ROPER ST. FRANCIS HEALTHCARE

Is it my thyroid?

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02/07/2026

Case 1

- (2020) MC is a 38-year-old female patient referred by her gynecologist for evaluation of possible Hashimoto's thyroiditis.
- History includes anxiety on fluoxetine 10 mg/day, iron deficiency due to menorrhagia and allergic rhinitis. No family history of thyroid disease and the patient has no symptoms.
- Physical exam revealed goiter, and the gynecologist ordered thyroid labs and thyroid ultrasound.
- TSH was 1.34. Free T3 2.66 (2–4.4). TPO antibody 53 (0–34).
- Thyroid ultrasound showed borderline thyroid enlargement, mildly heterogeneous parenchyma and bilateral cystic colloid nodules.
- Repeat TSH is 0.986. Free T4 1.12 (0.82-1.7). Free T3 2.8 (2–4.4). Ferritin 8.9 (30–300). Iron saturation 17% (20-40).

Case 1

What is the best next step in management?

A. Start patient on levothyroxine 25 mcg every day

B. Start patient on brand-name Synthroid 25 mcg every day

C. Start patient on liothyronine (T3) 5 mcg every day

D. Monitoring of thyroid functions and symptoms

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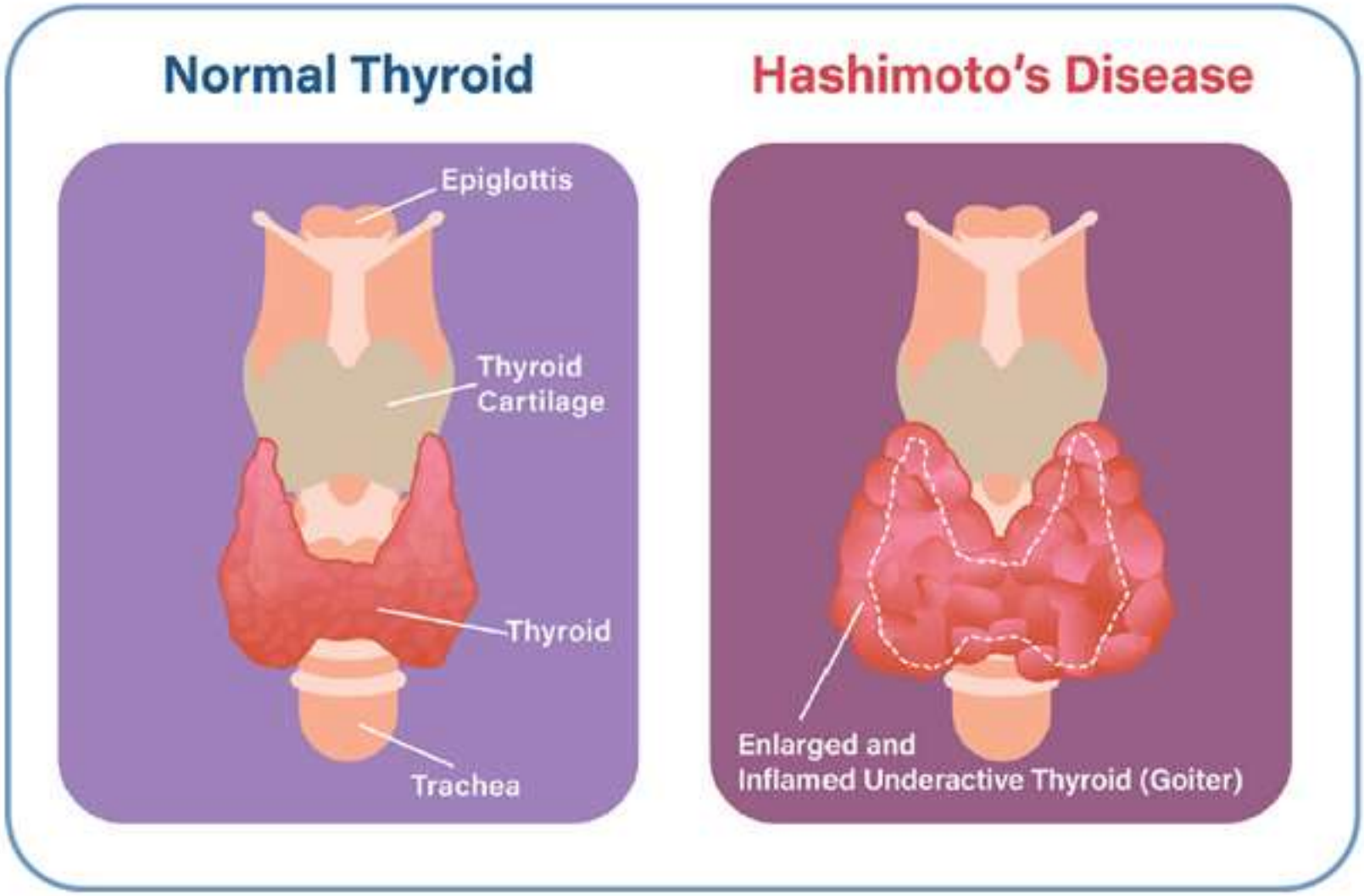
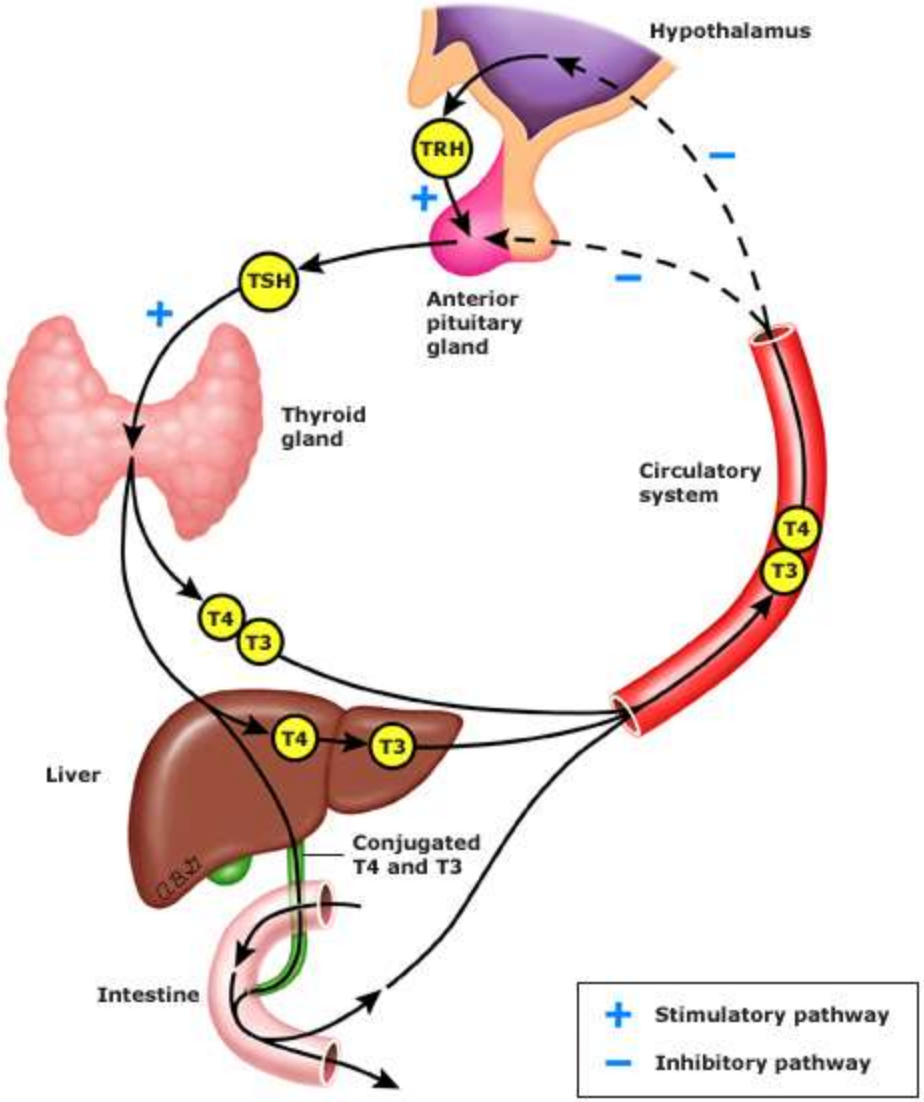
Physical exam differences in Hashimoto's thyroiditis and normal thyroid



