

Health Evaluation of the Dentist and His Wife: Part V: Protein-Bound Iodine

by

E. Cheraskin, M.D., D.M.D.*

and

W. M. Ringsdorf, Jr., D.M.D., M.S.**

Department of Oral Medicine

University of Alabama Medical Center

Birmingham, Alabama

*Professor and Chairman, Department of Oral Medicine, University of Alabama Medical Center, Birmingham, Alabama.

**Associate Professor, Department of Oral Medicine, University of Alabama Medical Center, Birmingham, Alabama.

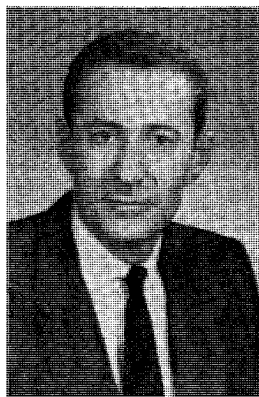
EDITOR'S NOTE: *The desire of a group of dentists and their wives to be acutely and definitely aware of their own general and oral health led to the development of a multiphasic screening program set up under the auspices of the Southern Academy of Clinical Nutrition. This is one of a series of reports of the findings issued by Drs. Cheraskin and Ringsdorf, acting as consultants to the group.*

Introduction

Earlier reports have described the results of a self-administered health questionnaire,¹ the three-hour oral glucose tolerance test,² serum cholesterol³ and protein⁴ findings of a multiphasic screening program of dental practitioners and their wives. This, the fifth report in the series, is intended to analyze thyroid state as judged from protein-bound iodine determinations in the same professional sample.

Method of Investigation

One hundred fifty-three dentists and their wives (members of the Southern Academy of Clinical Nutrition) participated in this screening program. Fasting protein-bound iodine determinations were made utilizing the Hycel Cuvette method. The age and sex distribution is summarized (Table 1). There is a statistically significant difference ($P < 0.025$) in age between the sexes.



E. Cheraskin, M.D., D.M.D.
Birmingham, Alabama

Results

Table 2 summarizes the PBI values for the sexes separately and for the entire group. It is abundantly clear that the greatest segment of the entire group and the sex subgroups ranged from 4.0 to 4.9 mcgm. per cent. The evidence also suggests that the mean values for the two sexes are statistically significantly different at the 1 per cent confidence level.

Reprinted from the *Journal of Applied Nutrition*, Volume 20, Numbers 3 & 4, Winter 1968-69

Discussion

There is considerable disagreement regarding the physiologic limits for protein-bound iodine. Table 3 summarizes some of the published reports. The most conservative estimate is 4-8 micrograms per cent. Utilizing this criterion, it must be concluded that 16.4 per cent of the group demonstrate levels consistent with hypothyroidism and 0.7 per cent of the sample show values consistent with hyperthyroidism. Other investigators prefer a more restricted range. Utilizing limits of 5-7 micrograms per cent, one finds that only 33.9 per cent of the group are within the physiologic limits with 60.8 per cent and 5.3 per cent hypo- and hyperthyroid respectively.

Summary

Protein-bound iodine determinations were performed in 153 dental practitioners and their wives. According to the broadcast physiologic limits reported, approximately 17 per cent of the group show possible dysthyroidism. Utilizing the most restricted physiologic limits of 5 to 7 micrograms per cent, two-thirds of the sample demonstrate either possible hypo- or hyperthyroidism.

Table 1
age and sex distribution

age groups	male group	female group	total group
20-29	3 [3.6%]	9 [13.0%]	12 [7.8%]
30-39	38 [45.2%]	34 [49.3%]	72 [47.1%]
40-49	37 [44.0%]	23 [33.3%]	60 [39.2%]
50-59	5 [6.0%]	3 [4.3%]	8 [5.2%]
60-69	1 [1.2%]	0 [0.0%]	1 [0.6%]
total	84 [100.0%]	69 [100.0%]*	153 [100.0%]*
mean	39.6	36.9	38.4
standard deviation	6.7	6.9	6.9

