

Goiter & Nodules:

what everyone should know
about these thyroid disorders



Goiter and Nodules –

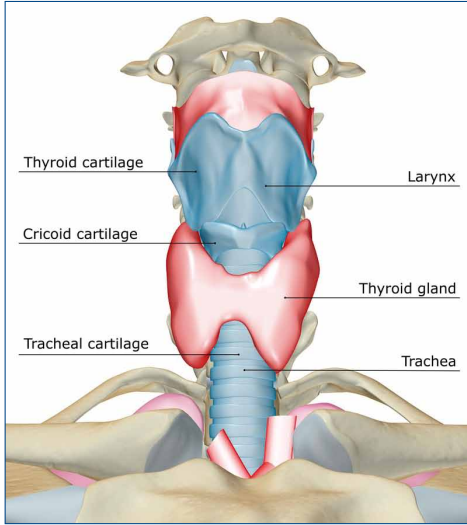
Did you know that the shortage of iodine in the diet is the worldwide number one cause of an enlarged thyroid (commonly referred to as “goiter”), as well as for most types of thyroid nodules?^{1 2} In fact, an estimated one billion people worldwide are affected by an iodine deficiency, as the United Nations World Food Program has determined.³

This helpful guidebook was compiled for those who suffer from a thyroid disorder (like goiter and/or thyroid nodules), their family, their relatives and friends and everybody else interested in the causes and treatment of goiters and thyroid nodules. It should make everyone aware of important information concerning these common disorders. It also answers questions such as: What are the initial signs and symptoms to look out for? What are the potential causes and complications of these disorders? How is the diagnosis done, and how does the treatment work? In addition, it contains noteworthy information on goiter as well as on thyroid nodules, which can affect any of us – regardless of the actual level of thyroid function.

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You must consult a suitably qualified health care professional on any problem or matter which is covered by any information in this guidebook before taking any action.

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About our thyroid

As long as it does not pose any problems, the thyroid (located in the lower region of the neck in front of the windpipe) goes about its work unnoticed. This butterfly-shaped organ is only merely the size of the thumb, but yet it is highly significant to all metabolic processes in the body.⁴ From the iodine derived from our food, it forms the two hormones thyroxine (T4) and triiodothyronine (T3). Controlled by a small gland in the brain – the pituitary gland – which produces the thyroid stimulating hormone (TSH) the thyroid ensures that just the right amount of thyroid hormone is circulating in the bloodstream. For instance, our overall metabolism, our sensation of heat and cold, the cardiovascular system, intestines, reproductive system, muscles and nerves (along with our well-being) are regulated by these hormones. Dysfunction occurs when the thyroid fails to supply a sufficient amount of hormone.

Even completely independent of the actual level of thyroid function, enlargement of the organ (commonly referred to as “goiter”) – or the formation of nodules within the thyroid – can occur. The latter can take on the form of an individual (solitary) nodule, or of several (multiple) nodules.⁵

An underactive thyroid produces too little thyroid hormone, resulting in a condition called hypothyroidism. People with hypothyroidism use energy more slowly and their metabolism also slows down, they will lack energy and feel tired.⁶

By contrast, if the thyroid is overactive, it releases too much thyroid hormone into the bloodstream, resulting in a condition called hyperthyroidism. This condition speeds up metabolism.

Goiter formation is not a disorder, which has only emerged in modern times. In China, even approx. 5,000 years ago, foods (such as sea grass), which contain iodine were applied to the treatment of goiter.⁷

Goiter and Nodules –



Symptoms of goiters and thyroid nodules

Goiters and thyroid nodules can manifest themselves differently in each affected individual. It is not in all patients that all symptoms occur. If you notice one of the signs described below in yourself or if you are concerned about a potential goiter, thyroid nodule or any other thyroid disorder, then please consult your doctor.

What you should look out for?

Goiters and thyroid nodules are two different thyroid disorders. Both involve an enlargement of this organ.

With a goiter the thyroid gland – which in normal, healthy condition is approximately the size of your thumb – can become larger than normal meaning, it can be visible or felt under the skin at the

front of the neck. Goiter is the medical term for an enlarged thyroid gland.