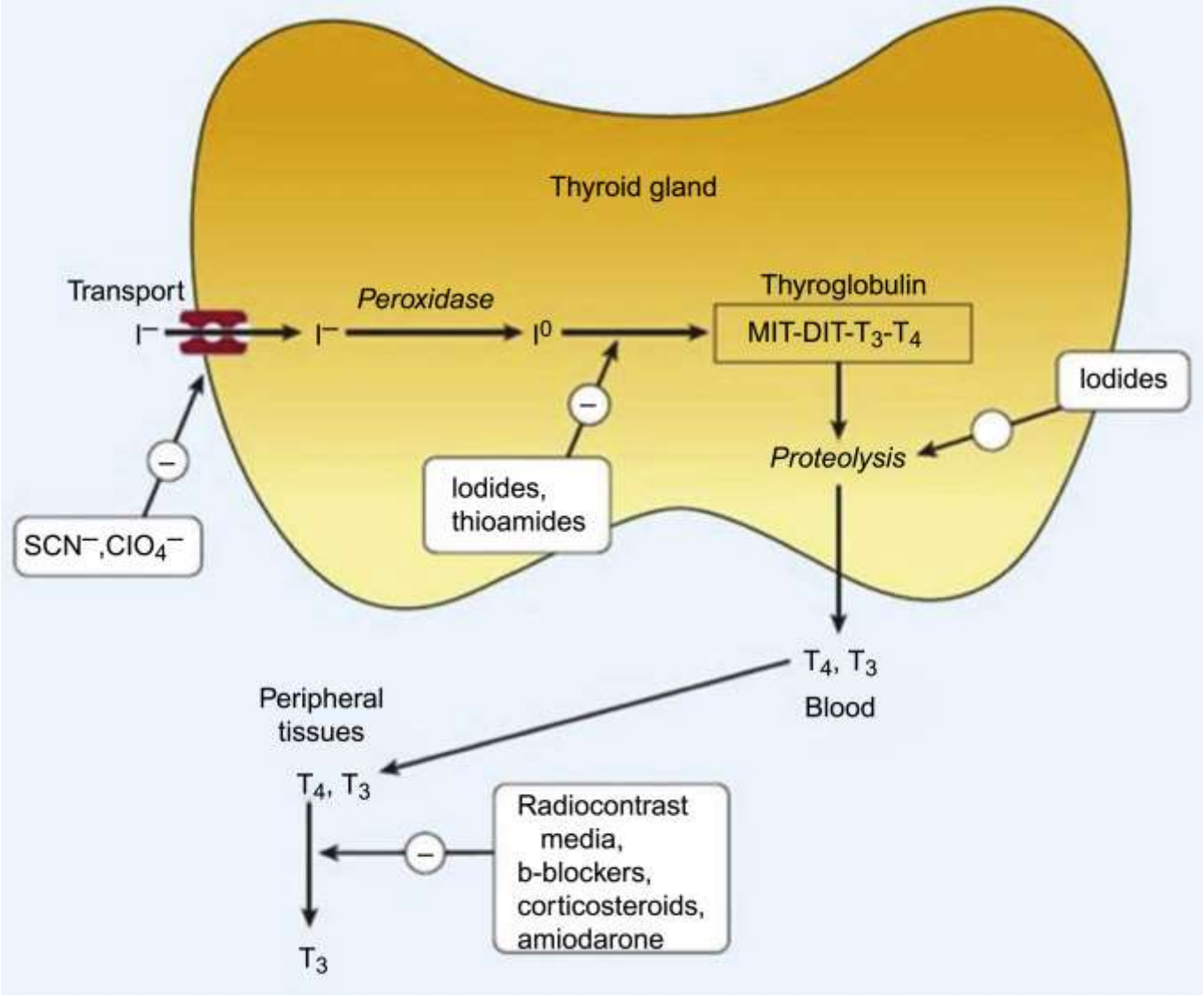
American Thyroid Association website

Thyroid hormone regulation



Adapted from Uptodate

Thyroid hormone formation



Themes UFO (2016) Thyroid & Antithyroid Drugs. Basicmedical Key. Published June 18, 2016

