

Chapter 2: **THYROID GLAND**

Anatomy and Physiology

The thyroid gland is located just below the larynx and in front of and to the side of the trachea.

Thyroid hormones act on virtually every cell in the body. We will be discussing three major hormones secreted by the thyroid. The first two, thyroxine (T4) and triiodothyronine (T3), are primarily controlled by thyroid stimulating hormone (TSH) secreted by the anterior pituitary gland. TSH production, in turn, is modulated by thyrotropin releasing hormone (TRH) secretion from the hypothalamus. The third hormone released from the thyroid gland, calcitonin, is not under hypothalamic/pituitary control. Calcitonin is involved in calcium homeostasis and responds to calcium levels in the blood.

Of the thyroid hormones released from the thyroid gland, about 80% are in the form of T4 and 20% in the form of T3. Up to 80% of the T4 released from the thyroid gland is converted to the more active T3 by peripheral organs such as the liver and kidney. T3 is a more potent hormone (approximately four times as strong), but T4 is much longer lasting. At any given time, most of the T4 and T3 in the body are bound to transport proteins; it is only the small, "unbound" or "free" portion of the hormones that is biologically active.

The thyroid gland needs about 1/5000th of a gram of iodine daily to be used in the formation of these two hormones. Tyrosine is also required to make thyroid hormones.

The functions of thyroxine and triiodothyronine are as follows:

- 1) Increase the basal metabolic rate of the body, thus setting the rate of the chemical reactions that occur in the body
- 2) Increase the rate at which the body uses food for energy, thus playing an important role in determining your caloric requirement
- 3) Increase the rate at which the body both makes and breaks down

glucose (gluconeogenesis and glycolysis), thus increasing the absorption of glucose by the cells in general and by the gastrointestinal tract

- 4) Increase insulin secretion by the pancreas
- 5) Increase the respiration rate and depth of each breath
- 6) Increase the rate of both protein synthesis and breakdown
- 7) Increase the growth rate of adolescents while quickening the closing rate of epiphyses in bones
- 8) Increase fat deposition into circulation to be burned for energy
- 9) Increase appetite
- 10) Increase urinary excretion of calcium and phosphorus
- 11) Increase secretion of digestive enzymes and peristalsis in the gastrointestinal tract
- 12) Dilate blood vessels, thus increasing blood flow
- 13) Increase heart rate, body temperature, and systolic blood pressure while decreasing diastolic pressure

The parafollicular cells of the thyroid gland secrete the third thyroid hormone, calcitonin.

When levels of calcium in the blood are too high, calcitonin is secreted and has the following effects:

- 1) Stimulates the movement of calcium into bone (in opposition to the effects of parathyroid hormone)
- 2) Increases the activity of bone forming cells (osteoblasts)
- 3) Decreases the activity and formation of cells that break down bone (osteoclasts). This process helps build new bone and lower serum calcium, which in turn, stops calcitonin secretion.

Because of the close relationship between calcitonin and parathyroid hormone of the parathyroid gland, most of our discussion involving symptoms, causes, etc. of calcium disturbance will be in the chapter on the parathyroid gland.

Symptoms of Thyroid Dysfunction

A person secreting too little thyroxine and/or triiodothyronine can exhibit some of the following symptoms:

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- 1) They will often be overweight and have a hard time losing weight, even with a restricted caloric intake, due to a decreased metabolic rate.
- 2) The decreased metabolic rate will also make them require more sleep and even when awake they will be tired and exhibit very little motivation and ambition. They will tend to have difficulty getting out of bed in the morning and can exhibit a poor memory.
- 3) They may tend to build up cholesterol deposits and be more prone to heart troubles. The sluggish circulation will also manifest in having cold hands and feet.
- 4) Too little thyroid hormone production can lead to an imbalanced output of estrogen and progesterone by the ovaries, leading to prolonged and painful periods, with an increased tendency towards water retention.
- 5) A decreased depth of respiration will make it easy for the person to get out of breath with just a little bit of exertion.
- 6) Decreased peristalsis may lead to constipation.
- 7) A person with hypothyroidism will get depressed easily and often cry or go to pieces from situations that do not warrant these reactions.
- 8) Other symptoms observed with this condition include: balding or thinning of hair, brittle nails, hands and feet that tend to peel or crack, chapped lips, decreased resistance to infections and a tendency to get muscle cramps easily.
- 9) Because sudden temperature or seasonal changes put the thyroid under stress in hypothyroid people, they will exhibit increased health problems at these times.

