Frontiers in Thyroidology

Volume 2

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Volume 2

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METABOLIC ALTERATIONS AND THYROID VOLUME IN IODINE DEFICIENCY

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As shown in an earlier study of adults, palpation is of limited value for epidemiological goiter studies (sensitivity 91%, specificity 63.5%) (1). Palpation is even less reliable in younger subjects, when compared to sonographic volumetry (Figs. 1 and 2). Therefore, sonography was applied for an epidemiological study (2).

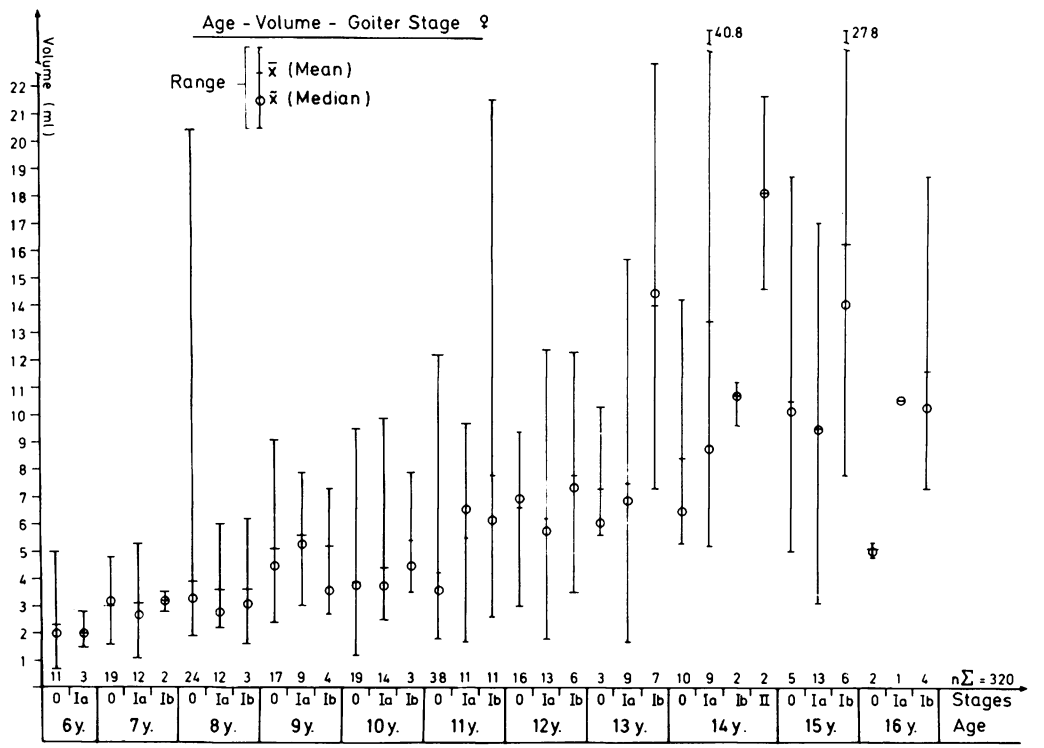

Fig. 1. Sonographically determined thyroid volume as compared with respective palpatory goiter stages for girls 6-16 years old.

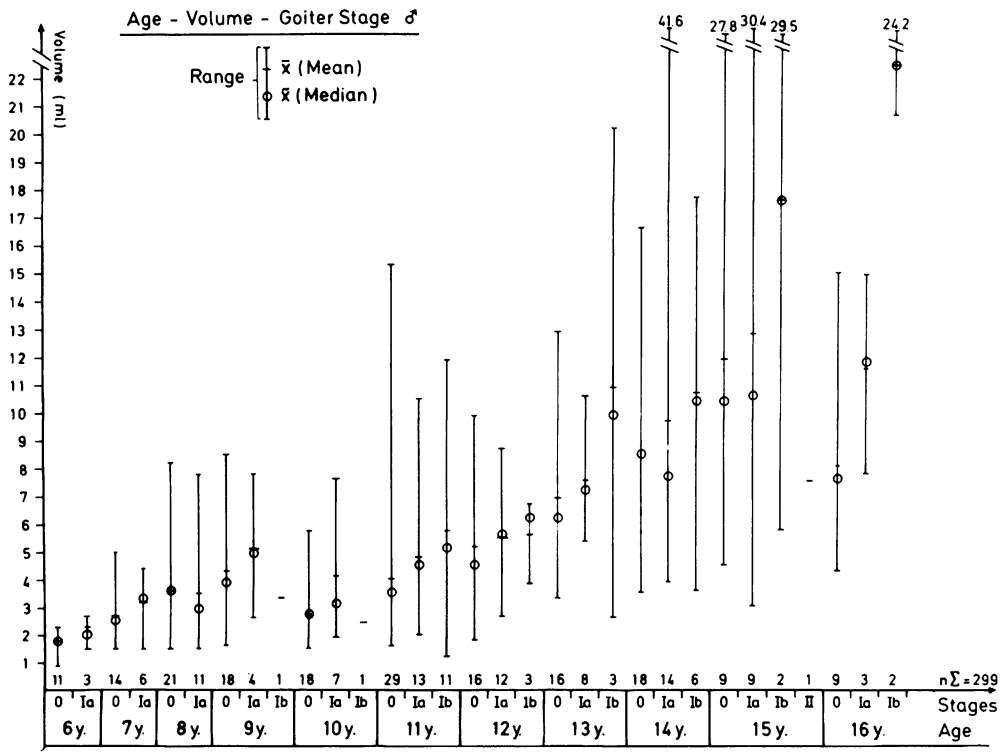

Fig. 2. Sonographically determined thyroid volume as compared with respective palpatory goiter stages for boys 6-16 years old.

