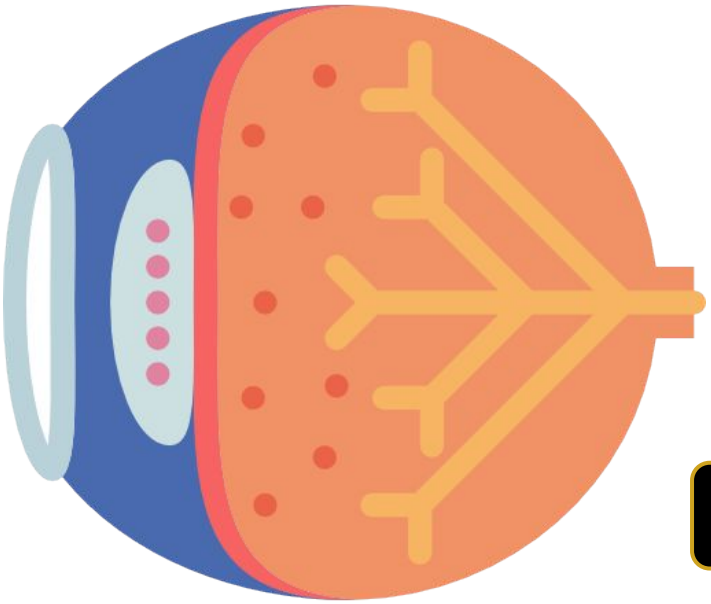
Lecture: 4



Editing file

Lids, Lacrimal & Orbit Disorder

- **Presented By: Dr. Adel Alsuhaibani / Yasser AlFaky**
- To understand orbital anatomy and evaluation techniques for orbital disorders.
- To identify Eyelid and lacrimal drainage anatomy and evaluation techniques.
- Identify common and serious causes of proptosis, enophthalmos and treatment options available and investigations.
- To know how to investigate and approach different etiologies of eyelid swelling.
- Know how to manage certain types of eyelid malposition.
- Know the role of general practitioner in managing patients with epiphora.

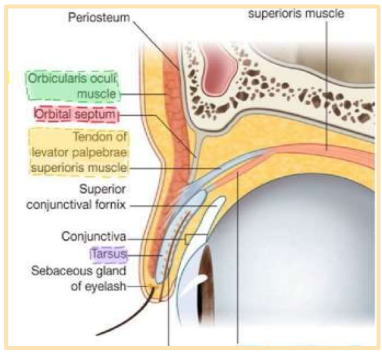
Important **Doctor's notes**

Golden notes **Extra** **Book**

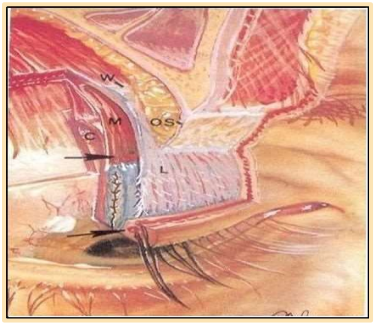
OPTHALMOLOGY TEAM

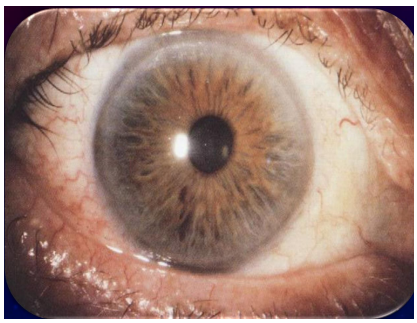
Lash Disorders

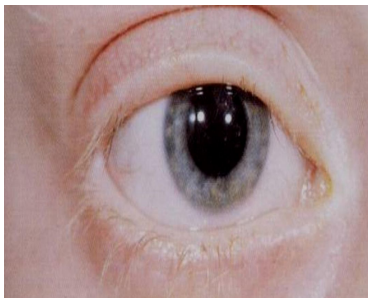
The upper eyelid anatomy:



- From outside: skin → (supplied by facial nerve) → orbital septum (a dense fibrous tissue) → orbital fat (also called preaponeurotic fat) → levator muscle which will be changed to tendon called levator aponeurosis, will attach to tarsals Muller muscle of conjunctiva.
- Tarsal is a condense fibrous tissue that is forming the skeleton of the eyelid, within tarsals are meibomian glands: fat secreting (sebaceous) glands, opens on the lid margin. forming the fatty layer of the tear film around 35 in the upper lid and 25 in the lower lid.
- The important thing in the orbital septum (anterior boundary of the orbit).
- Anything behind the orbital septum = orbit = intra orbital, anything anterior to the orbital septum = extra-orbital = preseptal.
- **What is the difference between levator muscle and Muller muscle ?**
    - They both elevate the eyelid. however, they differ in the nerve supply & the type of muscle levator muscle is a skeletal muscle supplied by the oculomotor nerve, and **muller** (AKA superior tarsal muscle) muscle is a smooth muscle supplied by sympathetic nerves.







Trichiasis:

Primary (metaplastic lashes and distichiasis) or secondary (entropion)

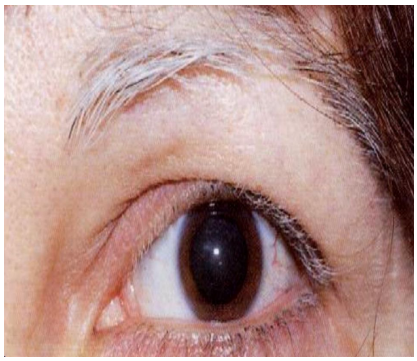
- Eyelashes should be away from the ocular surface.
- **Primary trichiasis:** when the eyelash rub on ocular surface while lid margin is normal in position.
- **Secondary trichiasis:** when the eyelashes are normal in position while the lid margin turns inward taking the lashes with it. Once correcting the lid margin, the lashes will go way from the ocular surface.
- Problem of trichiasis is **foreign body Sensation** and **continuous rubbing** against conjunctiva and corneal surface.
- **Complications** would affect the cornea, Microorganisms might enter, causing corneal inflammation and inducing keratitis, resulting in corneal opacity.

Madarosis:

Local or systemic

- It is the partial or complete loss of eyelashes **could be due to:**
- **Local cause:** infections, Malignant Surgical intervention(primary surgery or repair of Trauma).
- **Systemic condition**: psychologically rubbing the eye, Alopecia.

Lash Disorders



Poliosis:

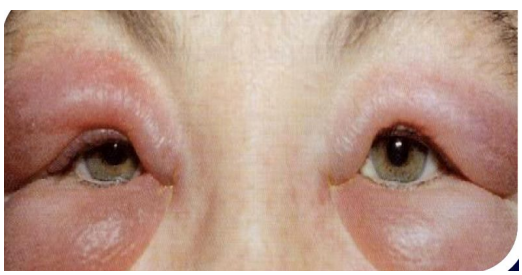
- Premature whitening of eyelashes.
- Can be due to **systemic association:**

VKH Vogt-Koyanagi-Harada (most common)

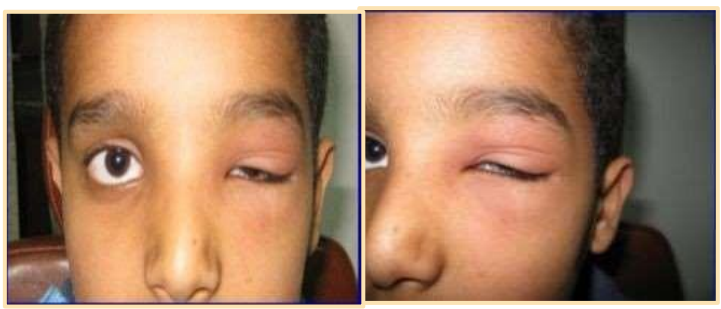
Allergic Eyelid Swelling:

- **Acute allergic edema:** insect bite, angioedema or urticaria.
- Unilateral or bilateral **painless and pitting edema.**
- **Contact dermatitis:** Sensitivity to topical medications.
- Swelling of eyelid is most commonly due to infection. BUT allergic swellings are very common, mainly due to insect bites and irritants. Not infection. Not inflammation
- How to differentiate between swelling due to allergy or infection?
  - By history taking and clinical examination.
- **Allergic eyelid swelling**:
  - Develops with a sudden onset of huge lid swelling and edema collection (pitting edema) which occur few minutes to few hours.
  - Presents with non tender, pink in color, no fever, **hallmark is itching.**
  - While examining evert the lid, as there might be follicle conjunctiva reaction helping in diagnosing allergy to medication.
  - Triggers include face cream, especially applying ointment at bedtime bc cream goes on your pillow and come back to your eyes, be careful and apply before 2h of bad time.

- **Preseptal cellulitis (infection):**
  - Develops gradually and takes a few days to develop and present with severe picture.
  - Presents with redness, warmth, tenderness and pt would be tired and ill (if a pediatric pt presents with swollen eyelid, and he's playing around, this is most likely allergy.)
- For example, if a patient suddenly woke up with a huge swelling & presence of the trigger & previous episodes (recurrence) most likely due to allergy because preseptal cellulitis takes time to develop.
- **Treatment:** Antihistamine and cold compress. (If you're in doubt of infection, start Abx and add systemic Antihistamine).



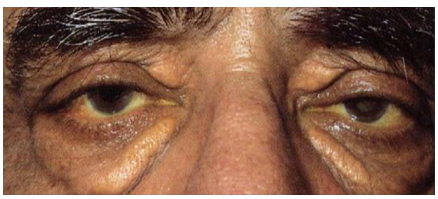
pale pink color, no engorged blood vessels



Lash Disorders

Xanthelasma:

- Elderly people or those with hypercholesterolemia.
- Cholesterol and lipid subcutaneous plaques, lipid deposits in the eyelid.
- We treat the hyperlipidemia along with the eyelid lesions.
- Investigating the lipid profile is very important because 50% will have lipid profile abnormality.
- Doctor's don't usually treat hyperlipidemia unless it reach to a certain limit, but if the pt develop Xanthelasma, in this situation we to treat hyperlipidemia even if they have mild elevation of lipid profile.
- **Treatment**: surgical excision or CO2 laser evaporation
  - If it's a small deposit, we can excise it, but we can't remove these material without removing skin (bc it's deposits in dermis and epidermis is so you have to excise the whole area,
  - If it's excessive like (image 1) , do lazer first.
  - You have to warn the pt that they have to control their lipid profile, be whom we remove this one it may reoccur



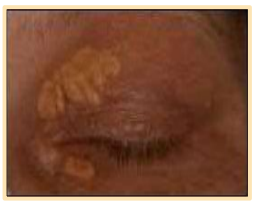
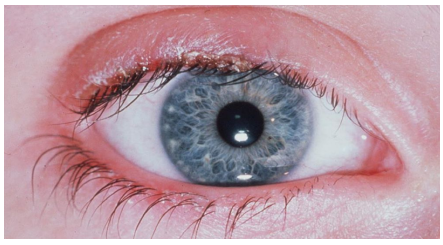


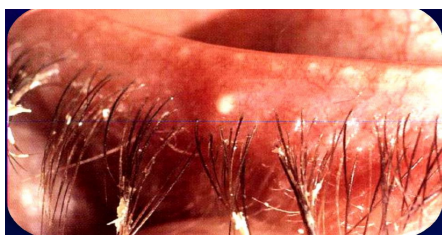
image 1

Eyelid infections

Blepharitis

- It is a chronic inflammation of lid margin that involves the roots of the eyelashes, and can involve the meibomian glands and the eyelids. Usually by bacterial infection, **staph aureus** is the most common.
- It is a very common disease unfortunately, ranging from mild to severe.
- **Anterior blepharitis** (anterior lamella of lid -near root of lashes), **Posterior blepharitis** (posterior lamella-near meibomian glands), or **Mixed Blepharitis.**
- **Mixed Blepharitis** is anterior and posterior blepharitis, with more symptoms and signs (mild congestion of the eye, minimal telangiectasia over the lid margin, photophobia, tense forign body feeling sensation, redness, sometimes transient blurring vision), it needs longstanding treatment.
- **Predisposing factors:** dandruff, staph infection, eyelashes mites and lice.
- **Signs**: lid margin (hyperemia, telangiectasia and tiny abscesses), scales and lashes (greasy and stuck together).
- **Symptoms**: burning, grittiness, mild photophobia, crusting and redness of lid margin.
- **Complications**: Stye, Tear film instability, Hypersensitivity to staph. toxins, trichiasis, madarosis and poliosis.





