Lids and Lacrimal

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Anatomy of the eyelid

Eyelid structures :

1-Skin → any disease that affect the skin can affect the lid, it has 2 characteristics :
- ⓐ thinnest skin of the body → to facilitate the eyelid movement
- ⓑ there's no subcutaneous tissue

2-Orbital septum

3-Orbital fat

4-Muscles;

A- Orbicularis oculi muscle → innervated by facial nerve, in facial palsy we have : lagophthalmus (inability to close the eyelid)

B- Levator palpebrae superiors muscle

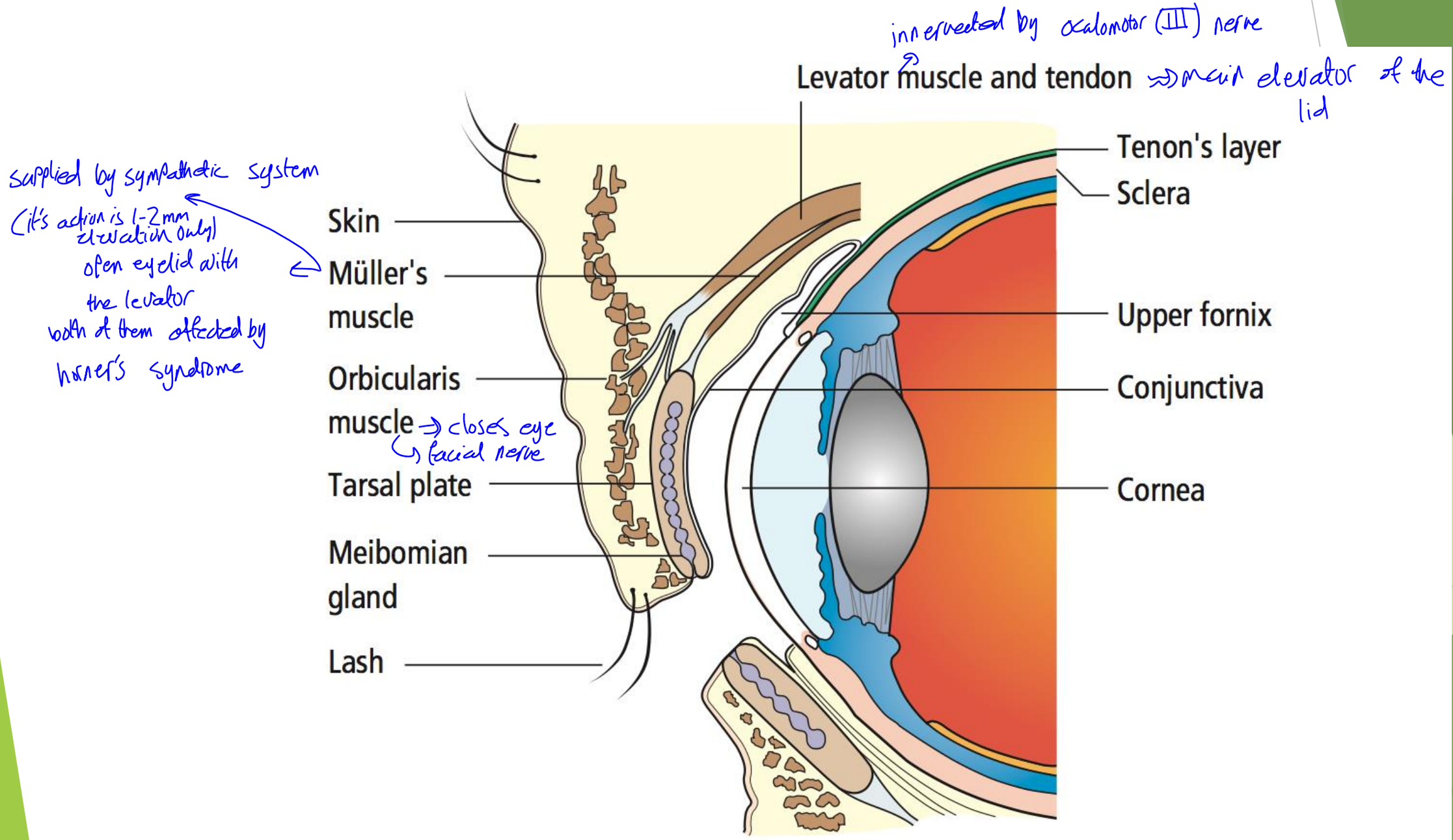
C- Superior tarsal muscle (Muller muscle)

5- Tarsal plates with Meibomian glands → secretes the oily part of the tearfilm covering the cornea

6-Conjunctiva → inner most layer

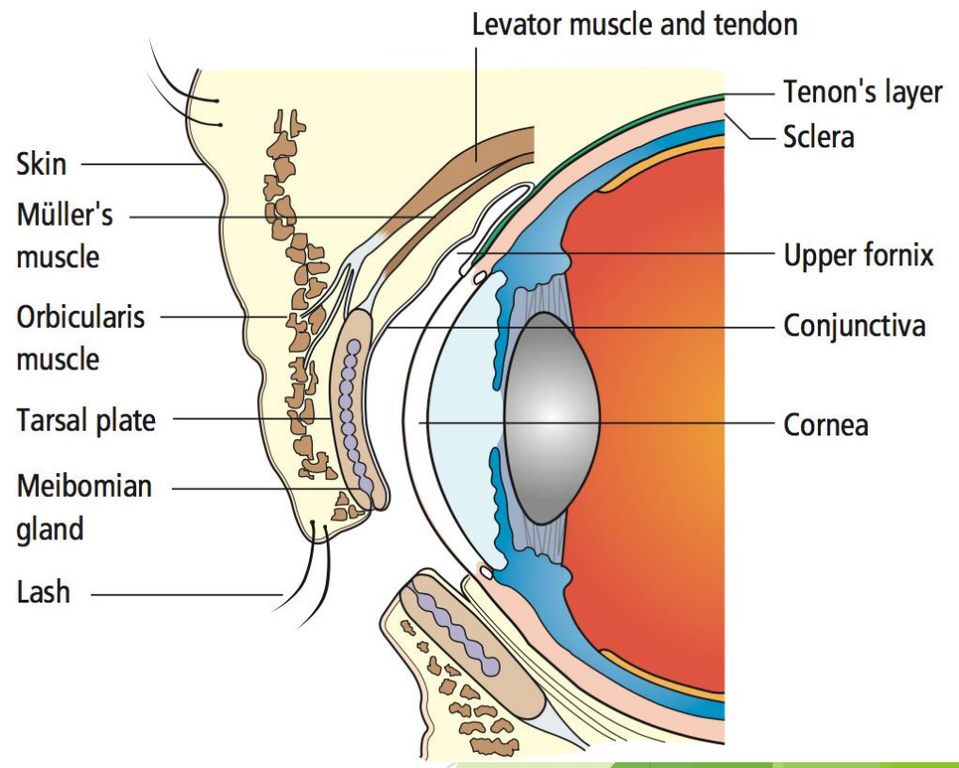
7-Eyelashes

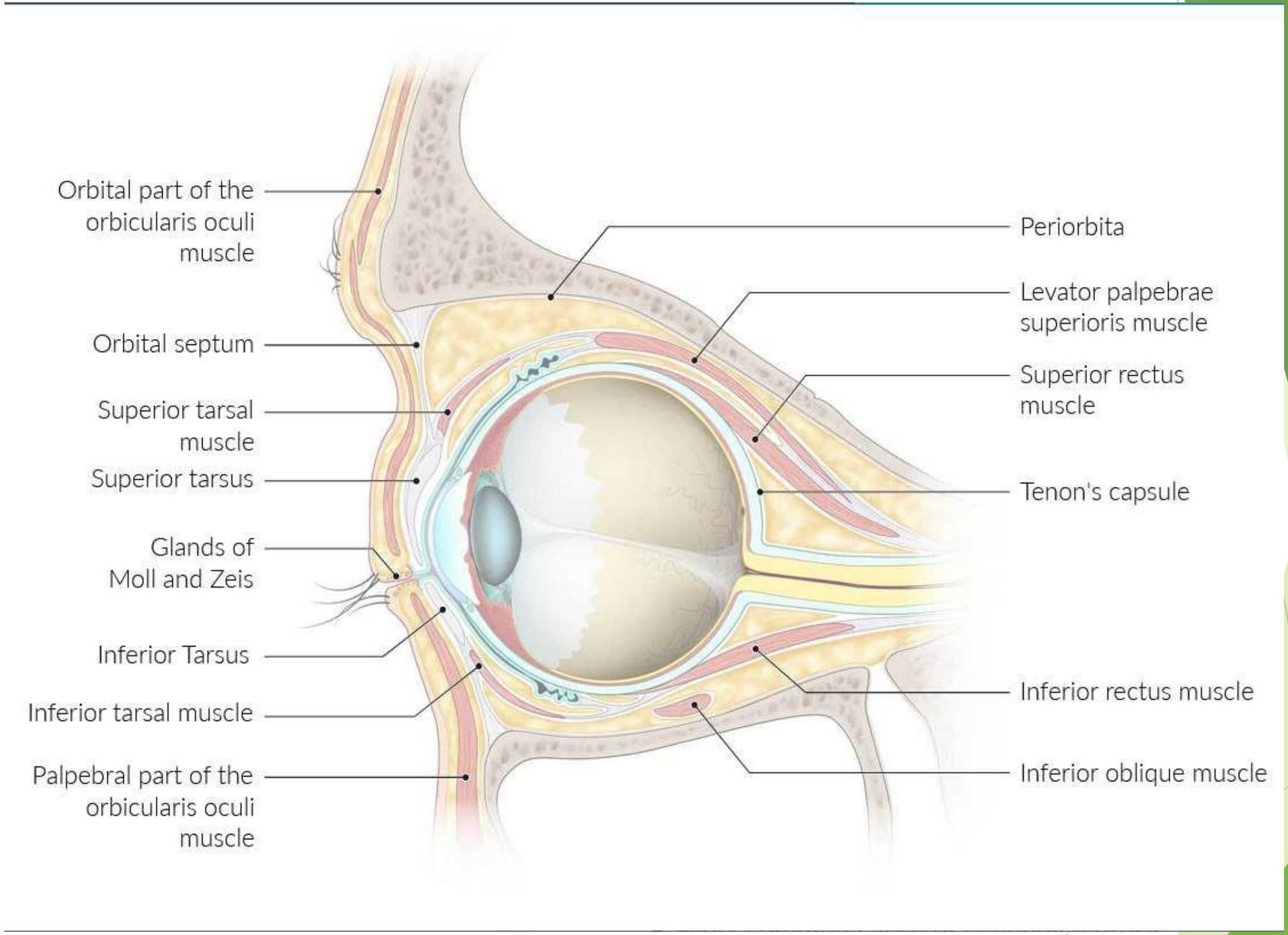
Eyelids (Tarsus)