A person over-secreting thyroid hormones can exhibit some or all of the following:

- 1) They will have trouble putting on weight (they will often be quite thin and wiry).
- 2) They will be nervous, worry a lot and have a hard time falling asleep (even when tired).
- 3) They will tend to sweat most of the time and dislike the heat.
- 4) They will have a tendency toward diarrhea (see the chapter on the large intestine for other causes of diarrhea).
- 5) More severe cases may possibly exhibit hand tremors and protrusion of the eyeballs.

Causes of Thyroid Dysfunction

- 1) It is the author's clinical experience that hypothyroidism is often due to a deficiency of the amino acid tyrosine which converts into T3 and T4. For some reason, we find many more women need tyrosine than men. It is depleted by stress and is not assimilated well in the diet unless starch and protein meals are separated. L-tyrosine supplementation will usually correct hormone levels and prescription hormones can often be avoided. This is typically only true if it is tried before prescription hormones are taken or if the person has only been on them a few months.
- 2) Chronic subclinical infections, such as parasitic, viral, fungal, spirochete and bacterial infections can also stress the thyroid gland and lead to dysfunction. (See the chapter on dysbiosis.)
- 3) Eating foods you are allergic to can stress the thyroid gland and lead to dysfunction. (See the chapter on food allergies/food toxins.)
- 4) It is the author's observation that toxic metal exposure, especially mercury, can lead to abnormal thyroid function. (See the chapter on heavy metals.)
- 5) Because of the thyroid's effect on insulin secretion, prolonged intake of refined carbohydrates and sweets can cause the overtaxing of your thyroid gland and lead to dysfunction. Our bodies were not designed to handle large amounts of refined products and physiologically we pay the consequences when overindulging.
- 6) Because of the resultant change in endocrine output with prolonged use, taking birth control pills, epinephrine and/or cortisone can lead to thyroid dysfunction.
- 7) Taking synthetic thyroid hormone for an inactive thyroid gland will tend to make your thyroid rely more on this outside source and will thus lead to further inactivity. It makes so much more sense to us to look for and correct the cause of the dysfunction in an effort to allow the thyroid to heal and return to normal functioning.
- 8) Overeating, especially fats and sugars, over prolonged periods will make the body produce more thyroid hormones (to increase fat burning and glucose uptake) than it can comfortably produce. This can eventually lead to hypothyroidism.
- 9) X-rays striking the thyroid (including dental x-rays) can damage the thyroid.
- 10) Prolonged, excessive intake of vitamin A supplements and also zinc can lead to hypothyroidism.

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- 11) A lack of iodine in the diet can lead to dysfunction.
- 12) An imbalance in the amount of estrogen in the body (be it due to pituitary, liver, ovary, or adrenal malfunction) can alter thyroid function.
- 13) Excess intake of cruciferous vegetables can lower thyroid function in some people.
- 14) If you suffer from hypoadrenia (see the adrenal chapter), the thyroid will often slow down to decrease your metabolic rate and give the adrenals a chance to rest.
- 15) Spinal misalignment in the mid cervical spine can cause thyroid dysfunction. I have seen it time after time in patients of mine involved in car accidents with resultant whiplash and cervical nerve dysfunction: they will go into a state of hypothyroidism and put on 10-30 pounds over the next 3-4 months.
- 16) Various strong emotional states can affect TSH secretion and cause thyroid hormone output to change. If this emotional state isn't properly dealt with, thyroid dysfunction will eventually result. Other causes of pituitary dysfunction can cause thyroid disturbances secondary to pituitary malfunction. (See the pituitary chapter.) In these cases, the pituitary must be restored to normal function in order for the thyroid to also be restored.
- 17) Increased exposure to the cold, especially without properly clothing the extremities, will (via the hypothalamus and pituitary) cause an increase in thyroid hormone output, which over time can overwork the thyroid and lead to dysfunction.