Eyelid infections

Blepharitis: cont..

- **Treatment**:
- The main goal of treatment is not to eradicate the disease, but to control the symptoms.
- It needs very high cooperation of the patient.
- They are treated with topical antibiotics and lid hygiene.

1) Lid hygiene

- Principle treatment is lid hygiene, pt has to clean the eyelid with commercially available lid scrub, or diluted baby johnson shampoo (does not irritate the eye), 2 times a day for the first month and then once a day for the rest of their life be it's related to skin type, as it's not something that improves with time.
- In the morning bc secretions accumulate through the night, predisposing to local infection of hair follicle or meibomian gland (Hordeolum).

2) Antibiotic ointment

- **Anterior blepharitis:**
  - Commonly associated with staph. aureus, so give topical Abx against staph. like daptomycin but they have to clean the lid first then apply Abx.
  - It's not uncommon in pediatric: eyelash mite infestation (demodex blepharitis)> Tea tree oil is very effective.

3) Systemic tetracycline

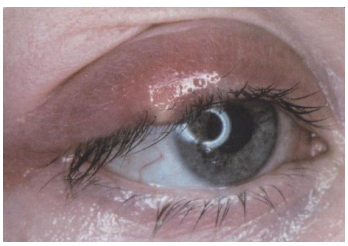
- **Posterior blepharitis:**
  - Tetracycline, Doxycycline for 3-4m according to the severity.
  - Chronic history: pt using roaccutane to treat acne leading to insufficient meibomian gland secretion, or skin atopy like eczema, so if you see chronic blepharitis check medical history for skin disease, or systemic disease

4) Lubricants:

- Not bc they have dry eyes, the problem is in the meibomian secretion. Tear production is fine but lipid part is abnormal that why tears evaporate very fast, so give pt a **viscous lubricant.**

5) Weak topical steroid:

- Anti inflammatory; steroid for couple of days to control inflammatory status of the Pt. then treat them with Abx topical (on lashes and lid margin زي الكحل)

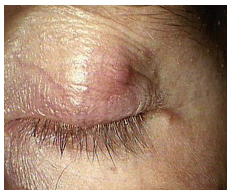


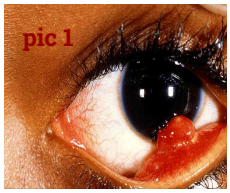
External Hordeolum (Stye):

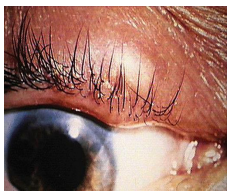
- It is a localized acute staph infection and inflammation of hair follicles and associated glands, around the root of the eyelashes. develops rapidly, producing an elevated, painful, red, swollen area on the eyelid.
- Pts present with mild preseptal cellulitis, redness, swelling of the eyelid, and sometimes pus.
- Predisposed by local (blepharitis) or systemic causes (Diabetic, decreased immunity).
- The inflammation sometime very severe especially if it's predisposed to chronic blepharitis. you find (multiple styes) or if the pt is diabeticnin this situation you may add systemic Abx.
- How is Stye different from blepharitis?
  - Blepharitis is a chronic infection along the route of the eyelashes, involving the whole eyelid, while a Stye is an acute & localized infection.
- **Treatment**: hot compresses, epilation, topical antibiotics and even systemic if associated preseptal cellulitis.

Eyelid infections

Internal Hordeolum (ACUTE CHALAZION)



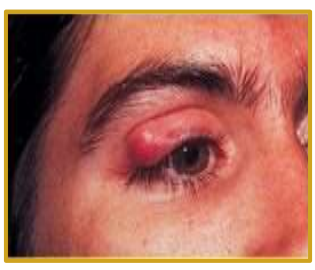


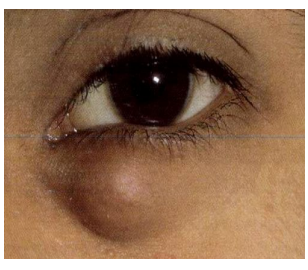


- Acute staph. infection of meibomian gland. The most common cause of meibomian gland inflammation.
- If pt is at the acute stage its **acute** chalazion (you have to be specific), if only chalazion they mean chronic inflammation
- **Signs**: tender inflamed swelling within the tarsal plate. It may discharge anteriorly through the skin or posteriorly through the conjunctiva.
- **Symptoms**: foreign body sensation (tapping of meibomian gland), starts as a very small dot over lid margin (it takes couple of hours), feeling of something in the eyelid when blinking (pain), swelling of lid.
- Most of the time it's confined to the tarsus: swelling, tenderness, pain (especially while blinking) and lacrimation (defensive mechanism).
- **Predisposing factors:** use of make-up, Systemic skin disease (oily skin)
  - Roaccutane, Dandruff (predisposing for blepharitis)
  - Pediatric, recurrent at this age group, usually at the age of 3 yo (change diet/feeding protocol) and 7yo (start play outside).
- **Treatment**: Control of infection then curettage if residual mass.
  - **Topical Abx and steroid** if localized, 60% resolve, the earlier the better.
  - **Systemic Abx** if the whole lid margin is inflamed.
- If treatment is delayed or the infection is more severe you may have whole lid margin inflammation or the chalazion captures anteriorly leading to (thinner skin, marked redness, telangiectatic blood vessels, pointing abscess) or posterior (abnormal conjunctiva like pic 1).
- It does not completely resolve, it become smaller but meibomian secretion is there that's why it tends to come back, with time the tissue will try to contain the "contamination" of this infection and causes more and more fibrosis .
- **Surgical intervention** in acute stage is not recommended bc anesthesia will not be effective.
  - Tissue is inflamed, so evacuation of inflamed tissue you will damage the adjacent tissue, so you wait for 1w/10 days till the acute inflammation subsides and then evacuate.
  - We do a vertical incision to avoid damage to more than one meibomian gland.
  - The earlier the better (after resolution of acute phase), not more then 3 months, to avoid more fibrosis.

Chalazion (MEIBOMIAN CYST)

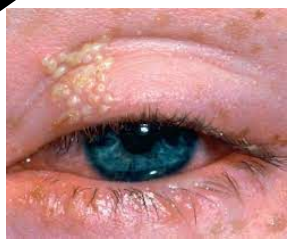
- Chronic lipogranulomatous inflammation caused by obstruction of the gland orifice. painless and tender, if painful > acute
- Most common lid mass.
- The meibomian orifices are blocked and as a result there will be accumulation of the meibomian gland secretions in the meibomian gland itself which is why the patients will present with swelling.
- In some cases, it presents with a co-infection and the patient presents with redness and pain along with the swelling.
- Treatment: 1) Surgery 2) Steroid injection





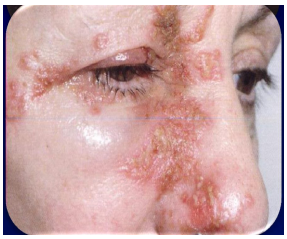
Eyelid infections

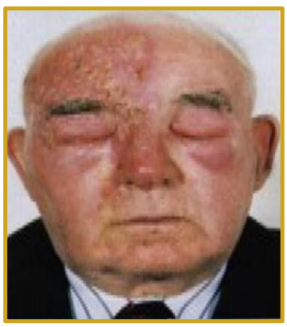
Herpes simplex:



- Primary Herpes implex, usually affects children, crops of small vesicles with mild edema may be associated with viral keratoconjunctivitis.
- Small redness on eyelid , on slit lamp : area of red skin as if the child has a burn, this finding is very early before formation or rupture of Pustule .
- **Treatment** with acyclovir, topical Antiviral for 10 days.
- Difficult to treat (takes a long time),but if you pick and treat early they disappear fast (1-2 days).
- Why it usually takes a long time to be diagnosed? bc pt goes to pharmacist and is misdiagnosed as allergy, and pt is given steroid.
- In viral infection if the lid margin is involved then most likely the conjunctiva is also involved and if conjunctiva is involved the cornea is involved. But if only skin is involved it's less likely to be affect ular involvement.

Herpes Zoster Ophthalmicus





- More serious, causing very agonizing pain (can lead to suicide).
- It occurs in the elderly without any comorbidities, however, if it occurs in young individuals you need to think about predisposing factors such as immunodeficiency.
- Almost always unilateral, So if you see lesion across the midline of the face it's not Viral it's secondary.
- It involves the ophthalmic division of trigeminal nerve.
- The nerve supplying the cornea is nasociliary nerve (branch of V1) and it supplies the tip of the nose also That's why if you see any lesion (Pustule) in the tip of the nose, you have to examine the cornea.
- The pathophysiology of Herpes zoster disease is unknown but one of the theories that the virus goes to the ganglia and have retroversion inflammation, that's why it recur.
- Hutchinson sign: lesion at tip of the nose.
- Problem is it cause agonizing pain, might bring the pt to comit suicide
- **Treatment**: systemic and topical acyclovir. Tx systemic antiviral and specific tests to rule out immunocompromisation.

Chlamydial Conjunctivitis

- **Adult Chlamydial Keratoconjunctivitis:**
- Sexually transmitted disease (50% associated with genital infection) caused by serotypes D to K.
- **Subacute onset,** unilateral or bilateral mucopurulent discharge.
- Follicular conj. Reaction and corneal involvement is uncommon.
- Non-tender lymphadenopathy.
- **Treatment**: Topical tetracycline, Systemic tetracycline, deoxycycline or recently azithromycin.

