



William B. Zipf, MD, FAAP
Rolando Lozano, MD, FAAP
Jennifer Dyer, MD, MPH, FAAP
55 Dillmont Road
Columbus, Ohio 43235

Hypothyroidism is a deficiency in thyroid gland secretion of the thyroid hormones, thyroxine (T4) and triiodothyronine (T3). During childhood and adolescence, the patient presents either with an enlarged thyroid gland, also known as a goiter, or diminution in the rate of growth in height. At the time of birth the symptoms and signs of hypothyroidism are minimal or absent, and the lack of adequate thyroid hormone from birth until approximately age 2 years is associated with varying degrees of permanent mental retardation. For these reasons, most countries in the western world and every state in the United States routinely perform screening tests within the first week of life to detect congenital hypothyroidism so that prompt treatment can be initiated to prevent mental retardation.

Hypothyroidism usually is caused by an abnormality of the immune system that results in damage and destruction of the thyroid gland. This process results either in loss of thyroid tissue or an enlargement of the thyroid. The gland has the shape of a bow tie or butterfly, and is located just below the larynx (“Adam’s Apple”) and in front of the trachea (“windpipe”). In most instances, there is no pain or tenderness associated with thyroid diseases, although patients occasionally complain of difficulty in swallowing as if there was a lump in their throat.

Often the only sign of hypothyroidism during childhood is an abnormal rate of linear growth. If the child was above average height before the disease, s/he may not be short compared to other children of the same age. Therefore, the most important feature of hypothyroidism is a decrease in the rate (called “velocity”) of growth in height. If the disease is recognized early and adequately treated, the child will grow at an accelerated rate until reaching the same growth percentile where the child measured prior to the onset of hypothyroidism.

Hypothyroidism progresses very slowly and insidiously, making the diagnosis difficult for healthcare practitioners. In more advanced and long-standing cases, the child may have other general symptoms of hypothyroidism, such as easy fatigability, mild weight gain in association with a reduction in appetite, constipation, an intolerance of cold weather, dry skin, and either delayed (usual) or early (rare) onset of sexual development at adolescence.

Less often, hypothyroidism may be caused by a failure of the pituitary gland to secrete thyroid stimulation hormone, or TSH. This hormone is essential for stimulating the thyroid gland to make T4 and T1 in normal amounts. TSH may be deficient for several reasons: 1) the pituitary gland is diseased (a rare cause); 2) the area above the pituitary (the hypothalamus) that stimulates the pituitary is diseased; or 3) there is a tumor, cyst, or other abnormal structure between the hypothalamus and pituitary gland that prevents the pituitary from receiving its stimulus to secrete TSH. Usually patients with TSH deficiency also have other hormone deficiencies: growth hormone, gonadotropins LH and FSH (which stimulate puberty and reproduction), and ACTH (which is necessary for cortisol or hydrocortisone secretion by the adrenal gland).

The treatment of hypothyroidism is easy and inexpensive. One or two tablets of the major thyroid hormone, thyroxine (trade names include Levothyroid, Levoxyl and Synthroid) once a day provides normal thyroid function and growth. The dose, depending upon the child's age, ranges between 50 µg (0.05 mg) and 200 µg (0.2 mg) although some infants require slightly lower doses. Sometimes, a child may make T4 but can't make T3 thus will need a medication that combines T4 and T3 (armour, nature thyroid) or just T3 (cytomel). The blood levels of T4, T3 and TSH should be monitored annually to assure that the dose remains adequate as the child grows. In most instances, the treatment must be continued for life since the diseases that cause hypothyroidism are permanent rather than transient.

Every child that has a decrease in the rate of growth in height during childhood and adolescence should have blood tests to measure T4, free T4, total T3 and TSH in order to determine if the growth problem is caused by hypothyroidism.