Thyrotoxicosis - Thyroid surgery for benign thyroid disease

QUICK FACTS

- Most cases can be controlled with medication.
- When medication does not control high thyroxine levels, surgery may be needed.
- Surgery may also be needed if thyroid eye disease causes a lot of symptoms.
- If you have surgery, you will need to take thyroxine replacement tablets for the rest of your life.
- Your voice can sound different after surgery. This can be temporary but rarely permanent.
- Very low calcium levels can cause pins and needles and muscle cramps. This is a medical emergency. Please contact your surgical team immediately or attend the nearest Emergency Department.

ABOUT THE CONDITION

What is the thyroid gland?

The thyroid gland is found in the neck, in front of the windpipe, between the collarbone and the Adam's apple. It is shaped like a bowtie or butterfly (see figure 1). There are two halves, the right and left thyroid lobes, connected by a bridge of tissue called the isthmus.

The thyroid gland produces a hormone called **thyroxine**. Thyroxine is released into the bloodstream and is important in controlling your metabolism.

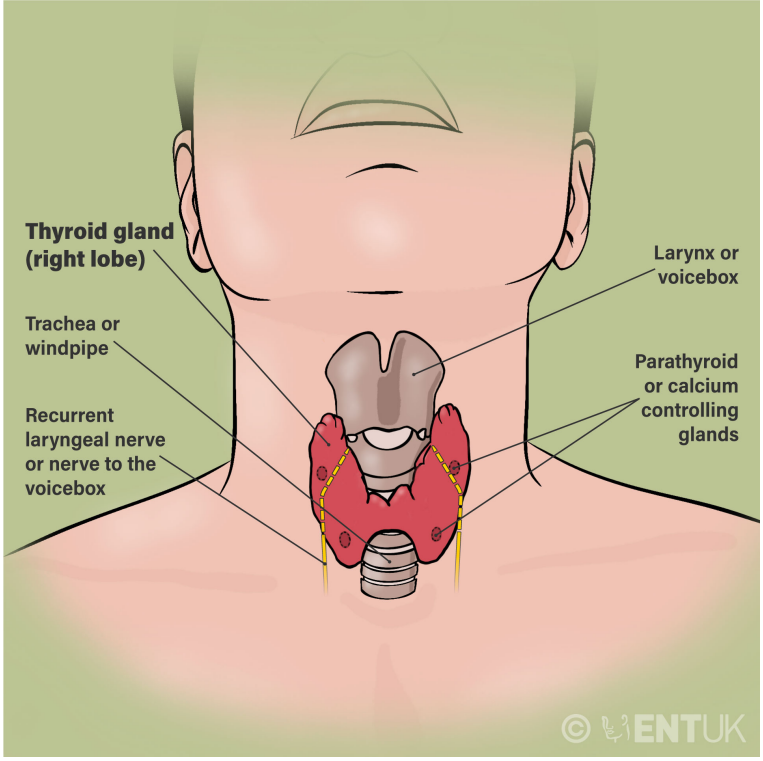


Figure 1. Location of the thyroid gland and the structures surrounding it.

What structures are next to the thyroid gland?

There are, on average, four **parathyroid glands** on the back of the thyroid gland. The parathyroid glands control the amount of calcium in your blood.

On either side, the **recurrent laryngeal nerve** runs behind the thyroid gland, in the groove between the windpipe and the food pipe. These two nerves move the voice box.

What is thyrotoxicosis?

Thyrotoxicosis is a condition when the thyroid gland becomes overactive and produces too much thyroxine. It is also known as hyperthyroidism. It is diagnosed from your symptoms, as well as examination and blood tests.

The commonest cause of an overactive thyroid gland is Graves' disease. This is an autoimmune condition where your immune system attacks your thyroid gland. It can affect about 3 in 4 people who have an overactive thyroid. Sometimes, a non-cancerous thyroid nodule can produce too much thyroxine. This is called a toxic thyroid nodule.

Temporary causes include thyroiditis (inflammation of the thyroid gland), pregnancy and certain medications.

What symptoms can it cause?

This condition can cause the following symptoms and physical signs:

Symptoms

- Hyperactive or ‘always on the go’
- Nervousness, anxiety, and irritability
- Mood swings
- Difficulty sleeping
- Constant tiredness and weakness
- Sensitive to heat
- Diarrhoea
- Constant thirst
- Itchiness

Physical signs

- Irregular or unusually fast heart rate
- Lower neck swelling from an enlarged thyroid gland
- Twitching or trembling
- Excess sweating
- Loose nails
- Patchy hair loss
- Weight loss (despite increase in appetite)

A third of people with Graves’ disease may have or later develop thyroid eye disease.