Thyroid nodules are abnormal growths/lumps on the thyroid gland. They can take on the form of an individual (solitary) nodule, or of several (multiple) nodules.⁸

The most common worldwide cause for these disorders is insufficient iodine in one's diet.⁹ In fact, according to the United Nations World Food Program, an estimated one billion people worldwide are affected by an iodine deficiency.¹⁰

Goiter

If a goiter occurs in the form of an enlargement of the otherwise normally-functioning thyroid caused by iodine deficiency, then no initial symptoms occur. Once the goiter has increased in size, its initial signs are cosmetic in nature. This is usually the point at which affected persons consult a doctor. A significantly-enlarged thyroid which applies pressure to surrounding organs can become noticeable with onset of the following symptoms:¹¹

- A sensation of pressure (a "lump") in the throat
- Difficulty swallowing/pain upon swallowing
- Hoarseness
- Chronic cough
- Laboured breathing with the head in a certain position
- Laboured breathing in stress situations
- Unpleasant sensation of constriction when wearing neck ties, turtleneck sweaters etc.

If thyroid dysfunction has occurred in addition to the onset of the goiter, the resulting symptoms indicate possible hypo- or hyperthyroidism (under- or overactive thyroid).

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Thyroid nodules

Initially, most thyroid nodules do not cause any noticeable symptoms. Therefore, they can go undiscovered until the next routine medical examination¹² – if, for instance, a particular lab test result as part of a blood test indicates an abnormal thyroid. Nodules can also form within a normally-functioning thyroid, or as the result of an untreated goiter. As the thyroid nodules grow further, the following symptoms can occur:¹³

- Pain
- Difficulty swallowing/discomfort upon swallowing
- Laboured breathing
- Hoarseness
- Symptoms which point to an overactive thyroid (hyperthyroidism) when “hot” nodules are present

Upon the onset of laboured breathing, hoarseness, severe pain and/or general signs of illness such as fever and joint pain (since these symptoms are possible signs of fast-growing, maybe even cancerous, nodules, an enlarged thyroid or thyroid inflammation), a doctor should be consulted immediately.

Hypothyroidism (underactive thyroid)

Since the signs and symptoms of hypothyroidism resemble those of other medical problems, this thyroid disorder is frequently overlooked. In addition, symptoms can develop over an extended period of time – and can thereby go unnoticed. You should look out for the following changes in your body:^{14 15 16 17}

- Fatigue, drowsiness/light-headedness and/or weakness
- Intolerance to cold (you respond more sensitively to cold than those around you)
- Impaired memory capacity

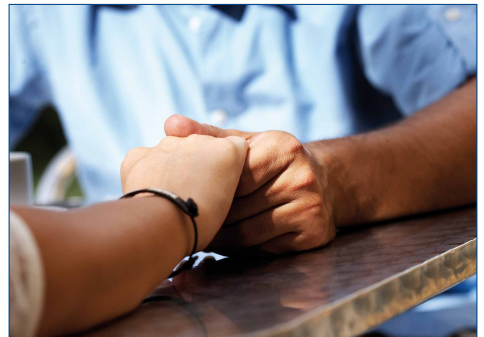
- Weight gain or a hindrance in weight loss (despite a healthy diet and exercise)
- Depression
- Constipation
- Menstrual and/or fertility disorders
- Joint or muscle pain
- Fine and brittle hair/fingernails and/or dry, scaly skin

It is important to know the initial signs of hypothyroidism, since even minor symptoms can progress to more serious disorders if they go untreated.

