Treatment for Thyroid Disease

ThyroidChange (www.ThyroidChange.org) is dedicated to improving the diagnosis and treatment of thyroid disease. This page is intended for patients to print for reference as they speak with their doctors. Please see the references at the bottom of this document for published research and other related articles.

Thyroid hormone imbalance can be treated in many ways depending on the cause of the imbalance and its severity. Thyroid treatment options and dosing are as varied as the individual patient. Please see below for further treatment details.

Hypothyroidism and Hashimoto's Thyroiditis

Hyperthyroidism and Graves' Disease

Thyroid Cancer

Adrenal Dysfunction

Other Imbalances

Hypothyroidism and Hashimoto’s Thyroiditis

If a patient has low levels of thyroid hormone, he/she is suffering from a thyroid deficiency, or hypothyroidism. Hashimoto’s thyroiditis (also known as autoimmune thyroiditis) is the most common cause of hypothyroidism. It is an autoimmune disease in which the thyroid is attacked by the body’s own immune system, resulting in the destruction of the gland and subsequent hypothyroidism. Both Hashimoto’s and hypothyroidism require treatment to replace the deficiency of thyroid hormone. For more information about how the thyroid works and the specifics about thyroid disorders, please see our About Thyroid Disease page.

In hypothyroidism or Hashimoto’s thyroiditis, it is common for patients to be prescribed levothyroxine-only (T4-only) therapies, sold under various brand names. However, many patients continue to be symptomatic on T4-only [1-6]. If the patient continues to have symptoms on levothyroxine-only, there are further treatment options such as liothyronine/levothyroxine (T3/T4 combination), liothyronine-only (T3-only), or natural thyroid extract medication (e.g. brand name Armour or Nature-Throid). Each patient must develop an individualized treatment plan with their attending doctor [1-11]. The treatments listed below can be used alone or in combination methods depending on the patient’s individual needs. For patients taking any thyroid medication, it is important to know that these medications can interact with certain foods, drugs, and supplements. Therefore, it is important to take thyroid medication one hour before meals, other medications, and four hours before any supplement containing iron, calcium, or zinc.

Thyroid hormone is normally used in two situations:

1. Replacement Therapy: the use of prescription medications to restore thyroid hormone balance.
2. Suppression Therapy: the use of prescription medications to suppress thyroid activity and prevent further growth of thyroid tissue (suppression). This is primarily used to prevent a recurrence or progression of thyroid cancer [20].

Levothyroxine (T4): Levothyroxine is a synthetic replication of thyroxine (T4), an inactive hormone secreted by the thyroid [4]. When diagnosed with hypothyroidism, most patients, both in and outside the United States, will be prescribed levothyroxine and it can be an effective thyroid treatment for many thyroid patients [21]. However, levothyroxine-only therapy requires the body to convert the inactive T4 to the active
hormone triiodothyronine (T3) for cellular use. The body cannot use T4 without a successful conversion process. Many factors can potentially complicate the conversion of T4 to T3, which is necessary for optimal functioning, and represents one reason why a patient may remain symptomatic on levothyroxine-only.

Some patients with thyroid disease find that T4-only therapy provides sufficient treatment [21,22]. Other times, patients remain symptomatic and may need to combine levothyroxine and liothyronine, use liothyronine-only, or use natural thyroid extract medication for efficient symptom relief. Less frequently, a patient may not be able to tolerate any treatment with levothyroxine due to thyroid resistance [1-11]. For more information on T4 to T3 conversion problems, thyroid resistance and treatment options regarding such issues, please see the article Thyroid Hormone Transport by Kent Holtorf, MD, Director of the National Academy of Hypothyroidism.