Aspects of thyroid eye disease

- Dry, gritty, watering eyes
- Sensitive to light
- Blurred or double vision
- Red eyes
- Puffy eyelids
- Pulled back eyelids
- Bulging eyes

Most cases can be controlled with medication prescribed by your GP and endocrinologist. A small number of patients will require surgery to treat their Graves’ disease.

ABOUT THE PROCEDURE

Why has a total (or near total) thyroidectomy been recommended to me?

Thyroid surgery is an option to manage excess thyroxine production caused by Graves’ disease and reasons include:

- Your thyroid hormone level is high, despite medication.
- Radio-iodine treatment hasn’t worked or may not be right for you.
- Thyroid eye disease is causing you a lot of problems.
- You have chosen surgery over other forms of treatment.

What is the benefit of having a total (or near total) thyroidectomy?

Your endocrinologist feels that surgery to remove all or most of your thyroid tissue would help control this disease. The benefit for you is that you will no longer have to take medication to control your overactive thyroid gland.

Your thyroid specialist will explain what happens in surgery, including the risks involved. You will also have the chance to ask any questions you may have. Based on this information, you will be able to make a

shared decision as to what you feel is best for your circumstances. Your general health is an important factor in whether surgery is a treatment option.

What are the alternatives to surgery?

The alternatives to surgery include:

- antithyroid medicines
- radioactive iodine treatment.

Your endocrinologist would already have considered all non-surgical ways of treating your overactive thyroid gland and discussed these with you before referring you for surgery.

Do I have to have the operation?

It is ultimately your decision to make, guided by the information and recommendation given by your thyroid specialist.

If you decide not to have surgery, the symptoms will continue. It is best to discuss your decision with your surgeon. Decisions to recommend surgery for Graves' disease are made on an individual case-by-case basis.

What will happen if I do not have the operation?

Your endocrinologist will continue to monitor your thyroid hormone levels and treat you with anti-thyroid medicines or radioactive iodine. You will be discharged from the care of the surgeon.

For more information on radioactive iodine, see the British Thyroid Foundation's website.

Further information

You may also wish to have a read of the patient information leaflets on the following websites:

- The British Association of Endocrine and Thyroid Surgeons patient information leaflets.
- The British Thyroid Foundation is a charity that offers reliable information and support for patients with thyroid disorders.

What does this surgery involve?

A total thyroidectomy is an operation to remove the entire thyroid gland. The operation is performed under general anaesthetic, which means you will be asleep.

A cut is made in a skin crease on the lower part of your neck. This tends to heal very well, and in time the scar is likely to be hardly visible.

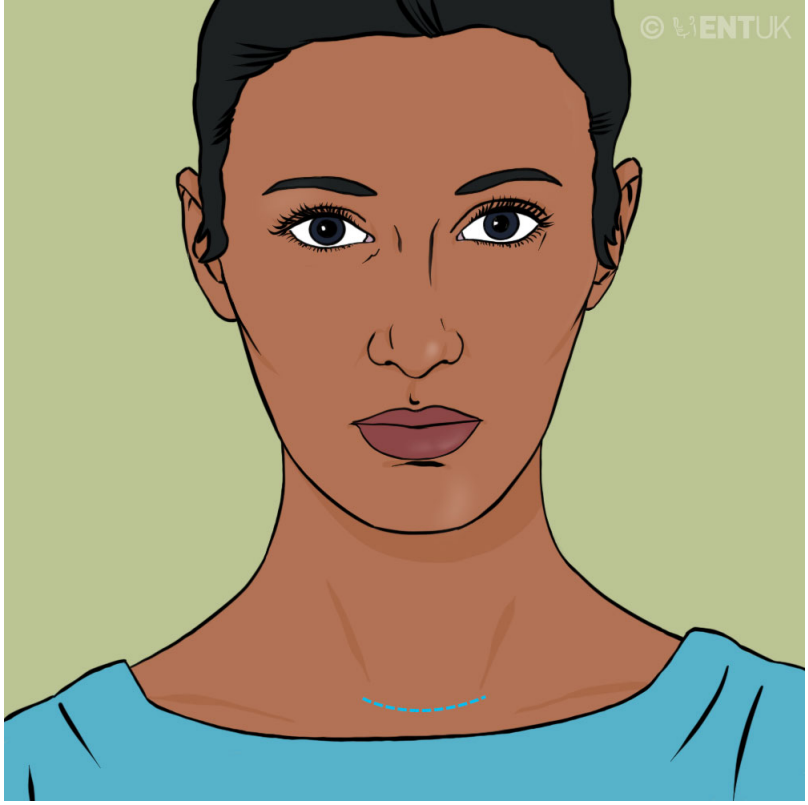


Figure 2. Location of the scar

The surgeon will find and protect the parathyroid glands and an important nerve called the recurrent laryngeal nerve. Sometimes one or more parathyroid glands are found within the thyroid gland itself. These have to be removed.

