

Periodontal Pathosis in Man:
I. Effect of Relatively High-protein
Low-refined-carbohydrate Diet upon Sulcus Depth*

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A RECENT report¹ has shown an interesting effect of a high-protein low-carbohydrate diet upon the periodontium of the mouse. Specifically, significantly less alveolar bone loss was noted with this particular dietary regime.

METHODS AND RESULTS

Forty junior dental students were employed for this experiment. Sulcus depth on all four surfaces of the anterior teeth was determined to the nearest millimeter and a mean sulcus depth obtained. The subjects were then instructed to eliminate, as far as possible, refined carbohydrates from the diet. The recommendation was also made that protein intake be increased. Sulcus depth was remeasured by the same examiner four days later.

Table I outlines the percentage frequency of subjects with different mean sulcus depths. Two points deserve special mention. Firstly, the prediet range (2.8-1.8 = 1.0) is slightly greater than that noted after the diet (2.4-1.5 = 0.9). Secondly, the initial mode is much higher (2.1-2.3) than postdietary (1.9). The initial sulcus depth was found to be 2.1 ± 0.2 . This can be interpreted to mean that approximately two-thirds of the subjects ranged from 1.9 to 2.3 mm. Four days later the values were 1.9 ± 0.2 (68 percent ranged from 1.7 to 2.1). The statistically significant difference is shown by a $P < .001$.

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TABLE I
Percentage of Subjects

Mean Sulcus Depth (mm.)	Prediet	Postdiet
1.5	0	7
1.6	0	10
1.7	0	12
1.8	10	12
1.9	13	38
2.0	7	5
2.1	22	3
2.2	15	5
2.3	22	3
2.4	5	5
2.5	3	0
2.8	3	0
Total	100%	100%

DISCUSSION

Obviously, not all the students obeyed the instructions to the same degree. There is even the possibility that some of the subjects ignored the recommendations. Nonetheless, there is no question but that sulcus depth was changed during the four-day experimental period. This then is consistent with the previously reported observations in lower animals.¹

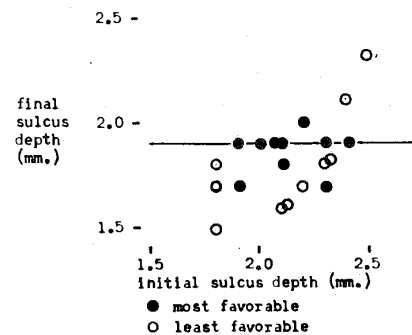


Figure 1

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TABLE II

Sulcus Depth of the Ten Subjects with the Most Physiologic Total Serum Protein and Blood Glucose Levels

Case	Blood Glucose		Total Serum Protein		Sulcus Depth	
	Initial	Final	Initial	Final	Initial	Final
009	72	80	7.0	7.0	2.3	1.9
010	74	73	7.4	6.9	2.1	1.9
012	78	75	7.5	7.1	2.4	1.9
013	63	80	6.7	6.8	2.0	1.9
015	92	70	7.7	7.5	2.1	1.9
019	92	77	6.7	6.9	2.3	1.7
020	85	70	6.4	6.6	1.9	1.9
022	60	76	6.7	6.9	1.9	1.7
023	73	77	6.6	6.7	2.2	2.0
025	73	72	6.9	7.0	2.1	1.8
Mean	76.2	75.0	7.0	7.0	2.1	1.9
S.D.	10.8	3.7	0.4	0.2	0.2	0.1

The question arises as to whether the observed changes here and in the previous report in lower animals can be attributed exclusively to the local action (physical consistency) of the diet. Baer and White¹ concluded that systemic influences must be operative.

Unfortunately, this question cannot be readily answered in the human. However, indirect evidence for systemic versus local influences can be derived. The sulcus depth of the ten subjects in this study with the most physiologic protein levels (as measured by total nonfasting serum protein²) and carbohydrate levels (as determined by nonfasting blood glucose^{3,4,5}) is sum-

marized (Table II). These ten individuals are plotted in Figure 1. It is noteworthy that the black dots (representing these persons) cluster about a mean sulcus depth of 1.9 mm. The sulcus depth of the ten subjects with the most pathologic total serum protein and sugar levels were also summarized (Table III) and also plotted (as the open circles) in Figure 1. It is interesting that these are the subjects with either relatively shallow or deep sulci. This type of information is indirect evidence of systemic influences operative during the experimental period.

It would be interesting to repeat this study: (1) under double-blind conditions,

TABLE III

Sulcus Depth of the Ten Subjects with the Most Pathologic Total Serum Protein and Blood Glucose Levels

Case	Blood Glucose		Total Serum Protein		Sulcus Depth	
	Initial	Final	Initial	Final	Initial	Final
001	63	83	7.2	7.4	2.1	1.6
002	63	70	6.9	7.3	1.8	1.5
003	81	63	7.0	7.2	2.2	1.7
008	77	82	7.1	7.4	2.1	1.6
017	70	57	7.1	6.4	2.3	1.8
028	70	85	6.9	6.3	2.3	1.8
029	83	91	6.7	6.3	1.8	1.7
034	65	82	7.1	7.4	2.5	2.3
040	106	85	7.0	6.9	1.8	1.8
041	82	95	7.0	6.7	2.4	2.1
Mean	76.0	79.3	7.0	6.9	2.1	1.8
S.D.	13.1	12.1	0.1	0.5	0.2	0.2

(2) with a larger sample, (3) patients rather than students, (4) measure other evidences of periodontal pathosis, (5) in the light of other systemic influences, and (6) for longer periods than four days.

SUMMARY

A study of forty dental students subjected to a diet low in refined carbohydrates with increase in protein for four days resulted in a significant alteration in sulcus depth. The leveling off of mean sulcus depth at about 2 mm. seems to be in parallel with changes in total serum protein and blood glucose.

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