**Liothyronine (T3):** Patients who remain symptomatic on levothyroxine-only therapy may be prescribed liothyronine, a lab-manufactured, synthetic version of T3, and sold using various brand names. T3 is the active form of thyroid hormone used by every human cell and is readily available to the cells for immediate use. Liothyronine (T3), regular or sustained released, can be prescribed with levothyroxine using current products on the market, or customized by a compounding pharmacy [23, 24]. Some patients do not need liothyronine since their body may readily convert T4:T3 in sufficient amounts [24]. On the other hand, stress and chronic illness, among other factors, can affect the T4:T3 conversion or create thyroid resistance [25-26]. A randomized, double-blind, crossover study found that the inclusion of T3 in thyroid hormone replacement improved cognitive performance, mood, physical status, and neuropsychological function in hypothyroid patients. Two-thirds of patients preferred T4 plus T3, and tended to be less depressed than after treatment with T4-only [8]. A growing number of studies and physician reports illustrate the need for liothyronine T3 (regular or compounded sustained release) in the treatment therapy for hypothyroid patients, particularly when the response to levothyroxine (T4) has not been adequate [1-11].

**Combination Levothyroxine/Liothyronine (T3/T4):** Combination therapy uses both levothyroxine (T4) and liothyronine (T3) to address hypothyroidism and may be preferable to T4 alone. If the patient is converting T4 into T3 effectively, traditional hypothyroid medications such as levothyroxine may be sufficient. However, if this conversion is not occurring properly, the patient may need a medication that includes T3. Many thyroid patient research subjects report a preference or saw a reduction of symptoms with combination therapies over levothyroxine-only therapies [1-5, 7-11]. Physicians with patients who are still symptomatic on levothyroxine may wish to initiate combination therapy and prescribe any of the following medications depending on patients’ needs:

1. liotrix (a single preparation with both T3 and T4 hormones)
2. both liothyronine (T3) and levothyroxine (T4) and in available doses
3. compounded T3 or T4 in custom-made doses
4. natural thyroid extract medication
5. natural thyroid extract medication with either additional T4 or T3 medication.

**Compounded T3 or T4:** Many physicians prefer to prescribe T4 or sustained release T3 in custom made formulas provided by a compounding pharmacy. The only commercially available form of T3 is liothyronine sodium, an immediate release medication which is rapidly absorbed and may result in higher than normal T3 concentrations throughout the body causing serious side effects. With compounded T3, the patient is getting a continuous dose of T3 over a 12 hour period which may be beneficial and more convenient for the patient. Additionally, compounded T3 or T4 can be prepared in unique dosage forms containing the appropriate dose of medication for each individual. Research indicates there is a need for sustained-release T3 preparations in order to avoid adverse effects [8, 27-28]. Ultimately, it is the expertise of the physician, use and interpretation of appropriate tests, dosing and formulation of the T3 or T4/T3 combinations, and careful monitoring of patient symptoms that determines the success of treatment.

**Natural Thyroid Extract (T4, T3, T2, and T1):** This formulation is derived from porcine thyroid gland and contains the thyroid hormones: T4, T3, T2 and T1, as well as other subcomponents such as calcitonin. Natural thyroid extract (NTE) is also referred to as natural thyroid, natural desiccated thyroid (NDT), or desiccated thyroid extract (DTE) and can be prescribed in prepared doses that are sold under brand names
While levothyroxine (T4) is considered the "gold standard" for treatment among a large number of physicians, many patients are left unsatisfied with levothyroxine in reducing their hypothyroid symptoms [1-6,10, 31]. A number of patients are simply unable to effectively convert T4 to T3. In a recent, randomized double-blind study comparing natural desiccated thyroid to levothyroxine endocrinologist Thanh Hoang, MD stated that 49% of the patients preferred natural desiccated thyroid medication, 32.9% had no preference, and 19% preferred levothyroxine. The researchers concluded that desiccated thyroid extract is a safe alternative for patients with hypothyroidism despite normal TSH measurements while taking levothyroxine alone [30-31]. There have been no studies in recent decades that indicate inconsistencies or impurities with desiccated thyroid extract. Many practitioners have indicated that natural thyroid extract medication is a consistent and effective method for treating hypothyroidism in many patients [2, 5, 31-32]. In the case of the U.S., all prescription thyroid medications (natural or synthetic) must adhere to stringent pharmaceutical standards established by the United States Pharmacopeia (USP) and the Food and Drug Administration (FDA). It is important to note that common natural thyroid extract brands such as Nature-Throid or Armour have never been recalled for inconsistent hormone levels or impurities [33-34].