Hyperthyroidism (overactive thyroid)

Hyperthyroidism is not as common as hypothyroidism. Nevertheless, you should pay closer attention to the following primary symptoms:¹⁸

- Weight loss (even when maintaining a normal diet)
- Nervousness, anxiety and irritability
- Very rapid heartbeat (often more than 100 beats per minute)
- Prominent, staring eyes (typical for Graves' disease, an autoimmune disorder affecting the thyroid)



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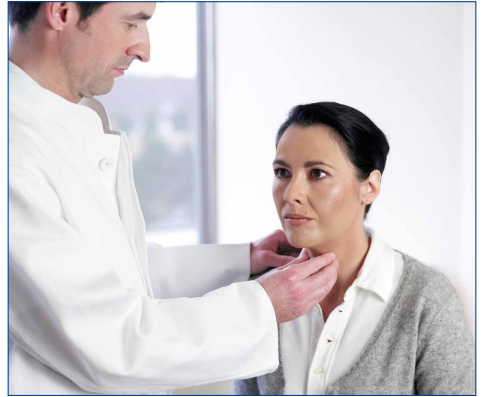
- Trembling hands
- Feeling very weak
- Hair loss
- Frequent bowel movements
- Rapidly-growing fingernails
- Thin and very smooth skin
- Excessive sweating
- Menstrual irregularities

Consequences of goiters and thyroid nodules

The physical symptoms (along with the change in one's appearance), which accompany goiters and thyroid nodules are extremely unpleasant for the affected person. Both can interfere – to a certain extent, severely – with one's self-esteem and one's professional, personal and family life. An extra factor is that an untreated disorder has further potential consequences.

The larger the **goiter**, the greater the attendant risk that also the surrounding organs will be affected. If the thyroid is immensely enlarged, then (for instance), the windpipe, cervical (neck) blood vessels and/or the oesophagus can be displaced or constricted.

If a goiter is thought to be present, a medical examination is always essential. Simple visual classification can be inaccurate – primarily due to the sub-



jectivity of the beholder and one's individual anatomy (e.g. a particularly muscular neck which more readily conceals the enlarged thyroid) – and can by no means serve as a substitute for a specific diagnosis by a doctor. Furthermore, nodules can form in the thyroid in addition to a goiter.

Thyroid nodules are differentiated as “cold” or “hot” nodules. In fact 85% of “cold” nodules and 95% of “hot” nodules are non-cancerous.¹⁹ However the latter can produce thyroid hormones in unchecked amounts can lead to hyperthyroidism. “Cold” nodules cause no overproduction of thyroid hormones – but they can grow unchecked. Therefore, it is particularly important to identify the type of nodule in order to avoid any possible risks.

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Causes of goiters and thyroid nodules

The number one cause of the development of a goiter and/or most thyroid nodules (as well as hypothyroidism) is an iodine deficiency.^{20 21 22} As explained above, iodine is essential to the function of the human body – that is to say, vitally necessary. However, the body cannot produce it itself; instead, it must be consumed day by day with one's food. If the thyroid lacks iodine, it partially or completely fails to produce the hormones thyroxine (T4) and triiodothyronine (T3), which regulate all of the body's metabolic processes. The sensitive system is disrupted, which in turn can lead to abnormal thyroid mutations.

Further reasons and risk factors for **goiter** formation:

- Familial predisposition²³
- Hormonal changes during pregnancy, puberty or menopause²⁴
- Thyroid inflammation (thyroiditis)²⁵
- Hyperthyroidism (overactive thyroid)²⁶
- Hypothyroidism (underactive thyroid)²⁷
- Graves' disease, Hashimoto's thyroiditis (auto-immune disorders affecting the thyroid)^{28 29}
- Certain medications (e.g. thyreostatics, lithium)³⁰
- Smoking³¹
- High nitrate exposure³² (for instance, through drinking water)

Further causes for **thyroid nodules**:

Thyroid nodules can be accompanied by an untreated goiter – which in turn can develop due to



an iodine deficiency. Another known risk factor for the formation of nodules is for example smoking.³³ Another reason is that nowadays the occurrence of thyroid cancer is growing.