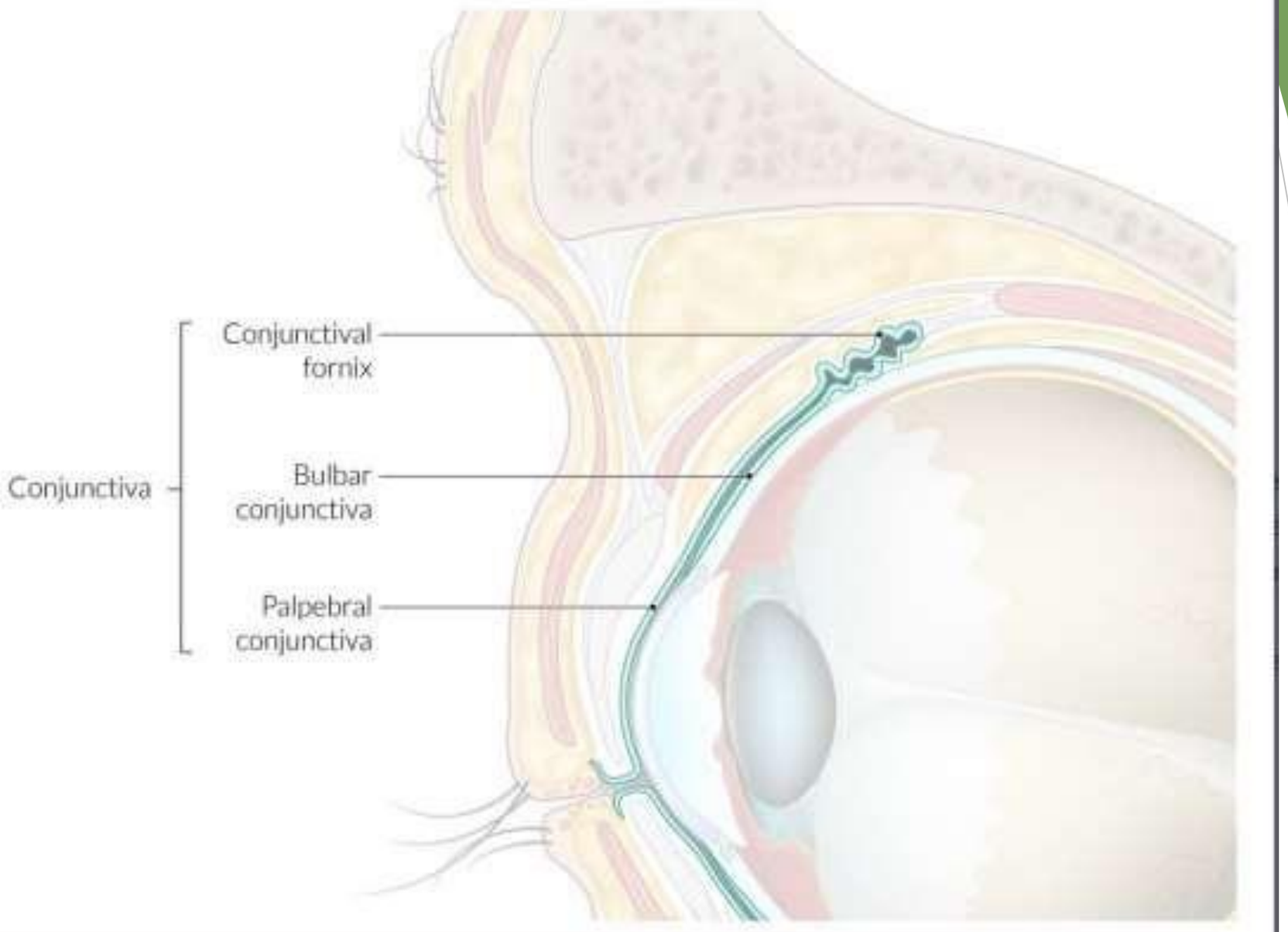


Eyelids

- **Levator muscle:** main elevator of the upper lid, supplied by the 3rd CN.
- **Muller's muscle:** weaker elevator and supplied by sympathetic system
- **Orbicularis muscle:** for Lid closure, supplied by the 7th CN.
- **Meibomian glands:** embedded in the tarsal plates, produce oily secretions to stabilize the tear film and PREVENT EVAPORATION.
- **Mucocutaneous junction.**




Orbital part of the orbicularis oculi muscle
Orbital septum
Superior tarsal muscle
Superior tarsus
Glands of Moll and Zeis
Inferior Tarsus
Inferior tarsal muscle
Palpebral part of the orbicularis oculi muscle
Periorbita
Levator palpebrae superioris muscle
Superior rectus muscle
Tenon's capsule
Inferior rectus muscle
Inferior oblique muscle



The conjunctiva can be divided into the palpebral conjunctiva (covering the eyelids), the bulbar conjunctiva (covering the globe with its sclera), and the conjunctival fornix. The conjunctival fornices (superior and inferior; here only the superior fornix is depicted) feature numerous folds and connect the palpebral and bulbar parts of the conjunctiva. The border of sclera and cornea is called the corneal limbus.

Eyelids

- **Functions of the eyelids:**

1- Physical protection to the eyes

2- Tear drainage

3- Maintaining normal tear film

4- Cosmetic function (Ptosis)

Pathologies;

1- Abnormal Lid Positions

2- Blepharitis

3- Benign Lumps and Bumps

4- Malignant Lumps

5- Lash Abnormalities

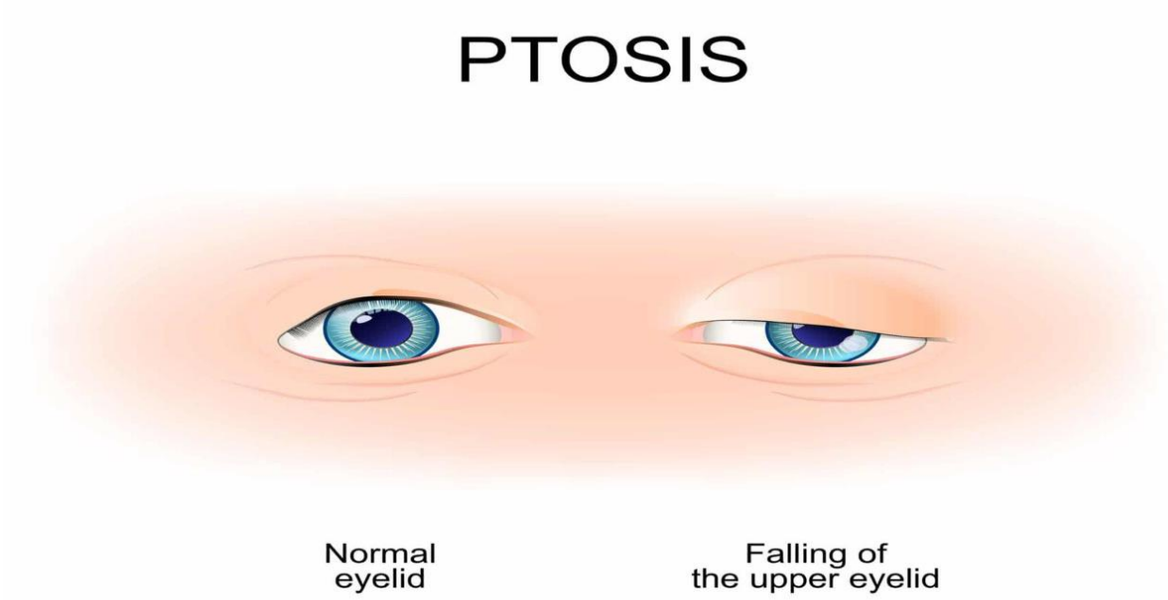
6- Lacrimal system

I. Abnormal lid position

1. Ptosis
2. Entropion
3. Ectropion

1-Ptosis

- Normally the upper lid covers 1-2 mm of the upper limbus. (connection between cornea + sclera)
- **Ptosis** is abnormally low position of the upper lid.
- Patients present due to cosmetic reasons, vision impairment or due to the underlying cause.
  ↳ amblyopia for ex. in children



Ptosis

Ptosis

Causes:

1. Mechanical (anything preventing full eyelid opening):
- Lid lumps (Excessive weight on the upper eyelid, e.g., hemangioma, hematoma, infections, tumors of the upper eyelid)
- Lid edema
- Lid scarring

2. Disinsertion of the aponeurosis of the levator muscle from its insertion on tarsus in elderly (most common cause of acquired ptosis)

3. Neurological:
- 3rd CN palsy
- Horner's

4. Myogenic:
- Most common cause of congenital ptosis (Malformation of the levator palpebrae superioris muscle)
- Myasthenia gravis
- Muscular dystrophy
- botulism

Ptosis

- **Signs:**

distance between upper + lower eyelid

1. palpebral aperture size reduction
2. Lid creases are absent or in abnormal position.
3. Horner's syndrome signs (small pupil, anhydrosis)
4. 3rd CN palsy (large pupil, Diplopia)
5. Myasthenia Gravis (fatigue after repeated movements)