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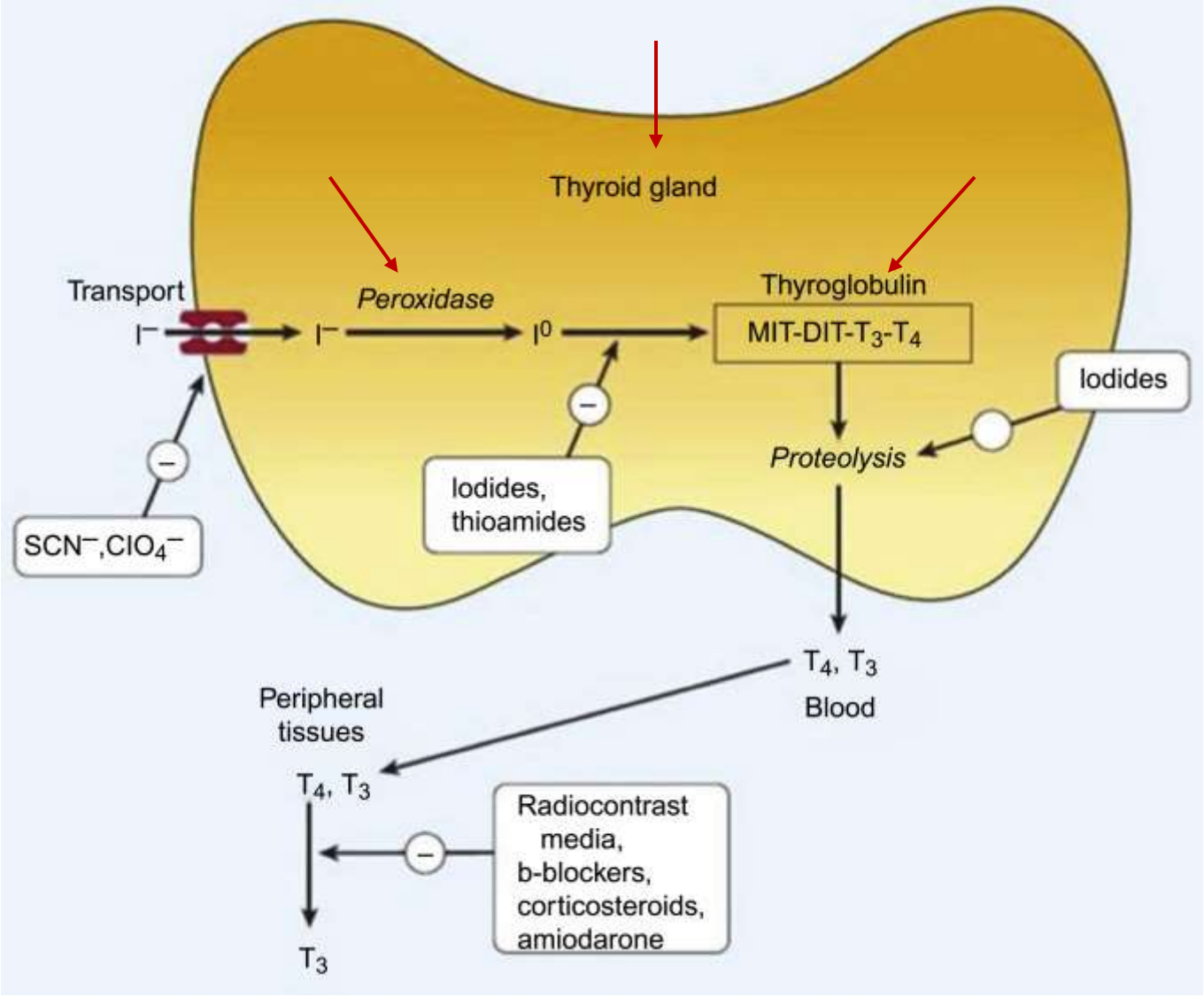

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Types of thyroid antibodies

Antibody	Target & Function	Clinical Significance
Thyroglobulin (TgAb)	Targets **Thyroglobulin**, the protein where thyroid hormone is stored.	Can interfere with Tg testing in **Thyroid Cancer** monitoring. Not essential for routine diagnosis. Not pathogenic.
Thyroid Peroxidase (TPOAb)	Targets **TPO**, the enzyme that adds iodine to thyroglobulin.	Found in nearly all **Hashimoto's** patients. Predicts progression from subclinical to overt hypothyroidism. Limited pathogenicity.
TSH Receptor (TRAb)	Targets the **TSH Receptor** on follicular cells.	**Stimulating (TSI):** Causes **Graves' Disease**. Pathogenic. **Blocking:** Can cause hypothyroidism. Pathogenic but rare **Neutral:** Binds but has no functional effect. Not Pathogenic

Types of hypersensitivity reaction

Type	Main "Player"	Timing	Common Example
Type I	IgE & Mast Cells	Seconds/Minutes	Peanut Allergy / Anaphylaxis
Type II	IgG/IgM	Variable	Rh Incompatibility
Type III	Immune Complexes	Hours/Days	Lupus (SLE)
Type IV	T-cells	2–3 Days	Poison Ivy / TB Test
Type V	Stimulatory IgG	Continuous	**Graves' Disease**

Case 1

(2026) follow-up:

The patient was followed up with yearly clinical follow-up and labs. She has remained symptom-free and thyroid levels have remained normal.

December 2025 labs:

TSH 1.79, free T4 1.03 (0.82–1.7) in December 2025

free T3 3.14 (2–4.4), TPO antibody 12 (0–34) in December 2023

Iron deficiency was treated

Patient was discharged from the endocrinology clinic for follow-up with her gynecologist.