P < 0.025

*approximate

Table 2
protein-bound iodine distribution

PBI groups (mcgm. per cent)	male group	female group	total group
2.0-2.9	4 [4.8%]	1 [1.4%]	5 [3.3%]
3.0-3.9	14 [16.7%]	6 [8.7%]	20 [13.1%]
4.0-4.9	38 [45.2%]	30 [43.5%]	68 [44.4%]
5.0-5.9	21 [25.0%]	19 [27.5%]	40 [26.1%]
6.0-6.9	6 [7.1%]	6 [8.7%]	12 [7.8%]

7.0-7.9	1 [1.2%]	6 [8.7%]	7 [4.6%]
8.0-8.9	0 [0.0%]	1 [1.4%]	1 [0.7%]
total	84 [100.0%]	69 [100.0%]*	153 [100.0%]*
mean	4.6	5.0	4.8
standard deviation	0.9	1.2	1.1

P < 0.01

*approximate

Table 3
serum protein-bound iodine values
in adult euthyroid subjects

source	date	number of subjects	mean (micrograms per cent)	S.D.	range
Barker et al (5)	1951	68	5.1	1.0	3.4-8.0
Hallman et al (6)	1951	37	5.4	1.1	3.2-8.0
Sunderman & Sunderman (7)	1954	65	5.0	1.0	2.9-7.9
Zieve et al (8)	1954	50	5.4	1.1	3.5-7.9
Skanse & Hedenskog (9)	1955	100	5.9	0.7	3.0-8.0
Sanz et al (10)	1956	12	4.8	3.5-5.6
Foss et al (11)	1960	55	5.6	3.5-8.0
Gaffney et al (12)	1960	101	5.0	0.9	3.2-6.8

REFERENCES

1. Cheraskin, E. and Ringsdorf, W. M., Jr. Health evaluation of the dentist and his wife: I. Historical information. *New York J. Dent.* 37: 284 Oct., 1967.
2. Cheraskin, E. and Ringsdorf, W. M., Jr. Health evaluation of the dentist and his wife: II. Three-hour glucose tolerance test. *JADA* 77: 107 July, 1968.
3. Cheraskin, E. and Ringsdorf, W. M., Jr. Health evaluation of the dentist and his wife: III. Fasting serum cholesterol. *JADA* 77: 109 July, 1968.
4. Cheraskin, E. and Ringsdorf, W. M., Jr. Health evaluation of the dentist and his wife: IV. Serum protein. (submitted for publication)
5. Barker, S. B., Humphrey, M. J. and Soley, M. H. The clinical determination of protein-bound iodine. *J. Clin. Invest.* 30: 55 Jan., 1951.
6. Hallman, B. L., Bondy, P. I. and Hagedwood, M. A. Determination of serum protein-bound iodine as a routine clinical procedure. *Arch. Int. Med.* 87: 817 June, 1951.
7. Sunderman, F. W. and Sunderman, F. W., Jr. The clinical significance of measurements of protein-bound iodine. *Amer. J. Clin. Path.* 24: 885 Aug., 1954.
8. Zieve, L., Dahle, M. and Schultz, A. L. Comparison of incineration and chloric acid methods for determination of chemical protein-bound iodine. *J. Lab. Clin. Med.* 44: 374 Sept., 1954.
9. Skanse, B. and Hedenskog, I. The determination of serum protein-bound iodine by alkali incineration; values in normal subjects. *Scand. J. Clin. Lab. Invest.* 7: 291, 1955.
10. Sanz, M. C., Brechbuhler, T. and Green, I. J. The ultra-micro determination of total and protein-bound iodine. *Clin. Chim. Acta.* 1: 570 Nov.-Dec., 1956.
11. Foss, O. P., Hankes, L. V. and Van Slyke, D. D. A study of the alkaline ashing method for determination of protein-bound iodine in serum. *Clin. Chim. Acta.* 5: 301 May, 1960.
12. Gaffney, C. W., Gregerman, R. I., Yiengst, M. J. and Shock, N. W. Serum protein-bound iodine concentration in blood of euthyroid men aged 18 to 94 years. *J. Gerontol.* 15: 234 July, 1960.