

USANA Technical Bulletin

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Hypothyroidism

Description

- The thyroid is a gland located slightly below the larynx in front of the trachea. The three primary hormones produced by the thyroid gland are thyroxine (T₄), triiodothyronine (T₃), and calcitonin. Thyroxine (T₄) and triiodothyronine (T₃) maintain the level of metabolism in the tissues that is optimal for their normal function. Calcitonin regulates the calcium and phosphate levels in the blood.
- Hypothyroidism is characterized by undersecretion of thyroid hormones, resulting in a lower basal metabolism.¹

Causes

- Thyroid gland surgery, irradiation therapy, chronic autoimmune thyroiditis (Hashimoto's disease), or inflammatory conditions, such as amyloidosis and sarcoidosis.²
- Endemic goiter is the enlargement of the thyroid, usually due to inadequate amounts of dietary iodine. This is particularly prevalent in the Midwest ("Goiter-Belt") where low levels of iodine are found in the soil. However, in Japan goiter has been associated with too much dietary iodine intake.² For this reason it is important to talk with your health care professional about the need for or avoidance of iodine.
- Juvenile onset hypothyroidism may be caused by a congenital defect. Defects in the thyroxine (T₄) hormone are another cause.

Types

- Adult hypothyroidism has two classifications, primary and secondary. Primary hypothyroidism comes from a disorder of the thyroid itself. Secondary hypothyroidism is caused by an inability to stimulate the thyroid.
- Both types of hypothyroidism can lead to very severe complications including myxedema coma.

At Risk

- People who consume inadequate amounts of iodine. Iodized salt has greatly reduced this risk.

Prevention and Management

- Iodine is necessary for the formation of the thyroid hormones. Inadequate dietary amounts of iodine may lead to goiter. Iodine can be found in seaweed and iodized salt.
- Zinc and selenium deficiencies affect the metabolism of thyroid hormones.³
- Selenium is important for modulating T₄ levels.⁴

Sources of Additional Information

- <http://medhlp.netusa.net/general/THYROID.TXT>

Abstracts

Als C, Lauber K, Brander L, Luscher D, Rosler H. The instability of dietary iodine supply over time in an affluent society. *Experientia* 1995 Jun 14;51(6):623-33. In the Bernese region, where goiter was formerly endemic, alimentary salt has been supplemented by increasing amounts of potassium iodide (KI): 5, 10, 20 mg KI/kg in 1922, 1965 and 1980 respectively. Ioduria rose from < 30 micrograms I/g creatinine in 1920 to > 100 micrograms I/g creatinine in the 1980s. In 1992 ioduria was estimated in 55 healthy volunteers (group A and individual B) and 234 thyroid carcinoma patients after thyroidectomy: hypothyroid patients with (C) and without thyroid remnants (D) and euthyroid patients on T₄ substitution (E). The arithmetic mean iodine excretion of the healthy volunteers in group A and individual B was found to be 87 +/- 40 micrograms I/g creatinine. This is insufficient according to the recommendations of the WHO. In all groups, the iodine excretion reached the recommended level only in some members: 24% (A, B), 19% (C), 38% (D) and 81% (E). It was thought in the 1980s that in a formerly iodine-deficient society, iodinated salt would continue to provide an adequate supply of iodine. However, iodine intake in this affluent society has proved to be unstable. This can be attributed to modifications of eating habits, which include a reduction of total salt consumption, combined with a growing consumption of manufactured food of cosmopolitan origin, prepared using salt containing little or no iodine.

References

- ¹ Taber's Cyclopedic Medical Dictionary. 16th ed. Philadelphia:F.A. Davis Company; 1985. p 879.
- ² Diseases. Springhouse (PA):Springhouse Publishing; 1993. p 995, 1002.
- ³ Kralik A, Eder K, Kirchgessner M. Influence of zinc and selenium deficiency on parameters relating to thyroid hormone metabolism. *Horm Metab Res* 1996 May;28(5):223-6.
- ⁴ Olivieri O, Girelli D, Azzini M, Stanzial AM, Russo C, Ferroni M, Corrocher R. Low selenium status in the elderly influences thyroid hormones. *Clin Sci (Colch)* 1995 Dec;89(6):637-42.