

Acquired Hypothyroidism in Children: A Guide for Families

What is hypothyroidism?

Hypothyroidism refers to an underactive thyroid gland that does not produce enough of the active thyroid hormones triiodothyronine (T_3) and levothyroxine (T_4). This condition can be present at birth or acquired anytime during childhood or adulthood. Hypothyroidism is very common and occurs in about 1 in 1,250 children. In most cases, the condition is permanent and will require treatment for life. This handout focuses on the causes of hypothyroidism in children that arise after birth.

The thyroid gland is a butterfly-shaped organ located in the middle of the neck. It is responsible for producing thyroid hormones T_3 and T_4 . This production is controlled by the pituitary gland in the brain via thyroid-stimulating hormone (TSH). T_3 and T_4 perform many important actions during childhood, including the maintenance of normal growth and bone development. Thyroid hormone is also important in the regulation of metabolism.

What causes acquired hypothyroidism?

The causes of hypothyroidism can arise from the gland itself or from the pituitary. The thyroid can be damaged by direct antibody attack (autoimmunity), radiation, or surgery. The pituitary gland can be damaged following a severe brain injury or secondary to radiation treatment. Certain medications and substances can interfere with thyroid hormone production. For example, too much or too little iodine in the diet can lead to hypothyroidism. Overall, the most common cause of hypothyroidism in children and teens is direct attack of the thyroid gland from the immune system. This disease is known as *autoimmune thyroiditis* or *Hashimoto disease*. Certain children are at greater risk of hypothyroidism, including those with congenital syndromes, especially Down syndrome and Turner syndrome; those with type 1 diabetes; and those who have received radiation for cancer treatment.

What are the signs and symptoms of hypothyroidism?

The signs and symptoms of hypothyroidism include

- Tiredness
- Modest weight gain (no more than 5–10 lb)
- Feeling cold
- Dry skin
- Hair loss
- Constipation
- Poor growth

Often, your child's doctor will be able to palpate an enlarged thyroid gland in the neck. This is called a *goiter*.

How is hypothyroidism diagnosed?

Simple blood tests are used to diagnose hypothyroidism. These include the measurement of hormones produced by the thyroid and pituitary glands. Free T_4 , total T_4 , and TSH levels are usually measured. These tests are inexpensive and widely available at your regular doctor's office.

Primary hypothyroidism is diagnosed when the level of stimulating hormone from the pituitary gland (TSH) in the blood is high and the free T_4 level produced by the thyroid is low. Secondary hypothyroidism occurs if there is not enough TSH, both levels will be low.

Normal ranges for free T_4 and TSH are somewhat different in children than adults, so the diagnosis should be made in consultation with a pediatric endocrinologist.

How is hypothyroidism treated?

Hypothyroidism is treated using a synthetic thyroid hormone called *levothyroxine*. This is a once-daily pill that is usually given for life (for more information on thyroid hormone, see the *Thyroid Hormone Administration: A Guide for Families* handout). There are very few side effects, and when they do occur, it is usually the result of significant overtreatment.

Your child's doctor will prescribe the medication and then perform repeat blood testing. The repeat blood testing will not happen for at least 6 to 8 weeks because it takes time for the body to adjust to its new hormone levels. If the medication is working, blood testing will show normal levels of TSH and free T_4 . The dose of the medication is adjusted by regular monitoring of thyroid function laboratory tests.

You should contact your child's doctor if your child experiences difficulty falling asleep, restless sleep, or difficulty concentrating in school. These may be signs that your child's current thyroid hormone dose may be too high and your child is being overtreated.

There is no cure for hypothyroidism; however, hormone replacement is safe and effective. With once-daily medication and close follow-up with your pediatric endocrinologist, your child can live a normal, healthy life.

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