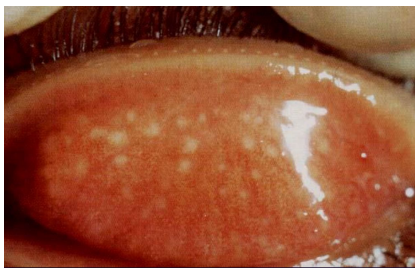
Trachoma

- Infection of conjunctiva and cornea in pediatric group.
- Caused by Chlamydia trachomatis (Obligate intracellular bacteria), serotypes A,B,Ba,& C.
- The common fly is a major vector in the transmission of the disease.
- It is the leading cause of preventable blindness all over the world.
- Atypical bacteria: bc it causes intracytoplasmic occlusion bodies, occlusion bodies is characteristic of viral infection and it responds well to Abx.
- Bc of the sequence of trachoma it causes severe fibrosis of conjunctiva pulling the eyelid inward (intropian > 2^{o} trichiasis > infection of cornea > dense corneal scars)

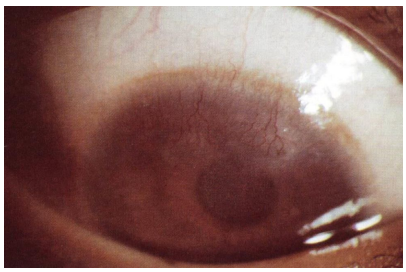
Eyelid infections

Trachoma: cont.

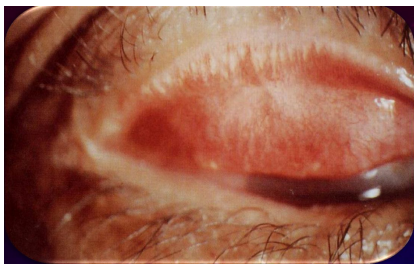
- What we see nowadays more than trichoma is adult inclusion blepharitis (Adult inclusion conjunctivitis), Caused by chlamydia but other serotype. It affect genital organs and the eyes, so it's imp to treat the Pt and their partner
- **Symptoms**: During childhood with redness, and mucopurulent discharge.
- **Signs**: follicular conjunctivitis, limbal follicles, keratitis.
- **Lab Investigations:** Direct monoclonal fluorescent antibody microscopy, ELISA, Polymerase chain reaction (PCR), Giemsa stain (inclusion bodies)
- Tx: topical abx, tetracycline or terramycin(systemic)
- **Complications**: Progressive conjunctival scarring (Arlt line, PTDs and entropion), Herbert pits, Corneal pannus.
- **WHO grading**
  - TF = trachomatous follicles
  - TI = trachomatous inflammation
  - TS = trachomatous scar
  - TT = trachomatous trichiasis
  - CO = corneal opacity



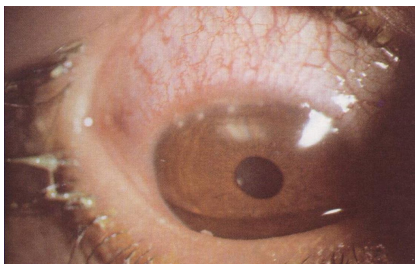
Follicular conjunctivitis: grayish elevated parts in Bulbar conjunctiva. found in allergy to medication, trachoma, viral infection

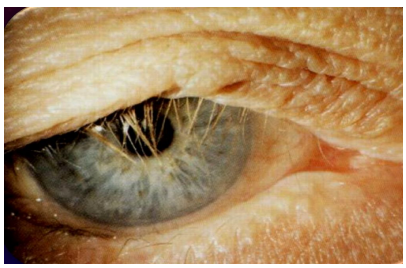


Inflammation of the cornea and Scars due to either the infection or lashes (2° trichiasis)

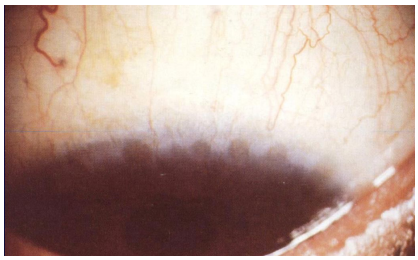


scars of bulbar conjunctiva





Severe ectropion with secondary trichiasis



Herbert's pits: healing follicles in the limbus (follicles that involved the limbus and cornea)

Eyelid malposition

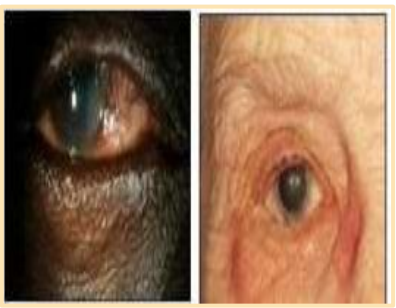
Entropion

- Inversion of the lid margin (the eyelid is turning towards the eye)the lashes irritate the cornea and conjunctiva, inflammation and scarring.
- **Types**:
  - Involutional (aging): only lower eyelid bc tarsas of upper eyelid is very long 10ml, while tarsus of lower eyelid is only 5ml, so if pt has laxity of lower eyelid, orbicularis muscle will override pushing the eyelid inward.
  - Congenital: common due to folds of skin, usually improve with time.
  - Acute-spastic: when orbicularis muscle is too strong (lower lid).
  - Cicatricial (scarring):
    - Most common cause of entropion is scarring of posterior lamella (conjunctiva) like **Trachoma** or chronic inflammation, chemical injury, surgery intervention on conjunctival side or Some disease that cause conjunctival Cicatrization (Steven Johnson syndrome)
    - Trachoma: Typically start with eye redness and discharge , if it's not treated it will lead to scarring in the conjunctiva and this typically we see it when we evert the eyelid , the scarring of conjunctiva will cause shortening of the eyelid from posterior part and this will lead to lid margin to turn toward the eye and the lashes will rub against the cornea , if not treated will lead to corneal laceration and corneal opacification this will compromise the vision.

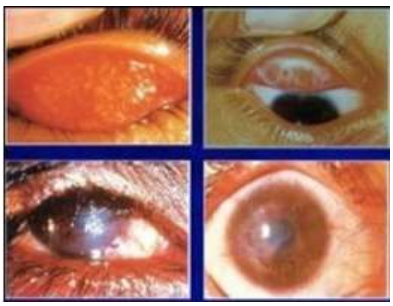
Eyelid malposition

Entropion: cont..

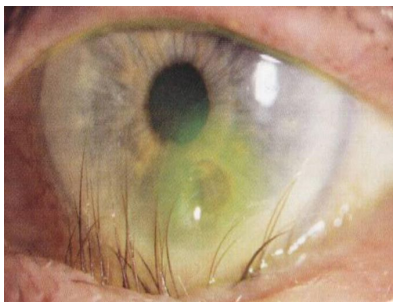
- Usually patient develops entropion many years later (patient had the infection 40 years ago).
- They usually present with entropion, corneal scarring, or dryness .
- Trachoma caused by chlamydia trachomatis which is an intracellular bacterium that cannot be stained with a gram stain because it doesn't have a cell wall, and It is treated with tetracycline, azithromycin, or clarithromycin. However the sequelae of trachoma like entropion, corneal scarring need to be treated with Surgical intervention.
- Treatment: surgical, most serious complication is corneal scarring and keratitis.



Left: upper eyelid entropion
Right: lower eyelid entropion

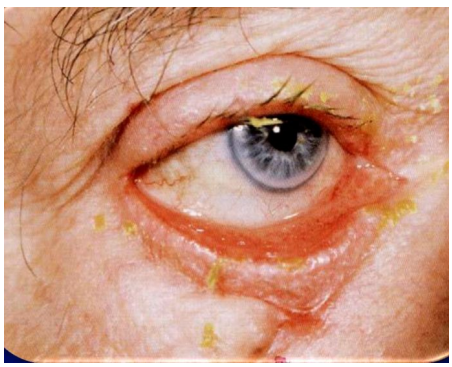


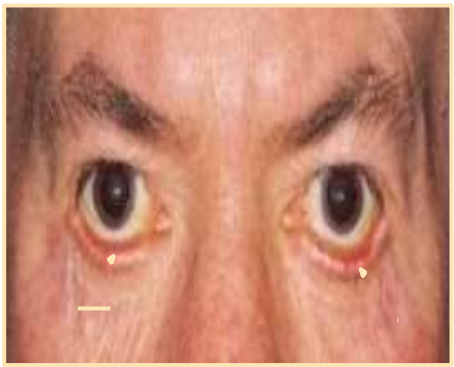
Cicatricial Entropion
Trachoma

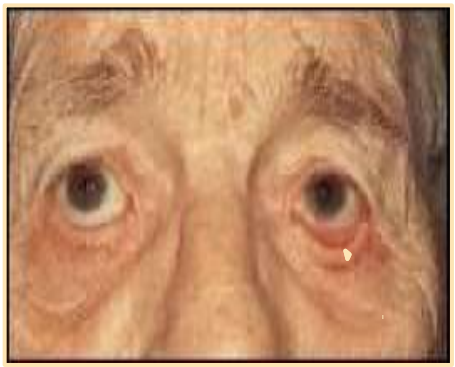


Ectropion

- Outward turning of lid margin (the eyelid is becoming so lax that it is turning away from the eye).
- **Types**:
  - Congenital.
  - Involutional (aging): also affect lower eyelid (weak orbicularis muscle). Laxity of eyelid tendon and eyelid.
  - Paralytic: facial nerve palsy → orbicularis muscle paralysis.
  - Cicatricial. Scarring of anterior lamella (skin), any cause of scars trauma, surgery
  - Mechanical: mass in lower lid (**in anterior lamella**)
- Complication: It causes severe dry eye and pt will have watery eye (excessive tearing), not due to obstruction lacrimal drainage system but due to inability to maintain tear film in normal position and to allow the tears to drain through the nasolacrimal system
- Treatment: surgical







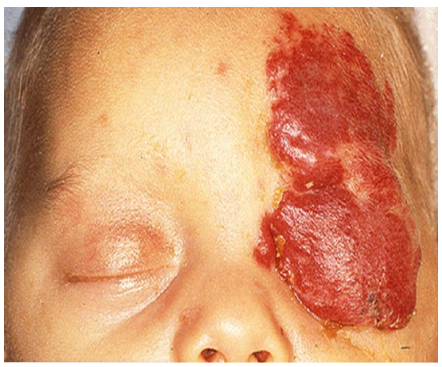
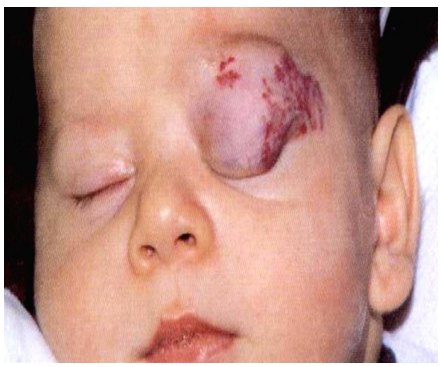
Benign Eyelid Tumors

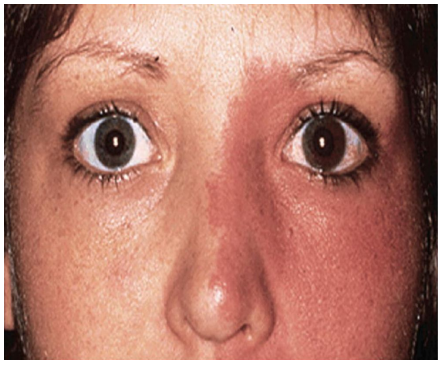
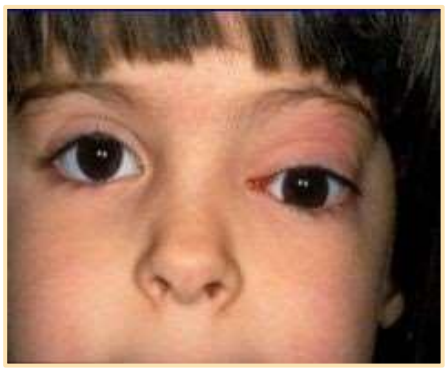
Benign:

- Naevus, Capillary haemangioma, Port-wine stain …etc
- Most common bangin lid mass-chalazion (meibomian cyst).
- Most common benign lid Tumor in pediatrics is capillary hemangioma.
- Among non pediatric age group > skin tag.