The thyroid gland is carefully peeled away from the nerve, which may need to be moved around to remove the gland completely. A nerve monitoring device may be used during the operation and to test the nerve afterwards.

At the end of the operation, the surgeon may insert a plastic tube called a drain through the skin. This prevents blood and fluid from collecting. The drain is removed once the surgeon is happy that no blood or fluid will collect in your neck. Sometimes a drain is not needed. Once the drain is removed and your calcium levels are at an acceptable level, most patients can go home.

In some hospitals, your surgery may be a day-case operation, which means you can go home on the day of surgery.

What should I expect after the operation?

Scar.

The cut, which is hidden in a skin crease, usually heals very well and fades into a thin white line. It can take up to 12 months before the scar reaches its final appearance.

In rare cases, scars can look thickened or develop into a **keloid scar**. If you have thickened scars elsewhere on your body, please let your surgeon know in advance and they can discuss options with you in more detail.

Numbness of the skin.

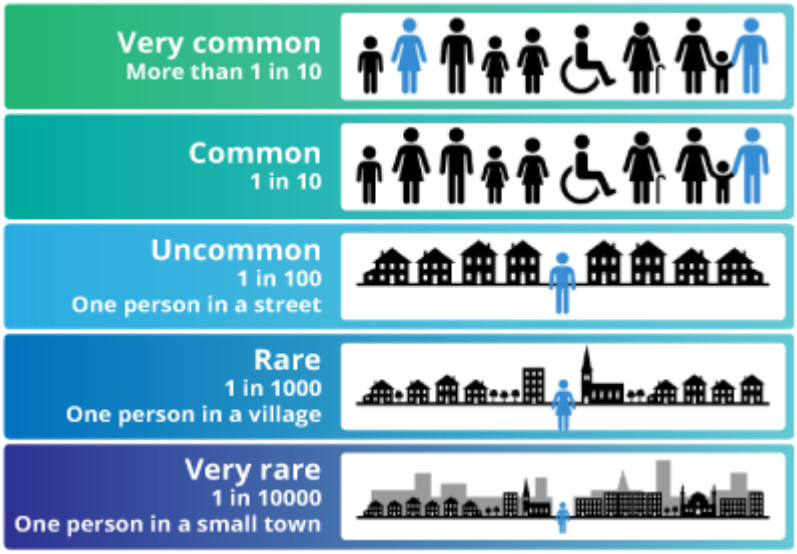
It is normal for the skin around the wound to be numb. This may improve slightly over time but is more likely to be permanent.

ABOUT THE RISKS

Are there any complications to this operation?

All operations involve some risks, but most patients who have this procedure recover well.

Complications are grouped into the following categories:



Thyroid storm.

This is a very rare complication (less than one case in 10000). It occurs when too much thyroid hormone is released into the blood stream during thyroid surgery. This can cause problems with your blood pressure during the general anaesthetic. To prevent this happening, medication is given to you prior to surgery so that your thyroid hormone levels are under control. Your operation will be postponed if your thyroxine levels are too high to prevent a thyroid storm.

Seroma.

The gap left inside the neck after removing the thyroid and the thyroid lump can get filled with fluid. This is known as a seroma and happens in between one and seven out of every 100 cases. If this happens, you will experience swelling of the wound and sometimes feel a sensation of pressure. Seromas can be drained with a needle and syringe in the outpatient clinic. You may need to have this done several times.

Bleeding and blood clots.

A blood clot or haematoma can form under the skin. This is uncommon and can cause neck discomfort and visible swelling. In severe cases, it can cause pressure on the windpipe, resulting in breathing difficulty. If a haematoma forms, you may need to have another operation to remove the blood clot and a drain may be inserted. This happens in between one and two out of every 100 cases.

Wound infection.

A wound infection may cause pain, swelling and redness of the wound and skin. This happens in up to three out of every 100 cases. Factors such as diabetes and smoking can make this more likely. The

infection is usually treated successfully with antibiotics. Pus may develop in the wound, but this is rare. If this happens, your surgeon may need to open the wound to drain the pus and wash it out. This is usually done under a general anaesthetic.