Further reasons and risk factors for **thyroid nodules**:³⁴

- Radiation or X-ray therapy in the neck area
- Autoimmune diseases, like type I Diabetes mellitus
- Pregnancy, menopause
- You are over 50 years of age
- Family members who suffer from thyroiditis
- Down syndrome or Turner's syndrome
- You are of Caucasian or Asiatic descent

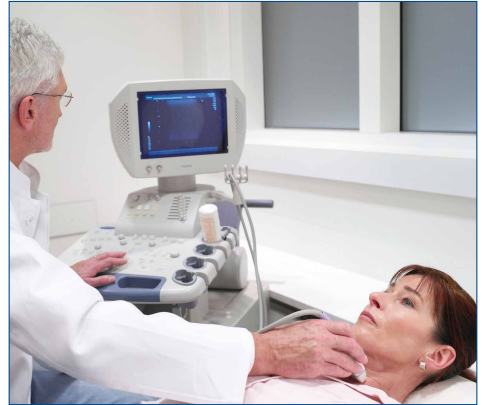
Goiter and Nodules –

Diagnosis of goiters and thyroid nodules^{35 35}

To diagnose a **goiter**, your doctor will initially perform a simple physical examination in which he/she can determine whether the thyroid is enlarged, or larger nodules are present. From the results of the subsequent blood test to determine the concentration of TSH (thyroid-stimulating hormone), he/she can determine whether the thyroid is functioning normally – or if the goiter has formed due to hypothyroidism or hyperthyroidism. Another element of basic diagnostics – to determine the actual size of the nodules and/or the thyroid – is ultrasonography (an ultrasound examination). This examination is completely painless.

Just as the diagnosis of a goiter, the diagnosis of **thyroid nodules** can also involve measures beyond the physical examination and the blood test. Ultrasonography indicates the actual size of the nodules and/or the thyroid. In fact, most thyroid nodules only become recognisable in the course of the ultrasound examination, since thyroid nodules can be hard to be determined during a physical examination.³⁷

The so-called thyroid scintigraphy is required for all **nodules**, which appear to have a minimum diameter of 1 cm. The patient will receive a capsule or a liquid containing weak radioactive iodine, which accumulates in the thyroid. On the gamma-camera monitor, the radiologist can see whether the nodule has absorbed any more or less iodine



than the rest of the thyroid tissue. If certain regions of the thyroid illuminate in “warm” colours such as red or yellow, that points to a “hot” nodule. If the colours are rather “cold” (blue or violet), then a cold nodule is present.

In general, **thyroid dysfunction** can go undiagnosed in many patients for quite a long time, since the symptoms don't clearly point to this potential cause. A current episode of depression, a pregnancy or menopause can mask the signs of such dysfunction. Therefore, if you experience any symptoms, which may point to hyperthyroidism or hypothyroidism, have a blood test done at your doctor's clinic. Based on these results, the TSH concentration can be detected – which in turn indicates any potential dysfunction.

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Treatment of goiters and thyroid nodules

The treatment of goiters and thyroid nodules is well-established and highly effective.

Treatment of goiter³⁸

The primary aim of goiter treatment is its shrinkage. If the growth is not considered to be malignant or due to nodules, treatment of the goiter can be performed with iodine, levothyroxine (a thyroid-hormone preparation) or a combination of both. When the occurrence of a malignant growth in the thyroid is detected, the whole thyroid gland should be removed via surgery and if a goiter causes immense discomfort the thyroid gland can be partially/completely removed. For some patients, radioiodine therapy can be a viable option as well. Following surgery or radioiodine therapy, treatment with substitution therapy (levothyroxine) is required to replace the lacking thyroid hormone production.

Treatment of nodules³⁹

This therapy is always based on the type and size of the nodule and varies among individual affected persons. In some cases, regular observation of the nodule's growth is the only necessary measure. For nodules which occur due to an iodine deficiency, treatment with iodine tablets, alone or in combination with levothyroxine can be effective. When nodules are accompanied by hyperthyroidism (for instance, as in the case with "hot" nodules), additional medication can be applied to reduce thyroid hormone production. For "hot" nodules, therapy with the radioactive form of iodine (a natural trace element) is an option. As in the treatment of goiters, the following applies likewise to nodules: If the nodule is considered to be malignant (or if the nodules cause immense discomfort), the nodules



should be removed or the thyroid gland itself can be partially/completely removed via surgery. Following such a procedure, treatment with substitution therapy (levothyroxine) is required to replace the lacking thyroid hormone production.