Liotrix (liothyronine/levothyroxine, T3/T4): Liotrix is a relatively new synthetic 4:1 combination preparation of levothyroxine (T4) and liothyronine (T3). It contains 50 mcg T4 and 12.5 mcg T3. Similar to the medications listed above, Liotrix is used to treat an underactive thyroid. It replaces or provides a synthetic version of thyroid hormone that is normally produced by the thyroid gland. As a result of recent studies that have demonstrated a restoration of the euthyroid state with a combination of T4 and T3, growing interest has occurred within the medical community for T3/T4 combination methods when patients [56]. The only brand of liotrix available in the U.S. is Thyrolar, manufactured by Forest Laboratories.

Hyperthyroidism and Graves' Disease

Hyperthyroidism occurs when too much thyroid hormone is present for proper functioning. It can be the result of infection, injury or cancer, but is most often caused by Graves’ disease. Graves’ disease causes the immune system to attack the thyroid gland, the eyes, some areas of skin (such as the skin over the shins), and, rarely, the brain.

The treatment of hyperthyroidism depends on the cause and severity of the disease, as well as on the patient’s age, possible goiter size, other conditions, and treatment desires. The main treatment goals for hyperthyroidism and Graves’ disease are to inhibit the production of thyroid hormones and to block the effect of the hormones on the body, and to treat symptoms related to increased heart rate [35]. The patient and physician must then choose between three effective and relatively safe treatments options: radioactive iodine (RAI) therapy, antithyroid drugs (ATD), or thyroidectomy. In the U.S., radioactive iodine ablation (RAI) is often recommended as a first-line treatment. In Japan and Europe, physicians generally prefer to start with antithyroid drugs (ATDs) in the hope that the disease will remit. Surgery, rather than RAI, is most often chosen when a patient continues to fight hyperthyroidism after being on ATDs for at least two years. The long-term quality of life following treatment was found to be the same in patients randomly allocated to one of the three treatment options [38]. For more information about the how the thyroid works and the specifics of thyroid disorders, please see our About Thyroid Disease page.

The following treatments can be used to address hyperthyroidism:

**Beta Blockers:** In the early stages of hyperthyroidism, excess thyroid hormone can stimulate the heart and cause arrhythmia or tachycardia (fast heart rate). To prevent damage and regulate a patient’s heart rate, beta blockers are often prescribed. Propranolol is often the first choice because of its ability to block T4 to T3 conversion although other non-selective beta blockers may be used [13, 14]. Other common beta blockers include atenolol, bisoprolol, metoprolol, nadolol, timolol, sotalol, nebivolol, and acebutolol. Beta blockers not only address the cardiac symptoms of hyperthyroidism, but can also lower the high level of anxiety which can affect the hyperthyroid patient. Once a patient’s thyroid levels have been lowered through the use of antithyroid drugs (described below), beta blockers are no longer necessary. It should be noted that beta blockers are not typically prescribed for patients with asthma because the drugs may trigger an asthma attack. Beta blockers may also complicate the management of diabetes and may lower blood pressure[35].