Case 2

- (2024) NG is a 34-year-old male patient working in IT with no previous significant past medical history but with a strong family history of type 2 diabetes who was admitted to the hospital for diabetic ketoacidosis and a new diagnosis of diabetes in March 2024.
- I started him on long-acting and short acting insulin, CGM, metformin. He had labs consistent with type 2 diabetes. On clinic follow-up, started and gradually increased dose of Semaglutide with simultaneous tapering off insulin. Weight decreased from 300 pounds in March 2024 to 200 pounds in November 2024.
- On follow-up visit, routine labs showed TSH 12.1, free T4 1.15 (0.82–1.7), Hemoglobin A1c 5.3%.
- Patient had no symptoms of hypothyroidism and stated that he felt great. He noted hypothyroidism history in his mother.

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Case 2

What is the best explanation for the patient's abnormal thyroid functions?

A. The effect of rapid weight loss on thyroid function

B. The effect of semaglutide on thyroid function

C. Lab error

D. Overt hypothyroidism due to nutritional deficiency

E. Subclinical hypothyroidism due to Hashimoto's thyroiditis

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Case 2

Repeat labs show TSH 7.1, free T4 1.08 (0.82–1.7), free T3 2.67 (2–4.4), TPO antibody 64 (0–34), thyroid ultrasound showed heterogeneous echotexture with no nodules.

What is the best next step in management?

A. Order thyroglobulin antibody and reverse T3 level

B. Start the patient on levothyroxine treatment, 25 mcg/day for 2 weeks then 50 mcg/day

C. Start the patient on levothyroxine treatment 100 mcg/day

D. Start the patient on liothyronine treatment, 25 mcg/day

E. Start the patient on selenium and iodine treatment

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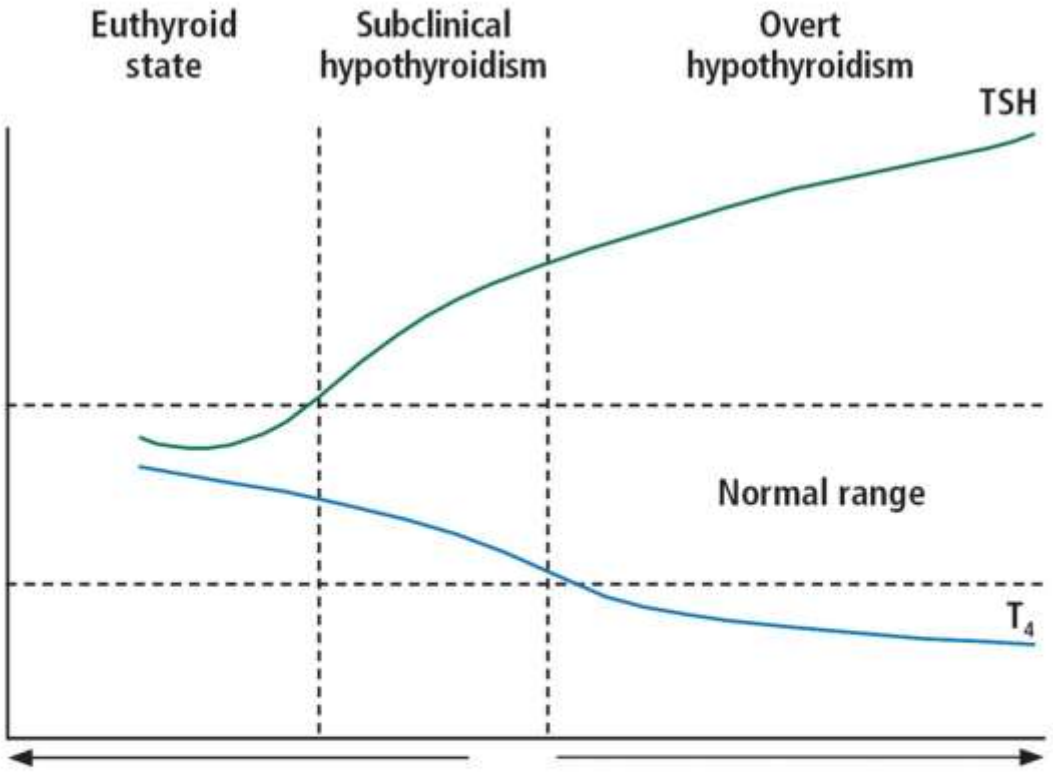
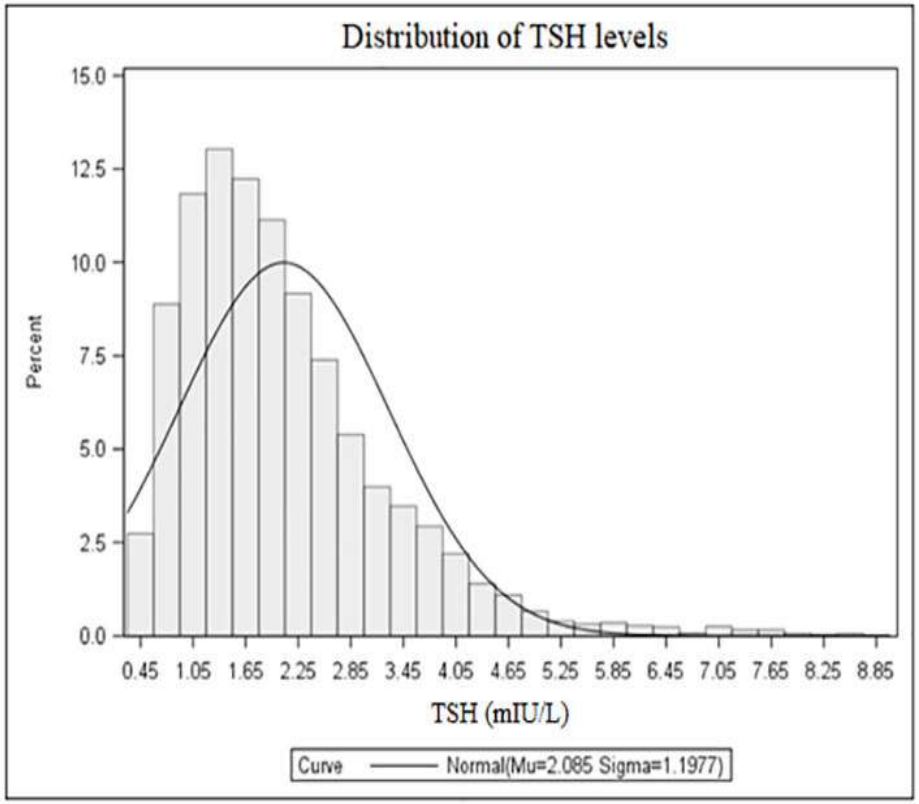
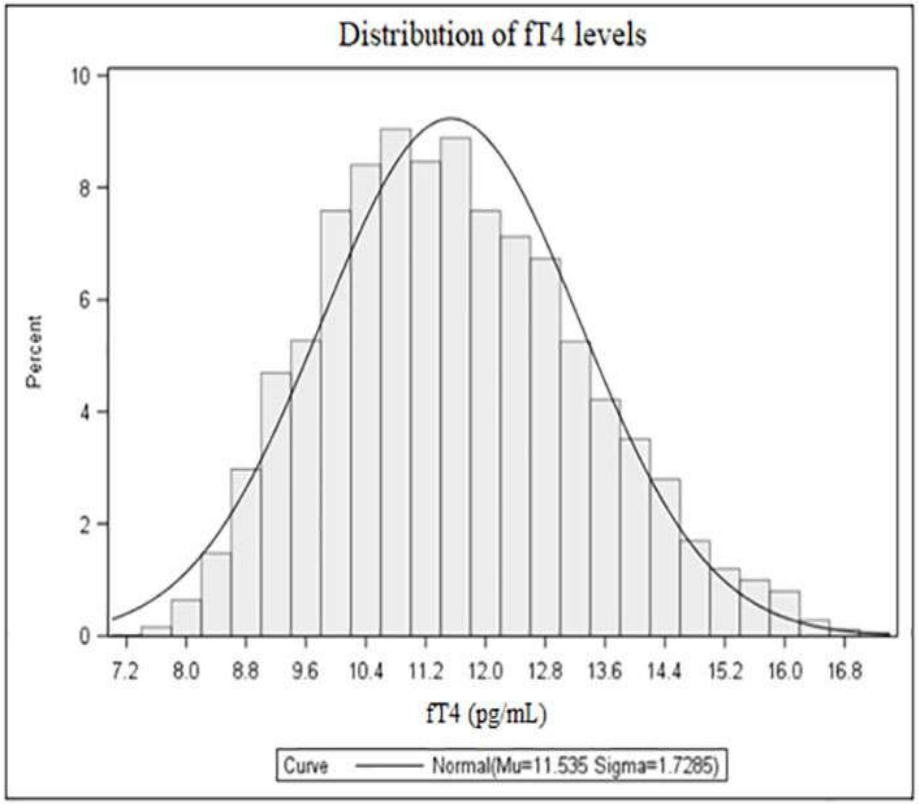
TSH and T4 levels in hypothyroidism



