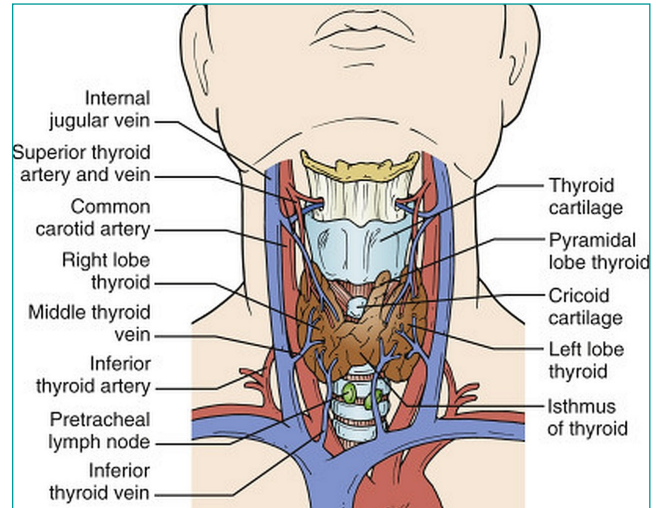


## 22.5. GLANDULA THYREOIDEA

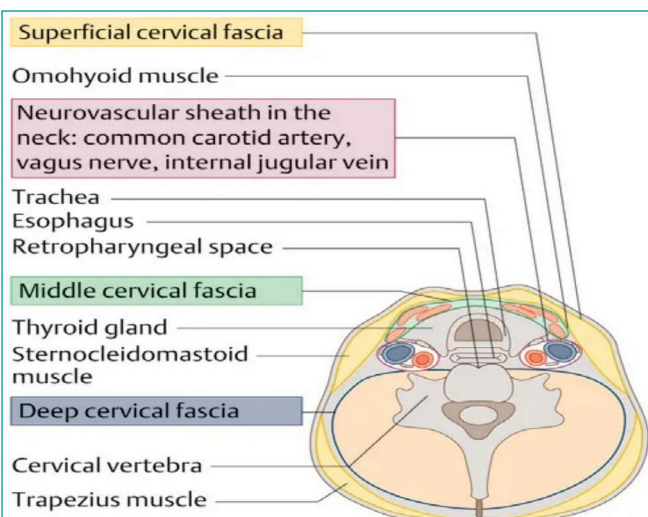
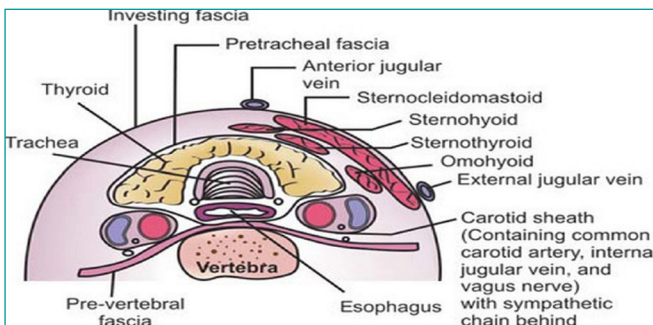
Transformer between physical and psychological regulations.

### 22.5.1. Anatomy Glandula Thyroidea

- Consists of two lobes and an isthmus (tissue bridge).
- Is encased in an organ fascia and subdivided by connective tissue.
- The gland consists of bladder-shaped follicles, filled with colloid, and loose connective tissue.
- Between the follicles are groups of lighter parafollicular C-cells (Calcitonin).