Treatment of hypothyroidism

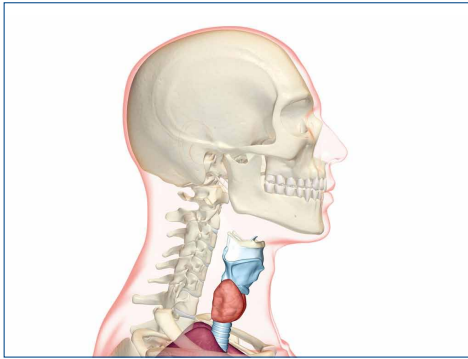
As there is no cure for hypothyroidism, the aim of treatment is to replace the missing thyroid hormone in the body. Taken daily, levothyroxine, which is synthetically produced thyroid hormone, should enable patients to live a symptom free life. This medication has been used very successfully since the 1950s. However, it is important to remember that treatment is a lifelong commitment and medication has to be taken every day even when symptoms are under control.

Once your correct dose of levothyroxine is found by you and your doctor, you will probably have a check up just once or twice a year. However, it is advisable to see your doctor more frequently if any changes in your condition occur.

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Treatment of hyperthyroidism

The treatment of hyperthyroidism is more complex. You can have surgery to remove a part or all of the thyroid gland or use radioactive iodine therapy to destroy cells in the thyroid gland. Both treatments are likely to result in you developing hypothyroidism. Alternatively doctors can block the thyroid hormone production with antithyroid drugs. Antithyroid medication can be very effective, but there may be side effects. Your doctor can explain the advantages and disadvantages of these treatments to help you weigh up your options.



Living with a thyroid disorder

For many people, the diagnosis “goiter” and/or “thyroid nodule” or “thyroid dysfunctions” can mean relief. Others, in turn, face this diagnosis with mixed emotions; this disorder can cause depression, and they lack the energy to follow through with treatment.

Be aware of this at all times: Thyroid disorders can be very effectively treated. Even so, you must certainly be patient with any treatment method before you can in fact benefit from a given therapy. In the course of treatment with medication(s), it may take several months for your doctor to optimise the dosage. Most thyroid disorders do not manifest themselves from one day to the next – the effectiveness of the therapy likewise takes time to become noticeable. Give yourself (and the treatment) some time. You will see: The effort is worthwhile. You will feel better than you have felt in quite a long time.

The most important tips

Take care of your body ...

The same principle, which applies to other illnesses, is likewise relevant to all types of thyroid disorders: Know the initial signs and take them seriously. The earlier a thyroid disorder is diagnosed, the earlier an appropriate therapy can be initiated – and the higher the chance of successful treatment.

Talk about it ...

If you are diagnosed with a thyroid disorder, you should talk to your family and friends about it in order to gain their support. Also, since thyroid dysfunction occurs cumulatively in some families, it is recommended that close relatives have their thyroid-hormone levels checked (if symptoms are present).

Get the message through ...

- Bring your partner to your next medical check-up so that he/she can understand what you are going through.

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- Prepare for your next visit to the doctor by writing down questions that you have about your thyroid disorder.
- If you must consult a specialist due to your thyroid disorder, then ask the doctor to send a copy of the medical examination results to your family doctor.
- In your wallet or handbag, carry a note indicating the details of your disorder, any prescribed medication and your attending doctor's contact information.

Iodine: Know the facts

Numerous thyroid disorders such as goiter, nodules and hypothyroidism are mostly attributable to an iodine deficiency. That's why daily intake of iodine is the best (and simplest) method of prevention. In times of increased iodine requirements (e.g. during pregnancy and nursing), the additional intake of iodine tablets is recommended in order to ensure sufficient supply.

How much iodine for whom?

