

PERIODONTAL PATHOSIS IN MAN

VII. Effect of multivitamin-trace mineral versus placebo supplementation on sulcus depth

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In a study of multivitamin-trace mineral versus placebo supplementation for four days in 43 dental students, the gingival sulcus depth was reduced significantly only in the vitamin-mineral group. These observations confirm the earlier reported findings of a decrease in sulcus depth after a relatively low-refined-carbohydrate high-protein diet and after protein supplementation.

In an earlier report,¹ it was shown that sulcus depth was reduced significantly after the administration of a relatively low-refined-carbohydrate high-protein diet for four days; however, in that study, there was no control group; the diet was not supervised, and two variables, refined-carbohydrates and protein, were involved.

In an attempt to clarify the earlier observations, the effect on sulcus depth of a known quantity of protein versus placebo supplementation was investigated. The findings indicated a statistically signifi-

cant reduction only in the protein-treated group.

This study was designed to clarify further the original observations^{1,2} through an investigation of the effect of multivitamin-trace mineral versus placebo supplementation on sulcus depth.

Table 1 • Composition of each multivitamin-trace mineral capsule

Component	Amount
Vitamin A (acetate)	25,000 units
Vitamin D (irradiated ergosterol)	1,000 units
Thiamin HCl (vitamin B ₁)	10 mg.
Riboflavin (vitamin B ₂)	10 mg.
Niacinamide	100 mg.
Pyridoxine HCl (vitamin B ₆)	5 mg.
Calcium D-pantothenate	20 mg.
Vitamin B ₁₂ (cobalamin)	5 µg.
Ascorbic acid (vitamin C)	150 mg.
Vitamin E (D-alpha-tocopherol succinate)	5 units
Vitamin K (menadione)	1 mg.
Kelp powder	300 mg.

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Table 2 • Average analysis of processed Pacific Coast sea kelp (*Macrocystis pyrifera*)

Component	Per cent
Moisture	8.0
Crude protein	7.5
Crude fiber	7.0
Nitrogen-free extract	42.2 (carbohydrates)
Fat (ether extract)	0.3
Ash	35.0
Iodine	0.15-0.2*
Calcium	1.2
Phosphorus	0.3
Iron	0.1
Copper	0.0008
Magnesium	0.76
Manganese	0.0008
Sodium	3.14
Potassium	9.63
Chlorine	12.21
Sulfur	0.93
Zinc	0.0003

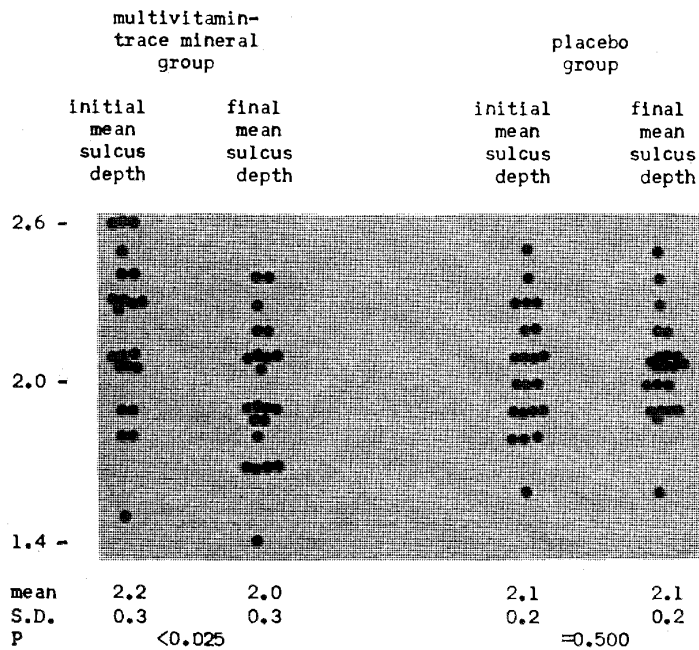
In spectrographic analysis, traces of other elements recognized by definite light lines are barium, boron, chromium, lithium, nickel, silicon, silver, strontium, titanium, vanadium and aluminum

*The iodine content of kelp varies with the season of the year and the location of the kelp beds.

METHODS AND RESULTS

Forty-three junior dental students participated in this experiment. Sulcus depth was determined to the nearest millimeter on the mesial, distal, labial and lingual sides of each maxillary and mandibular anterior tooth. A mean sulcus depth was derived from these measurements. On a random basis, 22 students were given a multivitamin-trace mineral supplement (Table 1, 2). The remaining 21 subjects received an indistinguishable placebo. The mean sulcus depth was redetermined four days later by the same examiner with no knowledge of the previously assigned values or the type of supplementation.

Original findings, including the initial and final mean gingival sulcus depths, standard deviations and the probability values, are listed (illustration). There was a significant ($p < 0.025$) reduction in



Effect of multivitamin-trace mineral versus placebo supplementation for four days on mean sulcus depth

Table 3 • Sulcus depth change with diet

	Initial scores	Final scores	Percentage change
Group I, low-refined-carbohydrate high-protein diet	2.1 ± 0.2	1.9 ± 0.2	-9.5
Group IIa, protein supplementation	2.3 ± 0.2	2.1 ± 0.1	-8.6
Group IIb, placebo supplementation	2.2 ± 0.2	2.2 ± 0.2	0.0
Group IIIa, multivitamin-trace mineral supplementation	2.2 ± 0.3	2.0 ± 0.3	-9.0
Group IIIb, placebo supplementation	2.1 ± 0.2	2.1 ± 0.2	0.0

sulcus depth (in millimeters) from 2.2 ± 0.3 to 2.0 ± 0.3 in the experimental group. The group given the placebo revealed no change.

DISCUSSION

This evidence indicates that multivitamin-trace mineral supplementation, in the amount given and for the period administered, exerts a beneficial effect on gingiva by virtue of a reduction in gingival sulcus depth. These changes appeared in dental students that had no apparent multivitamin deficiency, trace mineral deficiency or both.

These data also are interesting when compared with the gingival sulcus depth change previously reported after the administration of a relatively low-refined-carbohydrate high-protein dietary regime¹ and protein versus placebo supplementation² (Table 3). The decrease in mean sulcus depth for the relatively low-refined-carbohydrate high-protein diet (9.5 per cent), protein supplementation

(8.6 per cent) and multivitamin-trace mineral supplementation (9 per cent) is almost identical. On the other hand, the two placebo groups demonstrated no change.

In each instance, the improvement in gingival health has been statistically significant: low-refined-carbohydrate high-protein diet, $p < 0.001$; protein supplementation, $p < 0.001$, and multivitamin-trace mineral supplementation, $p < 0.025$.

Results of this study are in agreement with those of previous investigations^{1,2} that sulcus depth decreases after low-refined-carbohydrate high-protein diet and protein supplementation.

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1. Ringsdorf, W. M., Jr., and Cheraskin, E. Periodontal pathosis in man: I. Effect of relatively high-protein low-refined-carbohydrate diet upon sulcus depth. *J. Periodont.* 33:341 Oct. 1962.

2. Ringsdorf, W. M., Jr., and Cheraskin, E. Periodontal pathosis in man: V. Effect of protein versus placebo supplementation upon sulcus depth. Unpublished data.