Capillary hemangioma

- A benign tumor of the blood vessels or capillaries.
- Solitary in eyelid only or could involve other Capillaries in the body, most common is GIT, the might bleed and cause death (no capsule surgical excision is difficult).
- Growing over the first 1.5 year than it stops and regress, 10% per year (10 years), it enlarges in size until age 3 or 4 then it regresses by itself by age of 5 or 6 years.
- Senario:A 4 months old baby, the family noticed something started on his eye at age of 2 months and decreasing? Dx Capillary hemangioma
- We need to treat it because they can develop amblyopia or vision loss if left untreated, by mechanical ptosis> obstructing the visual pathway (Axis) or causing pressure on cornea leading to astigmatism. amblyopia difficult to treat later in life.
- It may affect half of the face > sturge weber syndrome diffuse type, associated with glaucoma. Glaucoma in this case is difficult to treat, when we touch the eye, it bleeds everywhere. For this syndrome they do lazer, bc of high vascularity causes hypertrophy of skin.and they have to follow IOP in close intervals to detect glaucoma
- **Treatment**: we used to inject long acting steroid but bc reported cases of Central retinal artery occlusion. due to retrograde fibration of injected substance, now we give systemic beta blockers (1st line)((propranolol). If they don't respond to beta blockers, we give them steroids injection or systemic steroids > if not laser treatment or surgical excision.
- Beta blockers in CI in Asthmtic pts, give them systemic steroid or beat infection of Long acting steroids


Cavernous Hemangioma
Usually in adults

Malignant Eyelid Tumors

Malignant:

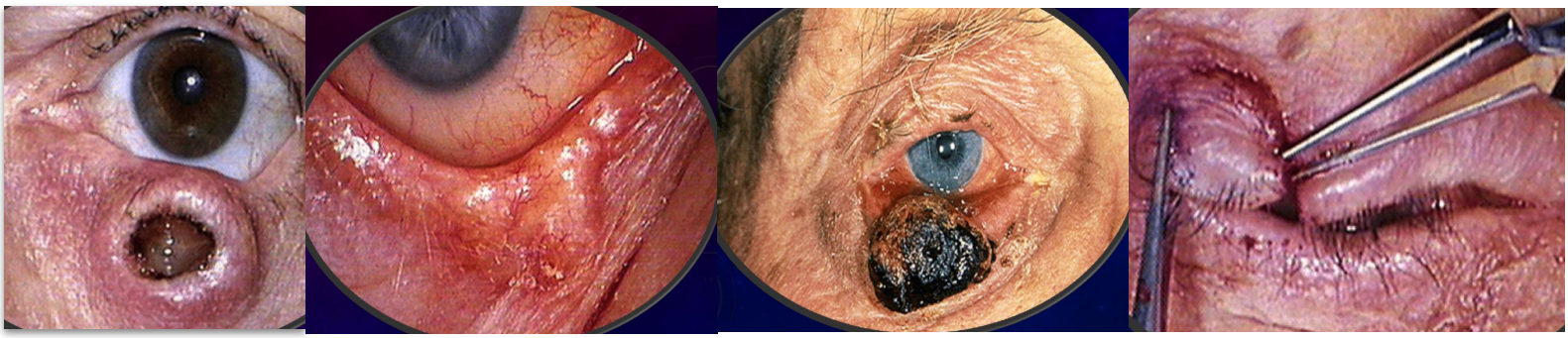
- BCC> SCC> SGC and Melanoma.
- Major role as GP is to pick malignant mass.
- Most of malignant tumors might develop in eyelid, eyelid contain skin, muscles, fat, tarsas
- How to detect malignancies?
  - Age → elderly
  - Recurrence → (surgical incision)
  - Restriction of normal anatomy → loss of lashes, can't tell where anterior and posterior lamella, engorging on the ocular surface, adhesions.
  - Onset → rapid growth
  - Pigmentation→ there's pigment or loss of pigmentation
  - **Telangictic blood vessls** → Basal cell carcinoma.

Sebaceous gland carcinoma

- Most commonly missed lesion, least common malignant tumor but most aggressive, difficult to treat.
- Chalazion: if a pt have recurrent chalazion, same chalazion same age, done surgical evacuation and it comes back, we have to think about SGC especially if it's disturbs the anatomy.
- SGC is fortunately rare but the problem is early age group (35,40,45 yo), not disease of elderly.
- TX is biopsy and surgical excision (safety margian 2-3 ml).
- Here we excise and on-table we send it to pathologist, to tell us if margin is free or we need to take more and than reconstruction.

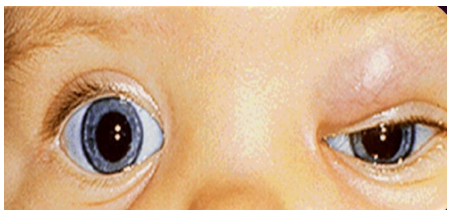
Basal cell Carcinoma

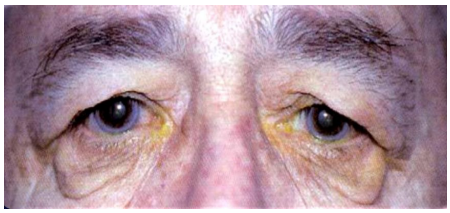
- Most common malignant-lid lesion is basal cell Carcinoma, bc related to sun exposure it's common in our community.
- BCC has 3 stages:
  - **Nodular stage:** 1 year to reach 0. 5 cm, one of the challenges in our community that it's pigmented, it might be confused with nevus.
  - **Ulcerative type**
  - **Sclerosing type**
- It's very imp if you have any subcated lid lesion, to palpate preauricular and retro-mandibular? (:/) lymph nodes, for stages and prognosis of the disease (possible metastasis)



Ptosis

- Drooping of the upper lid. Make sure it's the eyelid not only skin folds, and it's pre-tarsal show (area between skin fold and lashes, in primary position of gaze, (area of eyeshadow).
- Drooping of eyelid most of the time is not an issue but it might hide fatal disease (Horner syndrome, Surgical type of third nerve palsy can kill in few minutes (ruptured aneurysm in midbrain).
- **Pseudoptosis**: Skin folds → brow is down, eyelid in normal position disappearance of pretarsal show (we treat the cause)
- **Classification**:most common type is congenital, simple, invulational (elderly.)
  1. Neurogenic
  2. Myogenic
  3. Aponeurotic (involutional)
  4. Mechanical → Capillary hemangioma.
- Nowadays we see more due to non-surgical
- Intervention. (botox) just reassure the pt

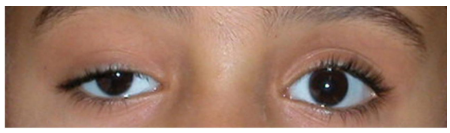


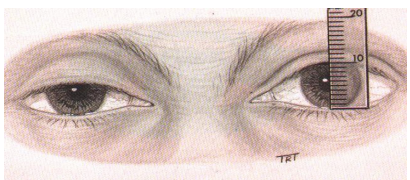


brow ptosis a pseudoptosis

Clinical Evaluation

- History:
  - Age of onset, Trauma (check old photos "difference" if it's due to trauma or not, but they may have some sort of condition and the trauma aggregate it), Previous surgery and Diurnal variations.
- Exclusion of Pseudoptosis.
- Associated signs:
  - EOM movements, Bell's phenomenon, Increased innervations, Fatigability and Jaw-winking.
- Measurements:
  - MRD 1, MRD 2, and lid crease.
  - Palpebral fissure height (PFH): very imp to measure the lid and levator muscle function.:- palpebral fissure→ distance between upper eyelid and lower. Comparing it with the contralateral side and calculating the difference is used to quantify the unilateral ptosis as mild (1 to 2 mm), moderate(3 to 4 mm) or severe(4 mm or more).
  - Levator function-distance between eyelids in both extreme down gate and extreme upward gaze.
  - PFH and levator function measurement tell how manny mm we should restrict from levator.





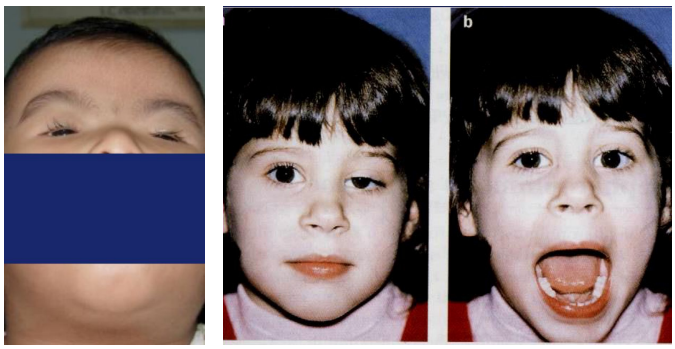
Management

- Preferable age for surgical correction? it's mandatory to treat congenital ptosis if it covers the pupil, for other causes its cosmetic.
- Surgery in pediatric group will be done under GA and the muscle is completely relaxed here we're restricting according to the measuremet, but in adult, surgery done under LA which have better outcomes be we restrict and let the pt sit during surgery and adjust.
- If unilateral, better to treat at preschool age → child at this age is cooperative and to avoid psychological disturbance, but some time we have to treat at earlier age if the pt liable to have complication like amblyopia, Astigmatism. (if eyelid covering pupil)- red reflex to see if the pupil is completely Seen.

Ptosis

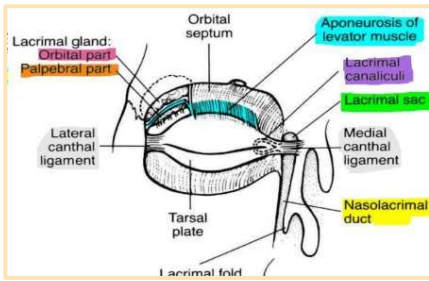
Management: cont.

- if bilateral, usually treated at 1y of age to prevent cervical spine deformity
- Type of surgery
  1. Levator Resection
  2. Frontalis Suspension
  3. Mullerectomy
- Postop. Complications and patient expectation.