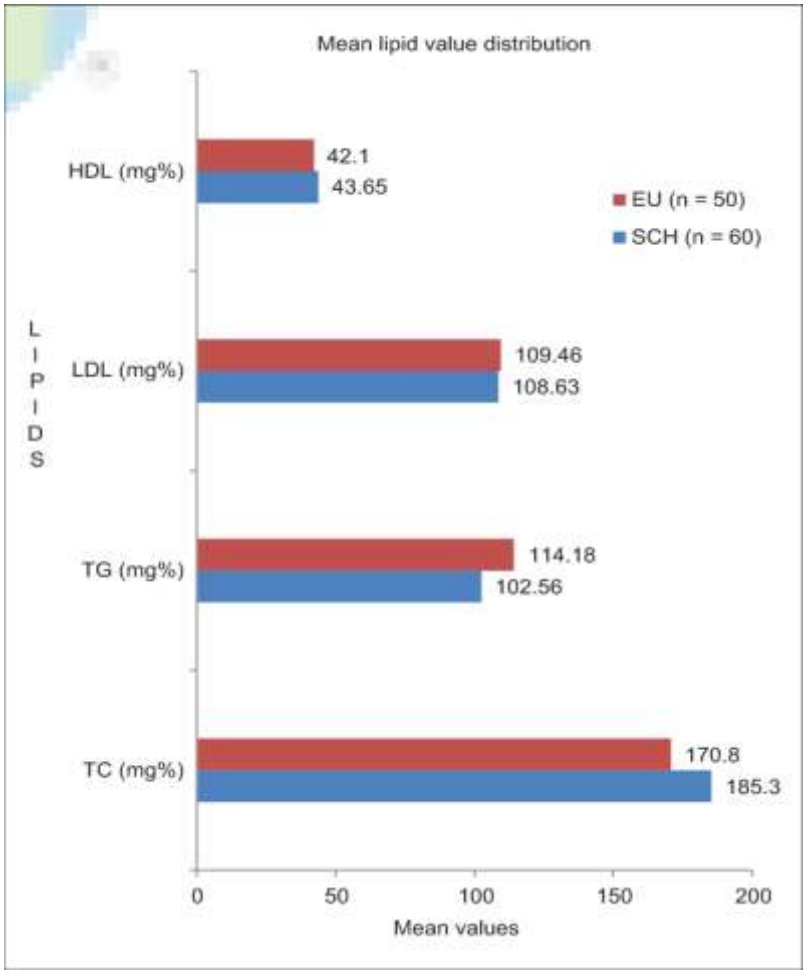
Distribution of TSH and Free T4 in euthyroid patients with obesity





Mele et al. Front. Endocrinol., 12 October 2022

Lipid levels in subclinical hypothyroidism



Risk of hypercholesterolemia in subclinical thyroid disease. Jayasingh et al. Journal of Family Medicine and Primary Care 5(4):809, 2016

Case 2

Follow-up: TSH improved on follow-up but did not completely normalize. If further increase in levothyroxine dose was made up to 75 mcg/day and on follow-up TSH was 0.7. Patient noted an improvement in his energy and focus, in retrospect. A1c, glucose and lipid panel remained under excellent control. Weight dropped 15 more pounds, down to 185.