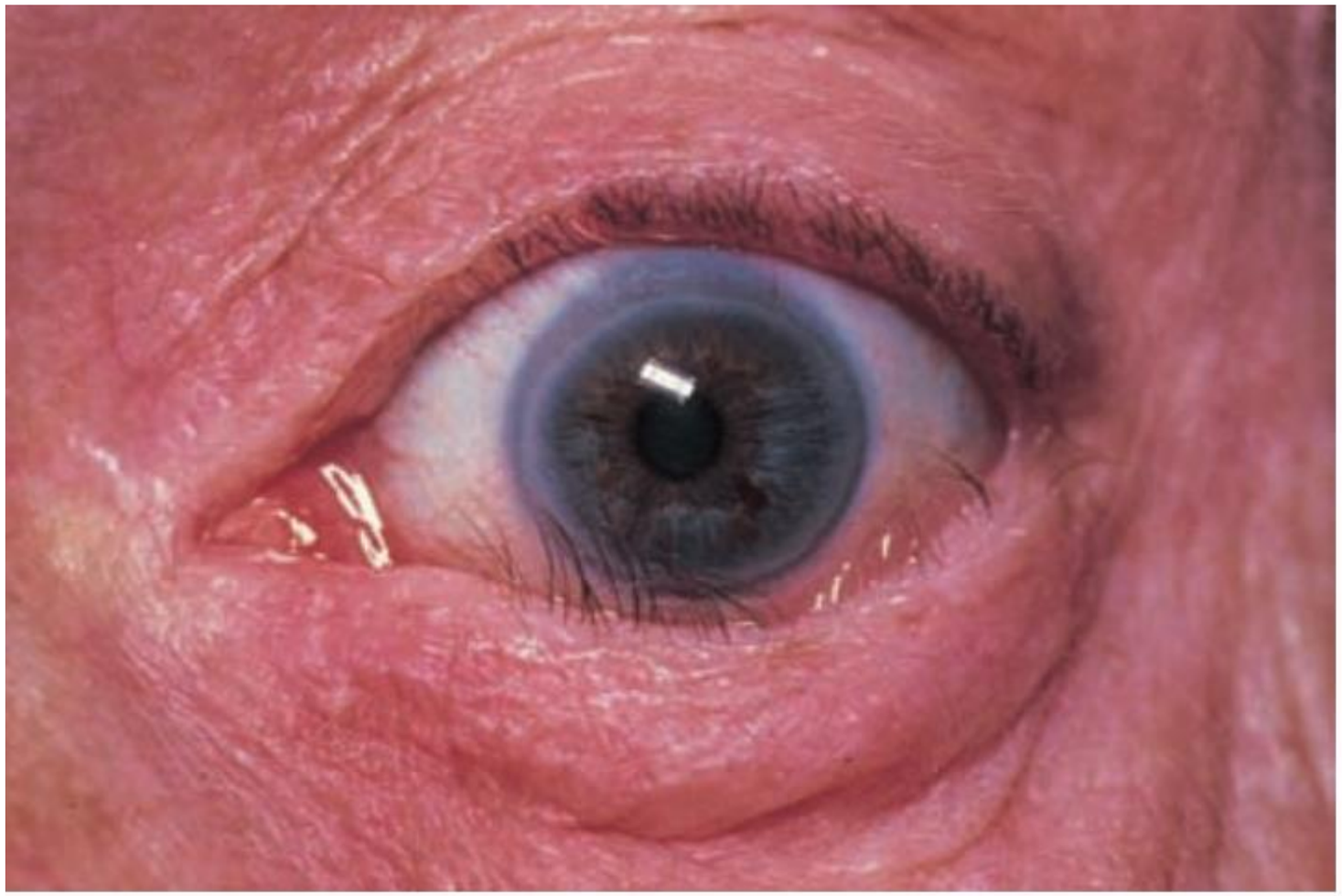
Ptosis

Management: check for any underlying causes

- Medical management for medically treated diseases such as Myasthenia gravis or of underlying cause.
- Otherwise —-> Surgery
- In children, if visual axis is covered it may cause amblyopia (Lazy eyes).

2-Entropion: in turning of the eyelid

eyelashes turn inside → irritation



Entropion

- Inward turning of the lid margin and lashes into the globe, usually the lower lid.
- May be induced by tightly closing the eye (spastic entropion).
- Patients complain of red, irritated eyes. due to frequent rubbing of lashes on cornea
- **Involutional Entropion:** in elderly (senile) due to weakening of the lower lid retractors, so the **preseptal part of the orbicularis muscle override the pretarsal muscle.**
- **Cicatricial Entropion:** due **to** conjunctival scarring.

First cause is gravity pulling upper lid down and lower lid inward
Second cause is anatomical ⇒ Bigger tarsal plate

Entropion

Management: (Treatment of the underlying cause)

- Taping of the lower lid and Lubrication
- Botulinum toxin into the orbicularis muscle (palpebral part) ↳especially for patients with frequent spasm
- Surgery

3-Ectropion

Ectropion

- Eversion of the lid away from the globe. (mostly lower lid)
- Causes:

1. age related orbicularis laxity
2. 7th CN palsy → most common
3. scarring of the periorbital skin

- Dry irritable eyes due to excessive exposure and tearing due to decreased tear drainage.
- Surgical management.

II. Blepharitis; inflammation of the eyelid margins

- **Chronic** inflammation of the lid margins. (low grade inflammation)
- Symptoms are red, itchy, sore eyes, worse in the morning. foreign body sensation in the eye
- **Anterior** vs. **Posterior** Blepharitis.
- Both are associated with atopic eczema, seborrheic dermatitis and rosacea.
- **Chronic condition that require long term treatment**.

→it's very common, chronic/low grade inflammation

A- Anterior Blepharitis

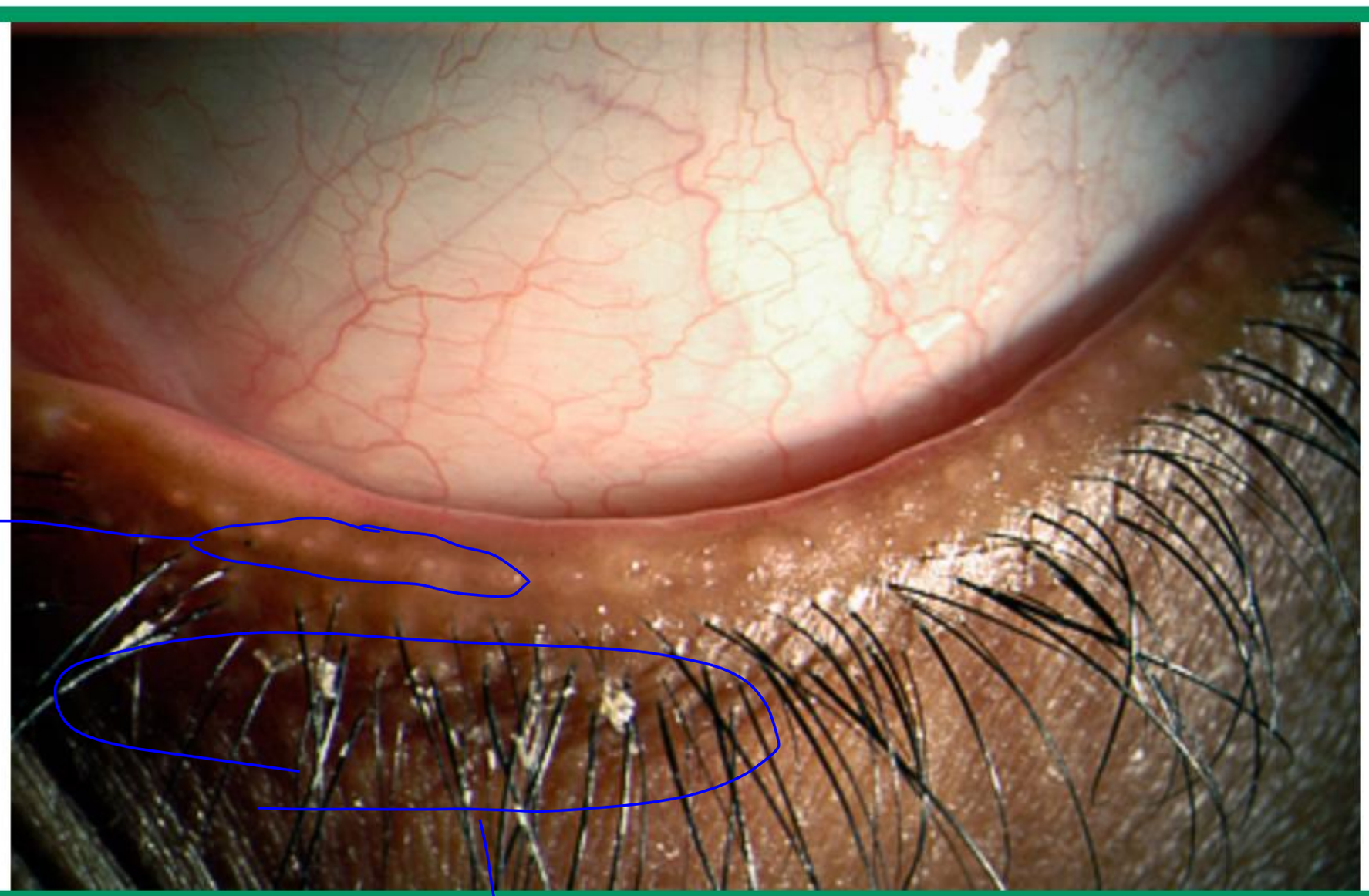
- Inflammation concentrated along the **eyelashes** accompanied with squamous debris and collarettes around eyelashes.
  - ↳ itchy
  - ↳ foreign body sensation
- **Blepharokeratitis** occurs when the cornea is involved.
  - ↳ autoimmune reaction with the cornea
  - → mild steroids are needed in trt.
- Associated with Staphylococcus overgrowth which can cause **marginal keratitis** (ulceration of the peripheral cornea)

Anterior Blepharitis

- **Signs**:

1. Scaling and redness of the lid margin
2. Ulceration : Staph infection
3. Collarettes formation (cylindrical dandruff)
4. Reduction in the number of eyelashes (loss) + whitening of the lashes

Anterior Blepharitis



Lower lid with inflammation with characteristic scales on the eyelashes.

This is combined ant. + post.

Anterior Blepharitis

- **Management:**

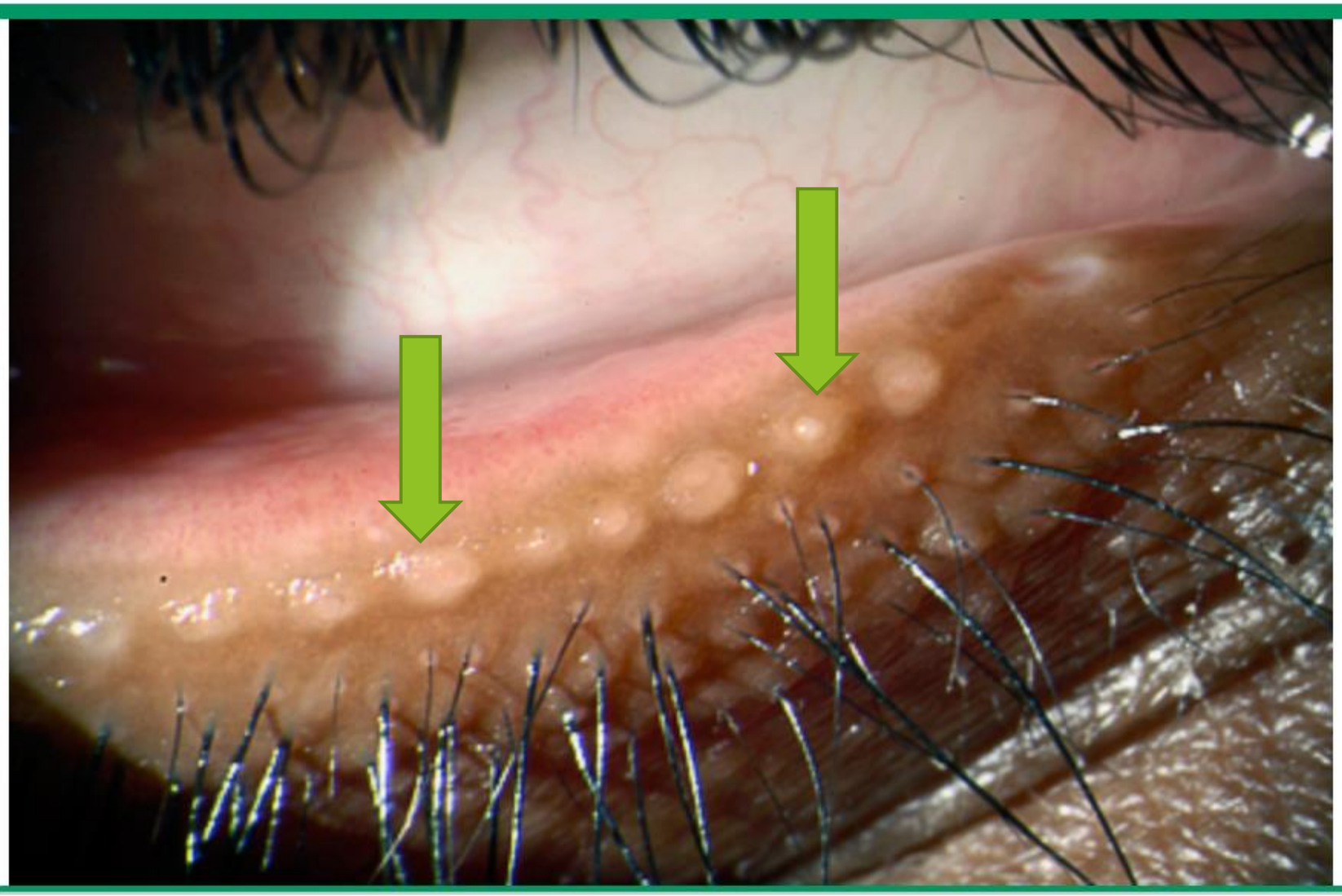
1. Lid toilet with bicarbonate solution or baby shampoo.
2. Topical steroids.
3. Topical antibiotics (fusidic acid eye ointment) or if necessary systemic (in case of long standing Staph infection).

