



THYROID GLAND ANATOMY, PHYSIOLOGY & — THYROID EYE DISEASE

جامعة ساوة

كلية التقنيات الصحية والطبية

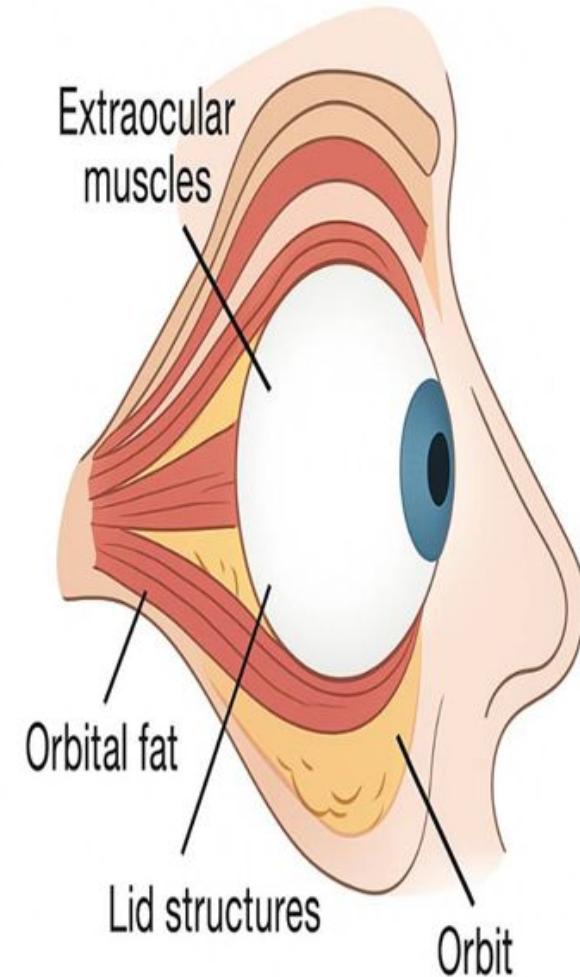
قسم تقنيات البصريات

المرحلة الثالثة

Why Optometry Students Should Learn This

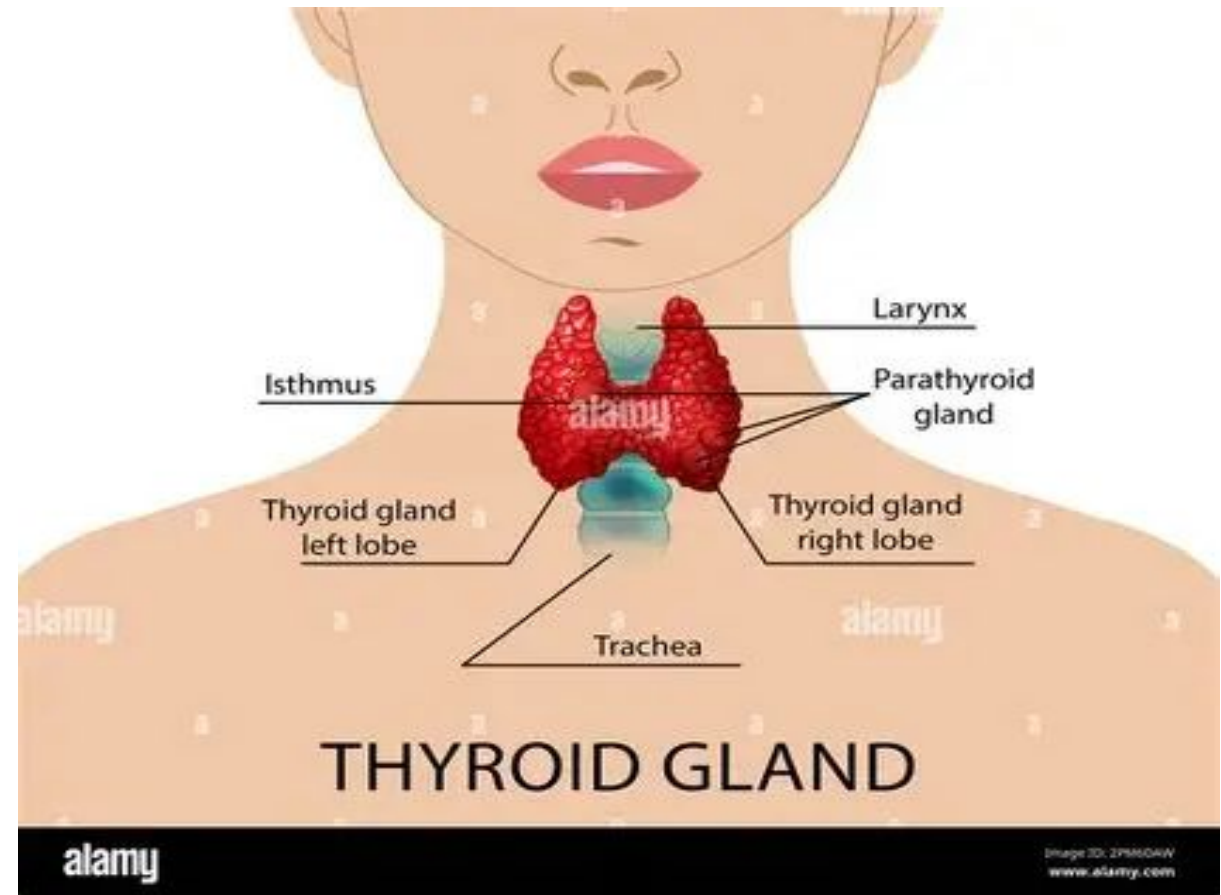
- Thyroid diseases can affect the eyes, eyelids, and vision
 - Early recognition can prevent permanent vision loss
 - Optometrists are often the first to notice symptoms
 - Thyroid Eye Disease is one of the most common orbital disorders