Other Indications of Thyroid Dysfunction

Not all cases of thyroid dysfunction will show up on blood tests. An easy way to check your metabolic rate at home and get a general idea of your thyroid function involves keeping a temperature chart. Every morning, before you get out of bed, take your axillary temperature. Put the bulb of the thermometer in your armpit and with your arm tightly against your body keep it there for a full five minutes. Record the temperature daily for one month and find the average. A normal axillary temperature would be between 97.6-98.4. If it is less and you exhibit some of the symptoms mentioned in the hypothyroid section, you could have an under-functioning gland. If over 98.4 and symptoms match, you could have an over-functioning thyroid. There are many other causes of altered body temperature so do not rely on this as a sole diagnosis.

Treatment of Thyroid Dysfunction

If your thyroid has been surgically removed, you will need to take medication. If it hasn't been removed, it is the author's opinion that medication should only be taken if all else fails, as it may further inhibit the body's own production of thyroid hormones and might possibly produce side effects. First off, try to prevent the thyroid from dysfunctioning, but if it is too late, try to help the thyroid heal and restore its normal function.

- 1) It is necessary to figure out and eliminate all food allergies/food toxins. (See the chapter on food allergies/food toxins.)
- 2) It is necessary to find and treat all chronic, subclinical infections. (See the chapter on dysbiosis.)
- 3) It is necessary to figure out if there is a component of heavy metal toxicity and address it. (See the chapter on heavy metals.)
- 4) Abstain from alcohol, caffeine, marijuana, tobacco, birth control pills, and other drugs that may harm the thyroid. (Consult your physician before stopping any prescription medications.)
- 5) Minimize intake of white sugar, brown sugar, molasses, corn syrup, margarine, vegetable oil, and other refined sugars and hydrogenated fats. Don't overeat.
- 6) If you must be x-rayed, make sure the thyroid is properly shielded.
- 7) When it is cold, make sure your whole body is dressed warmly.
- 8) Decrease the stress in your life.
- 9) If you've had a whiplash injury or suspect spinal misalignment, have a good chiropractor check it out.
- 10) Make sure your pituitary, adrenals, pancreas, reproductive glands, and liver are functioning properly and not causing secondary thyroid disturbances.
- 11) Since most soils are somewhat depleted, if you have a garden, consider fertilizing with liquid seaweed or fish emulsion to supply iodine to the soil. Care must be exhibited as these can sometimes be a source of mercury.
- 12) There are 2 reflex points that may help normalize thyroid function, one on each side of the sternum (breastbone) between the 2nd and 3rd ribs. Rub them vigorously for one to two minutes, two times weekly, for one month.
- 13) A treatment that may help thyroid function is to take a very hot compress and put it over the thyroid for 30 seconds and then put an

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ice bag there for 30 seconds. Alternate hot and ice 6 times, once in the morning and once at night, for one week.

- 14) For an under-functioning thyroid, you should stay away from excessive vitamin A (more than 10,000 IU vitamin A daily) and excessive zinc (more than 30 mg zinc daily) supplementation. Decrease foods with thiourea (thyroid inhibitor) - these include cabbage, broccoli, cauliflower, kohlrabi, peanuts and soybeans. Eat food high in iodine and manganese (seaweed, seeds, dark green vegetables, kale, collards, etc.). Some people do not tolerate iodine well, so be careful. Oats and bananas can be helpful because they stimulate the thyroid. A cold short bath, or a sunbath, and lots of vigorous physical exercise will all help revive a sluggish thyroid.
- 15) For an over functioning thyroid gland, an ice bag for 30 minutes daily will help slow it down temporarily. Eat foods high in thiourea - cabbage, broccoli, cauliflower, kohlrabi, soybeans, and peanuts. Avoid bananas and oats.
- 16) For an under-functioning thyroid , try taking an L-Tyrosine supplement (500mg. on rising and 500mg. mid morning) and a natural iodine supplement like Alaria Supreme.

Supplement Recommendations

THORNE RESEARCH

- 1) Tyrosine
- 2) Iodine-Tyrosine
- 3) Thyroscin

SUPREME NUTRITION PRODUCTS

- 4) Endo Supreme
- 5) Alaria Supreme