B- Posterior Blepharitis

- Usually caused by Meibomian gland dysfunction (MGD), where these glands are obstructed by squamous debris and the lipid secretions become viscous and cloudy.
- Lid margin and Conjunctiva may be injected.

→ also staphylococcal infection

Posterior Blepharitis



Lower eyelid with characteristic posterior lid inflammation and oily white plugs visible at the meibomian gland openings.

Posterior Blepharitis

- **Management:**

1. Lid massage after hot bathing.
2. systemic Azithromycin
3. Oral Doxycycline or tetracycline → both contraindicated in children + pregnants + lactating
   ↳ dose 1/day (better)
4. Artificial tears in case of eye dryness due to decreased oil secretions.

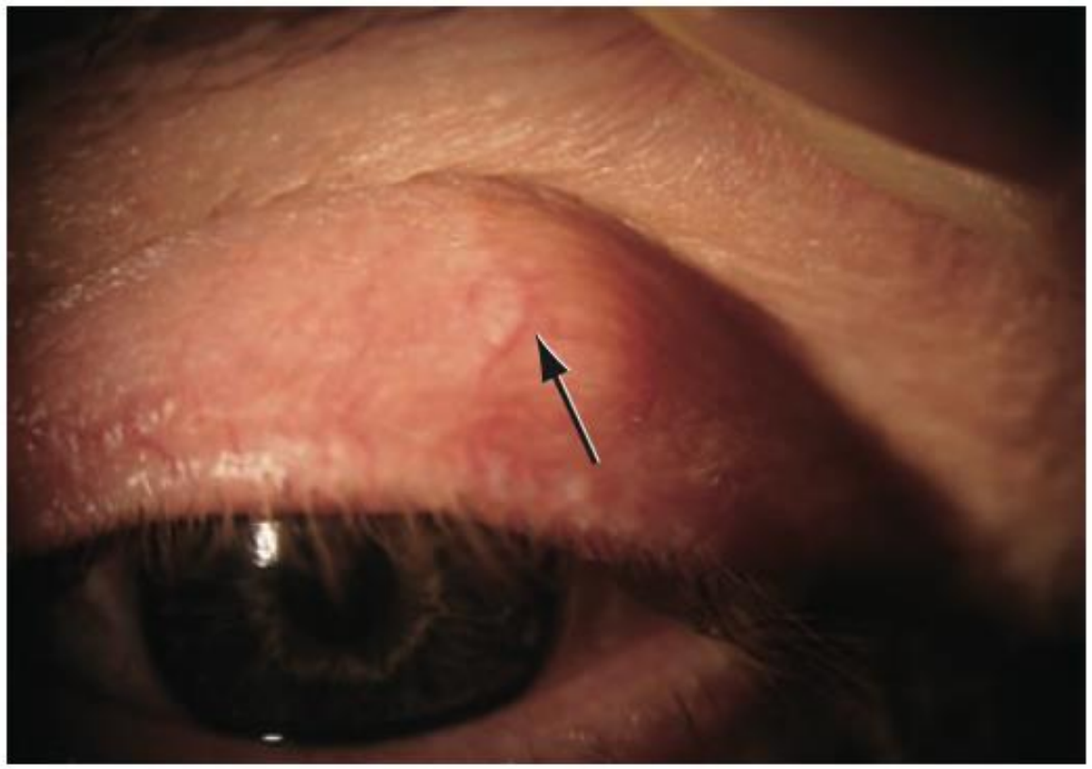
III. Benign lid lumps

1. Chalazion
2. Molluscum contagiosum
3. Cysts
4. Squamous cell papilloma
5. Xanthelasmas
6. Keratocanthoma
7. Naevus

1- Chalazion

- Lipo-Garnuloma within the tarsal plate due to meibomian gland obstruction.
- Common and painless condition.
- Resolves within 6 months, if persistent it is incised and curetted through the conjunctiva.

Chalazion



☆ Painless, no signs of inflammation

2- Hordeolum

- **Abscess (*Internal hordeolum):*** painful abscess within the meibomion gland, managed by drainage and antibiotics. (systemic AB in children are needed)
- **Stye (*External hordeolum):*** very painful abscess of an eyelash follicle, managed by removal of the eyelash, hot compressors and topical antibiotics.

Can transform into chalazion

Hordeolum / Stye

3- Molluscum Contagiosum

- Lesion on the lid margin caused by **Pox virus.**
- Irritated red eye.
- **Follicular conjunctivitis:** when lymphoid tissue forms on the tarsal conjunctivit.
- Treated by excising the lesion.

requires general anaesthesia

+ Highly contagious

Molluscum Contagiosum

- Sex: ♂ > ♀
- Age: most common in childhood (peak incidence < 5 years of age) and early adolescence
- More common in warm and humid climates or areas with poor hygiene
- Up to 20% of HIV-positive patients have symptomatic infection

Molluscum Contagiosum

- **Pathogen:** a DNA poxviruss
- (molluscum contagiosum virus)
- **Transmission:**
- Direct skin contact (contact sports, sexually transmitted)
- Autoinoculation (scratching or touching lesion, e.g., while shaving)
- Fomites (e.g., on bath sponges/towels)
- **Risk factors:**
- immunosuppression , active atopic dermatitis (in children),
- hot and humid climates, crowded living conditions.

* each eyelash has 2 glands; oil + sweat

4- Cysts

- **Sebaceous cysts:** citemsoc rof desicxe ,stsyc euqapo .snosaer ↳ obstruction of oily glands around lashes
- **Cyst of Moll:** dnalg taews ot eud tsyc tneculsnarT .noitcurtsbo ↳(translucent), → sweat gland obstruction.
- **Cyst of Zeis:** Opaque cyst due to obstructed accessory sebaceous gland. occurs away, not exactly at the eyelashes

Sebaceous cyst

Cyst of zeis

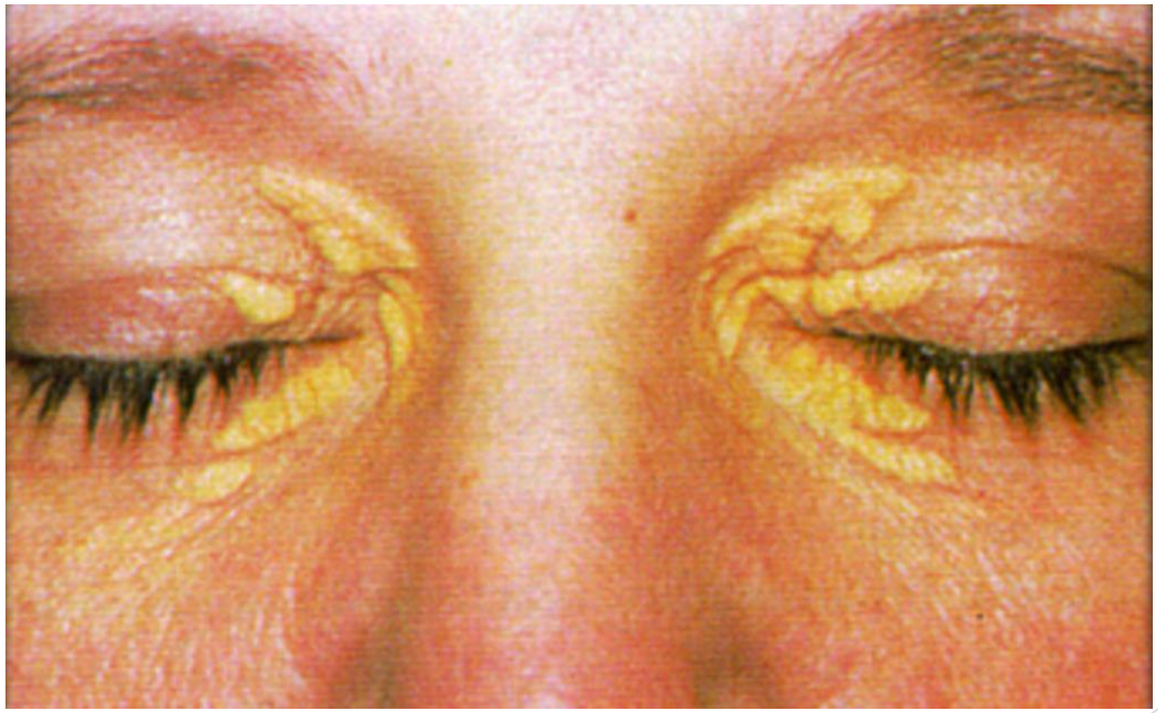
Cyst of moll

5- Squamous Cell Papilloma (Skin Tags) سالم

- Frond like lesion
- Caused by Human papilloma virus
- Fibrovascular core and thickened squamous epithelium
- Excised for cosmetic reasons

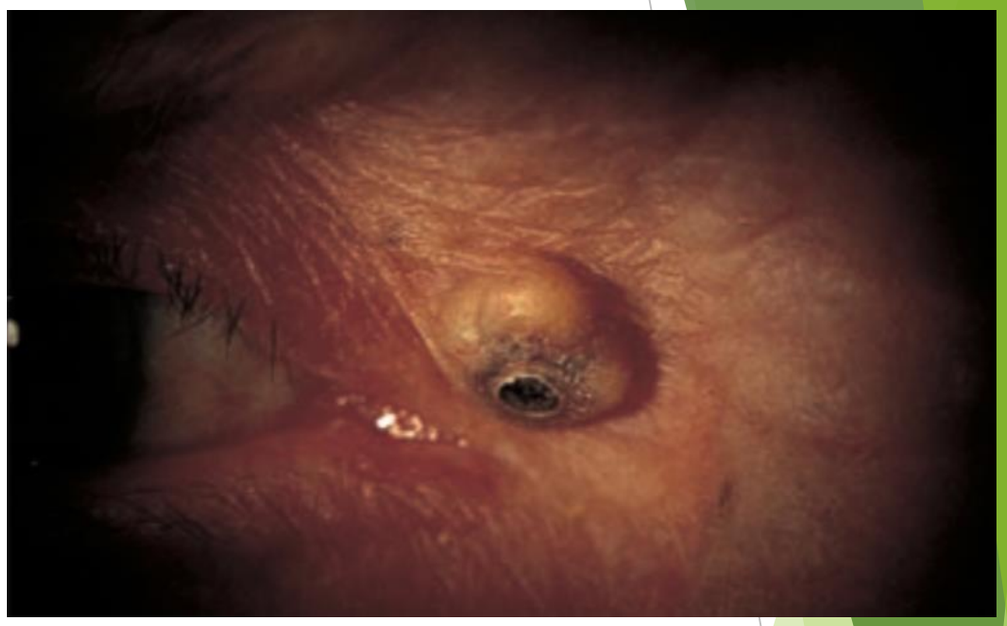
6- Xanthelasmas

- Lipid bilateral lesions.
- Associated with hypercholesterlaemia.
- Check Blood Cholesterol.
- Excised for cosmetic reasons



7- Keratocanthoma

- Brownish, fast growing lesion with central crater filled with keratin. Growth over 3-6 weeks in contrast to malignancies (months to years).
- Excision and Histology because it may have malignant features, and spontaneous regression will lead to scar formation.



