

Biology of the Orthodontic Patient:

I. Plasma Ascorbic Acid Levels*

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INTRODUCTION

The interaction between genetic and environmental factors starts at conception and continues until the end of life . . . many dental dimensions, such as tooth size and form and arch width and length, are under genetic control . . . on the other hand, environmental factors also have a bearing . . . but these factors seem to be of secondary significance . . .

This citation,¹ illustrative of orthodontic thinking, recognizes the interplay of heredity and environment in the genesis of malocclusion. Whether environmental forces are truly secondary or only so because of poor definition is an unresolved question.

The purpose of this report, the first in a series, is to examine the possible role of an environmental factor, ascorbic acid, by considering the extent of vitamin C deficiency in a routine sample of orthodontic patients.

METHOD OF INVESTIGATION

One hundred forty-two children from two research projects participated in this experiment. They ranged in age from 110 to 212 months (Table I). Venous blood was obtained about two hours after breakfast and plasma ascorbic acid levels determined in 139 subjects.² Table II summarizes the findings.

RESULTS

According to the recommendations by the Interdepartmental Committee on Nutrition for National Defense [ICNND],³ plasma ascorbic acid levels <0.1 mg. per cent are frankly deficient

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and <0.2 mg. per cent are low. Utilizing these criteria, it must be concluded that 17.3 per cent display suboptimal vitamin C state. Other authorities contend that 0.6 mg. per cent is the delineation between satisfactory and unsatisfactory state.⁴ On this basis, then more than half [53.3 per cent] of the group demonstrates suboptimal ascorbic acid levels.

DISCUSSION

The importance of vitamin C in bone metabolism is well known. The need for optimal bone function during and after orthodontic therapy is clearcut. It is, therefore, noteworthy that somewhere between 17 and 53 per cent of orthodontic patients demonstrate suboptimal vitamin C status as measured by plasma ascorbic acid. The significance of this observation with regard to orthodontic success and failure must await more study of orthodontic results in the light of vitamin C state.

SUMMARY AND CONCLUSIONS

A study of vitamin C state (as measured by nonfasting plasma ascorbic acid) in 139 routine orthodontic patients discloses suboptimal vitamin C levels in 17 to 53 per cent.

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REFERENCES

1. Van Der Linden, F. P. G. M.: Genetic and environmental factors in dentofacial morphology, *Am. J. Orthodont.* 52:576, August, 1966.

TABLE I
AGE FREQUENCY DISTRIBUTION
Number and Percentage
of Subjects

Age Groups [months]	Project One	Project Two	Total
100-119	15 [16.7%]	1 [1.9%]	16 [11.3%]
120-139	22 [24.4%]	6 [11.5%]	28 [19.7%]
140-159	23 [25.6%]	14 [26.9%]	37 [26.1%]
160-179	25 [27.8%]	13 [25.0%]	38 [26.8%]
180+	5 [5.6%]	18 [34.6%]	23 [16.2%]
total	90 [100.0%]	52 [100.0%]	142 [100.0%]*

* approximate

TABLE II
PLASMA ASCORBIC ACID FREQUENCY DISTRIBUTION
Number and Percentage
of Subjects

Plasma Ascorbic Acid Groups (mg. per cent)	Project One	Project Two	Total
0.00-0.19	18 [20.2%]	6 [12.0%]	24 [17.3%]
0.20-0.39	21 [23.6%]	8 [16.0%]	29 [20.9%]
0.40-0.59	9 [10.1%]	12 [24.0%]	21 [15.1%]
0.60-0.79	14 [15.7%]	9 [18.0%]	23 [16.5%]
0.80-0.99	20 [22.5%]	8 [16.0%]	28 [20.1%]
1.00+	7 [7.9%]	7 [14.0%]	14 [10.1%]
total	89 [100.0%]	50 [100.0%]	139 [100.0%]

2. Mindlin, R. L. and Butler, A. M.: The determination of ascorbic acid in plasma; a macromethod and a micromethod, *J. Biol. Chem.* 122:673, December, 1937-1938.
3. Interdepartmental Committee on Nutrition for National Defense: *Manual for nutrition surveys*, United States Government Printing Office, Washington, D. C., 1957 p. 121.
4. Association of Vitamin Chemists, Inc.: *Methods of vitamin assay*, Second edition, Interscience Publishers, New York, pp. 147-150.

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