Thyroid Eye Disease



Thyroid Gland: Basic Anatomy

- Small, butterfly-shaped gland
- Located in front of the neck, below the Adam's apple
- Has right lobe, left lobe, and isthmus



What the Thyroid Gland Does (Physiology)

The thyroid makes two main hormones:

- T3 (Triiodothyronine)
- T4 (Thyroxine)

These hormones control:

- Body metabolism
- Energy levels
- Heart rate
- Growth and development
- Important for normal eye function

Common Thyroid Problems

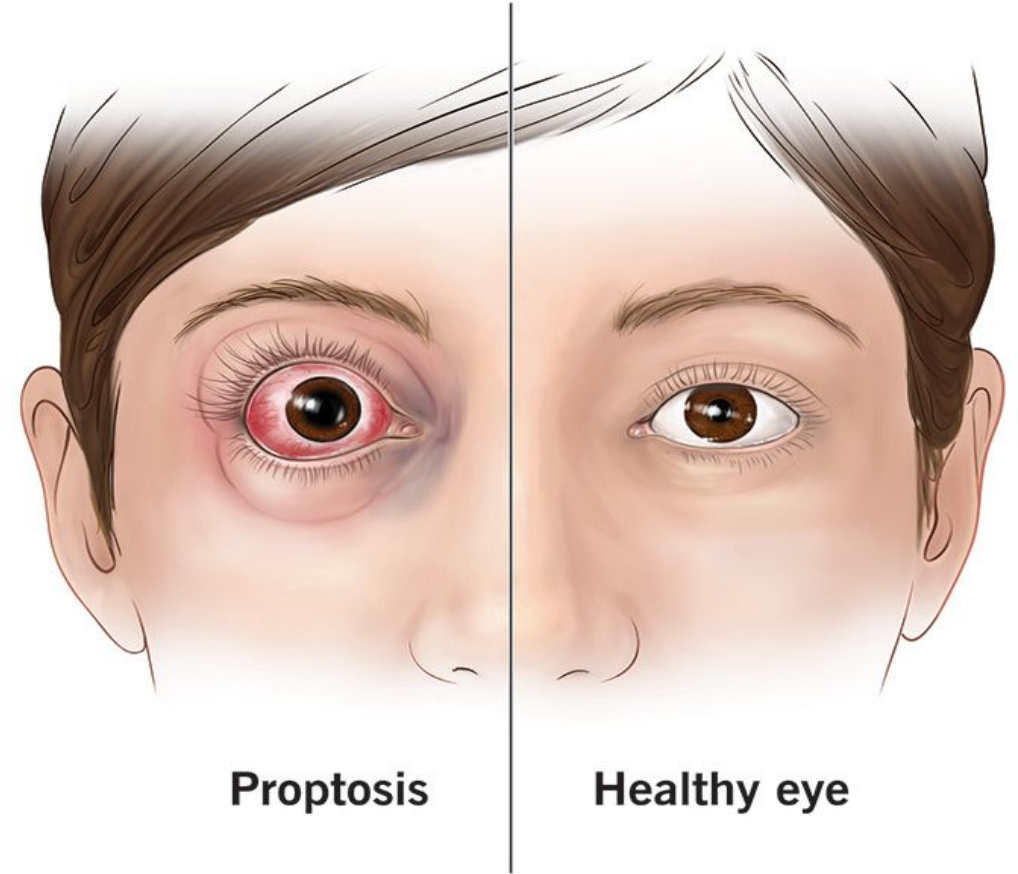
1. Hyperthyroidism
 - Thyroid works too much
 - Most common cause: Graves disease
2. Hypothyroidism
 - Thyroid works too little

Both can cause eye symptoms.