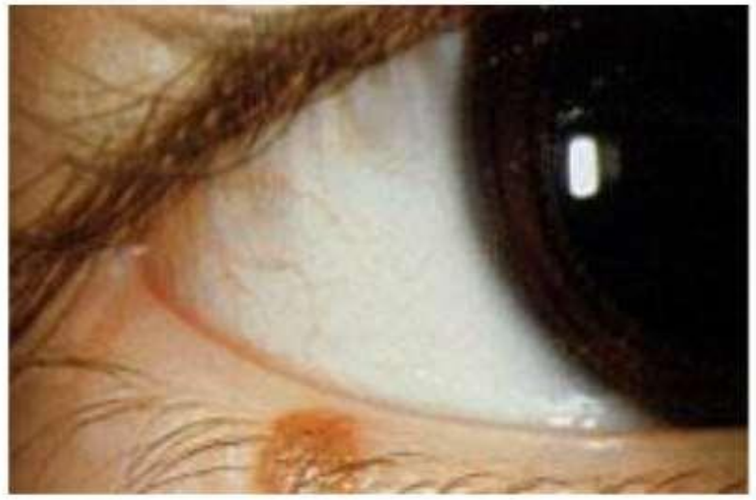
8- Nevus

Naevus (mole):

*Lesion that derived from the naevus cell (altered melanocytes)

*Can be pigmented or not

*No treatment is necessary



IV. Malignant tumors

1. Basal cell carcinoma (BCC):

- M.C malignant tumor of eyelids. 90% of eyelid tumors are BCC, and 10% of all BCC occur in the eyelids.
- Slowly growing, **locally invasive** and non-metastasizing tumor.
- **Painless** lesion that can be nodular, scaly or ulcerative *(Rodent Ulcer)*
- Therapy: -Excision biopsy with safe margins or Mohs Surgery. Other treatment modalities;
  - Cryotherapy
  - Radiotherapy
- Good prognosis. → locally invasive, no mets

Basal Cell Carcinoma

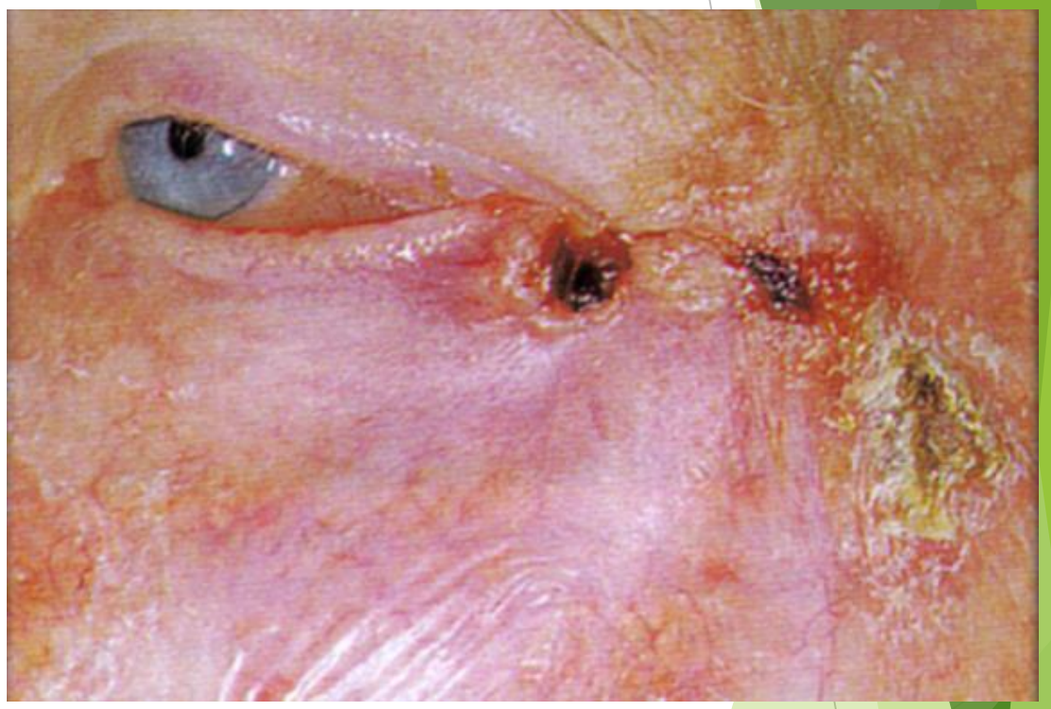
- Risk factors :

-Fair-skinned individuals
-history of prolonged sun exposure.

IV. Malignant tumors

2. Squamous cell carcinoma (SCC):

- Less common but faster growing and more malignant which metastasize to regional lymph nodes
- Hard nodule or scaly patch
- Excisional biopsy with safety margin
- Squamous cell carcinoma can arise de novo or from preexisting actinic keratosis.



V. Lashes abnormalities

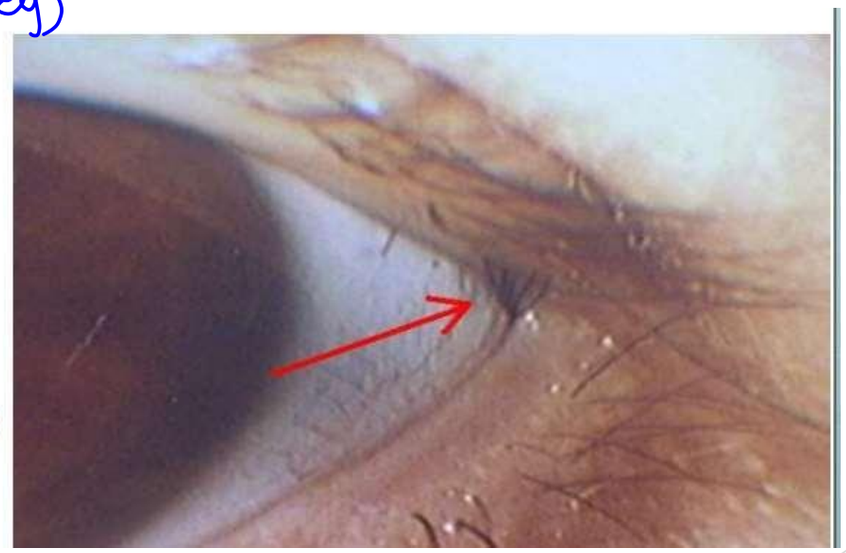
Trichiasis:

Eyelashes are directed towards the globe and the lid margin is normal **(Vs Entropion).**

↳ here secondary trichiasis

- Lashes rub against the cornea and cause irritation and abrasion.
- Associated with **trachoma** (Chlamydia trachomatis) in the developing world. → endemic in Africa
- Managed by epilation of the offending lashes and local surgical resection. Electrolysis or cryotherapy for recurrent cases.

↳ (cautery)



The lacrimal system

The lacrimal system

- The lacrimal glands normally produce about 1.5 µl of tears per minute.

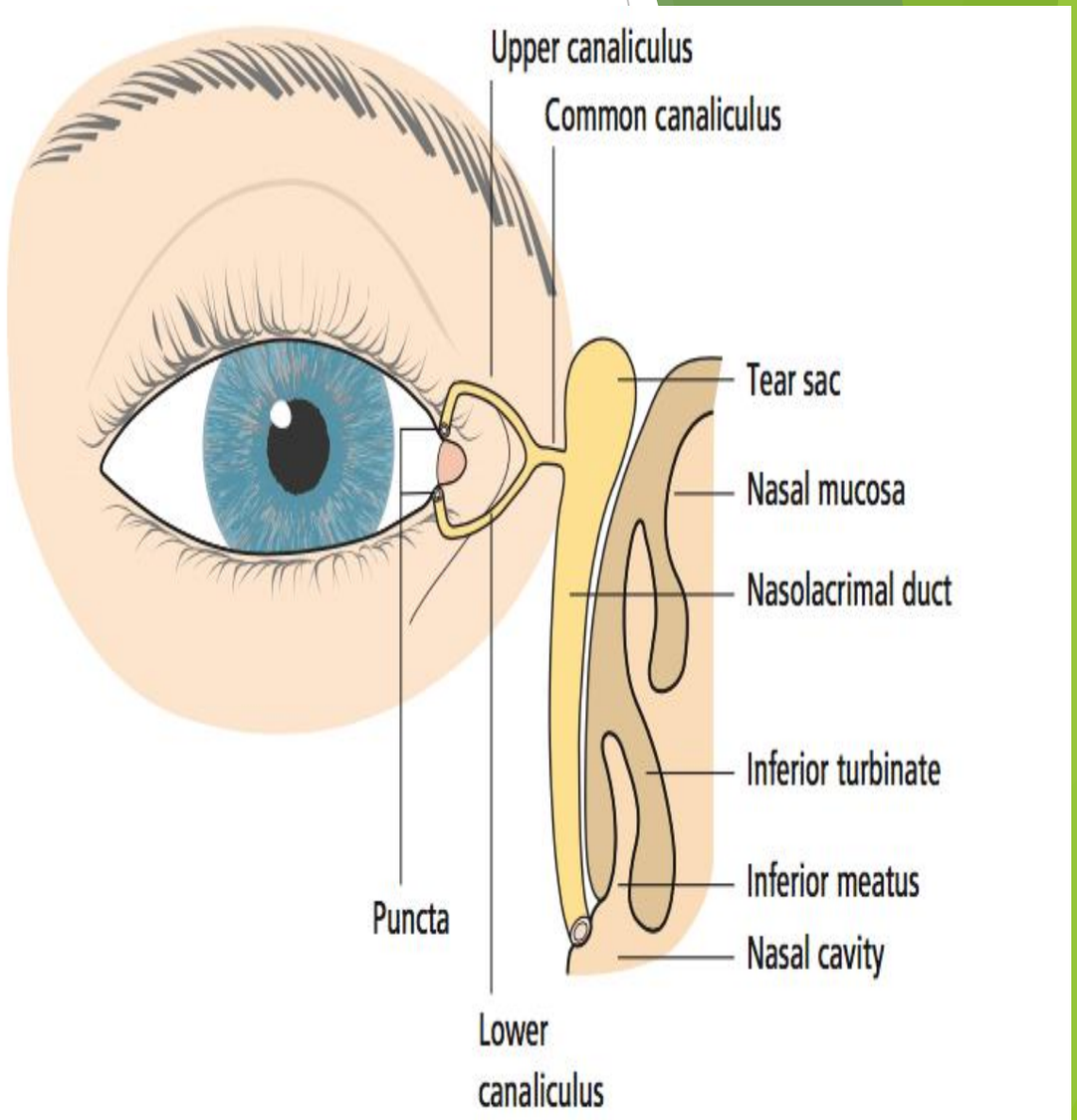
- Some tears are lost by evaporation while the remainder drain via the nasolacrimal system into the nose.