### 22.5.2. Surrounding, Fascia & Ligaments Glandula Thyroidea

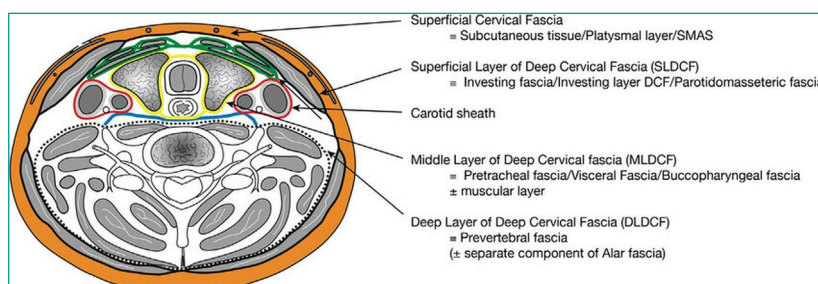


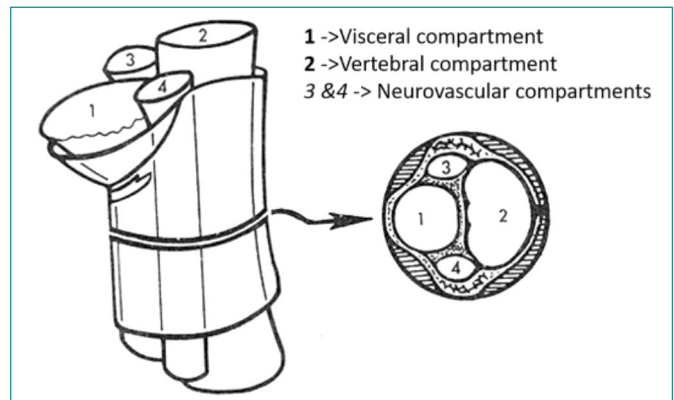
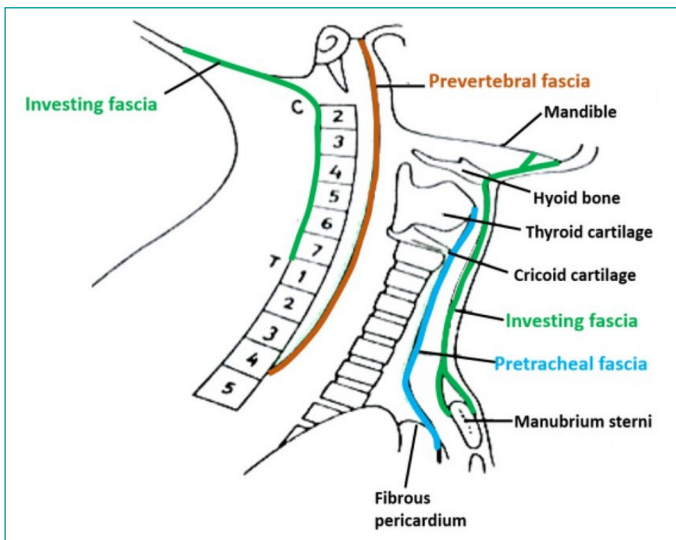
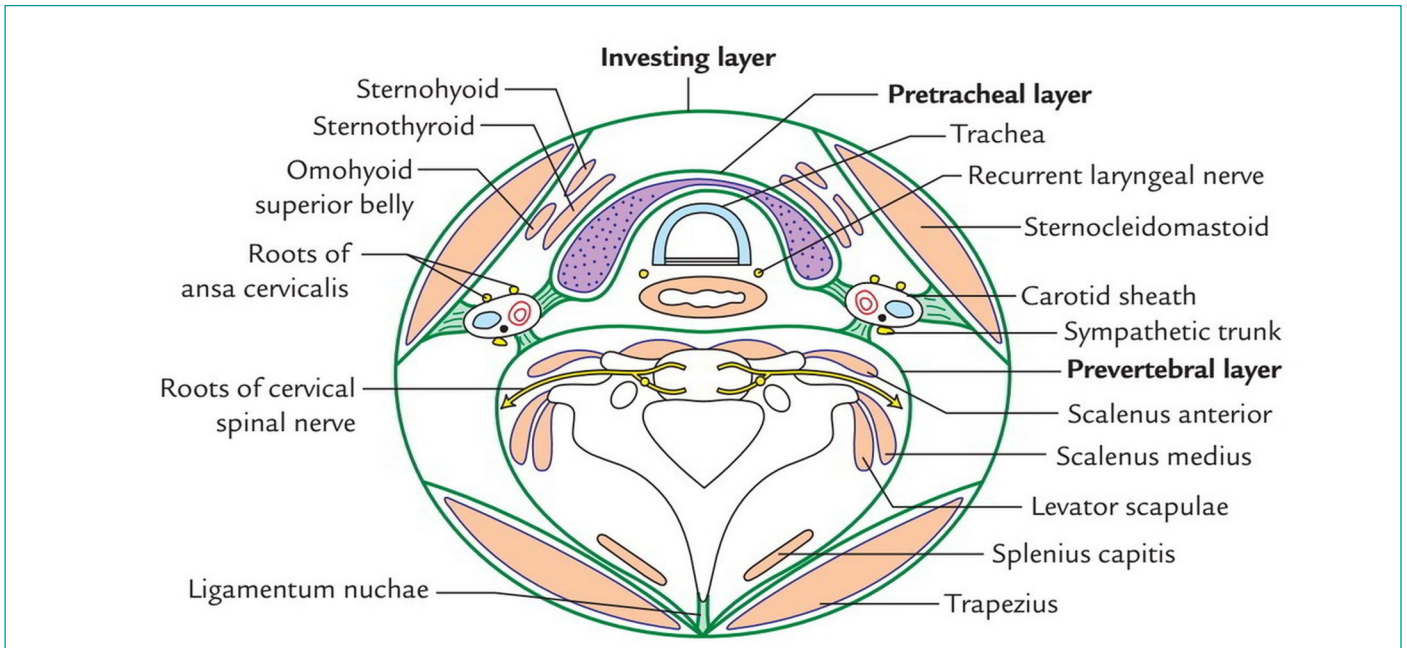
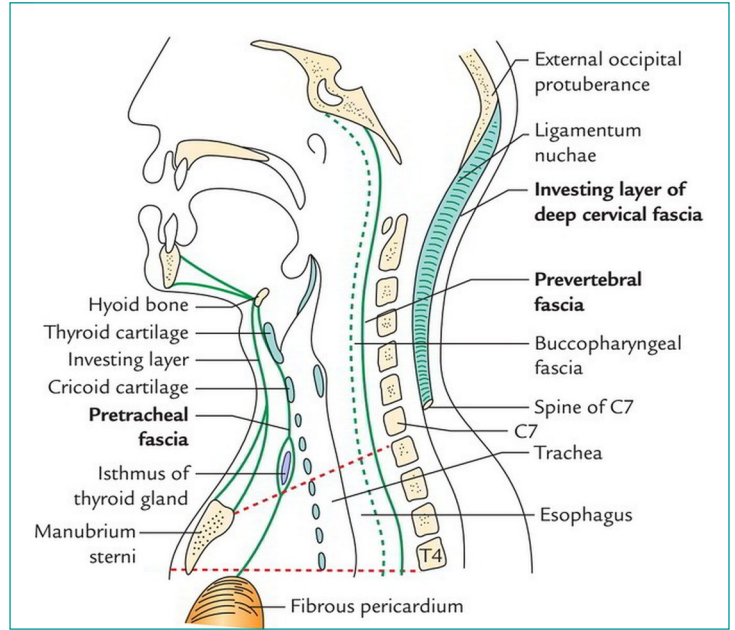
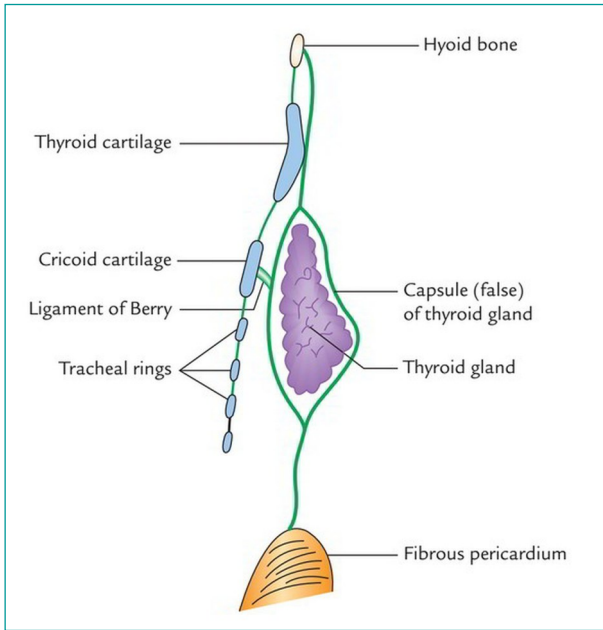
*From an osteopathic perspective, fascia are important:*

