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# HypertHyroidism



Hyperthyroidism is a treatable condition.

Your doctor has recently told you that your son or daughter has hyperthyroidism. You may be having mixed feelings - it is a great relief to find the reason for the health problems that s/he has been experiencing. On the other hand, most parents feel anxious about what this means for now and the future. We hope you will feel better as you learn more about the condition from this booklet and the health care team.

## What is hyperthyroidism?

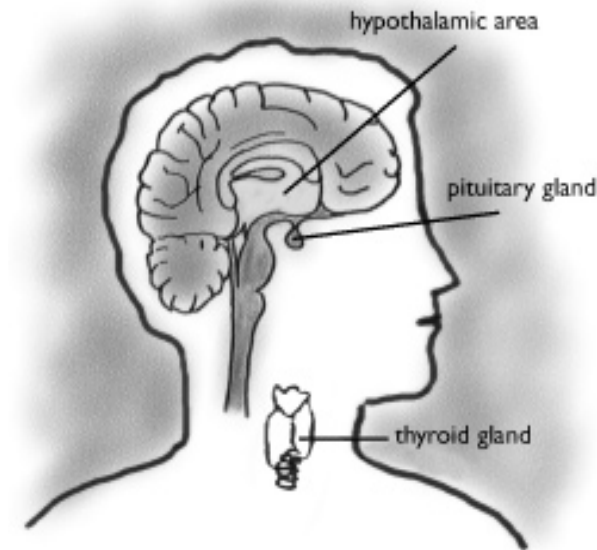
Hyperthyroidism is a condition in which the body makes more of the thyroid hormones than it needs. The body needs thyroid hormones for normal growth and development and for making the body cells do their jobs at the rate that maintains health. Too much thyroid hormone makes the body speed up all its activities. In fact the whole body becomes “hyper”:

- The heart beats too fast and the blood pressure goes up too high
- The body produces too much heat, and starts to sweat
- The brain can't slow down enough to have a restful sleep or concentrate
- Muscles want to move so there is shaking, fidgeting and restless moving around
- The bowels move too often
- The body loses weight because of all this activity
- Usually the thyroid gland has become larger, and this is called goitre.

## How are the hormones produced?

Cells in the thyroid gland produce and store the hormones *thyroxine* (T4) and *triiodothyronine* (T3). The thyroid gland sits in the neck, in front of the trachea (windpipe), just below the larynx (voice box).

The cells of the gland use iodine (found in iodized salt and some foods) to make the hormones.



The pituitary gland directs the productions of the hormones. It works like a thermostat and senses the amount of thyroid hormones in the blood. When there is not enough thyroid hormone for the body's needs, the pituitary gland adds thyroid-stimulating hormone (TSH) into the blood. TSH triggers the thyroid gland to produce more hormones. When there are enough thyroid hormones in the blood for the body's needs, the pituitary gland decreases the amount of TSH, and the production of thyroid hormones slows down.

Hyperthyroidism occurs when the body continues making a lot of the thyroid hormones even though the pituitary gland is not sending a message to do so.

## What causes hyperthyroidism?

The most common type of hyperthyroidism is called Graves disease or autoimmune thyrotoxicosis. Usually our immune system protects the body from things that could harm it, like germs, by making substances called antibodies that destroy what is harmful. For reasons that are not known, the immune system has produced antibodies that act like TSH and cause the gland to produce too much thyroid hormone. The thyroid gland mistakes the “fake TSH” for the sign that it needs to make more thyroid hormones and makes too much. This type of hyperthyroidism tends to run in families who have other autoimmune conditions such as diabetes mellitus.

Occasionally one or more overactive nodules in the thyroid gland cause hyperthyroidism.

Another cause of short-term hyperthyroidism is a viral infection (subacute thyroiditis).

Occasionally the hyperthyroidism is because of an inflamed gland (Hashimotos thyroiditis). At first the gland makes too much hormone, but after a while it makes less and less until the person has too little thyroid hormone. This is called hypothyroidism.

*Incidence: Approximately 1 in 400 adults have hyperthyroidism. It is 5 times more common in women than in men. It is more common in adults than in children and teens.*

*Graves disease is named for the Irish physician, Robert Graves, who first described it in 1835.*

## How is the condition diagnosed?

Parents usually realize that “something is not right” and bring their son or daughter to the doctor with some of the “hyper” signs described at the beginning of this booklet. The doctor requests blood tests, which show the abnormal amounts of the hormones related to this condition: high levels of thyroid hormones, low levels of TSH, and high levels of thyroid microsomal antibodies (TMA), thyroid peroxidase antibodies (TPO), and TSH-receptor antibodies.