- The tear film reforms with each blink.

The Lacrimal System

Tears drains into:

1. upper and lower puncta
2. upper and lower canaliculi then into the common canaliculus
3. lacrimal sac then
4. The nasolacrimal duct then passes into the nose



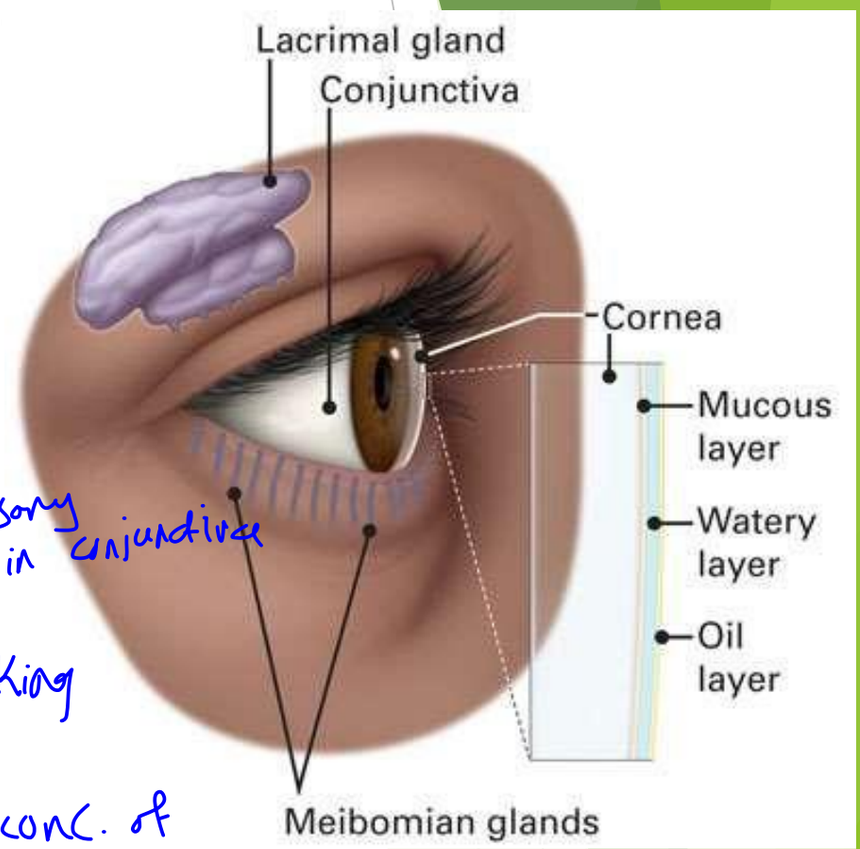
The tear film

The tear film (10Um thick) covers the exposed ocular surface and comprises three layers:

1- A thin ***mucin*** layer in contact with the ocular surface and produced mainly by the conjunctival goblet cells

2- ***Aqueous layer*** produced by the lacrimal gland

3- A surface **oil layer** produced by the tarsal meibomian glands and delivered to the lid margins.

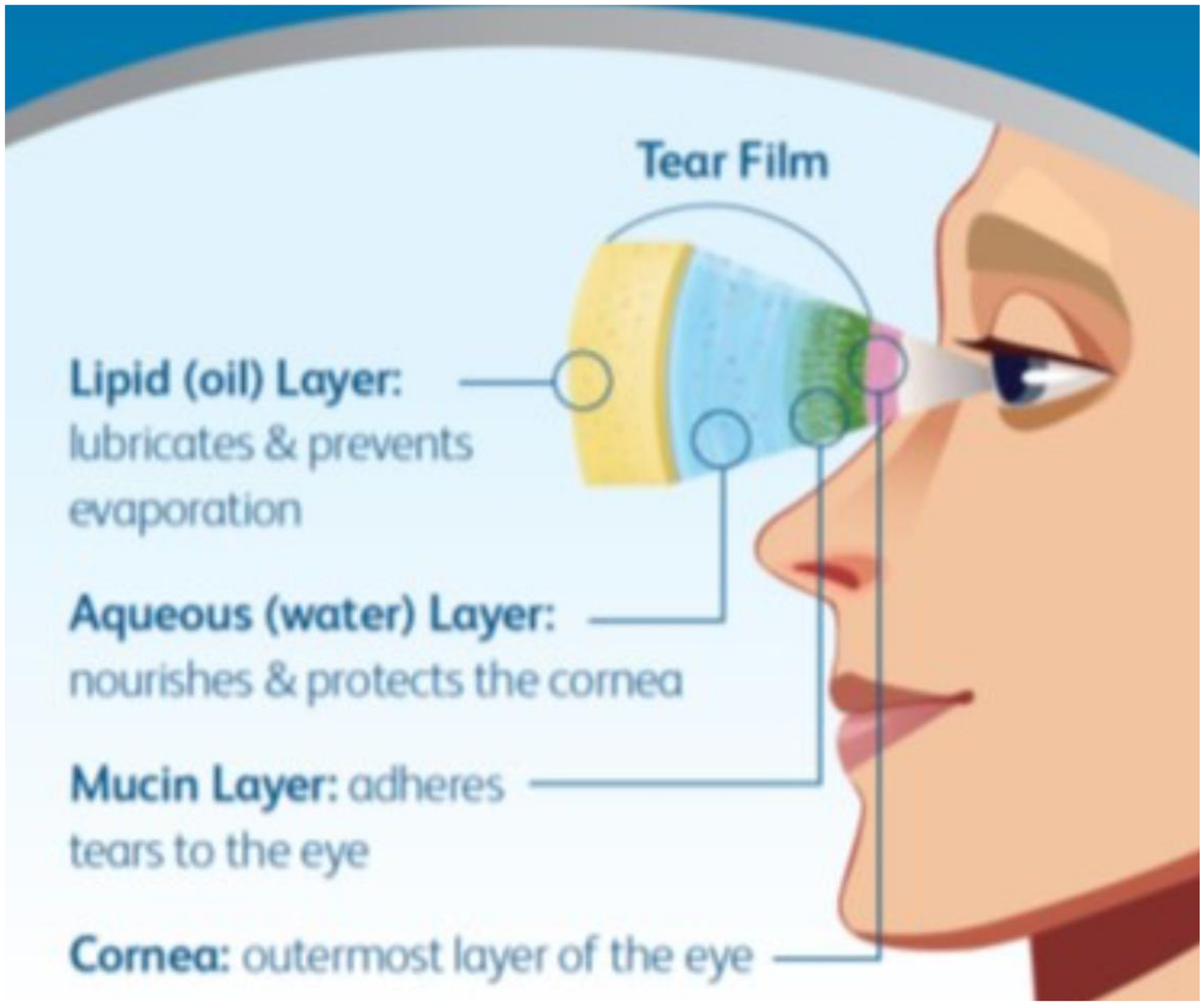


The Lacrimal System

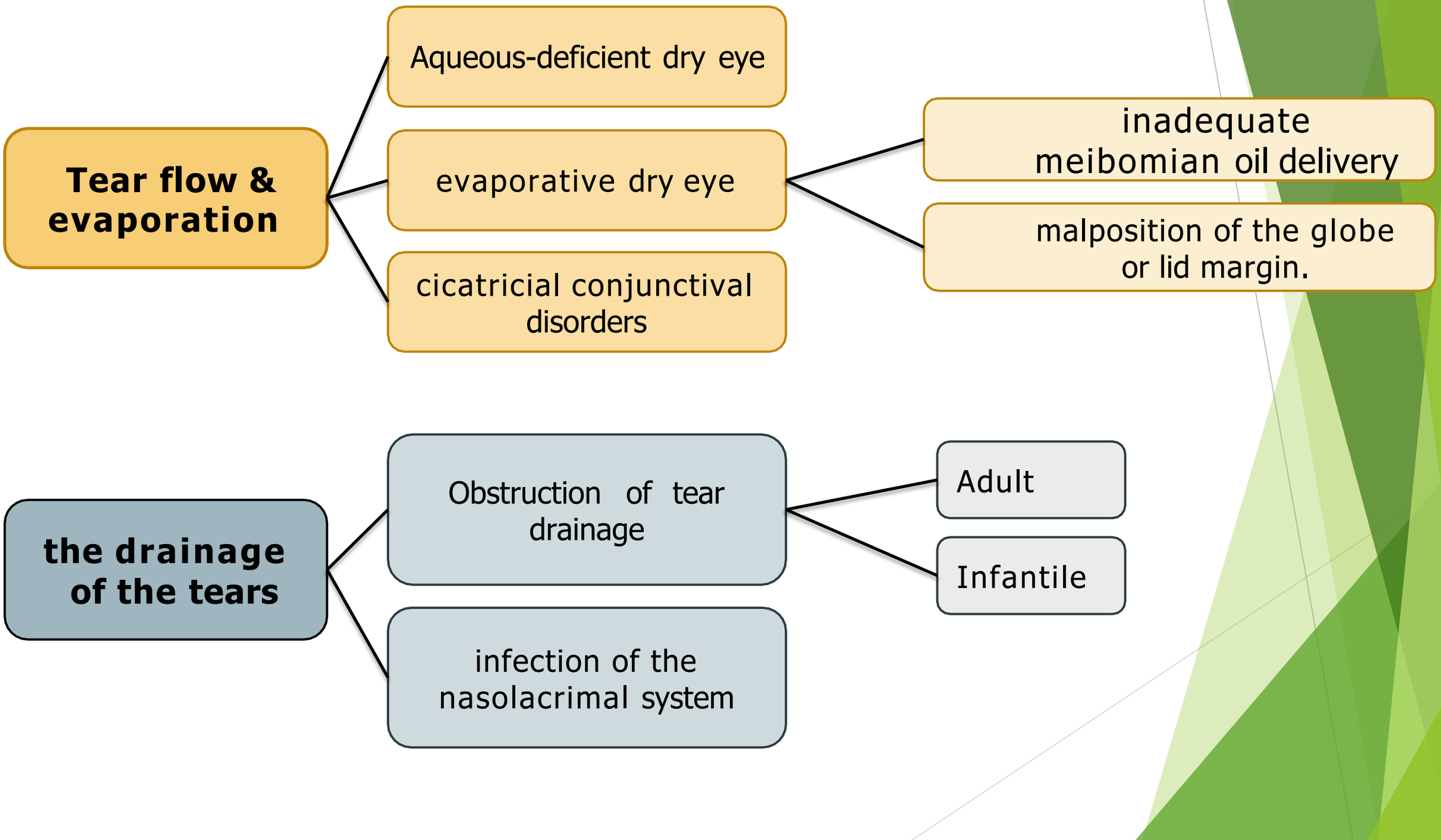
- **Functions of the tear film:**

1. Moistens the eye and prevent dehydration.
2. Provides smooth air/tear interface for distortion free refraction.
3. Transmits Oxygen to the cornea.
4. Removes debris and foreign bodies.
5. Antibacterial (Iga, lysozyme, lactoferrin)

The Lacrimal System



Abnormalities of lacrimal system



1- Tear flow and evaporation problems ⟹ Dryness

- Deficiency of tear flow and volume and/or excessive evaporation lead to tear deficiency and ocular surface ***hyperosmolarity.***
- This results in ocular surface damage, inflammation, discomfort and visual loss **(Keratoconjunctivitis Sicca)**

↳ primary dryness of the eye)

Aqueous-deficient dry eye

- Occur due to deficient Lacrimal gland secretions.
- More common in elder women. (hormonal changes)
- Mainly due to **Sjogren's syndrome** (Primary or Secondary)

Aqueous-deficient dry eye

- **Primary Sjogren's syndrome:** autoimmune disease which causes inflammation and dysfunction of glands.