- *Fascia Superficialis (neck).*
  - *Fascia pre-trachealis (via the hyoid bone to the Pericardium).*
  - *Fascia pre-Vertebralis Cervicalis.*
- In addition, several muscles play a role:*
- *M. Omohyoidus.*
  - *M. Sterno-Cleido-Mastoideus.*
  - *Mm. Infrahyoid.*

*The fascia pre-Vertebralis runs from the Foramen Magnum (anterior) to the front of T<sub>3</sub>. The space dorsal of this, is the pre-vertebral space, the space ventral the retro-pharyngeal space.*

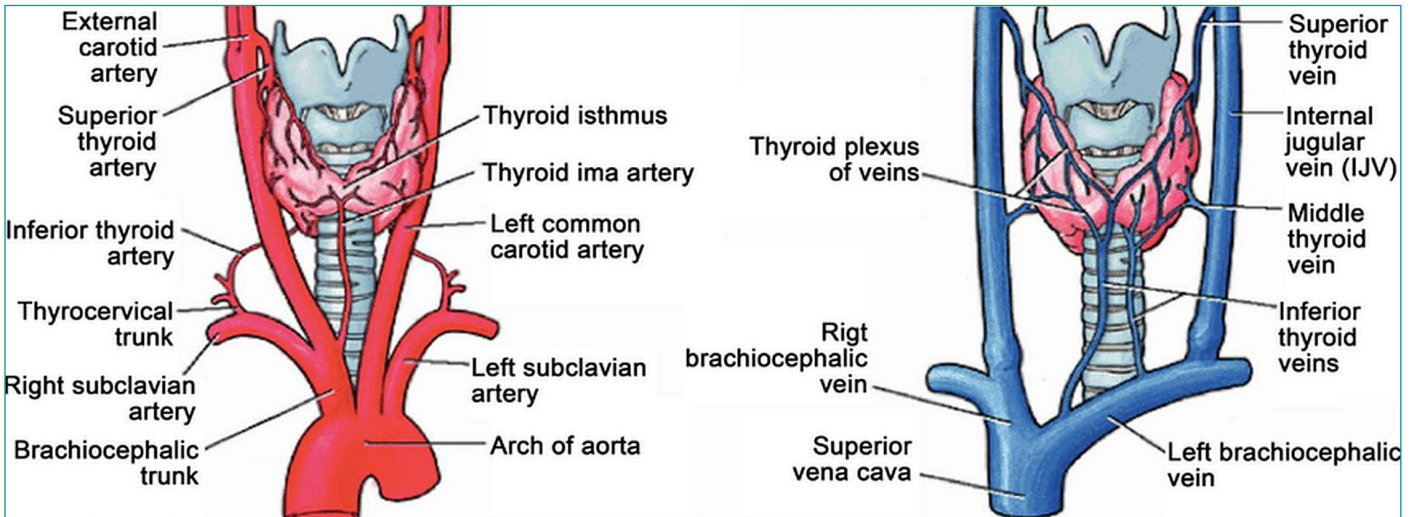
*The thyroid gland must be free in its fascial play area in order to perform its function optimally. In addition, the Glandula Thyroidea must be able to keep up with all cervical movements and especially when swallowing (300 times a day).*





**Osteopathy in the Visceral Field**

Part 4: from Endocrinology via Diaphragmata up to BBRs.  
 22. Endocrinology. 5. Gl. Thyroidea.



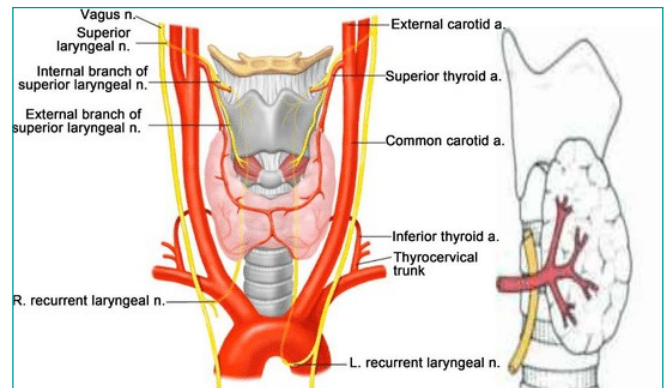
**22.5.3. VLAN Glandula Thyroidea**

*Vascularisation:*

- A. Thyroidea Superior out of the A. Carotis Externa.
- A. Thyroidea Inferior out of the A. Subclavia.
- V. Thyroidea Superior towards the V. Jugularis interna.
- V. Thyroidea Inferior towards the V. Brachiocephalica sinistra.
- Lymph drainage towards the deep and pretracheal lymph-gangliae.