Low calcium (hypocalcemia).

Low calcium levels occur if all parathyroid glands are not working well after thyroid surgery. This can happen if the parathyroid glands have been removed during total thyroidectomy, as they are sometimes found within the thyroid gland. It can also happen if their blood supply has been interrupted or bruised or if there is some bruising of the glands. Almost one in four people who have surgery for Graves' disease experience this complication in the days after their operation. Most recover over six to 12 months. The risk of permanent hypocalcaemia is two to five out of 100 cases. This would mean long-term calcium replacement was needed. Your calcium levels will be monitored until they are stable. If they are low, you will need to take calcium replacement tablets. If your calcium levels are very low, you will need calcium replacement into your veins (via a drip) and will be put onto a heart monitor. Your medical team may also start you on calcium and vitamin D as a precaution.

You **must report** any of the following symptoms to the nurse **immediately** as they indicate that your calcium levels are low.

- **tingling around your lips or fingers**
- **muscle cramps**

Hungry bone syndrome.

After surgery to remove the full thyroid gland, the calcium levels can stay very low for a few days. This is rare and can be due to the long-term effects of high thyroid hormone levels on bone turnover. This is known as ***hungry bone syndrome***. You will need to stay in hospital for a few more days so that your calcium levels can be replaced and monitored. When the calcium levels in the blood reach an acceptable level, you will be sent home with medication. The endocrine team will be involved and are likely to arrange further follow-up visits to their clinic.

Voice changes.

Voice changes may be temporary or permanent. If there is any concern about your voice or breathing, a flexible laryngoscopy will be carried out. A long, thin tube with a camera on the end is gently inserted through your nostril and down into your throat. This allows your surgical team to see if your voice box is moving correctly. It is common for patients who wake up from a general anaesthetic to have a dry throat and sound a bit husky. This should not last long.

Non-specific voice changes

A third of patients describe some voice change up to three months after surgery (for example, a deeper voice or the voice getting tired with use). These patients have no recognisable nerve injury, and the vocal cords move well when they are examined. Over time, the voice usually gets better without any treatment. In some cases, voice therapy may be of benefit.

Injury to the recurrent laryngeal nerve

A persistent hoarse voice after surgery may suggest weakness on one side of the voice box, caused by injury to the recurrent laryngeal nerve. Temporary injury to the nerve can take place in between two and 11 out of 100 cases. Most will get better without treatment. Sometimes, it can take up to 12 months for the nerve to recover.

Sometimes, the nerve is cut during the operation. This is rare. If this happens, your surgeon will inform you of the reason. Permanent injury to the nerve takes place in one out of 100 cases.

The risk to the nerve can be much higher if there is cancer close to or invading it, if lymph glands are being removed around the nerve, or if a large thyroid gland (known as a goitre) is being removed. It can also be much higher in those who have had previous surgery on their gland. Your surgeon will be able to inform you of your specific risks.

In rare cases, both recurrent laryngeal nerves are damaged. This can occur in one in 200 cases. Your voice may sound nearly normal, but you could experience **breathing difficulty**. This is when both vocal cords stay in a closed position rather than perform the natural movement of opening with breathing. The narrowest area of your breathing passage, which is at the level of the voice box, has now become even narrower. The breathing can become laboured and noisy. This is known as **stridor**.

Some patients may be able to tolerate this, but usually patients who have poor lung reserve may need the voice box to be narrowed. This is done by using a tube called a **tracheostomy** tube, which is inserted directly into the windpipe to help breathing. Around half of patients who get this complication will need a tracheostomy.

This may be temporary or permanent. Your thyroid specialist doctor will be keeping a close eye on you. You will need to be monitored by flexible laryngoscopy regularly.

In selected patients, cutting away the back part of the voice box (called a ***laser posterior cordectomy***) gives enough room for the patient to breathe. This procedure carries a risk of drinks and food going down the wrong way into the lungs. This causes coughing and sometimes chest infections.

Superior laryngeal nerve weakness

The superior laryngeal nerve runs close to the blood vessels that feed the top part of the thyroid gland. It controls the tension of the vocal cords. Damage to this nerve may cause a change to the pitch of your voice, making it difficult to reach high notes when singing. You may find that your voice tires more easily. This is thought to happen in up to five out of 100 cases. It may be more significant to you if you use your voice professionally.

Can anything be done to improve my voice?