- Associated with Dry mouth and MGD.

- **Secondary Sjogren's syndrome:** accompanied with other autoimmune diseases (Rheumatoid arthritis, SLE, Scleroderma)

- Dx: decreased salivary and lacrimal functions, T-cell infiltrates in minor salivary gland bx, anti-Rho and anti-La titers.

Aqueous-deficient dry eye

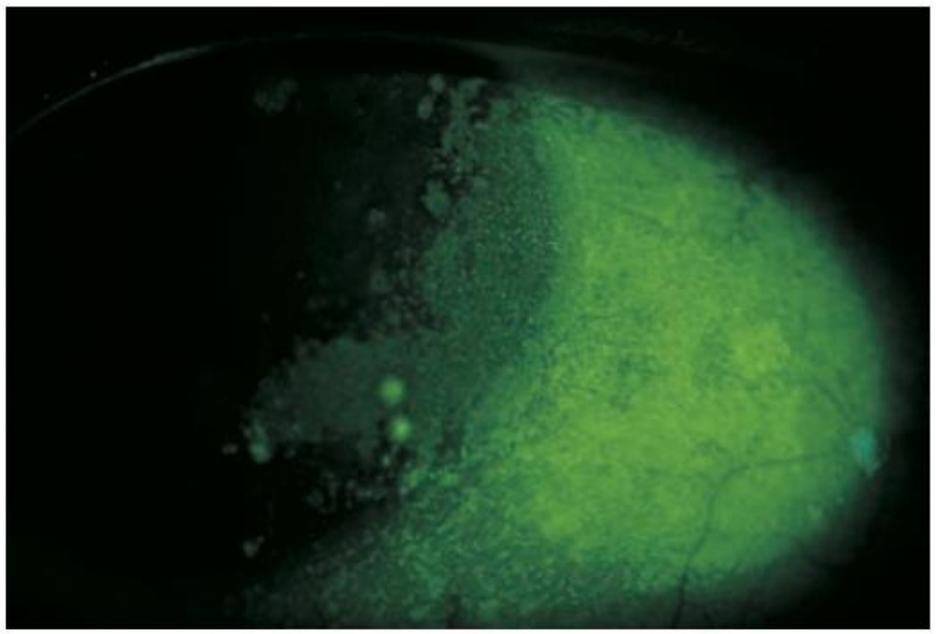
- **Symptoms (Non-Specific):**

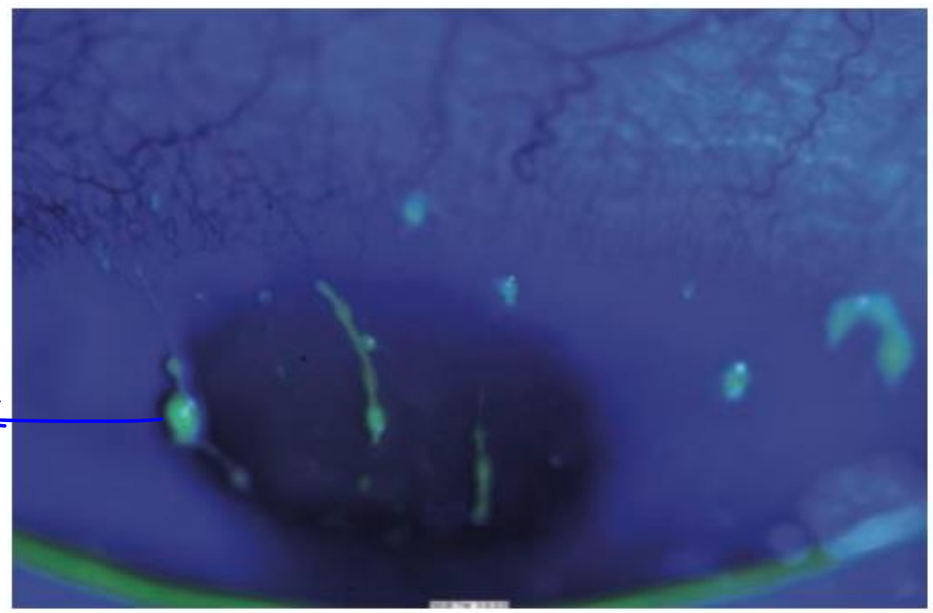
1. Burning eyes
2. Photophobia (can't open eyes in light)
3. Heaviness of the lids
4. Ocular fatigue
5. Grittiness (sand sensation)
6. Worse in the evening
7. Visual acuity affected due to corneal damage.

Aqueous-deficient dry eye

- **Signs with fluorescein stain:**

1. Early break up of the tear film after 5 seconds of blink suppression
2. Punctate staining of the eye with fluorescence will show small dots of fluorescein over the exposed corneal or conjunctival surface
3. Filamentary keratitis (tags of abnormal mucus)





Aqueous-deficient dry eye

Management:

1. Artificial tears
2. Shielded spectacles
3. Puncta plugs or surgical occlusion
4. Topical anti-inflammatory (cyclosporin)

Prognosis:

-Mild cases respond to artificial tears.
-Severe cases may be difficult to treat

2-Evaporative Dry Eye

A- Inadequate Meibomian oil delivery (MGD):

Extensive Meibomian gland obstruction →deficient tear film lipid layer → ↑ water loss from eyes.

treatment as in posterior blepharitis.

B- Malposition of the globe or lid Margin:

- Ectropion
- Lagophthalmos: Incomplete lid closure **as in** 7th CN palsy.
- Proptosis
- Infrequent blinking (Parkinson's)

management:
- correct lid deformity
- artificial tears
- local Botulinum toxin to levator muscle
- Lateral tarsorrhaphy (for severe proptosis or facial palsy)

Cicatricial conjunctival disorders

- Loss of goblet cells occurs in most forms of dry eye, but particularly in cicatricial conjunctival disorders such as erythema multiforme (Stevens–Johnson syndrome).

- ‘target’ lesions on the skin and discharging lesions on the eye, mouth and vulva

- In the eye this causes conjunctival shrinkage with adhesions forming between the globe and the conjunctiva (symblepharon)

Goblet cells are lost also in:

1- chemical burn of the eye

2- Trachoma

3- vit A deficiency-xerophthalmia

(corneal melting and perforation “keratomalacia”)

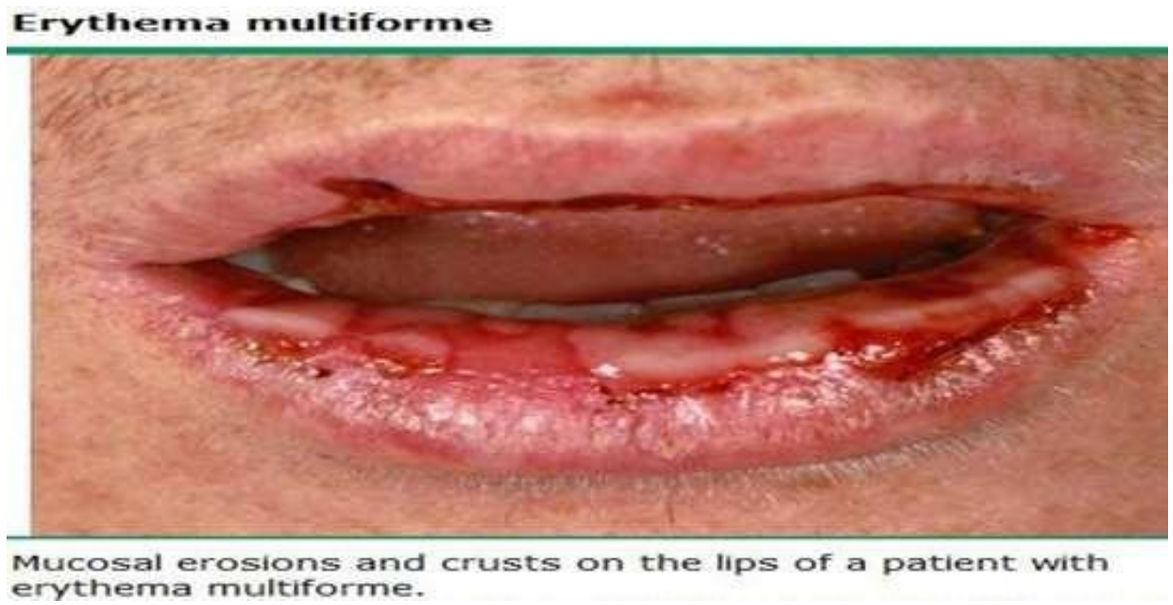
Cicatricial conjunctival disorders

Symptoms & signs

Similar to aqueous deficiency

Examination may reveal scarred abnormal conjunctiva and area of fluorescein staining