*Innervation:*

- PΣ: N. Laryngeus Recurrens (out of N.X).
- OΣ: Gg. Cervicalis medialis and superior, these form the pre-visceral Thyreoid-plexus.



**Intermezzo N. Vagus:**

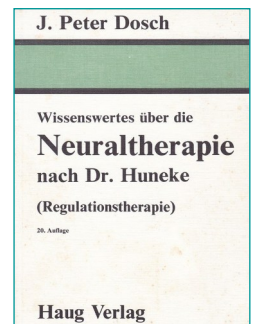
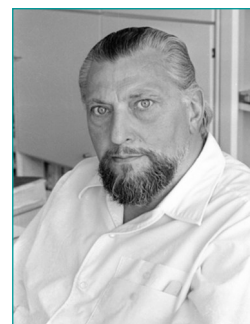
*It is interesting to consider that most nerves are afferent (80%), especially the N. Vagus and therefore also the N. Laryngeus Recurrens.*

*With that, the Glandula Thyroidea, in addition to its physiological function, could have a nervous influence on the heart, digestion and many other things.*

**History of the nerval glandula Thyroidea:**

*Dr. Peter Dosch already spoke about this in 1978 in his book on Neural Therapy. He called the phenomenon "the nerval thyroid," which symptoms show long before it becomes a manifest disorder.*

*The 'nerval thyroid' can be in both hyper- and hypofunction. The symptoms are similar to the pathological representations, but nothing is found clinically.*



### 22.5.4. Brief Physiology Glandula Thyreoida

The follicles produce the thyroid hormones, the para-follicular cells produce Calcitonin.

#### \* Triiodothyronine (T<sub>3</sub>) and Thyroxine (T<sub>4</sub>).

They promote protein synthesis in the cytoplasm and enzyme activity in the mitochondria (oxidative degradation). Their influence therefore mainly concerns the basal metabolic rate.

*Stimulation:* TSH from the pituitary gland, thermosensory centers in the hypothalamus (TRF) and limbic system.

*Inhibition:* T<sub>3</sub> and T<sub>4</sub> in blood (-feedback) and limbic system.

15 times as much T<sub>4</sub> is produced as T<sub>3</sub>, but the effectiveness of T<sub>3</sub> is 5-10 times stronger.

Both hormones, coupled with protein, are stored as thyroglobulins in the colloid. Under the influence of TSH, both hormones are released from the storage form.

Switching off T<sub>3</sub> and T<sub>4</sub> reduces the basal metabolic rate to about 50%; An excess can double the basal metabolic rate. T<sub>3</sub> and T<sub>4</sub> also increase the effect of adrenaline and norepinephrine. In addition, they affect the myelination of nerve tissues, especially neurovegetative.

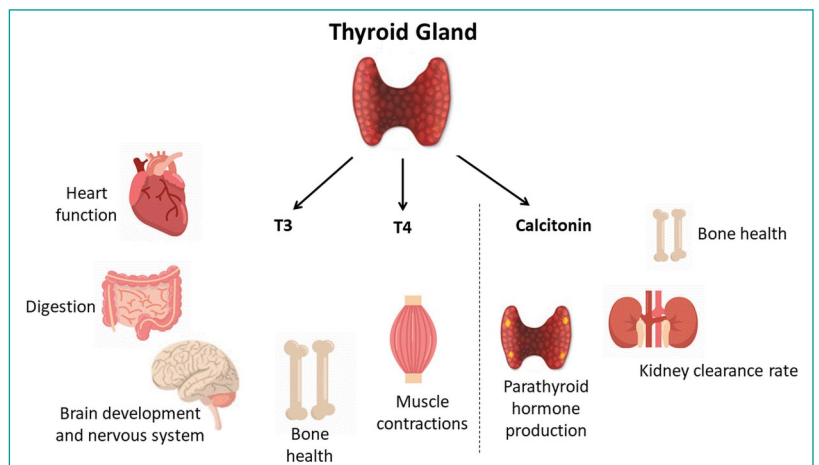
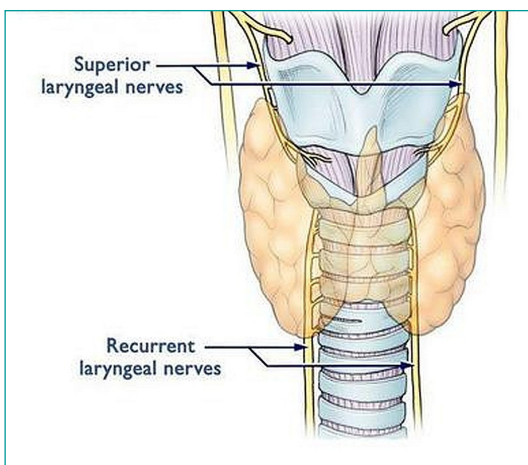
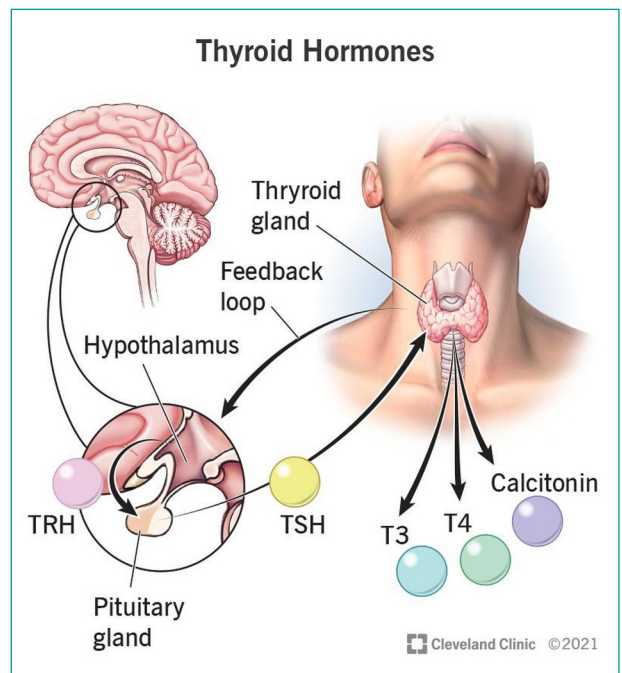
In the tissues:

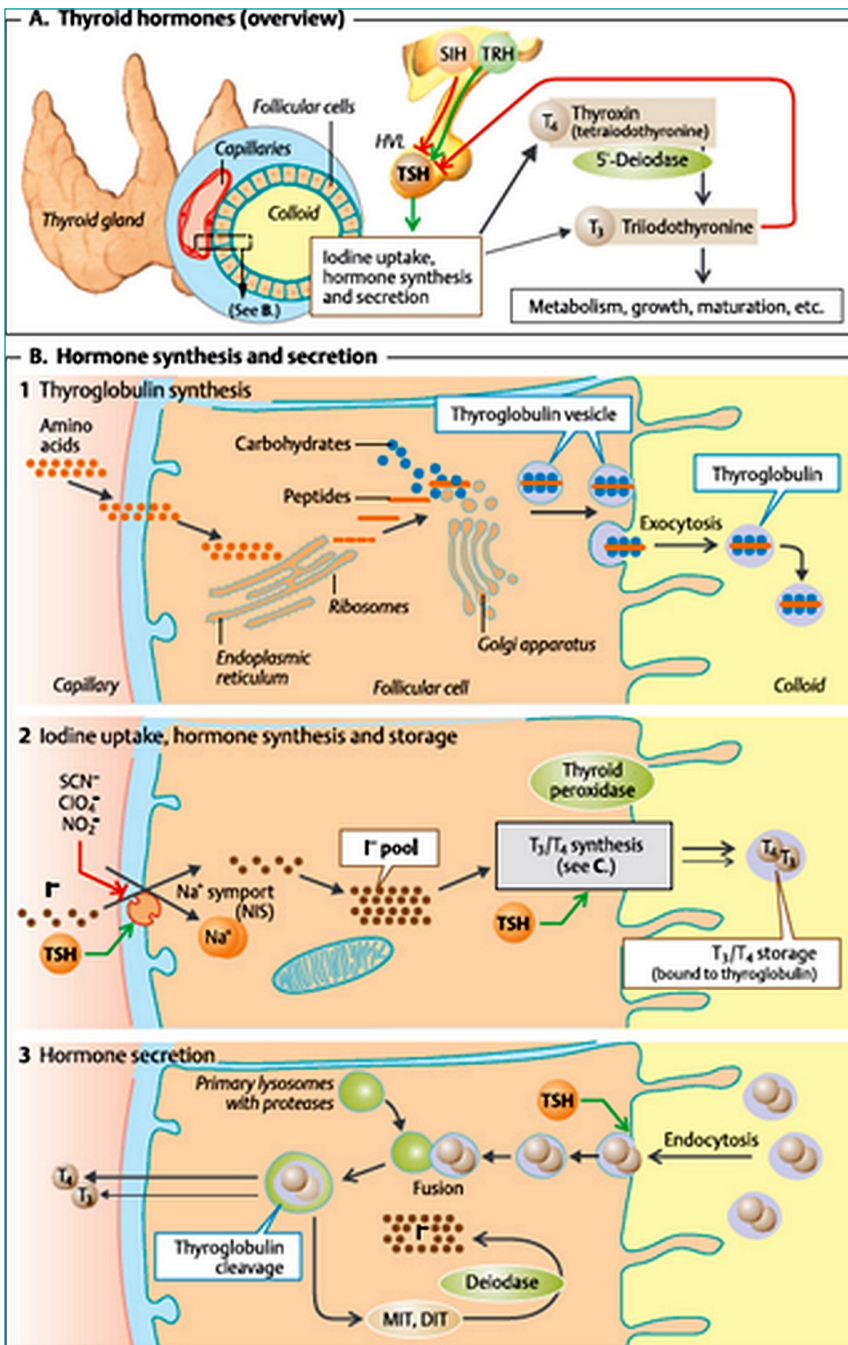
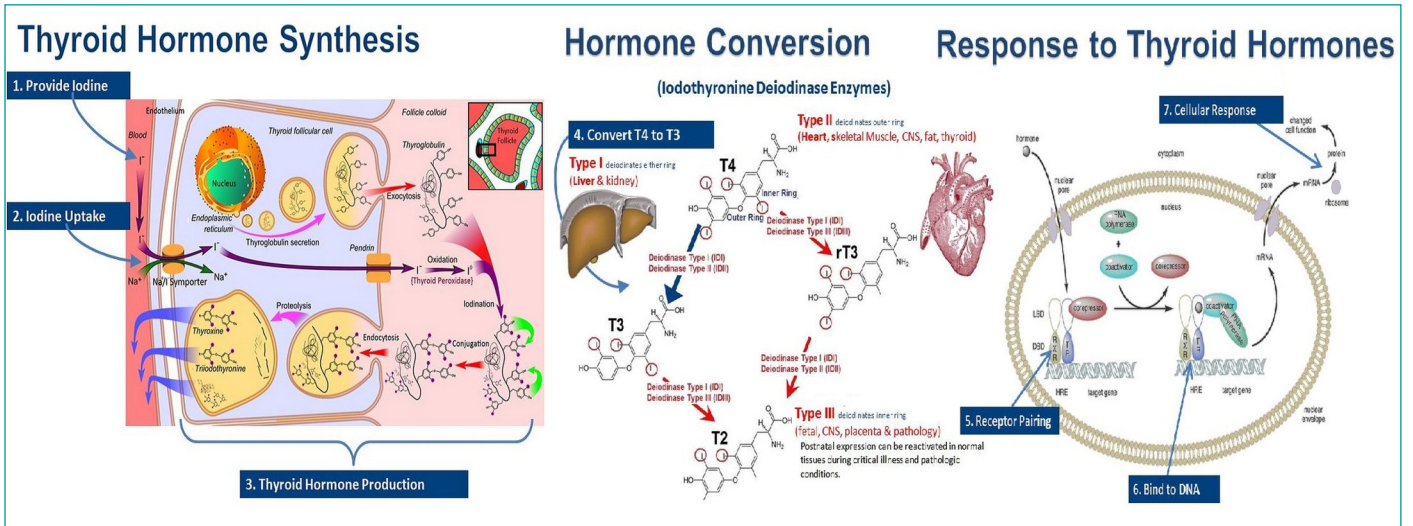
- synthesis of enzymatic proteins.
- glycogenolysis and glycogenesis → hyperglycaemia.
- fat metabolism and cholesterol breakdown.
- water and ion metabolism → diuresis.