*“I really hate blood tests, so I put EMLA® on my arm an hour before the blood test. Then I don’t feel the poke.”*

The blood tests are:

- T4 (free or total) measures the amount of thyroxine in the blood
- T3 (free or total) measures the amount of triiodothyronine in the blood
- TSH measures the pituitary gland's response to thyroid levels in the blood
- TMA and TPO indicate that the body is making chemicals which damage the thyroid cells.
- TSH-receptor antibodies indicate that the body is making chemicals which can abnormally raise or lower the TSH message.

Normal Hormone Values\*

	SI Units (Canada, Europe)	Conventional Units (USA)
Free T4	8.0-16.1 pmol/L	0.6-1.2 ng/dL
Total T4	60-140 nmol/L	4.6-10.8 µg/dL
Free T3	3.4-7.2 pmol/L	221-469 pg/dL
Total T3	1.5-2.5 nmol/L	98-163 ng/dL
TSH	0.3-6.0 mU/L	0.3-6.0 µU/mL
TMA	negative	negative

\*These values may vary depending on the lab method that is used.  
Your health care team can explain your child's specific test results to you.

## How is hyperthyroidism treated?

**There are three treatment options:**

- Anti-thyroid medications to block the production of thyroid hormones.
- Iodine-131 radiotherapy treatment to stop the gland from making too much thyroid hormone permanently.
- Surgery to remove part of the thyroid gland (seldom advised).

Usually in children and teens, the first treatment is the anti-thyroid medication, because in some cases the condition may go away completely and no further treatment will be necessary. This is called a "remission". Sometimes the hyperthyroidism comes back (relapses) months or years later and anti-thyroid drugs will be used again, hoping for another remission. Sometimes the condition does not go away at all and the doctor will suggest radioiodine to stop the problem permanently.

### Anti-thyroid medications:

Your doctor may prescribe propylthiouracil (PTU®) or methimazole (Tapazole®).

PTU® tablets block the production of thyroid hormones, and also decrease the use by the cells of the body. The effect lasts only a short time, so it has to be taken 3 times each day.

You should call your doctor if you develop a significant rash, joint pain, jaundice (yellow colour in your skin and eyes) or an infection or fever that does not go away as quickly as usual.

Ask your doctor if there are any limits on your activities when you are hyperthyroid or taking beta blockers.

Most doctors recommend that you avoid cold remedies with decongestants during the hyperthyroid phase because they will cause your heart rate to increase.

Tapazole® tablets work in a similar way but the effect lasts longer, so it may be taken once or twice a day.

Both anti-thyroid medications may have side effects for a few people. They may cause

- a red itchy rash all over the body
- joint and muscle aches
- decrease in white blood cells that help fight infections
- damage to the liver or kidneys

Your doctor will check your blood regularly for signs of any problem.

It takes 4-6 weeks for the medication to work fully. Then a blood test is needed to check the dosage. You will need monthly blood tests and dosage changes until the overproduction of thyroid hormones is held in check and your lab tests show that your hormones are in the normal range.

Since it takes about a month for the anti-thyroid medication to be effective, your doctor may also ask you to take another medication such as propranolol for a short time. This type of medication is called a beta-blocker and slows down your heartbeat to a normal rate.

As you can see, the blood tests are very important to show that:

- your thyroid hormones are at the right level
- the medication is the correct dose
- there are no side effects of the medicine



Note: Although the condition is called hyperthyroidism, soon the treatment will bring your child/youth's thyroid levels back to normal. You can expect her health to be the same as before the thyroid gland started making too much hormone. The young person won't be "sick" any longer, and will be her old self at home and at school.

The amount of radiation exposure to the rest of the body is very small - similar to the amount you would get from a diagnostic procedure like a GI series. However pregnant women should never receive I-131 and your daughter will be checked for this prior to I-131 treatment.

Travel note:  
The I-131 disappears from the body in a few weeks. But because it is radioactive while in the body, sensitive devices at airports and borders will react to it. Ask for more information if you are planning air travel close to the time of your treatment.