Treatment: artificial lubricant



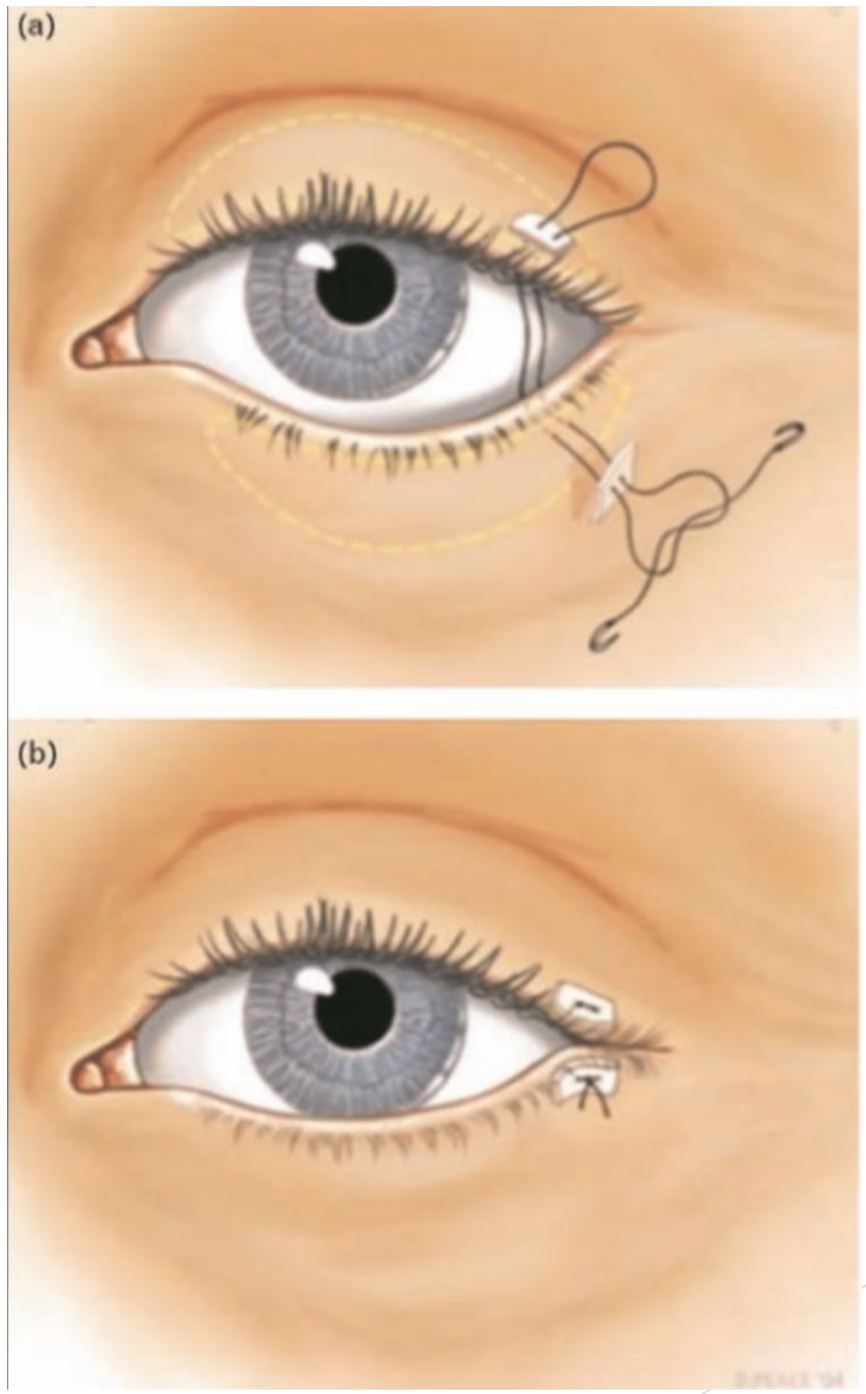
Mucosal erosions and crusts on the lips of a patient with erythema multiforme.

Evaporative Dry Eye

Management:

- Correction of lid deformity
- Artificial tears and lubricants
- Local Botulinum toxin injection into the levator muscle in case of incomplete closure
- Lateral Tarsorrhaphy

Lateral Tasrsorrhaphy



Tear Drainage Disorders ➡ Tearing

- Either due to <u>irritation</u> of the ocular surface or due to <u>occlusion</u> of the drainage system (**Epiphora**)

Infantile Drainage Obstruction

- The nasolacrimal system canalizes and become patent near Term period.
- Watery eyes will result from failure of the distal end of the nasolacrimal duct to canalize.
- Obstructed canaliculi may result in mucocele or Dacryocystitis.
- **The conjunctiva is not inflamed.**
- Dx: pressure over lacrimal sac→ discharge from puncta
- Treatment: mostly resolves spontaneously in the 1st year of life
- If not➔ probing to perforate the occluded membrane through the lacrimal duct

Adult Drainage Obstruction

- Most common site of obstruction is the nasolacrimal duct, but can be present anyway in the tract.

- **Causes**:

1. Infections
2. Direct Trauma, Fractures
3. Topically applied drugs

- Present with watery eyes, stickiness and white eyes, worse in cold or windy weather.

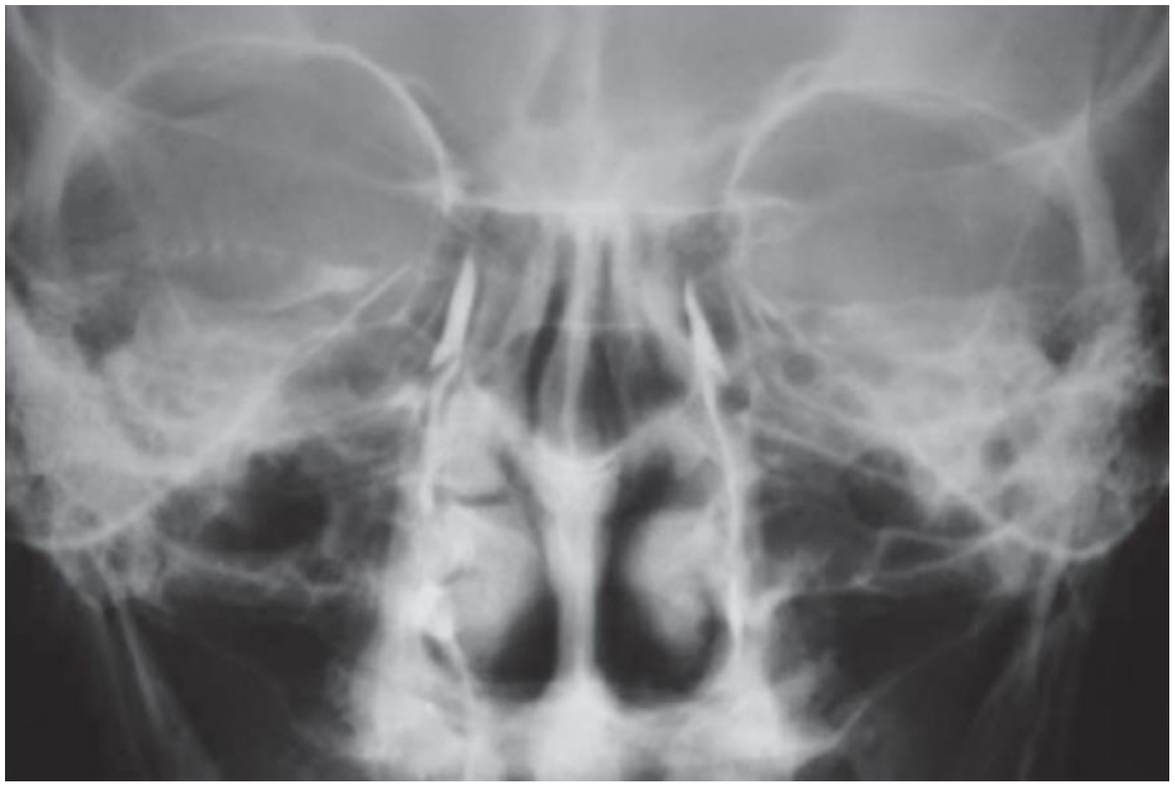
Adult Drainage Obstruction

- Stenosed punctum can be seen on slit lamp.

- **Patency of the Nasolacrimal system can be assessed by:**

1. Syringing normal saline into the canaliculi.
2. Fluorescein dye disapperance after 5 minutes.
3. Dacryocystogram: radio-opaque dye followed by X-ray
4. Dacroyscintogram: Radioactiveisotope followed by gamma camera

Adult Drainage Obstruction



Dacryocystogram

Dacryoscintogram

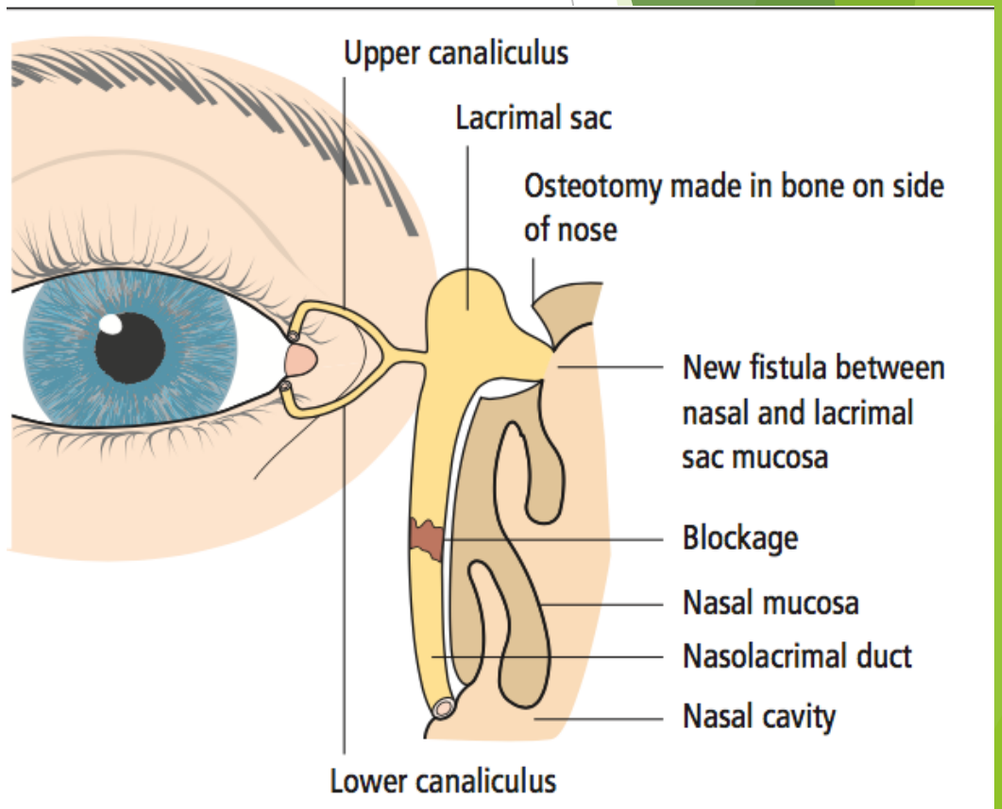
Adult Drainage Obstruction

- **Management:**

- Exclude other ocular diseases causing watery eyes.

- Dacryocystorhinostomy (DCR):

  new fistula between nasal and lacrimal sac mucosa



Nasolacrimal system infections

- **Dacryocystitis:** mostly due to obstruction of the system.
- Staph. or Strep. infection.
- Presents with painful swelling on the medial side of the orbit
- Treated with systemic antibiotics.
- **Mucocele:** collection of mucus in an obstructed sac, usually painless (not infected).
- DCR is done in both cases.

Acute Dacryocystitis

nasolacrimal sac inflammation

THANK YOU