**Antithyroid Medication (thionamides):** Most patients will first be advised to receive radioactive iodine (RAI)
therapy (described below) which shrinks part or destroys all of the thyroid gland. However, antithyroid drugs might be considered as a first line of defense for some patients due to their ability to quickly restore a patient to normal thyroid levels and do not permanently damage the thyroid gland. They are best used for patients with less severe cases of hyperthyroidism. Antithyroid medications work to prevent the overproduction of thyroid hormone. Common antithyroid medications include methimazole, propylthiouracil (PTU) and carbimazole. It is important to note that allergic reactions are fairly common with antithyroid medication. Skin rashes, anaphylactic responses such as mouth or throat itching, tongue-swelling, chest tightness or breathing issues may occur in some patients. Any patient experiencing such reactions should notify their doctor immediately or go to the nearest emergency room for treatment.

Radioactive Iodine Therapy (RAI-131 or RAI): In the U.S., radioactive iodine (RAI) is the treatment of choice for hyperthyroidism and Graves' disease [14]. It is administered orally by capsule or in liquid form that contains radioactive iodine which destroys the tissue of the overactive thyroid tissue or shrinks thyroid glands that are functioning normally but are causing problems because of their abnormal size (i.e. goiter). RAI is captured by the iodine receptors in the thyroid, therefore, it cannot harm other body organs. After RAI treatment, the patient must remain in isolation to process the treatment since they are highly radioactive (and therefore, emitting radiation to others). If this protocol is not followed, exposed individuals and animals are susceptible to thyroid destruction. The radioactive iodine is eliminated from the body through perspiration, urination and the secretion of other bodily fluids, and isolation should last for a period of at least 72 hours [36]. Approximately 90% of patients need only one dose of RAI to eliminate overproduction of thyroid hormone, however, it may take up to six months before the medication fully destroys all or part of the thyroid. Most patients experience reduced symptoms about a month after treatment. As a result of RAI, many patients are then considered “hypothyroid” and will need thyroid replacement medication [37]. It should be noted that recent studies found that Graves’ ophthalmopathy can develop or be worsened by the use of radioactive iodine in 15 percent of patients [14]. The use of corticosteroids has been found to greatly decrease the 8% incidence of ophthalmopathy that may occur after RAI when thyroid eye disease is present [54].

Surgery: Although it is not as common a treatment option as radioactive iodine therapy or antithyroid drugs, surgery can be considered with hyperthyroidism for the small percentage of patients who are allergic to antithyroid medications, who are resistant to radioactive iodine, or who have a hot nodule. Thyroid surgery is known as a thyroidectomy and involves the partial or total removal of the thyroid gland [39]. If surgery is the treatment option, a subtotal thyroidectomy is performed most commonly. In a subtotal thyroidectomy, some of the thyroid tissue is preserved, thus reducing the incidence of hypothyroidism to 25 percent, but persistent or recurrent hyperthyroidism occurs in 8 percent of patients. A total thyroidectomy is typically reserved for patients with severe disease, large goiters, or nodules that may be concerning of cancer. However, a total thyroidectomy carries an increased risk of hyperparathyroidism and laryngeal nerve damage [14]. Once part of or all of the thyroid is removed by surgery, the patient usually is considered hypothyroid and will need to compensate for the lack of thyroid hormones by taking thyroid hormone replacement medication.

Thyroid Cancer

Cancer of the thyroid gland (thyca) has various forms and treatment is dependent on the individual case. The most common form of thyroid cancer in the United States is papillary thyroid cancer followed by follicular thyroid cancer. The least common are medullary and anaplastic thyroid cancer. Each name indicates where the cancer is located on or within the thyroid gland. If diagnosed and treated early, thyroid cancer treatment is highly effective and usually includes the surgical removal of a portion or the entire thyroid gland, and perhaps, treatment with a form of radiation such as radioactive iodine (RAI), also known as I-131 (please see the RAI section of this page) [43]. Following surgery or RAI, the patient is often considered hypothyroid and can begin thyroid hormone replacement therapy as described above.