### Iodine-131 (I-131) treatment:

When anti-thyroid drugs do not lead to the hyperthyroidism going away (going into remission) your doctor will discuss I-131 ablation therapy. This treatment involves taking a capsule or drink that contains radioactive iodine. The thyroid cells take up the radioactive iodine and they are damaged so that they stop over-producing thyroid hormones. The rest of the cells in the body do not take up iodine, so no other damage is done. Then the I-131 disappears from the body in a few weeks. It takes several months for the I-131 treatment to have its full effect, and sometimes a second or third treatment is necessary. Most people develop an underactive thyroid (become hypothyroid) after I-131 treatment, which means that not enough thyroid hormones are being made. One daily tablet of synthetic thyroid hormone will replace what the body needs.

Many people are concerned about the safety of I-131 treatment, but it has been used for over 50 years for more than 2 million people and is considered the safest, most convenient and effective treatment for hyperthyroidism. It is also important to remember that the purpose of this treatment is to stop the hyperthyroidism which is harmful to the body.

If your doctor suggests I-131 treatment, request further written information about the procedure.

Several steps are involved:

- first you take a small drink of radioactive iodine in water to determine how big your thyroid gland is
- the next day a thyroid scan is done to calculate the correct dose of I-131
- then the I-131 drink is given to you

## Questions from parents and teens

**Q: Is there any way to know if my child's hyperthyroidism will go away?**

A: There is no way to predict who will have a remission. (Remission means the condition goes away for a while or permanently.) However young children, those with large goitres and those who have high thyroid microsomal antibodies are less likely to have a remission.

**Q: The radioactive iodine treatment stops one problem but gives you another one. What is the point of doing that?**

A: The anti-thyroid drugs are a temporary treatment to block the extra thyroid hormones for a while, because the condition may go away by itself. If it does not go into remission, your doctor will discuss stopping the hyperthyroidism permanently because the anti-thyroid medications can become a problem in long-term use. They must be taken several times each day. They can have side effects and have to be adjusted frequently. It is true that hypothyroidism usually occurs after radioactive iodine treatment, but it is very easy to manage with one daily tablet of synthetic thyroid hormone with no side effects.

**Q: Did we do anything to cause this?**

A: No, although as you read earlier, some families are more prone to have autoimmune conditions.

Even if the hyperthyroidism goes away, your child should have thyroid blood tests done every year to be sure the problem doesn't return; also an underactive thyroid problem could develop.

During the “hyperthyroid phase” some teens are burning a lot of calories and they develop a big appetite. When their condition is corrected, they won't need to eat so much.

**Q: Will my daughter gain back the weight she has lost?**

A: Your daughter will return to her body's normal weight when the thyroid hormones are in the correct range. A healthy diet and regular exercise will keep her weight at the optimal level.

**Q: My daughter's eyes are really bulging. This really bothers her. What is it? Will it go away?**

A: There are two factors to the bulging. When your daughter is hyperthyroid, the muscles of her eyelids are in spasm, giving her a staring appearance. This will go away. Another part of the problem is that the auto-immune disease process has caused the eye tissues and eye muscles to swell. This may go away slowly, but sometimes additional treatment is needed, and an eye specialist (ophthalmologist) is advised.

**Q: Are there any alternative therapies such as herbal remedies, organic foods, or acupuncture that are helpful?**

A: The therapies that have been described in this booklet are the only ones known to decrease the excess thyroid hormones. However alternative therapies may make you feel better generally – discuss your ideas with your doctor. You should not be giving your child extra iodine-containing food supplements such as kelp.

**Q: Are the medications expensive?**

A: The cost of the treatment will depend on the number of anti-thyroid tablets that are needed to suppress the thyroid gland. The cost could be \$10-\$30 each month.

**Q: My son is skipping a lot of the pills even though I remind him.**

A: You and your son know it is important to control hyperthyroidism because the condition is very taxing to the body. Ask your son why he is having difficulty taking his pills, and see if the two of you can problem-solve any specific issues. Discuss the problem with your doctor – it may be time to try another therapy.

As you can see, the process of treating hyperthyroidism depends on how your body responds to the different treatments and whether your thyroid gland stops making the problematic thyroid stimulating antibodies. It is a process that means pills and regular blood tests, and possibly I-131 treatment, but the hyperthyroid phase will be controlled and you will feel much better.





## Websites and support groups for hyperthyroidism

**Endocrine Web Thyroid Links:** [www.endocrineweb.com/thyroid.html](http://www.endocrineweb.com/thyroid.html)

**Thyroid Foundation of Canada:**  
[www.thyroid.ca](http://www.thyroid.ca)

**National Graves Disease Foundation:**  
[www.ngdf.org](http://www.ngdf.org)

More links available from:  
**The Department of Endocrinology at BC Children's Hospital**  
<http://endodiab.bcchildrens.ca>

## For pricing and ordering information

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