Case 3

- (2022) MS is a 24-year-old female patient seen in a new patient visit for evaluation and management of hypothyroidism. She was diagnosed to have Graves' disease in 2014 and had total thyroidectomy after which she developed postoperative hypoparathyroidism and hypothyroidism.
- Medication regimen included levothyroxine 150 mcg daily, liothyronine 5 mcg daily and calcium 3 times day, first dose close to the thyroid hormone. She had improved on addition of T3 in the past. Her dose of thyroid hormone was frequently changed and most recently several months before her referral it was reduced from 175 to 150 mcg/day. She also has history of ADD and had been started recently on Adderall. Her only complaint is tingling of hands.
- On exam, weight 165 lbs, scar of previous thyroid surgery, no thyroid tissue palpable, mild tachycardia
- Labs: In February 2022 TSH was 0.064, free T4 1.83 (0.82–1.7), free T3 3.51 (2–4.4). Calcium level 7.9 mg/dL (8.5–10), parathyroid hormone 9.4 (15–65).

Case 3

In deciding her thyroid hormone regimen, all the following factors are important to consider except:

A. Relative potency of T4 and T3

B. Body weight and weight change

C. Interference with the absorption of thyroid hormone by other medications and supplements

D. Brand versus generic Synthroid and Cytomel

E. Date of the last thyroid hormone dose adjustment.

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Weight-based dosing for full dose hormone replacement with T4

- For adult females 18 to 65 years of age: 1.6 mcg/kg body weight per day
- For adult females more than 65 years of age: 1.4 mcg/kg body weight per day
- For adult males 18 to 65 years of age: 1.4 mcg/kg body weight per day
- For adult males more than 65 years of age: 1.2 mcg/kg body weight per day

Relative potency of various thyroid hormone formulations

Natural Desiccated Thyroid		Levothyroxine/T4	Liothyronine/T3
Nature-Throid, WP Thyroid	Armour Thyroid, NP Thyroid	Synthroid, Unithroid, Levoxyl, Tirosint, Tirosint-SOL	Cytomel
DOSAGE SIZE	**DOSAGE SIZE**	**DOSAGE SIZE**	**DOSAGE SIZE**
¼ grain / 16.25 mg	¼ grain / 15 mg	25 mcg	5 mcg
½ grain / 32.5 mg	½ grain / 30 mg	50 mcg	
¾ grain / 48.75 mg	¾ grain / 45 mg	75 mcg	
		88 mcg	
1 grain / 65 mg	1 grain / 60 mg	100 mcg	25 mcg
		112 mcg	
1¼ grain / 81.25 mg	1¼ grain / 75 mg	125 mcg	
		137 mcg	
1½ grains / 97.5 mg	1½ grains / 90 mg	150 mcg	
1¾ grains / 113.75 mg	1¾ grains / 105 mg	175 mcg	
2 grains / 130 mg	2 grains / 120 mg	200 mcg	50 mcg
2¼ grains / 146.25 mg	2¼ grains / 135 mg		
2½ grains / 162.5 mg	2½ grains / 150 mg		
3 grains / 195 mg	3 grains / 180 mg	300 mcg	

https://www.naturalthyroidguide.com/conversion-chart

T4 color dosing

https://www.synthroid.com

Case 3

- Thyroid hormone levels stabilized on combination treatment of levothyroxine 125 mcg and liothyronine 5 mcg/day as the patient lost weight with the use of Adderall and as she implemented the precautions to prevent interference with the absorption of thyroid hormone.

- Thyroid levels remained stable for 3 years until the patient gained weight recently and we increased the dose of levothyroxine to 137 mcg and maintained liothyronine at 5 mcg/day.

- Hand tingling immediately resolved with the addition of calcitriol 0.25 mcg daily with lunch.

Case 4

- (2025) MM is a 55-year-old female patient seen in consultation for hyperthyroidism. It was initially diagnosed on lab testing. TSH was 0.01, free T4 was 2 (0.82-1.7), thyroid ultrasound showed heterogeneous and hyperemic echotexture with enlargement.

- She was started on 10 mg methimazole twice daily in June 2025 which was reduced to 10 mg daily in July 2025 as her lab work improved. She has history of iron deficiency, menopausal syndrome, and complains of weight gain, insomnia, GERD, hair loss and fatigue. She was started on Veozah for menopausal hot flashes, but it was held because of elevated liver enzymes. She has strong family history of breast cancer.

- Labs:

Thyroid labs: TSH 8.2, free T4 0.92, free T3 2.83, TSI 1.96 (0–0 5.5)

Alkaline phosphatase 135 (35-117), all other liver enzymes were normal

FSH 142 LH 57, estradiol, progesterone and testosterone all undetectable

Iron saturation 16% (20–40), ferritin 68 (30–300), CBC normal

Case 4

Which of the following statements is most accurate about this case:

A. Her symptoms are multifactorial

B. Methimazole should be immediately discontinued

C. Her initial diagnosis could not be Graves' disease since the patient has been gaining weight

D. If hemoglobin is in the normal range, iron studies should not be ordered

E. Treatment with hormone replacement therapy will resolve her thyroid problem.

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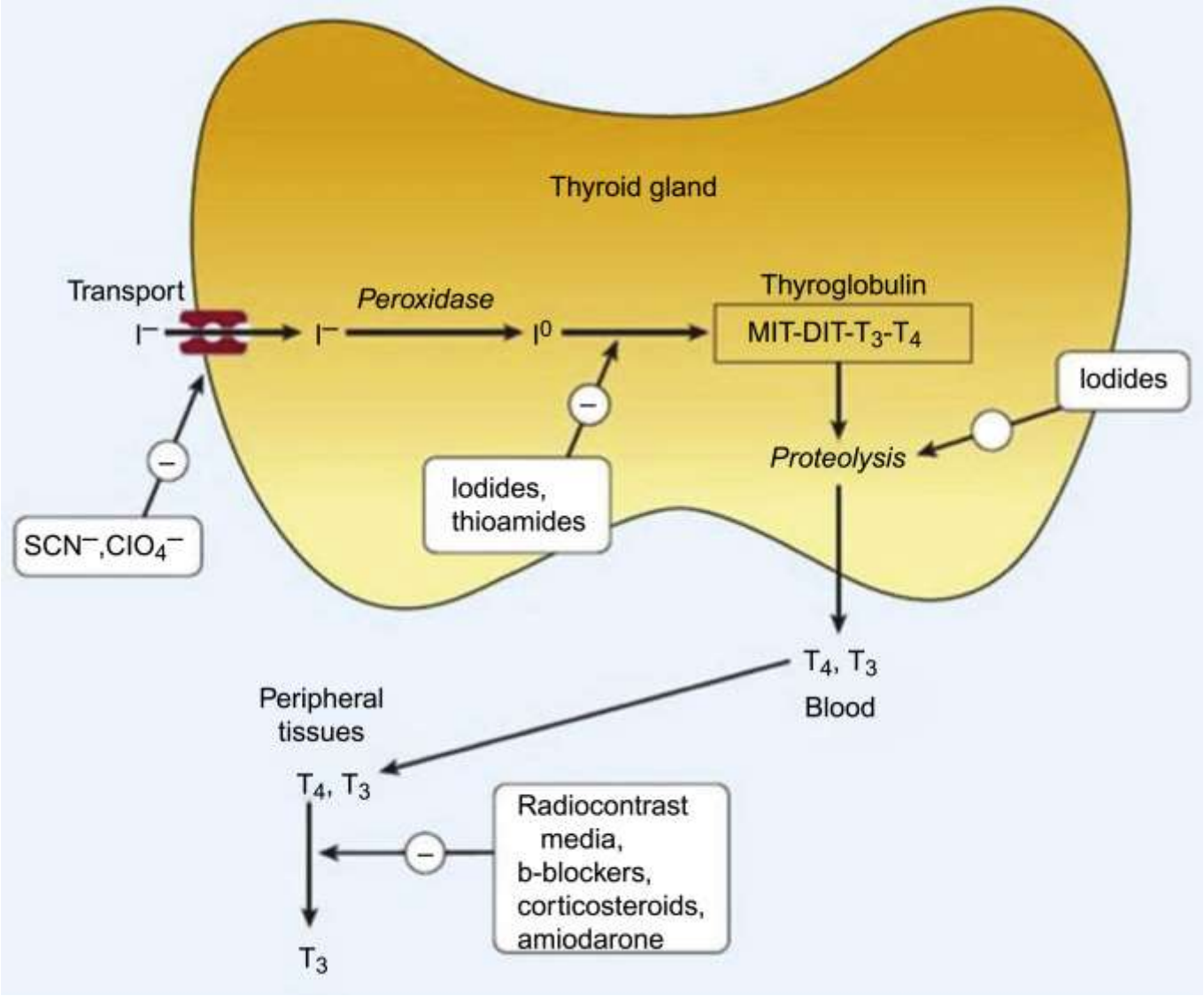