Complex congenital ptosis (Marcus-Gunn syndrome (MGS)) → when she opens her mouth ptosis improve, Sometimes when moving the jaw sides and anterior

Lacrimal System



Structure and Function:

Lacrimal producing system:

- The lacrimal gland is approximately 2 cm long and it is situated superior-temporally behind the orbital rim.
- It can be divided into two main parts: The main lacrimal gland
  - Orbital: larger and sits on the lateral margin of levator palpebrae.
  - Palpebral: smaller and located along the inner surface of the eyelid.
- Accessory Lacrimal glands distributed all over the ocular surface (bulbar and palpebral conjunctiva.
- We have accessory lacrimal gland present in the upper and lower fornix nearby tarsal plate . however, the main tear production comes from lacrimal gland which is present in the anterior lateral superior part of the orbit.
- The two lobes are separated by levator aponeurosis, which is the tendon for levator muscle.
- Precrneal tear film: epithelium is hydrophobic. but why tear film is spreaded over the ocular surface, bc we have some secretion that change epithelium from hydrophobic to hydrophilic. goblet cell secreting mucin
- Precorneal Tear film have 3 layers : mucin layer, Aqueous layer (major part 90% in the middle) and oily layer "lipid layer"(prevent the aqueous layer from evaporation early). Meibomian glands secrete lipid layer.
- Accessory lacrimal gland responsible for daily secretion, when we need more → Lacrimal gland pump large amount of tear (psychological, irritation
- Inflammations) but some theories say that also Lacrimal gland take role for daily secretions

Lacrimal excretory system:

- The problem of lacrimal excretory system that it's a reservoir, if we have obstruction in lacrimal excretory system and stagnant secretion of lacrimal sec it predispose to infection (chronic or acute).

Physiology:

From the palpebral part of the lacrimal gland there are small ductioles secreting the tears to lubricate the eye, these ductioles open into the superior fornix, the tears will lubricate the cornea, and then will be drained through the lacrimal drainage system starting with the lower punctum which is a small round opening and upper punctum, and from there, there are small ducts called canaliculi (canaliculus).

Lacrimal system

Physiology:cont

- The upper and lower canaliculi will meet to form common canaliculus, then it will go inside the lacrimal sac, then from the lacrimal sac the nasolacrimal duct will take the tears to the inferior meatus.
- The canthal ligaments attach the eyelid to the bone. There are two canthal ligaments; the medial canthal ligament, and the lateral canthal ligament. The lacrimal sac is behind the medial canthal ligament.

Lacrimal system disorders

Dacryoadenitis

- It is Lacrimal gland inflammation.
- Acute inflammation of lacrimal gland → tenderness, pain, eyelid drop in lateral side (S-shape eyelid).
- The problem with lacrimal gland disease is disturbance of precorneal tear film → dryness of eye.
- Lacrimal gland normally not palpable.
- Most common cause of enlarged gland is Viral infection.
- If bilateral inflammation and associated with parotid gland sometime is due to systemic viral infection.
- There's bacterial infection (uncommon), or parasite infection.
- Whats more common infection or inflammation? Dacryoadenitis most commonly due to autoimmune disease.
- Dacryoadenitis may be manifestation of either IgG4 related disease (mikulicz disease) or associated systemic or vascular disorders or secondary Sjogren.
- Most common cause of destruction of lacrimal gland is sjogren's syndrome by lymphocytic infiltrate.
- The lymphocytic inflammation will destroy the producing acini Lead to decrease production of tear..
- It's imp to grasp these pts early, if you miss them for long time (lacrimal gland over), if pt have rheumatoid arthritis or common skin disorder or any other autoimmune disease, if you start **topical** cyclosporine twice a day for 3 months, you may prevent severe dry eye.
- Scar conjuntiva may obstruct palpebral Lacrimal gland and superior fornix
- For Autoimmune disease→ systemic steroid.
- Lacrimal gland tumor, not common
- 50% malignant, 50% benign
- Malignant: 50% epithelial (good prognosis) and 50% non-epithelial.
- So 25% of lacrimal glands are malignant with good prognosis

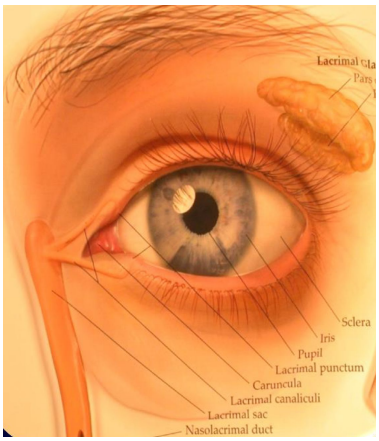
Excessive watering:

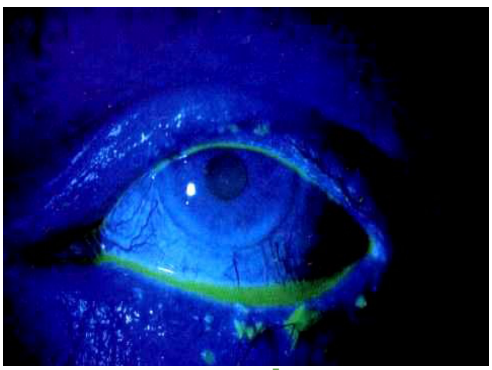
- Lacrimation: reflex over-production of tears, Any foreign body, inflammation (tears not only ligid, it's contain antiviral and antibacterial properties)
- Epiphora: mechanical obstruction of tear drainage.
- Lacrimal pump failure
- Dry eye may induce blindness, Watery eyes has no major Complication and bc of a lot of dry causes like dry weather, Age, hormonal change (menopause) diabetic, antihypertensive meds, OCP, and using roaccutane, we only]treat watery eyes only if it's bathoring the pt.
- If female pt with (كحل) it's not bothering or ask if she can put make-up for long time.
- If male pt ask about reading, using reading glasses bc moving your head down, the tear meniscus will be higher “covering the pupil) leading to minus lens in front of you cornea (cornea is down while reading), it will bathor the pt.
- Surgical intervention might induce dry eye, but always take pt complain serious.

Lacrimal system disorders

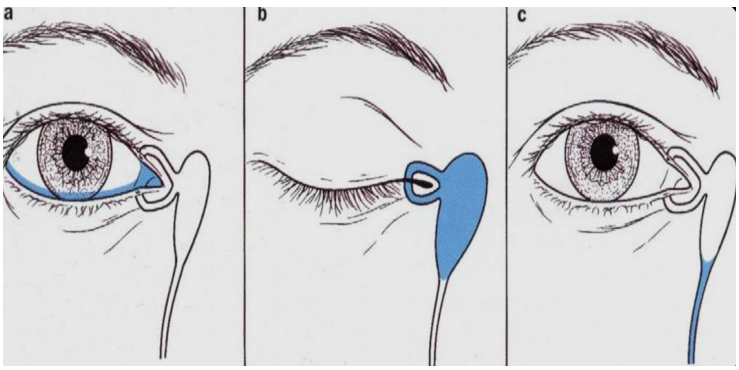
Examination of the Lacrimal System

- The eyelids.
- The dynamics of eyelid closure. if pt can close the eyes, means oribularis is fine, exclude facial palsy. facial palsy one of the cause of watery eyes, it affect Horner muscle (muscle attached laterally to lacrimal see, to produce-negative pressure to suck the tears.) and cause ectropion (and inability to close the eyes)
- Position of eyelid- entropion or ectropion (cause watery eyes)
- Look at canaliculus, medial compared to lateral, lateral should be higher by 2 mm, if not pt will complain of Lateral tearing
- Lacus lacrimalis area, any mass?
- Lashes, A lasher rupping at ocular surface (overproduction).
- The puncta, is it patent or obstructed?
- The marginal tear strip.
- The lacrimal sac.
- Dye Disappearance Test.
- Probing and irrigation.
- Jones dye test
- Radiography
- If everything is normal: evaluate Canalicum system
- Lacrimal sac, nasolacrimal pathway and inferior meatus (opening) it might be due to simply allergic Rhinitis
- Tx of lacrimal obstruction:
- If it's at the level of the punctum just dilation and make sure the rest of lacrimal apparatus is patent, we may use stunt
- If obstruction beyond the punctum, we do trinoscopy (dacryocystorhinostomy creating fissure opening between dacryocyst, lacrimal sec, and Nose, we' have to remove a bone, it's a simple procedure
- If obstruction at lower level, it's predisposing to infection and tx is not an option,
- Fluorescein test, it might be difficult with children bc when you apply the dye they cry and wash it, but not through lacrimal apperonts
- Sometime pt have stenosis not complete obstruction , which delay the washout





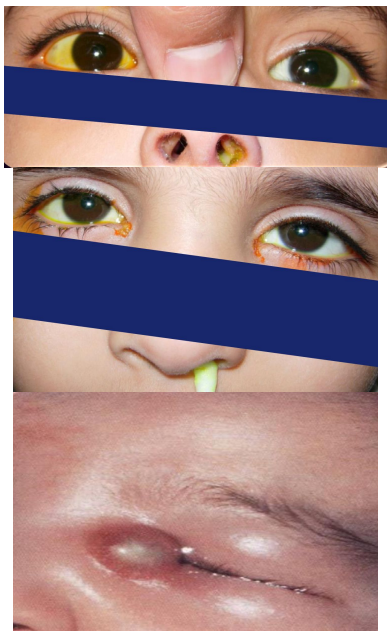
you can see here a tear meniscus



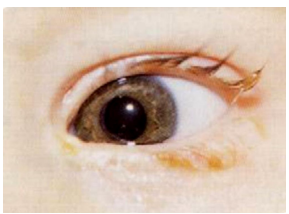
Lacrimal system disorders

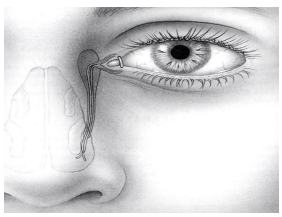
Congenital Lacrimal Duct Obstruction (common problem)

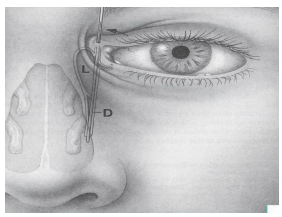
- One of the most common conditions that a child can present with is tearing and chronic discharge. This condition is called congenital lacrimal duct obstruction. The reason why they accumulate tears and have discharge is because they have delayed canalization of the nasolacrimal duct. Commonly the delayed canalization happens at the valve of Hasner at the distal end of the nasolacrimal duct. The nasolacrimal duct has a membrane that's supposed to be perforated before birth, but some children present with delayed membrane perforation.
- How to confirm? fluorescein
- In congenital lacrimal duct obstruction, the tears will accumulate in the lacrimal sac because of the obstruction, and eventually there will be discharge because the accumulation of tears in the lacrimal sac is a media for infection so the child will present with a chronic low-grade infection. if its conjunctival infection, eyes will be red, but here despite having discharge the eyes are fine, which means the infection have reservoir away from the eyes.