The International Council for the Control of Iodine Deficiency Disorders (ICCID), the World Health Organisation (WHO) and Unicef have issued the following RDA (in micrograms [μg] of iodine)^{40 41}

- for children from 0 to 7 years of age: 90 μg daily
- for children 6–12 years of age: 120 μg
- for those > 12 years of age: 150 μg
- for pregnant and nursing women: 200 μg

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Iodine content of various foods

Fish and other seafood ***Iodine content /100 g***

Shellfish	243 µg
Cod	170 µg
Common mussels	130 µg
Shrimp	130 µg
Oysters	58 µg
Sole/plaice	53 µg
Halibut	52 µg
Tuna	50 µg
Herring	39 µg
Salmon	34 µg
Perch	4 µg
Eel	4 µg
Rainbow trout	4 µg
Carp	2 µg

Grain products

Rye bread	8.5 µg
Oatmeal	5.9 µg
White bread	5.8 µg
Rice	2.2 µg

Vegetables

Spinac	12 µg
Radishes	8 µg
Salad cucumber	1.9 µg
Potato	1.5 µg

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Eggs

Iodine content /100 g

Chicken egg (whole egg)	9.8 µg
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Fruits

Apple	1.1 µg
Pear	1 µg
Cherries (sweet)	0.9 µg

Beverages

Black tea	10.7 µg
Coffee (roasted)	3.3 µg

Milk

Mother's milk	6.3 µg
Cow milk	3.3 µg

Dairy products

Condensed milk	6.7 µg
Edamer cheese	4 µg
Yogurt	3.5 µg
Farmer's cheese/cottage cheese	3.4 µg
Butter	2.9 µg

Meats

Beef	6.8 µg
Pork	5.2 µg
Veal	2.8 µg

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Your personal hyperthyroidism checklist

If you **AGREE** with 5 or more of these statements, **tell your doctor about your symptoms**. There is a possibility that you may be suffering from hyperthyroidism.

	Yes	No		Yes	No
I feel anxious and irritable a lot of the time	<input type="radio"/>	<input type="radio"/>	I have been sweating more than usual	<input type="radio"/>	<input type="radio"/>
My hands and fingers tremble slightly	<input type="radio"/>	<input type="radio"/>	I often feel weak	<input type="radio"/>	<input type="radio"/>
My skin and hair seem to be getting thinner, and my nails are growing faster than they used to	<input type="radio"/>	<input type="radio"/>	Everything in my body seems to have speeded up, including my bowel functions and metabolism, and my weight is going down despite increased appetite	<input type="radio"/>	<input type="radio"/>
My heart rate has become quite fast	<input type="radio"/>	<input type="radio"/>	My menstrual cycle has changed	<input type="radio"/>	<input type="radio"/>
My eyes appear to be staring, or bulging	<input type="radio"/>	<input type="radio"/>			

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Your personal hypothyroidism checklist

If you answer 5 of these questions with **YES**, *tell your doctor about your symptoms*.
There is a possibility that you may be suffering from hypothyroidism.

	Yes	No		Yes	No
I feel tired and sleepy most of the time, with little energy and stamina	<input type="radio"/>	<input type="radio"/>	I notice a lot of negative thought and feel depressed	<input type="radio"/>	<input type="radio"/>
My brain works less efficiently, my thinking is foggy, my concentration and memory are poor	<input type="radio"/>	<input type="radio"/>	My motions and reflexes have become slow	<input type="radio"/>	<input type="radio"/>
Everything in my body seems to have slowed down, including my bowel functions and my metabolism, and my weight is going up	<input type="radio"/>	<input type="radio"/>	I feel stiffness and aches in my muscles and bones as well as a numb feeling in my hands	<input type="radio"/>	<input type="radio"/>
My skin and my hair have become dry, pale and puffy, my nails are brittle	<input type="radio"/>	<input type="radio"/>	My blood pressure has gone up and my heart rate is slow	<input type="radio"/>	<input type="radio"/>
I feel cold most of the time (even when other people are feeling comfortable)	<input type="radio"/>	<input type="radio"/>	My cholesterol level has gone up	<input type="radio"/>	<input type="radio"/>

For further information

If you would like any further information on thyroid dysfunction, please visit these following websites:

www.thyroidweek.com www.thyroid-fed.org

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