Iodine metabolism plays a major role in these hormones:

- \* Absorption: through food, drinking water, salt.
- \* Oxidation: I → I<sub>2</sub>.
- \* Iodination: Fixation of I<sub>2</sub> + amino acid → Tyrosine.

The hormone Calcitonin is discussed at the glandule Parathyroidea.





**Sources:**

- Silbernagl, S., Despopoulos, A., Taschenatlas Physiologie, ISBN 978 313 2410 305, Thieme Verlag, 2003.
- Collins, Joseph, ND, phytotherapeutic support of Thyroid function, Nutri-News, Douglas Laboratories, 2007
- Hormones produced by the thyroid gland, Hormones Australia, endocrine society of Australia, 2020.

### 22.5.5. Brief Pathology Glandula Thyreoidea

#### Goiter (= enlarged thyroid gland)

In a goiter, the function of the thyroid gland can be increased, normal or decreased (hyperthyroid, euthyroid and hypothyroid goiter).

The thyroid gland can be enlarged evenly or "knobby" (diffuse and multinodular goiter).

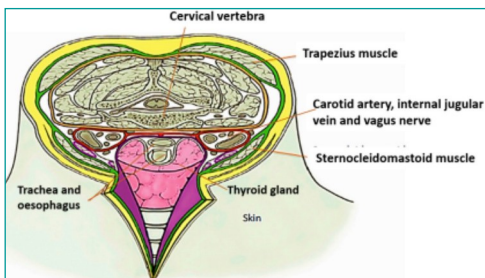
In principle, treatment of a goiter is only necessary if:

- there are (mechanical) complaints: pressure on the Trachea; pressure on the vocal cord nerve;
- it may be a carcinoma.



#### **Intermezzo struma:**

*In certain regions, the endemic goiter (= congenital goiter) occurs: because the diet contains too little iodine, too little thyroid hormone is produced in the body, which increases TSH production and thus the growth of the thyroid gland. When this happens during pregnancy, the unborn child already develops a goiter.*



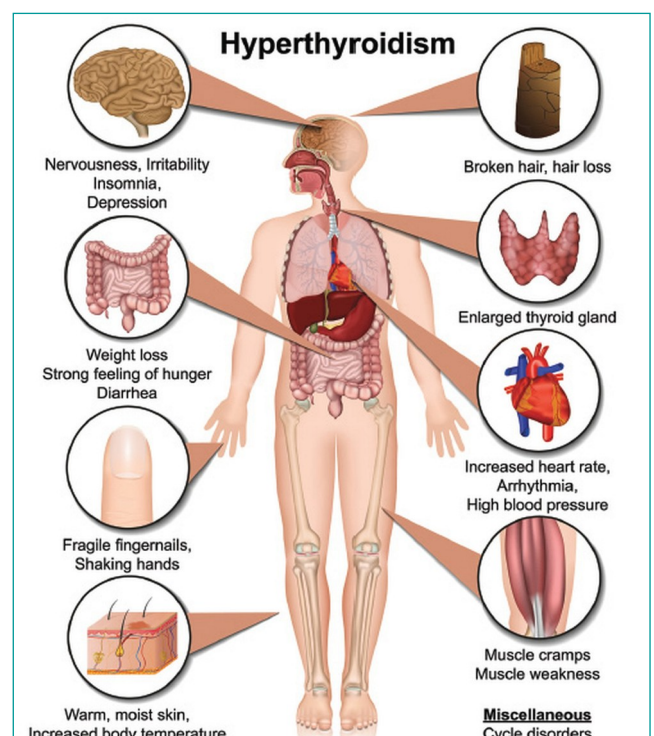
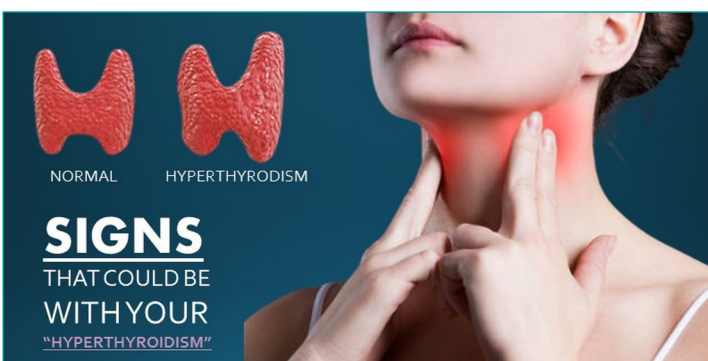
**From an osteopathic perspective, in some cases we can do something about the goiter or thyroid disorder.**