What Is Thyroid Eye Disease (TED)?

- Also called Graves Orbitopathy
- Autoimmune disease → body attacks tissues around the eyes
- Causes inflammation and swelling in:
 - Eye muscles
 - Eyelids
 - Orbital fat
 - Lacrimal gland

Proptosis (bulging eyes)



 Cleveland Clinic © 2023

Picture of a patient with mild proptosis

Why TED Happens (Simple Explanation)

- Immune system produces antibodies
- They activate cells behind the eye
- These cells swell and collect fluid
- Space in the orbit is tight → eyes push forward (proptosis)



Cross-section of orbit showing swelling

Risk Factors for TED

- Smoking (most important!)
- Graves disease
- Female sex
- Stress
- Radioactive iodine treatment
- High T3/T4 levels not controlled

Symptoms of Thyroid Eye Disease

Patients may feel:

- Dryness
- Grittiness (sand sensation)
- Tearing
- Photophobia
- Pain on eye movement
- Blurred vision
- Double vision (diplopia)

Signs of Thyroid Eye Disease (Visible to Clinician)

- Proptosis (eyes pushed forward)
- Lid retraction (upper lid too high)
- Lid lag (upper lid moves slowly down)
- Redness and swelling
- Conjunctival chemosis
- Restricted eye movements
- Exposure keratopathy
- Severe case: optic nerve compression

Special Eye Signs

Names

- Dalrymple sign:
widened palpebral
fissure
- Stellwag sign:
decreased blinking
- von Graefe sign: upper
lid lag on downward
gaze

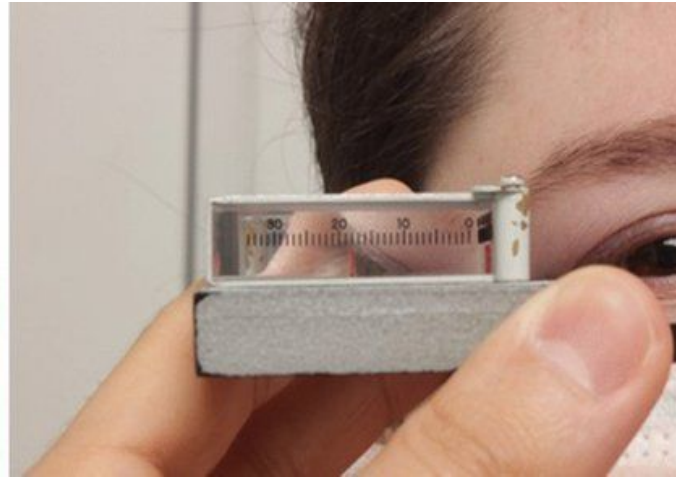
Complications of TED

If untreated, TED may cause:

- Corneal dryness & ulcers
- Permanent double vision
- Vision loss (optic
neuropathy)
- Severe disfiguring proptosis

Eye Tests Done by Optometrists

- Visual acuity
- Color vision (optic nerve risk)
- Pupils
- Eye movements
- Exophthalmometry (Hertel)
- Slit-lamp exam for cornea
- IOP measurement



Hertel exophthalmometer

Diagnosis (Medical Tests)

- Thyroid blood tests (TSH, T3, T4)
- Thyroid antibodies
- Orbital CT or MRI for muscle enlargement

Management of Thyroid Eye Disease

General (for all patients):

- Stop smoking
- Lubricating eye drops
- Cold compresses
- Sleep head elevated

Medical:

- Steroids
- Immunosuppressive drugs
- Teprotumumab (TED-specific)

Surgical (for severe cases):

- Orbital decompression
- Strabismus surgery
- Eyelid surgery

Ocular Manifestations of Thyroid Disorders (General)

Hyperthyroidism:

- Lid retraction
- Lid lag
- Proptosis
- Dry eye
- Possible TED

Hypothyroidism:

- Puffy eyelids
- Dry eye
- Loss of outer eyebrow (madarosis)
- Low intraocular pressure

What Students Should Remember

- Thyroid gland affects the eyes strongly
- TED is common and serious
- Early signs → mostly detected by optometry professionals
- Dry eye + lid retraction + proptosis = Think TED
- Urgent referral if:
 - Vision drops
 - Color desaturation
 - Painful eye movements

Summary Slide

- Thyroid gland controls metabolism
- Thyroid disorders often affect the eyes
- TED is autoimmune & can threaten vision
- Optometrists play a key role in early detection
- Management includes lubrication, steroids, or surgery

**THANK YOU AND
HAVE A GREAT DAY!**



RD