

# Child With Suspected Acquired Hypothyroidism

Suggestive history and physical findings	Initial laboratory and/or radiologic work-up can include:	When to refer	Items useful for consultation	Additional information
<p><b><u>Symptoms/Signs:</u></b> Constipation, fatigue, sluggishness, cold sensitivity/intolerance, heavy or irregular menses, pale or dry skin, thin/brittle hair or nails, [mild] weight gain, dyslipidemia, depression, slow growth</p> <p>Later symptoms: puffiness of face or hands, sallow complexion, thickening of the skin, slow speech, worsening lethargy, significant growth delay</p> <p><b><u>Family history:</u></b> Often includes a history of thyroid or other autoimmune disorders</p> <p><b><u>Differential Diagnosis</u></b></p>	<p><b><u>Blood tests:</u></b> Thyroid function tests:</p> <ul style="list-style-type: none"> <li>• TSH</li> <li>• Free T4 (FT4)</li> </ul> <p><b><u>Other tests to consider:</u></b> Anti-thyroid antibodies*</p> <ul style="list-style-type: none"> <li>• Thyroid peroxidase Ab</li> <li>• Thyroglobulin Ab</li> </ul> <p>*These are not necessary for a diagnosis.</p>	<p><b><u>Urgent:</u></b> TSH &gt; 50 uIU/mL AND FT4 below reference range</p> <p><b><u>Routine:</u></b> TSH above reference range AND/OR FT4 below reference range.</p> <p>Consider: Repeat FT4 and TSH in 2-3 months if TSH is elevated but below 10 uIU/mL [May add on thyroid auto-antibodies at that time].</p> <p><b><u>Find a Pediatric Endocrinologist</u></b></p>	<p>Previous growth data/growth charts</p> <p>Current medications child is taking including seizure medications</p> <p>Pertinent medical records</p> <p>Recent laboratory and radiologic studies</p>	<p><b><u>Additional Information</u></b></p> <p><b><u>Acquired Hypothyroidism in Children: A Guide for Families</u></b></p> <p><b><u>References</u></b></p>

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### Differential diagnosis for Acquired Hypothyroidism

- Autoimmune thyroiditis/Hashimoto's thyroiditis/Chronic lymphocytic thyroiditis
- Euthyroid Sick Syndrome/ Non-thyroidal Illness
- Subacute thyroiditis / Other thyroiditis
- Drug induced hypothyroidism: thioamides, amiodarone, excessive iodine exposure, antiepileptics
- Iodine deficiency
- Infiltrative or storage disorders of thyroid gland
- Iatrogenic hypothyroidism: post-irradiation; post-thyroidectomy

### Additional Information

- In Primary Hypothyroidism (thyroid failure), FT4 is low or normal; TSH is elevated.
- In Central Hypothyroidism (pituitary/hypothalamic cause), FT4 is low but TSH may be normal or low (rare).
- Thyroid auto-antibodies (thyroid peroxidase antibody and thyroglobulin antibodies) may be helpful in determining underlying etiology of hypothyroidism.
- Total and Free T3 are generally not necessary for screening and monitoring.
- Mildly abnormal TSH levels ( $< 10$  uIU/ml) with normal FT4 are not likely to cause symptoms and can be followed and repeated over time. A good portion of children with this subclinical hypothyroidism revert back to normal thyroid function over time.
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- Hyperlipidemia may be seen secondary to hypothyroidism. Consider screening with TSH, FT4 in dyslipidemia.
- Consider screening for hypothyroidism in depression especially in setting of poor linear growth.
- Thyroid ultrasonography is not generally required unless thyroid gland is significantly enlarged and/or asymmetric, or there is suspicion of thyroid nodule.
- Common obesity is generally exogenous and unlikely to be secondary to hypothyroidism. Screening for thyroid dysfunction is not recommended in absence of symptoms, poor linear growth or other risk factors.

## **Treatment**

Treatment of hypothyroidism includes thyroid hormone replacement (Levothyroxine; LT4). Brand-name thyroid hormone (i.e., Synthroid, Levoxyl, Unithroid) is an equivalent option for therapy as generic LT4. Switching of levothyroxine from brand name to generic preparations, or between generic preparations can lead to perturbations in serum TSH, and is not recommended unless under supervision of endocrinologist. In addition, other forms of thyroid hormone replacement, such as desiccated porcine thyroid hormone (Armour Thyroid, Nature-Throid), are not well studied for long-term use in hypothyroidism in children, and are not currently recommended.

Dosing of LT4 is in micrograms, and pill strengths are commonly color-coded for ease of use and safety. Administration along with some foods and supplements, such as soy and high fiber, should be avoided as it can impair LT4 absorption. Titration of doses is by serial thyroid function testing (TSH +/- Free T4, often TSH only is required for ongoing monitoring), generally done about 4-8 weeks after a dose change. Follow up visits are recommended at regular intervals to monitor adherence, blood levels, and growth and development.

## **Suggested References and Additional Reading**

- Jonklaas J et al. Guidelines for the Treatment of Hypothyroidism: Prepared by the American Thyroid Association Task Force on Thyroid Hormone Replacement. *Thyroid*. December 2014, 24(12): 1670-1751.
- U.S. Food and Drug Administration's Decision Regarding Bioequivalence of Levothyroxine Sodium. American Thyroid Association, The Endocrine Society, and American Association of Clinical Endocrinologists. *B Thyroid*. July 2004, Vol. 14, No. 7: 486-486.
- Irwin Klein and Sara Danzi. Evaluation of the Therapeutic Efficacy of Different Levothyroxine Preparations in the Treatment of Human Thyroid Disease. *Thyroid*. December 2003, Vol. 13, No. 12: 1127-1132

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