*As mentioned on the previous pages, the function of the thyroid gland is highly dependent on the surrounding fascia and muscles. The thyroid gland must be free in its fascial play area in order to perform its function optimally.*

#### Hyperfunction (hyperthyroidism or thyrotoxicosis)

Hyperfunction of the thyroid gland can have several causes:

- Graves-Basedow disease;
- Plummer's disease;



## Graves' disease

### Introduction

This autoimmune disease is very common, especially in women between the ages of 20 and 40. The hyperthyroidism is caused by the presence of Thyroid-stimulating immunoglobulin (TSI).

*Symptoms:* three symptoms occur:

1. Symptoms of hyperthyroidism: all metabolic processes in the body are accelerated:

- ◇ tachycardia; atrial fibrillation may be present in the elderly, often with decompensatio cordis;
- ◇ increased sweat secretion;
- ◇ frequent defecation;
- ◇ nervousness, tense and agitated;
- ◇ red skin;
- ◇ accelerated breathing;
- ◇ slightly higher temperature and cannot withstand the heat;
- ◇ emaciation despite good appetite;
- ◇ tremor;
- ◇ fatigue;
- ◇ muscle weakness;
- ◇ hypo- or amenorrhea (in women).

2. diffuse goiter;

3. Infiltrative ophthalmopathy:

- ◇ suffer from light shyness, burning and tears in the eyes;
- ◇ swollen eyelids;
- ◇ bulging eyes (exophthalmos), so that the eyes can sometimes no longer be closed → danger of dehydration;
- ◇ partial paralysis of the external eye muscles.

*Examination:* further investigation may confirm the suspicion:

a. blood test (the most important additional test):

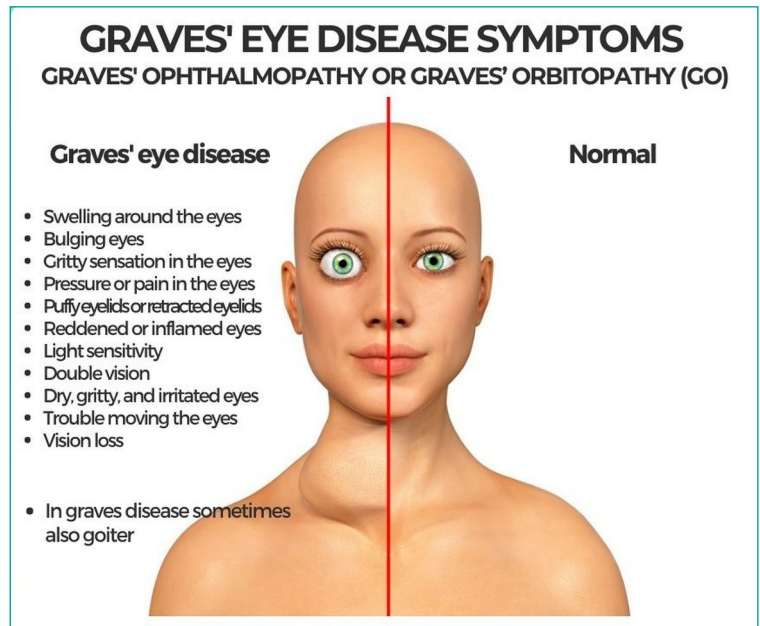
- ◇ T4 (and T3) increased; in particular the free (not protein-bound) part is important (→ also determine the TBG (transport protein));
- ◇ TSH very low to immeasurable.

b. thyroid scintigraphy (using injected radioactive technetium):

- ◇ in a multinodular goiter, the distribution of the radioactive substance is very uneven;
- ◇ in a "hot nodule" the radioactive substance accumulates in one place.

c. If there is still doubt:

- ◇ TSH test: synthetic TRH is administered which, under normal conditions, stimulates TSH production, except in the case of hyperthyroidism.

