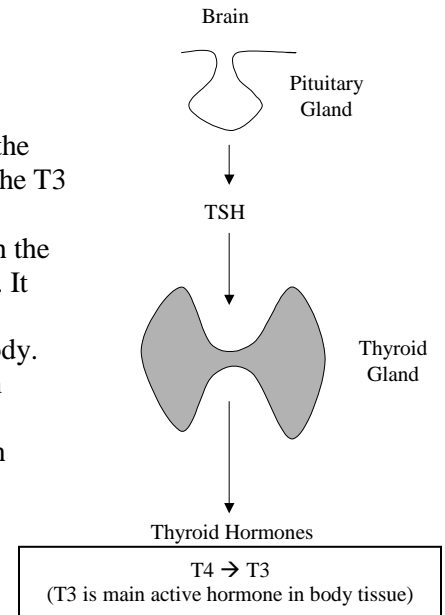


HYPOTHYROIDISM – PATIENT INFORMATION

WHAT IS THE THYROID GLAND AND WHAT DOES IT DO?

- The thyroid is a butterfly-shaped gland that straddles the trachea (windpipe).
- The thyroid makes two hormones, called T3 and T4, which are released into the blood to control many of the body's systems and functions.
- T4 is the main circulating thyroid hormone. T4 can be converted into T3. T3 is the main active hormone at the tissue level (heart tissue, brain tissue, etc.) Most of the T3 available to body tissue is converted from T4 already in the tissue.
- The thyroid is controlled by the pituitary gland. This gland is located underneath the front part of the brain, behind the eyes, and it controls several hormone systems. It controls the thyroid by releasing a hormone called TSH (thyroid stimulating hormone). TSH causes the thyroid to release T3 and T4 which then act in the body. The pituitary can sense how much T3 is available in the pituitary tissue, and can adjust the signal to the pituitary gland to keep the hormone levels normal (very similar to how the thermostat can sense how much heat is in your home, and can adjust the signal to the furnace to keep your home at the right temperature).
- Problems with the thyroid gland affect either the function of the thyroid, the structure of the thyroid, or both. Problems with the function include *hyperthyroidism* (overactive thyroid) and *hypothyroidism* (underactive thyroid). Problems with structure include *goiter* (enlarged thyroid) and *nodules* (abnormal lumps in the thyroid).



WHAT ARE THE SYMPTOMS OF HYPOTHYROIDISM?

- There are many symptoms of hypothyroidism. These include fatigue, weakness, weight gain, muscle aches, constipation, depressed mood, dry skin, intolerance of cold temperatures, and heavy menstrual periods.
- These symptoms are “non-specific.” This means there are many other conditions that can cause these same symptoms. Blood testing is necessary to confirm the symptoms are due to an underactive thyroid.

WHAT CAUSES HYPOTHYROIDISM?

- The most common cause is autoimmune thyroid disease, also called Hashimoto's thyroiditis. In this condition the body's immune system attacks and destroys the thyroid gland. This occurs for unclear reasons.
- Other causes of hypothyroidism include previous thyroid surgery or radioactive iodine treatment, neck radiation, iodine deficiency (which is uncommon in United States), use of certain medications (like amiodarone, interferon, or lithium), and pituitary gland problems.

HOW IS HYPOTHYROIDISM DIAGNOSED?

- Hypothyroidism is usually suspected because symptoms are present, and is confirmed by blood testing.
- In most circumstances, the TSH is the most sensitive marker of the body's thyroid status. In hypothyroidism the TSH rises, as the pituitary gland tries to signal the thyroid gland to release more thyroid hormone. The T4 levels may be low or normal. T3 levels are not usually needed, as they are usually normal even when thyroid function is low.
- In *rare* situations where the cause of the hypothyroidism is a pituitary problem, the TSH level may be normal or low. In these cases the diagnosis is based on a low T4 value and a low or normal TSH.
- Antibodies against the thyroid gland may be detected in the blood if the hypothyroidism is caused by autoimmune thyroid disease.

HOW IS HYPOTHYROIDISM TREATED?

- Hypothyroidism is treated by giving thyroid hormone in pill form.
- The dose of thyroid hormone is adjusted based on symptoms and blood tests. In most instances, the dose should bring the TSH into the normal range (usually about 0.4-4.5 mIU/L), and ideally the TSH should be between 0.4 and 2.0 mIU/L (some people may still have mild symptoms with a TSH between 2.0 and 4.5).