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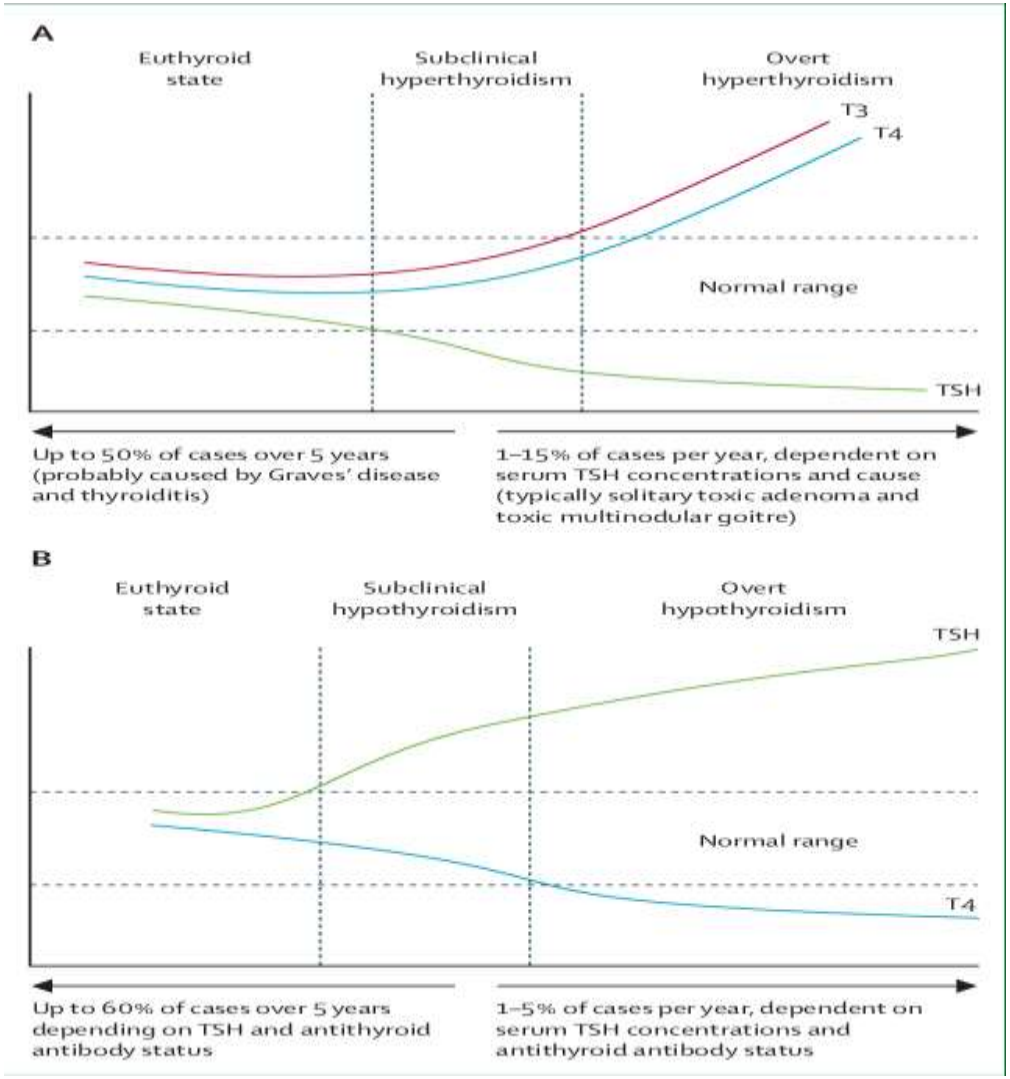
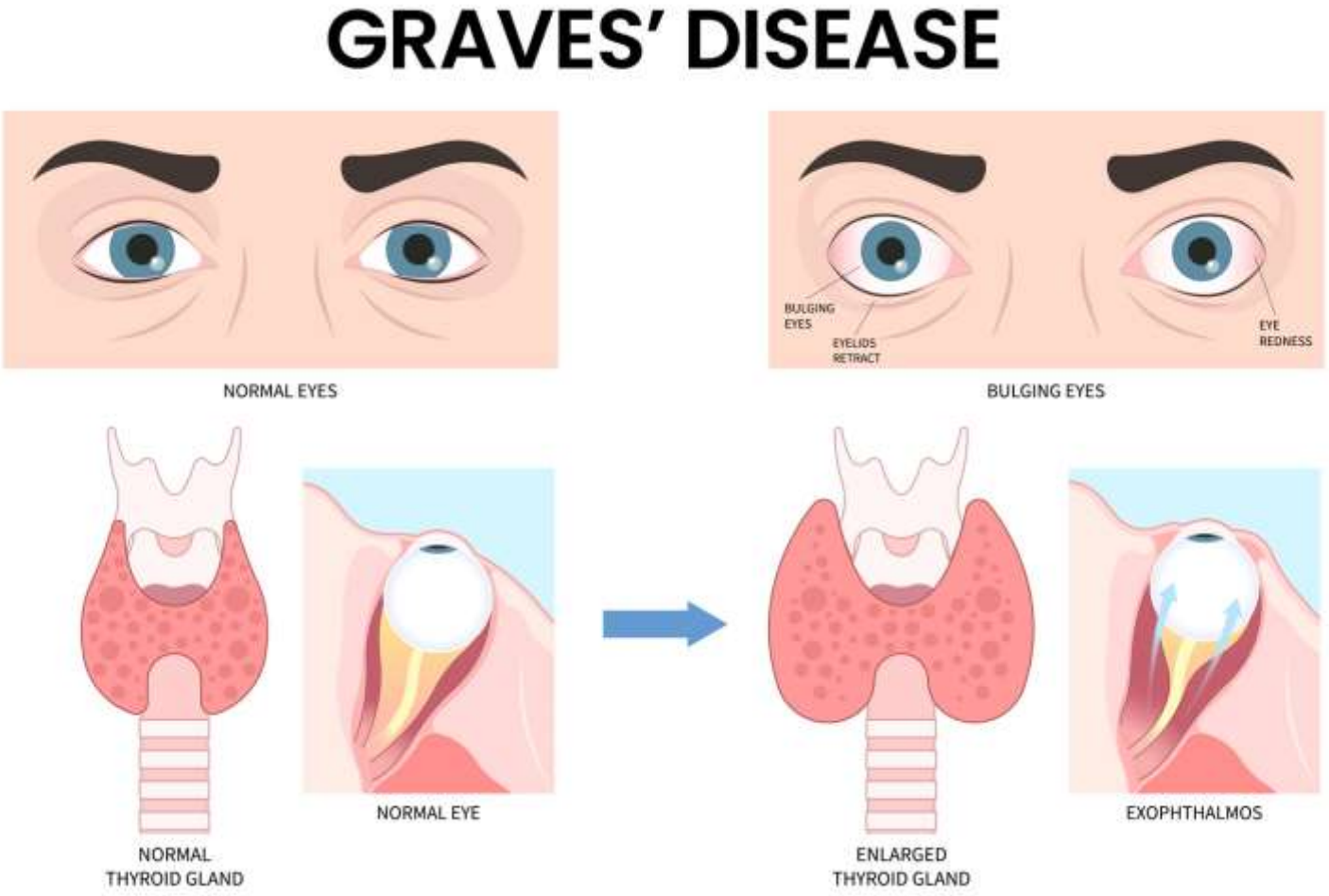
TSH, T4 and T3 changes with hyperthyroidism



Cooper DS, Biondi B: Subclinical thyroid disease, The Lancet, vol 379 P1142-1154. 2012

Thyroid Eye Disease



https://www.treathypothyroidism.com

Case 4

- Correlation between thyroid hormone levels and between body weight: Effects on metabolism and on appetite.

- Causes of fatigue in patients with thyroid disease:

Fatigue associated with hypothyroidism

Fatigue associated with hyperthyroidism

Fatigue due to other factors that may be linked to the thyroid

- Differentiating between hot flashes and heat intolerance

Case 4

Follow-up (patient last seen January 2026):

Symptoms of hyperthyroidism have resolved, TSH improved as we cut back her dose of methimazole gradually to 5 mg 3 times weekly. TSI 1 (0–0.55)

Started the patient on tirzepatide and a nutritional plan with weight loss from 145 pounds to 122 pounds.

Patient restarted using Veozah with resolution of her hot flashes.

Iron deficiency was treated.

Fatigue and other symptoms resolved.

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Questions?

Resources

- American Thyroid Association website
- Uptodate.com
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- Cooper DS, Biondi B: Subclinical thyroid disease, The Lancet, vol 379. P1142-1154. 2012