Thyroid volume of 2,224 school children 13 years of age from 23 German towns and 1,375 adults from seven German towns was estimated. In addition, 224 school children and 303 adults were studied in Stockholm. Morning urine samples for estimation of iodine excretion and sera for determination of serum TG and serum TSH were collected from adults.

Swedish children have a thyroid volume of 4.1 ± 1.65 ml in boys (mean ± SD), range 1.9 - 9.4 ml, and 4.3 ± 1.72 ml in girls, range 1.4 - 11.5 ml. German children show significantly larger volume ($p<0.0001$) with marked local differences (Fig. 3): boys 8.5 ± 4.7 ml, range 1.1 - 40.7 ml; girls 10.1 ± 5.7 ml, range 1.4 - 47.7 ml.

Among Swedish adults, women have a thyroid volume of 7.7 ± 4.3 ml (mean ± SD), range 2.5 - 34.0 ml, median 6.9 ml, and men 11.1 ± 4.7 ml, range 3.3 - 27.4 ml. German adults, again, show significantly ($p<0.001$) larger volume: women 16.5 ± 12.2 ml, median 13.3 ml, range 2.6 - 124.1 ml; men 26.9 ± 17.0 ml, median 23.1 ml, range 3.8 - 105 ml.

Swedish urinary iodine excretion (µg iodine/g creatinine) was 170.2 ± 93.3, median 141.4, range 61.6 - 656. German urinary iodine excretion was significantly ($p<0.0001$) lower: 83.7 ± 94.4, median 62.6, range 0.1 - 1063.

Thirty-one German samples were iodine contaminated, i.e., > 1064. Serum TSH (µg/ml) levels measured by a hypersensitive immunoassay for Swedish adults were 1.49 ± 0.82, median 1.55, range 0.08 - 3.98. German adults had significantly ($p<0.001$) lower TSH levels: 0.97 ± 0.52, median 0.9, range 0.02 - 2.82. TG serum levels for Swedish adults were 23.6 ± 17.4, median 21.1, range 15.0 - 86.0. German adults showed much higher ($p<0.0001$) TG levels: 72.6 ± 50.6, median 43.0, range 1.6 - 234.7.

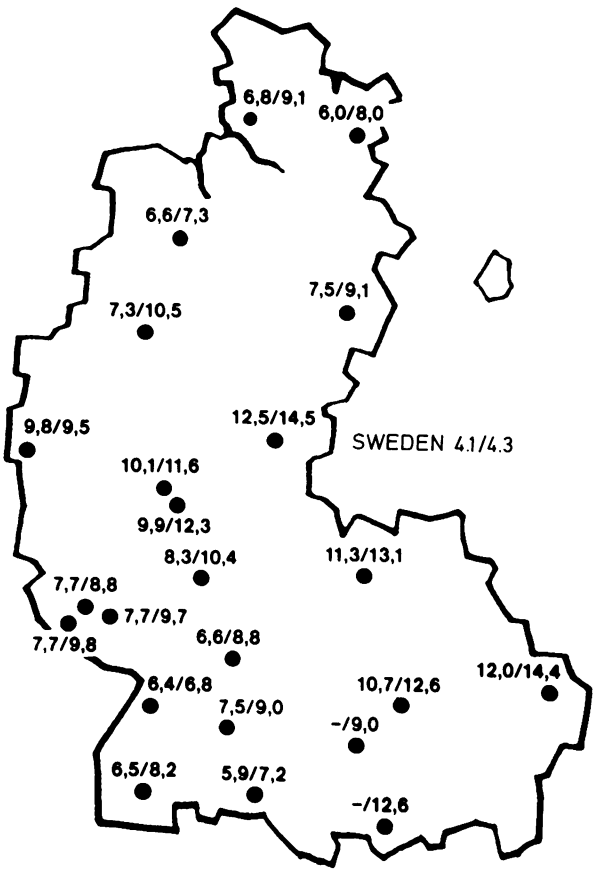

Fig. 3. Thyroid volume (ml; male/female) of 13 year old children (Germany/Sweden; $p<0.0001$).

CONCLUSIONS

1) Thyroid palpation is of limited value for epidemiological goiter studies, especially in children. A new definition of goiter is necessary.

2) Our results indicate again the goitrogenic and metabolic effects of iodine deficiency.

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