Most bruised nerves will recover on their own. Sometimes it takes days, sometimes weeks or months. For cases of recurrent laryngeal nerve injury, a filler injection can be used to bulk up the vocal cord. This makes your voice sound stronger, although it depends on the position of the vocal cord. This can be done in clinic under local anaesthetic. If the recurrent laryngeal nerve has been permanently damaged, more complex surgeries can be considered.

If the vocal cord is paralysed in a position that leads to a weak and breathy voice, then a filler injection into the vocal cord may be needed to help strengthen your voice. Your surgeon may refer you to a laryngologist (voice specialist) for this.

Hypothyroidism

Hypothyroidism is the medical term for an underactive or absent thyroid. When the entire thyroid gland is removed, your body cannot produce thyroxine. You will need to take thyroxine hormone replacement tablets for life. These will be started on the day after your operation and should be taken daily before meals.

Complications of general anaesthetic

The operation is performed under general anaesthetic. Complications can include blood clots in the legs (deep vein thrombosis) or lungs (pulmonary embolism), heart attack, chest infection, stroke and death. The pre-assessment team and anaesthetist will explain what happens during a general anaesthetic and the risks that are relevant to you. **This link** summarises the common events and risks of general anaesthetic.

AFTER THE SURGERY

What happens after the operation?

After the operation, you will be transferred to the recovery area. When you are fully awake, you will be taken to a ward area or the day-case unit.

Will I have a drain in my neck?

A wound drain may be inserted. The nursing staff will monitor this. You will be reviewed on the ward round and a decision will be made about when the drain can be removed. Some units do not use drains and your surgeon will let you know what to expect in your case.

Will I need any blood tests whilst I am in hospital?

Low calcium levels occur if none of the four parathyroid glands are not working properly after thyroid surgery. Your **calcium and parathyroid hormone (PTH)** blood levels will be closely monitored after surgery. The first blood test is on the evening of your surgery and then the next morning. You may need blood tests several times a day, depending on the results.

You will be given calcium replacement tablets if the calcium level is below normal. If your calcium level is very low, calcium will be given into your vein and your heart will be monitored.

Will there be any changes to my medications?

Your beta-blocker (propranolol) medication and carbimazole will be stopped after surgery, as they are no longer be required.

Removing your thyroid gland removes your body's ability to make thyroxine. You will need to take **thyroxine replacement tablets (levothyroxine)** for life. If you do not take replacement tablets, you will develop hypothyroidism (low thyroxine levels). Untreated hypothyroidism is a life-threatening condition. You will be started on thyroxine hormone replacement tablets based on your weight.

Your **thyroid hormone level** will be checked approximately six weeks after your operation. Your medication can then be adjusted by your GP, if required. Your GP will monitor your thyroid function tests (TFTs) regularly to ensure you are on the correct dose of levothyroxine tablets. These tablets are ideally taken on an empty stomach about 30 minutes before your breakfast. There are several medications that can affect the absorption of your levothyroxine, therefore please speak to your GP or pharmacist about this.

You may also be started on calcium supplements and Vitamin D depending on the calcium level in your bloodstream. These will also be monitored by your specialist or GP.

How long will I be in hospital?

If you have a drain in your neck, you need to stay in hospital until it is removed. Your surgeon will decide when the drain should be removed. Most patients spend between 24 and 48 hours in hospital after the operation.

You may need to stay in hospital for more than 48 hours if you develop a haematoma, wound infection, or very low calcium levels.

What should I expect after I am discharged from hospital?

Your **calcium level** may need to be checked one week after surgery and closely monitored if it is low. Let your surgeon and GP know if you have **any numbness or tingling around your lips or fingers. A very low calcium level is a medical emergency so you will need an urgent blood test and treatment.** You may be advised to go to your nearest hospital or Emergency Department. Your discharge information should have details about this.

How long will I be off work?

You will be off work for a minimum of two weeks. You should begin to feel better the day after the operation.

Will I have stitches?

Some surgeons will close the wound with staples, stitches, or skin glue. The stitches or staples are usually removed after five to seven days. Your surgical team will advise when and where these should be removed.

What happens to the thyroid gland after it has been removed?

A pathologist examines the gland. This takes at least a week or two. It may take longer if special tests are required. Sometimes, an unexpected pathology is obtained. Your thyroid specialist will advise when and how the result of the pathology will be given to you.

Follow up

Your surgical team will advise you about follow-up appointments. Your endocrinologist will likely organise an appointment.

Is there anything else I should know?

Your thyroid specialist will ask you if you agree to have your anonymised surgical data included in the national thyroid registry. The data helps guide future best practice and calculate the complication rates of the operation, some of which are quoted in this information e-leaflet.

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