HOW WILL I BE MONITORED AFTER BEGINNING THYROID HORMONE?

- Your doctor will monitor your symptoms and thyroid blood tests.
- Because it takes a while for your body to readjust to a new dose of thyroid hormone, the thyroid tests should be rechecked at least 6 to 8 weeks after a dose change.

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- If you are on too much thyroid hormone, you may develop symptoms of hyperthyroidism. You should let your doctor know if you develop new symptoms such as worsening fatigue, poor sleep, palpitations, tremor or shakiness, excessive sweating, anxiety or irritability, or intolerance to hot temperatures.
- If you have heart problems (even if not previously diagnosed), these can potentially get worse when starting thyroid hormone. In people with known or suspected heart disease, thyroid hormone is started at a low dose and increased slowly over time. When you start thyroid hormone, please let your doctor know if you have chest pain or difficulty breathing, or think you are having heart trouble for another reason.

WHAT KINDS OF THYROID HORMONE ARE THERE? HOW SHOULD IT BE TAKEN?

- Typically thyroid hormone is given as a pill containing T4 (levothyroxine). There are several brands of levothyroxine, including Synthroid® and Levoxyl®. All brand name preparations of thyroid hormone work equally well. Because different brands may be absorbed differently in each person, even when the dose is the same, it is always best to keep using the same brand whenever possible.
- Generic versions of thyroid hormone are labeled levothyroxine. There were concerns about the potency of generic levothyroxine in the past, but the problems appear to have been corrected. If you take generic thyroid hormone, ask your pharmacist to make sure you get pills from the *same manufacturer* each time you get refills.
- Armour thyroid comes from an animal source, and contains a fixed ratio of T4 and T3. The T3/T4 ratio is slightly higher in Armour thyroid than in normal human thyroid levels.
- Thyroid hormone should be taken on an empty stomach, typically before breakfast or at bedtime, at least 45 minutes before eating and 3 hours after eating. It is also best to take it separately from other medicines, as some medicines or minerals (especially Zoloft [sertraline], Evista [raloxifene], calcium, magnesium, antacids, iron, and soy products) can interfere with thyroid hormone absorption.
- If you miss a scheduled dose, it is okay to take it later the same day. If the day has already passed, it is best not to try to “make up” for the missed dose. Missing a dose occasionally will not cause any problems. If for some reason you miss more than two doses per month, it is important to let your doctor know as this can alter your blood test results.

WILL MY DOSE CHANGE?

- Once the proper dose is determined, it is often stable for years, but can change over time. Ongoing monitoring is important.
- The appropriate dose may slowly increase in the first year or two after hypothyroidism is diagnosed, especially for those with autoimmune thyroiditis. This occurs as residual thyroid hormone production is lost.
- If you become pregnant, start or stop hormone replacement (including birth control pills), or gain or lose a significant amount of weight, your dose may need to be adjusted. Taking acid suppression pills may increase the dose needed.
- Because thyroid hormone is important for a baby’s brain development during pregnancy, thyroid levels are monitored every 1-2 months during pregnancy. *Please contact your doctor immediately when you become pregnant, so that your thyroid levels can be monitored appropriately.*

SHOULD I ALSO TAKE T3?

- Typical thyroid hormone pills contain T4 (levothyroxine). There is also a pill form of T3, called liothyronine. T3 is usually not needed in pill form, as the body is able to convert T4 into T3 as it needs. Most people find that they feel well when taking an appropriate dose of T4. However, there are some people who still have low thyroid symptoms, even when the dose of T4 is able to return the TSH to the target range.
- There are multiple studies that have compared how people feel when taking T3 combined with T4 compared to T4 alone. An initial study from 1999 showed the majority of people preferred the combination of T4 and T3, while subsequent studies have not found the combination to be beneficial. Looking closely at the results, in each study some of the people felt better with the combination of T4 and T3, some felt worse, and some felt no different.
- Therefore, for people who do not feel well when on an appropriate dose of T4, it is reasonable to try combination treatment with T3 (either levothyroxine plus liothyronine, or with Armour thyroid). It is important to set a limited amount of time (3-6 months) to see if the combination works better than T4 alone. If it does not, it is best to look for other causes for the symptoms.
- There is a theoretical reason why T3/T4 combination therapy may not be ideal during pregnancy, as T3 may not cross the placenta efficiently. If you are planning pregnancy or become pregnant while taking T3, please discuss this with your doctor.