- Another cause for the discharge is the lacrimal sac is lined with mucus secreting cells. In children with a perforated nasolacrimal duct, the mucus goes to the nose. Whereas in children with this condition, the mucus cannot go to the nose and, so it will accumulate in the eye. They can be presented with unilateral or bilateral excess tearing and discharge.
- To treat this condition, we usually ask the parents to massage the area above the medial canthal ligament regularly until the age of 1. If the patient was presented after the age of 1, the chances of opening the duct through massaging the area is really low, so we go for probing to perforate the membrane.
- If a child presents with tearing but no discharge, you need to think about congenital glaucoma, eyelashes rubbing against the cornea , foreign body causing irritation or absence of the punctum of the lacrimal sac.
- Management:
  - Massage
  - Probing
  - Probing + Stent
  - DCR

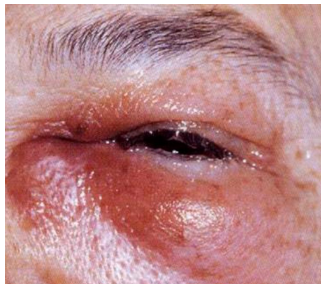


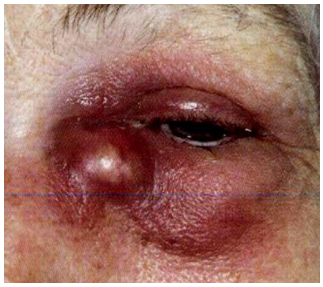




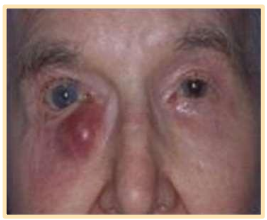
Acute dacryocystitis:

- Symptoms: Pain, tenderness, redness, Swelling
- Signs: it's a closed abscess.
- Complications
- Treatment: Very imp to give space for pus to come out and give systemic and topical Abx (not treatment) till resolution of acute attack, do dacryocystorhinostomy (DCR) (definitive treatment)
  - Systemic antibiotics
  - Stab incision
  - DCR





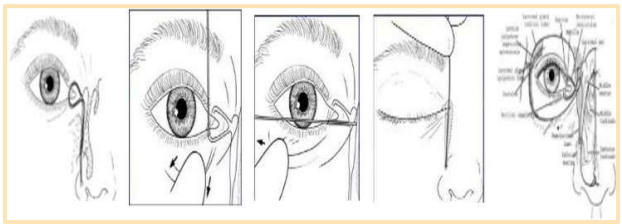
Lacrimal Disorders - Male Cases



This patient has an acute nasolacrimal duct obstruction, which wasn't treated well, so he developed acute dacryocystitis, it is a form of an acute infection in the lacrimal sac.If acute dacryocystitis wasn't treated, the patient will develop orbital cellulitis. Presentation : acute redness, swelling, and pain in the area of the lacrimal sac. Also, tearing and discharge.
Treated by: system antibiotic plus topical antibiotic and drainage of abscess. after the resolution of infection we need to open the nasolacrimal duct So the infection won't happen again.

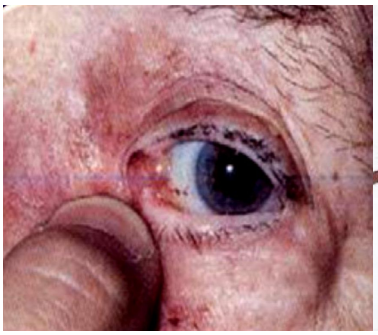
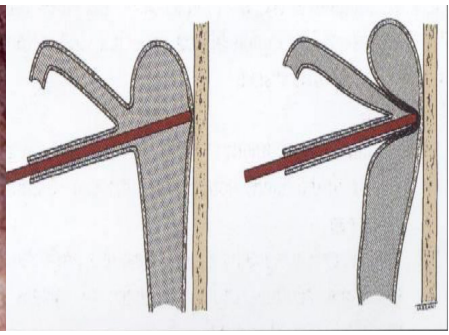
In adults with lacrimal drainage problems, we do lacrimal irrigation to detect where the obstruction is, and to introduce a cannula through the punctum all the way to the lacrimal sac. Then push a fluid and if the lacrimal drainage works, the patient will feel a fluid inside their nose and throat.
In children, we do a fluorescein dye (diagnostic dye eye drops) and wait 5 minutes; if the dye is still apparent then the lacrimal drainage is compromised.

In children, probing is done. A metallic probe is introduced through the punctum, and then through the canaliculus, and then all the way down to the nose so it can perforate the membrane. Sometimes, a stent made of silicone will be placed to prevent the membrane from reforming and it will be removed after a few months.



Lacrimal system disorders

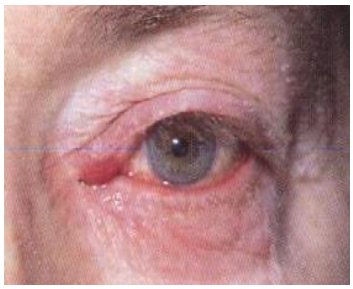
CHRONIC DACRYOCYSTITIS

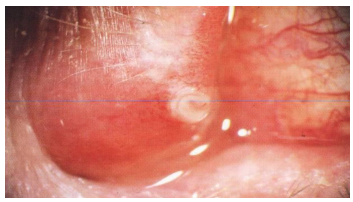
- Symptoms:
  epiphora + mucopurulent discharge
- Signs:
  painless swelling
  +ve regurgitation test
  probing and irrigation
- Treatment: DCR

to access size of obstruction

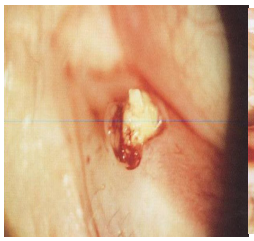
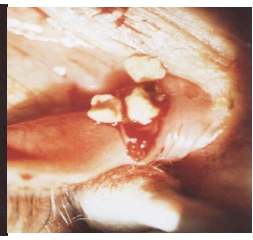
CHRONIC CANALICULATUS



- Caused by Actinomyces (Streptothrix sp.) Gram +ve bacilli.
- Symptoms: epiphora & chronic MPC not responding to conventional Rx for 1-2 months, redness.
  always look at punctum (especially upper), you'll found rised punctual (pouting) and when press → milk discharge, and pt will have pain particularly at this area.

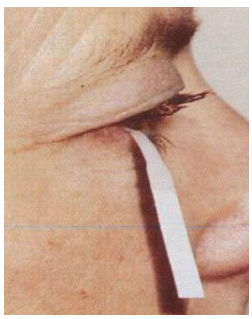
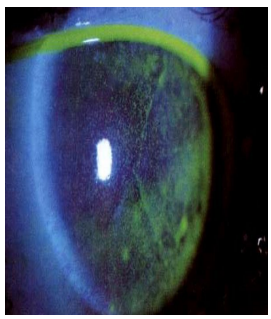


- Simple dilate and evacuate, you find stones
  when evacuate pt will respone to Rx in few days
- Signs: Pericanalicular inflammation, Pouting punctum,
- Concretion (sulphur granules) and NO NLD obstruction.
- Treatment: Curettage, Canaliculotomy and topical antibiotics.

DRY EYE

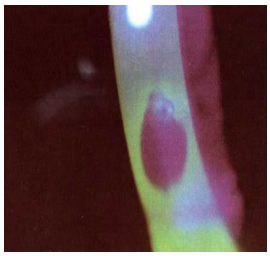
- more dangers than watery eyes, and it's very common
- it's a sign, lubricant will not help, it could be due to chronic inflammation of lid margin, that might end with Madarosis and new lashes coming from meibomian gland or if due to lacrimal gland disease it might end up with complete distraction, so you have to think about etiology
- Trachoma may induce dry eye due to section of conjunctival orifice of Lacrimal gland, and Cyst or back pressure may induce dry eye
- Symptoms
- Signs: to diagnose
  - first thing to do is break up time test (Tear BUT test): Put fluorescein, ask pt to blink once, and examine Cornea surface, (fluorescein is hydrophilic, so it will be taken by aqueous part) and calculate time in seconds from last blind to appearance of black dot (no fluorescein) in the corneal surface, normally takes 10 sac, it 10-5 sec→tendency to have due eye, less than 5 sec→ Dry eyes. but does not tell you Where's the problem (mucin layer, aqueous layer or lipid layer), if pt have blepharitis it's most likely lipid layer, conjunctival scars → mucin layer, and treat accordingly
  - Tear meniscus
  - Schirmer test: lacrimal gland (aqueous layer)
  - SPK
  - Rose Bengal stain

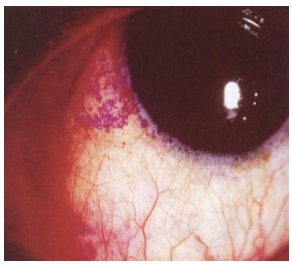



Lacrimal system disorders

DRY EYE:cont..

- Treatment: Keratoconjunctivitis sicca, so just aqueous layer is affected treat with any lubricant, if problem with mucin layer give hyaluronic acid, if lipid layer liposome spray, but must identify the etiology, what if pt uses roaccunate, OCP, Autoimmune disease, using antipsychotic drugs or beta-blocker (antihypertensive), even sunscreen
  - Preservation of tear
  - Lubricants
  - Punctal plugs
  - Permanent occlusion





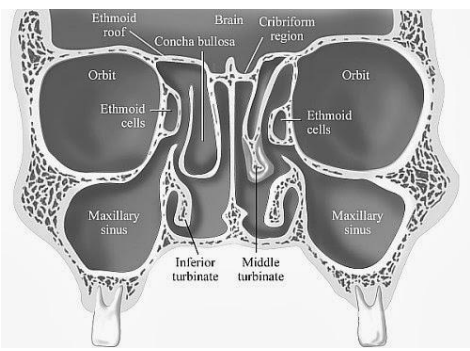
Anatomy of the Orbit - Male slides

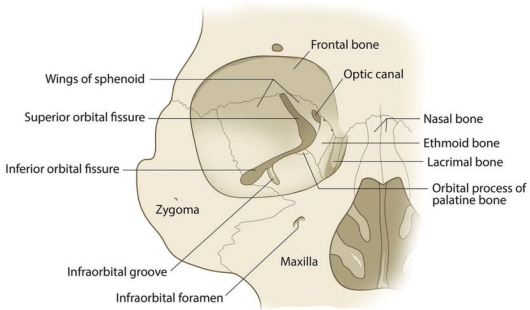
Orbital walls:

- The orbit is formed by 4 walls; the orbital floor, orbital roof, medial wall, and lateral wall.
- The orbital roof is mainly formed by the frontal bone and lesser wing of sphenoid at the back of the roof of the orbit.
- The orbital floor is formed mainly by the maxillary bone medially and zygomatic bone laterally.
- The lateral wall is formed by the zygomatic bone anteriorly, and the greater wing of sphenoid posteriorly.
- The medial wall is formed by the maxillary bone anteriorly, the lacrimal bone in the middle, the ethmoidal bone taking most of the medial wall, and in the far end there's a small peace formed by the lesser wing of sphenoid.
- **The strongest wall is the lateral wall** and the thinnest **wall** is the medial **wall**.
- The thinnest bone in the medial wall is the ethmoidal bone which is also called "lamina papyracea" and it is 0.04-0.3 mm in thickness (very thin!) which makes it more prone to infections (orbital cellulitis secondary to ethmoidal sinusitis or if there is a fracture in the orbital wall so the air in the sinus will come in the orbit) to cross over from the sinuses to the orbit and for fractures to occur.
- The thinnest bone in the orbit is the roof of the infraorbital canal.

