone repair following gingival injury. Shaw<sup>6</sup> indicated reversal of the periodontal syndrome in rice rats. Guggenheimer et al.<sup>7</sup> showed that approximately 70% of the patients treated for recurrent aphthous ulcers showed some improvement after receiving chlortetracycline 250 mg Q.I.D. for 5 to 7 days.

Newman et al.<sup>8</sup> in their work on the microbiota of periodontosis have shown that the predominately cultivable organism, a Gram-positive asaccharolytic rod, is susceptible to tetracycline. Interestingly, Crawford et al.<sup>9</sup> have shown in their work on the microbiota of advanced periodontitis that the predominately cultivable organism is a Gram-positive asaccharolytic rod.

Obviously, a discrepancy exists in the literature between the apparent beneficial effects of regaining attachment and quicker crest repair shown in animals and the

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absence of substantial benefits from tetracycline found in human studies.

### MATERIALS AND METHODS

The study was conducted on those patients at the Veterans Administration Medical Center presenting with periodontal problems and meeting specific criteria for selection. These were: (a) Moderate to advanced periodontitis, (b) Medical clearance, and (c) Informed consent.

Each patient had a thorough evaluation including an initial clinical examination, full mouth series of radiographs, standard periodontal charting, clinical photographs, oral hygiene instructions and a recording of gingival inflammation by the use of three different indices: (1) Loe & Silness—Gingival Index, (2) Greene and Vermillion—Debris Index, and (3) Muhlemann—Papillary Bleeding Index.

The procedure consisted of random division of 20 patients into two test groups. Both groups underwent an identical clinical regime consisting of: (a) four visits of root planing and curettage under local anesthesia (1 per quadrant) 1 week apart; (b) 1 month recall visits for 3 months—periodontal chartings and record of various indices to be taken at that time.

During this period one group received tetracycline and the other received a placebo. This was a double-blind study.

#### Drug Regime

- a. First week of root planing—250 mg 4 times per day.
- b. 2nd week of root planing—250 mg 3 times per day.
- c. 3rd week of root planing—250 mg 2 times per day.

At the end of the 3-month period both groups had their medications switched and were carried on identical clinical regime for the next three months. There were 21 patients who started the study but 15 actually completed the entire regimen.

At the end of the experimental procedure results were evaluated according to the various indices (Tables 1-3).

**Table 1**  
*Data for Patients on Placebo*

Patient's number	Gingival Index		Debris Index		Papillary Bleeding Index	
	Initial	3 Months	Initial	3 Months	Initial	3 Months
6	0.3	1.1	1.3	1.4	4	10
7	1.4	1.1	2.3	0.75	24	24
17	1.4	1.3	1.0	0.92	22	4
20	0.3	0.9	0.75	1.8	1	10
18	0.6	0.8	0.9	1.4	7	9
11	1.0	0.5	2.7	1.8	10	8
12	0.5	0.4	1.2	1.2	4	2
3	1.5	0.2	1.4	1.0	4	0
9	1.5	0.1	1.8	1.0	5	0
21	1.9	1.3	2.0	2.0	13	11
2	1.1	0.7	1.5	2.1	6	3
1	0.9	0.8	1.4	2.2	0	1
14	0.7	1.7	0.2	0.6	7	9
8	1.2	0.9	1.7	2.8	16	16
16	1.2	1.4	2.1	2.5	11	6

**Table 2**  
*Data for Patients on Tetracycline*

Patient's number	Gingival Index		Debris Index		Papillary Bleeding Index	
	Initial	3 Months	Initial	3 Months	Initial	3 Months
6	1.9	0.3	1.4	1.3	26	4
7	1.1	1.3	0.75	0.9	24	12
17	1.3	1.2	0.92	1.4	4	8
20	1.2	0.3	2.3	0.75	20	1
18	1.2	0.6	1.6	0.9	25	7
11	0.5	0.6	1.8	1.6	10	8
12	1.0	0.5	2.7	1.2	8	4
3	0.2	0.2	1.0	0.6	0	0
9	0.1	0	1.0	1.1	0	0
21	1.3	1.0	2.0	1.0	11	1
2	1.8	1.1	1.3	1.5	12	6
1	0.8		2.2		1	
14	1.3	0.7	0.5	0.2	13	7
8	1.5	1.2	2.2	1.7	12	16
16	1.3	1.2	2.8	2.1	16	11

**Table 3**  
*Summary of Data*

	Tetracycline (N = 14) Gingival Index		Placebo (N = 15) Gingival Index		
	Initial	3 mo.	Initial	3 mo.	
Av	1.4	0.74	Av	1.4	0.76
SE	0.13	0.21	SE	0.127	0.265
	(P 0.002)		(P 0.05)		
	Debris		Debris		
	Initial	3 mo.	Initial	3 mo.	
Av	1.85	1.21	Av	1.8	1.38
SE	0.280	0.209	SE	0.221	0.225
	(NS)		(NS)		
	Papillary Bleeding		Papillary Bleeding		
	Initial	3 mo.	Initial	3 mo.	
Av	16.5	7.0	Av	11.1	6.9
SE	2.31	1.76	SE	3.5	4.8
	(P 0.01)		(NS)		

### DISCUSSION

The results of the current study indicate a significant improvement in the Gingival Index and Papillary Bleeding Index following a 3 month regimen of oral hygiene instruction and root planing. These results are in agreement with previous studies.<sup>10</sup> However, the results also indicate that these changes occurred with no significant difference between the tetracycline augmented and the placebo control group. The data indicate that when the medications were reversed the results were the same. Although researchers have suggested improved results when tetracycline was used in conjunction with conventional therapy our results do not agree with this hypothesis. Perhaps tetracycline must be administered for periods longer than 3 months to show significant results. If this is true then longer term studies should be performed.

However, if comparable results can be attained with or without antibiotic augmentation then the clinician should weigh the adverse and side effects of tetracycline before administration.

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