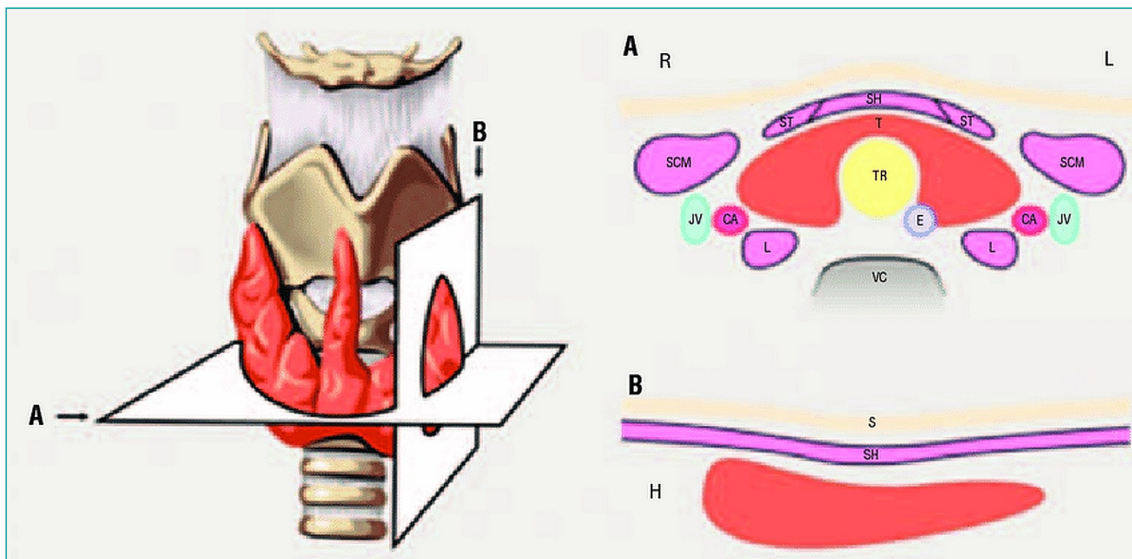


*Therapy:*

- treatment of the eye symptoms: difficult, almost impossible treatment: symptomatic measures (dark glasses, artificial tears, covering during the night, possibly corticosteroids);
- Stopping excessive secretion of thyroid hormone: 3 possibilities:
  - ◊ medicamentous (preferred): antithyroid drugs (such as carbimazole), initially often combined with propranolol (beta-blocker); 2-6 weeks later followed by thyroxine substitution for about a year, after which there is a definitive recovery or a switch to:
  - ◊ administration of radioactive iodine; Because the final effect only occurs after about 6 months, drug treatment with thyroid drugs is necessary for the first time. Risks: hypothyroidism. Pregnancy is a contraindication;
  - ◊ In the case of the existence of a large goiter, a subtotal strumectomy is generally preferred. Before surgery, the patient is given propranolol to avoid the effects of the thyroid hormone that enters the circulation during surgery. After surgery, the chance of a recurrence is about 10%, which is then treated with radioactive iodine.

*Complications of surgery:*

- \* hypothyroidism (removed too much);
- \* hypoparathyroidism (parathyroid glands removed);
- \* (life-threatening) bleeding;
- \* hoarseness due to damage to the N. Laryngeus) Recurrens;
- \* Hypofunction.



*Transverse (A) and longitudinal (B) section of the Thyroid.*

*CA-carotid artery; E-esophagus; H-head direction; JV-jugular vein; L-long muscle of the neck; S-skin; SCM-sternocleidomastoid muscle; SH-sternohyoid muscle; ST-sternothyroid muscle; T-thyroid; TR-trachea; VC-vertebral column.*

**Source:** Ruchała, Marek & Szczepanek-Parulska, Ewelina. Thyroid ultrasound - A piece of cake?. *Endokrynologia Polska*. 61. 330-44. 2011.

### Hypofunction (hypothyroidism)

*Causes:* The causes of hypothyroidism can be:

- primary hypothyroidism: the cause is located in the thyroid gland itself (congenital anomalies; thyreoiditis; subtotal strumectomy and treatment with radioactive iodine);
- Secondary hypothyroidism: The cause is insufficient stimulation of the thyroid gland (possibly due to panhypopituitarism due to pituitary tumors, pituitary bleeding, pituitary surgery or idiopathic).

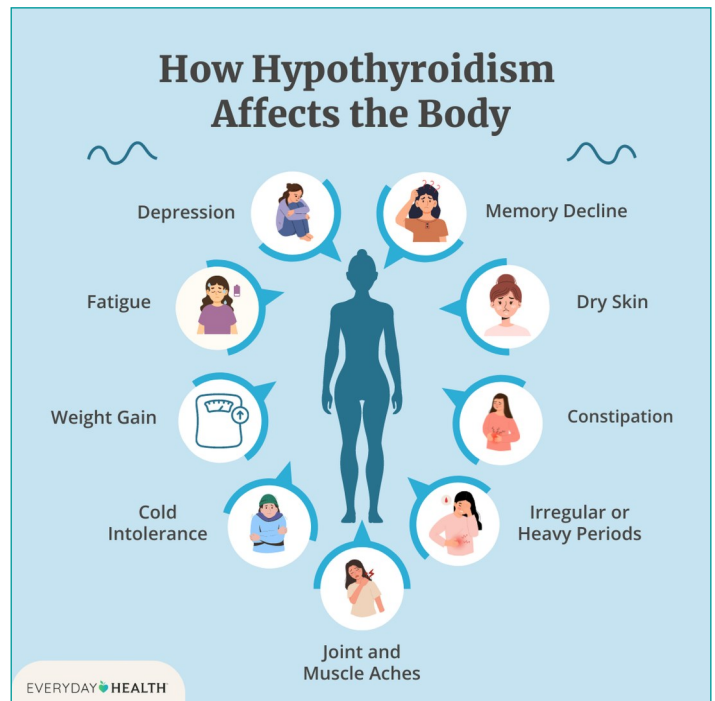
The secondary form is less common than the primary form.

#### *Symptoms hypofunction*

Congenital hypothyroidism gives rise to the clinical picture of cretinism: if the newborn is not treated quickly enough, mental retardation and dwarfism occur.

In adults, the clinical picture is often insidious:

- The most common symptoms ("aging symptoms") are:
  - ◊ coldness;
  - ◊ slowness in thinking and acting;
  - ◊ quickly tired;
  - ◊ dry skin and hair;
- crackling, slow and low voice;
- bradycardia;
- constipation;
- in severe cases: myxedema (not true edema!);
- yellow face with swollen eyelids;
- possibly overweight;
- sometimes deafness, tinnitus and dizziness;
- menstrual disorders such as hypermenorrhoea;
- rapid arteriosclerosis.



#### *Examination hypofunction*

- Blood test:
- low T4 and high TSH (primary hypothyroidism);
- low T4 and low TSH (secondary hypothyroidism);
- failure of other hormones (secondary hypothyroidism);
- high cholesterol;
- when in doubt: TRH test: high TSH after TRH (primary hypothyroidism).

#### *Therapy hypofunction*

Replacement therapy with levothyroxine (Thyrax) which is built up slowly to avoid the risk of a heart attack.