Due to the individual nature of cancer staging and treatment, patients must work closely with their doctors to create an individualized treatment plan. It is highly recommended that the patient find a surgeon skilled in thyroid gland removal to minimize complications such as collateral damage to your parathyroid glands. The effectiveness of thyroid cancer treatment lends itself to the reputation of being a “good cancer” to have, however, it should not be minimized and needs effective treatment and monitoring. For more information about the how the thyroid works and the specifics of thyroid disorders, including thyroid cancer, please see our About Thyroid Disease page.
Adrenal Dysfunction

Many physicians are discovering that adrenal dysfunction often accompanies thyroid problems. Adrenal dysfunction can be defined as imbalanced cortisol levels that exist between Cushing’s disease (life-threatening high cortisol presentation) and Addison’s disease (life-threatening presentation of low cortisol) [40-42]. When cortisol levels are not optimal, thyroid hormone may not be utilized properly and a patient may experience heart-racing, over-stimulation, and increased fatigue when beginning thyroid medication. Adequate cortisol levels throughout the day must be in place for a patient to successfully tolerate thyroid hormone [46, 55].

Treatment or supplementing for adrenal dysfunction depends on the severity of high or low cortisol and should always be monitored by your healthcare provider. In cases of undertreated adrenal dysfunction (not as severe as Addison’s Disease), low doses of bioidentical hydrocortisone (HC) or sustained-release compounded hydrocortisone is the most commonly used steroid to treat this issue. In less severe cases, some practitioners may recommend taking an adrenal glandular preparation and/or some of the following supplements: Vitamin C, pantothenic acid (Vitamin B5), and adaptogens such as holy basil, ashwagandha, siberian ginseng, or rhodiola. Phosphatidylserine (PS) may also be used to lower high cortisol [44-46]. Many integrative doctors are savvy to the thyroid/adrenal relationship. Please see our List of Doctors page to find an integrative doctor near you.

Sex Hormone Imbalance

The hormones of the body are interrelated and act as a team. If one hormone level is not optimal, then this could affect other hormone levels as well. They are critical for day-to-day energy and for your metabolism to function normally. Untreated thyroid disease can often lead to excess testosterone, low testosterone, low progesterone/estrogen dominance and symptoms/conditions such as PCOS, low libido, infertility, endometriosis, etc. [47-48]. If it is determined that sex hormone levels are low, the physician may prescribe either bioidentical hormones or synthetic hormones to help achieve optimal balance of hormones throughout the body.

Bioidentical hormones, sometimes referred to as natural hormones, are biochemically identical to the hormones made in the body. Bioidentical hormones may include estrogen, progesterone, testosterone, DHEA and cortisol. Bioidentical hormones are usually derived from natural sources such as the wild yam, manufactured in a laboratory, and are available by prescription through a compounding pharmacy. Synthetic sex hormone replacement is also available. They are not identical in either structure or activity to the natural hormones that they emulate, but can offer effective symptom relief for many patients. A growing number of practitioners and patients prefer bioidentical hormone replacement therapy (BHRT) as a treatment option not only for reported symptom relief and overall optimal hormone balance, but for the wide array of formulations, dosages, and delivery systems that can be used to individualize treatment. BHRT provides options for the physician whose patients cannot tolerate synthetic medication or the ingredients contained in them [49].

Vitamin/Mineral Deficiencies

Many people with thyroid and autoimmune thyroid conditions have vitamin and mineral deficiencies. Nutritional deficiencies affect the proper conversion and utilization of thyroid hormone, and need to be evaluated through proper testing and diagnosis. Physicians are finding that low levels of vitamin B12, vitamin D, iodine, iron, and/or ferritin are often concurrent with thyroid disease in their patients [50-53]. While a single nutritional deficiency can have a serious effect on a thyroid patient's health, multiple deficiencies are common. Supplementation is usually required to correct a deficiency and should be monitored by a qualified physician to achieve optimal levels and to avoid excess. Please see our About Testing page for a guide to testing these common nutritional deficiencies and their optimal ranges.
References:


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