Orbital sinuses:

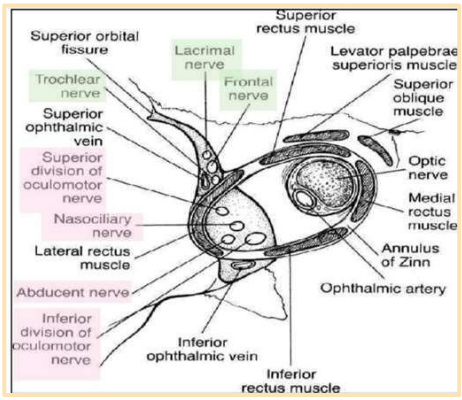
- The sinuses surround the orbit from 3 directions:
  - The maxillary sinus is below the orbit.
  - The ethmoidal sinuses and sphenoid sinus are medial to the orbit (beside).
  - The frontal sinus is above the orbit





Anatomy of the Orbit- Male slides

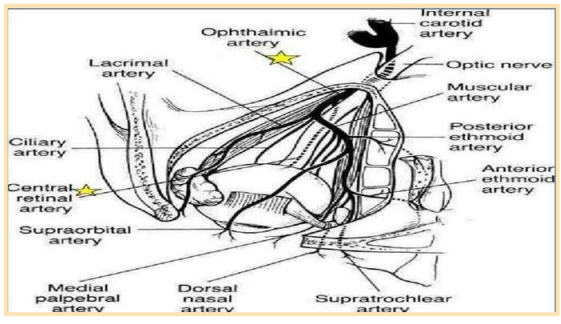
Blood supply:



- The main blood supply for the orbit comes from the internal carotid artery specifically from its ophthalmic branch.
- The ophthalmic artery gets inside the orbit along with the optic nerve and it gives many branches; the most important branch is the central retinal artery (because if there is any injury to that branch the patient will loss the vision permanently due to the occlusion).
- The main problem with the central retinal artery is that it has no collaterals, so if it gets occluded the patients will immediately lose their vision.

Annulus of zinn:

- Annulus of Zinn is a ring of condense fibrous tissue, and it is the origin of all the recti muscles.
- It also contains the optic canal and the optic foramen. You can see the optic nerve along with the ophthalmic artery (pic 2).
- Inside the Annulus of Zinn there're also the nasociliary nerve, abducens nerve, and the superior and inferior divisions of oculomotor nerve. The abducens nerve supplies the lateral rectus muscle. The superior and inferior divisions of oculomotor nerve supply the rest of the recti muscles. The nasociliary nerve is a mixed nerve that carries sensation to the cornea and conjunctiva & controls the pupil. Also, it supplies the ciliary muscles & ciliary body as well as the tip of the nose. That's why when a patient presented with a herpetic infection that involves the nose, you must examine the eyes very well. Herpetic infections are transmitted along the nerves, so it could start at the nose and travel through the nasociliary nerve all the way to the eye. This is called **hutchinson's sign**; when involving the tip of the nose and the eye. You can also see the superior orbital fissure. Part of the superior orbital fissure is contained within the annulus of zinn (abducens, nasociliary and oculomotor) and the other part is outside the annulus.
- There are multiple vital structures that pass through the superior orbital fissure to get inside the orbit and to exit the orbit. Starting from the top there're the lacrimal nerve, frontal nerve, and the trochlear nerve.(remember it as LFT) The trochlear nerve innervates the superior oblique muscle. The origin of the superior oblique is outside the annulus of zinn which is why the trochlear nerve is outside the annulus of zinn. The lacrimal nerve supplies the lacrimal glands. The frontal nerve is a branch of the trigeminal nerve, and it is a sensory nerve. It gives sensation to the forehead and the whole scalp.



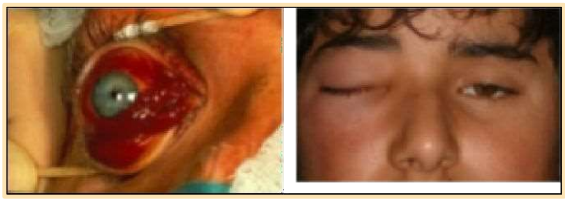
Pic 2

Evaluation- Male slides

7P's:

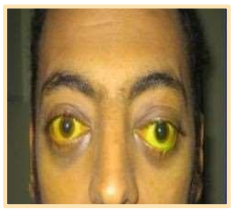
1. Pain.
2. Progression.
3. Proptosis. (cardinal sign of orbital pathology)
4. Palpation.
5. Pulsation.
6. Periorbital changes.
7. Past medical history.

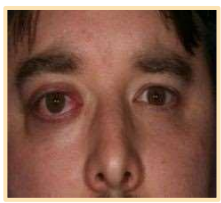
1. Pain:



- Infection.
- Inflammation.
- Hemorrhage.
- Malignant lacrimal gland tumor (most tumors are painless in the orbit).

2. Progression:





A. Minutes to Hours (if progression occurred within minutes to hours, there are only a few things that you need to think about):

- Hemorrhage sudden
- Orbital emphysema: air in the orbit, usually reduces by itself, It usually occurs due to trauma which results in a communication between the sinuses and the orbit. It increases the pressure in the orbit, and it can cause compression of the optic nerve and most importantly the central retinal artery which could cause blindness. If a patient presented to the ER with a medial wall floor fracture, it's important to tell the patient to not blow their nose or cough(valsalva maneuver) because the air can go from the sinuses to the orbit and it can increase the orbital pressure.
- Lymphangioma: Congenital hamartoma: abnormal lymphatic vessels that are present in the orbit that tend to bleed, so the patient may present with acute proptosis.
- Varix (upon valsalva) occlusion, dilation or thrombosis of venous system.
    - Varicocele in the orbital veins that also tend to bleed & thus patients may present with acute proptosis. Venous system malformed

B. Days to Weeks

- Children: **capillary hemangioma**, rhabdomyosarcoma, retinoblastoma, neuroblastoma, leukemia.
- Inflammatory disease: Idiopathic orbital inflammatory disease, thrombophlebitis, thyroid orbitopathy, recurrent inflamed dermoid.
- **Infections:** orbital cellulitis, abscess, cavernous sinus thrombosis. 1 day or 2 not hours
- Trauma, post-surgical, hemorrhage: orbital hemorrhage, lymphangioma. (Acute or late)
- Malignancy: rhabdomyosarcoma, metastasis, granulocytic sarcomas, adenoid cystic carcinoma.
- Carotid-cavernous (C-C) fistula.

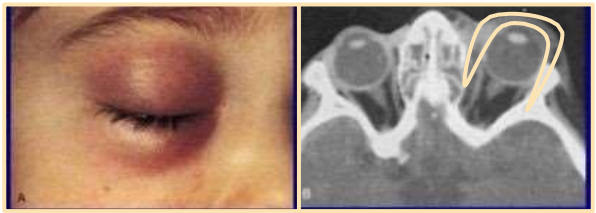
Progression- Male slides

C. Months to Years (benign conditions)

- Dermoid Cysts.
- Benign mixed tumors.
- Neurogenic tumors.
- Glioma, lymphoma & meningioma
- Cavernous hemangioma
- Osteoma
- Lipoma
- Fibrous histiocytoma

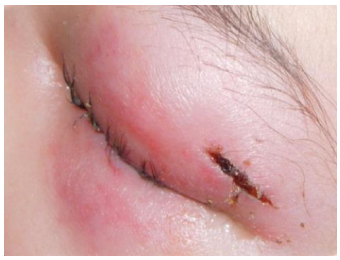
Orbit diseases - Female slides

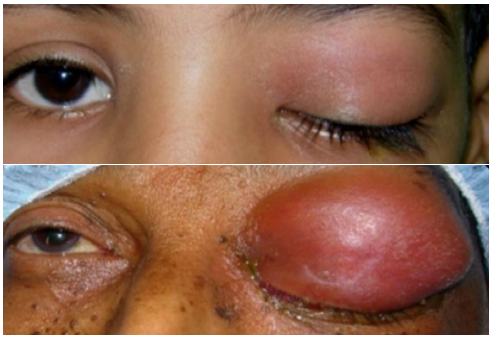
- Inflammatory: Orbital cellulitis
- Graves Ophthalmopathy
- Orbital Blow-out fracture
- Tumors



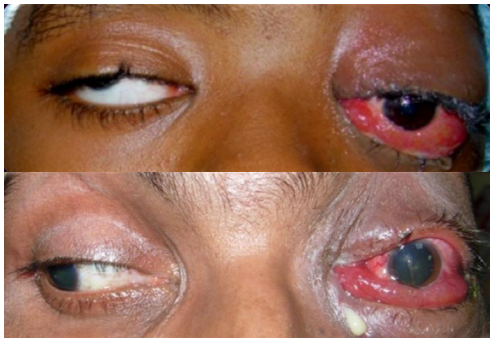
Orbital infection

- **The orbital septum is the anterior boundary of the orbit, so anything anterior to the orbital septum is considered extra-orbital.**
- Preseptal Cellulitis: the infection is anterior to the orbital septum
  - Vision, motility, pupils, VF, disc are WNL (within normal limit)
  - Globe itself is not proptotic (the eyeball itself is in a normal position).(usually treat it with oral Abx as an outpatient)
- Orbital Cellulitis: the infection is behind the orbital septum.
  - 90% secondary to sinus disease.
  - High risk of morbidity and mortality
    - Orbital abscess. If untreated
    - Brain abscess. If untreated
    - **Cavernous sinus thrombosis,** high motiality
  - do imaging for subperiosteal abscess and give pt IV systemic Abx and close montioning.
  - Most diagnostic feature of orbital cellulitis:
    1. proptosis (examine eyes from sides, up and down, not front only bc wide palpebral fissure (false proptosis)
    2. limitation of EOM





orbital or preseptal cellulitis?? we can't tell, eye is closed

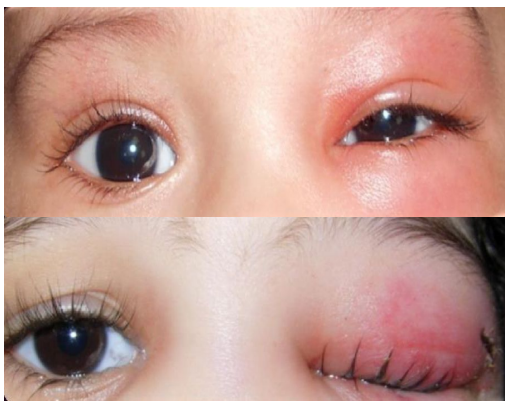


it's orbital cellulitis, there's limitation of EOM

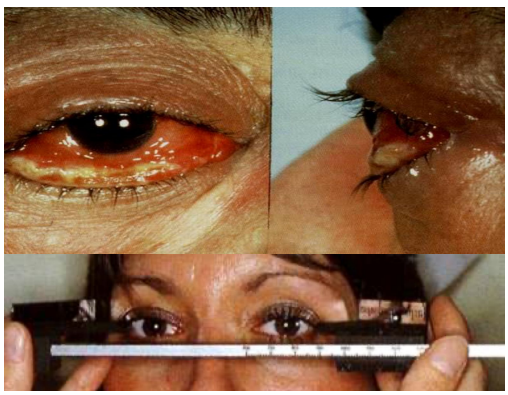
Orbit diseases:

Orbital infection:cont…

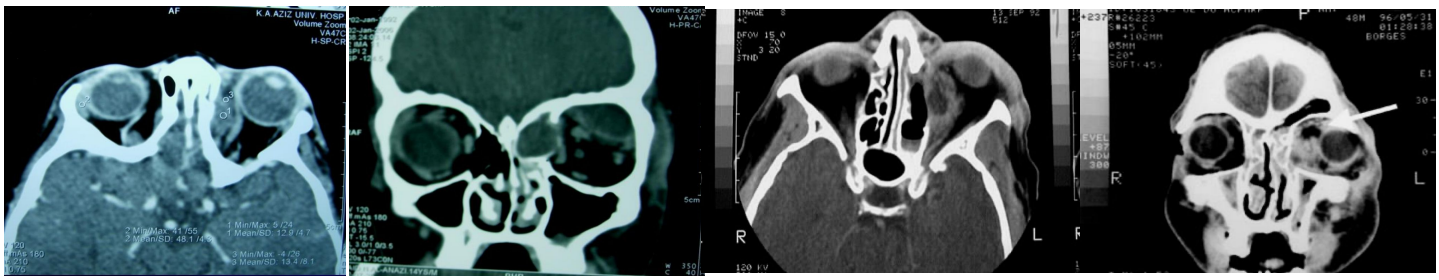
- if pt have Hx of blephanitis, insect bit or trauma it might be secondary pre sep teal le nail it, sinus the common source of orbital disease (lateral is the only aspect not surrounded bu=y sinus)
- if you have 100 preseptal cellulitis pt and treat them as orbital cellulitis it okay, but if you have 1 pt with orbital cellulitis and reat him as periorbital cellulitis it's misdiagnosis be careful
- Treatment:
  - Admission for close observation.
  - Referral to ENT & infectious diseases.
  - Systemic antibiotics and surgery if needed.
- Both preseptal cellulitis and orbital cellulitis present with eyelid swelling, redness, and pain.
- So, how can you differentiate between the two? patients with preseptal cellulitis are typically afebrile, healthy looking, and no signs of abnormalities in the eye and they can be treated with oral abx outpatient; However, patients with orbital cellulitis could be febrile, sick looking, and they have abnormalities in vision, eye motility, eye position (proptosis), or decreased disc.
- Triad of inflammation/Infection process: Tender, Redness, Hotness
- For example, if a patient presented with eyelid swelling, redness, pain, along with proptosis → this is orbital cellulitis.
- Infections can easily cross-over especially through the medial wall.
- We need to recognize the cause of orbital cellulitis , if it's from the sinuses we need to treat the sinuses with the help of ENT specialist, if it's from somewhere else we need to recognize the cause and treat
- it have pt with orbital or preseptal cellulitis and you don't know the etiology, do imaging, CT without contrast, than evaluate



orbital or preseptal cellulitis??we can't tell, eyes on primary gaze, or closed



Hertel test for proptosis: you can see the cornea on the scale

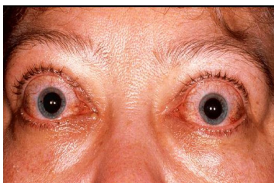
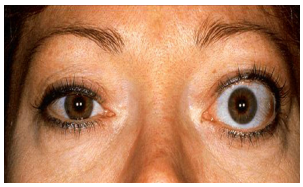
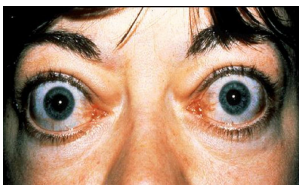
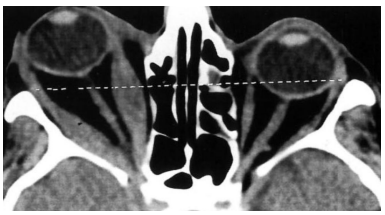
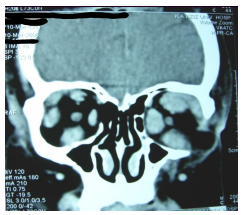
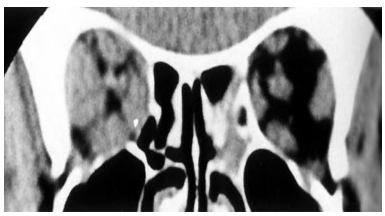


you'll see abscess formation, most commonly abscess of the medial wall especially if pt have sinusitis

Orbit diseases:

Orbital infection:cont...

- The most common cause of unilateral/bilateral proptosis and lid retraction is thyroid, even in children
- if you see conjunctival redness→ active form of active autoimmune disease, you have to treat give immunosuppressive
- for imaging: the most imp cut are coronal and orbital apex, where muscle are crowded and can easily compress optic nerve

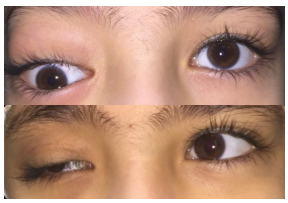
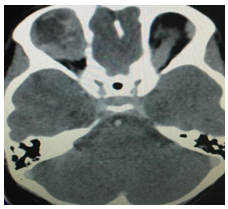
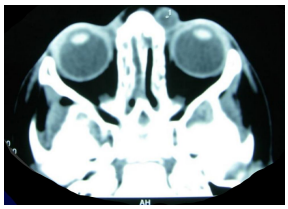
tenden spared (thin) "lollipop"

enlarged muscles

Left: most disastrous compilation, treat with surgery
Right: not compressing

Orbital tumors:

- Malignant might happen in pediatric group, most common is rhambdomyosarcoma
- Rhabdomyosarcoma→good prognosis if detected early, Very bad prognosis if detected late, with subacute onset might be confuse you with inflammation(Cellulitis), So look for mass.
- Optic nerve glioma

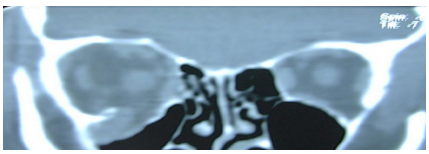




Trauma:

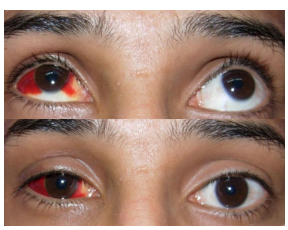
Blunt trauma

1. make sure pt is stable
2. examine the globe
3. than the orbit

- **Subconjunctival hemorrhage: if it's limbal base (hemorrhage is toward limbus and fide away toward fornix) it's most likely local cause (subconjunctival) rubbing.**
- **but if fides away toward limbas, and must collection around fornix → this's fracturebert**
- If pt has trauma by something larger than orbital inlet, which don't cause ocular damage but cause sudden increase in IOP, it would lead to floor fracture (weakest wall), orbital fat will herinate and maybe muscle too, if anterior→ inferior oblique will entrap, if posterior→ inferior rectus
- It's Blow out fracture, inability to elevate the eye (can be complete or partial entrapment.
- Go to OR or pt may have ampolopia especially if up gaze, wight put a bridge.

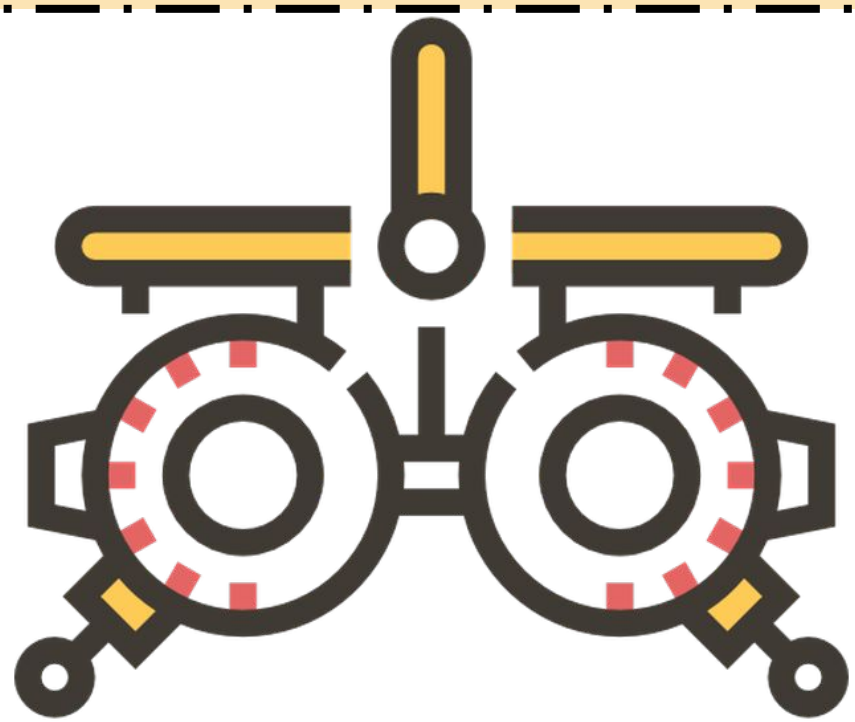


orbital floor is cracking and muscle is entrapped.



OPTHALMOLOGY TEAM

ADDITIONAL INFO FROM MALE LECTURE



Proptosis

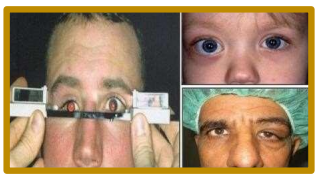
Bilateral	Unilateral
Seen in inflammatory conditions (typical condition is thyroid eye disease in Grave's) Immune processes or systemic diseases	Primary orbital neoplasms usually unilateral (mass occupying lesion)

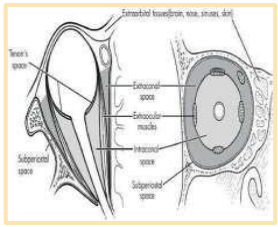
Causes

Inflammatory	Infection	Vascular	Neoplasm

• **Thyroid disease**
• Orbital pseudotumor
• Wegener granulomatosis
	• Orbital abscess
	• Cellulitis
		• Orbital hemorrhage
		• Lymphangioma (sudden)
		• C-C fistula
		• Orbital varices - proptosis with valsalva.
		• Cavernous hemangioma
			• **Benign:**
			  ○ cavernous hemangioma
			  ○ lymphangioma
			• **Malignant:**
			  ○ adenoid cystic carcinoma
			  ○ lymphoma
			  ○ glioma
			• **Contiguous:**
			  ○ sinus
			  ○ intracranial nasopharynx
			  ○ skin
			• **Metastatic:**
			  ○ lymphoma
			  ○ leukemia
			  ○ neuroblastoma
			  ○ Rhabdomyosarcoma

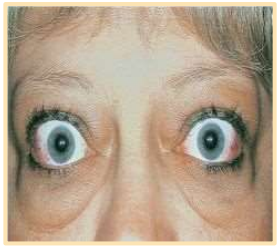
- Proptosis can be either:
  - **Axial**
  - **Non-axial**
  - **Pulsatile.**



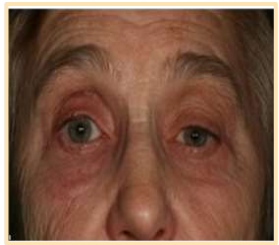


❖ Pseudoproptosis:

- ◇ Sometimes when the eyes are wide open, you might think that the patient has proptosis but actually they have lid retraction).
- ◇ We differentiate pseudoproptosis and proptosis by using exophthalmometer
- ◇ The most common cause for enophthalmos is trauma. When there's a medial wall or an orbital floor fracture, some of the orbital contents will herniate into the maxillary sinus which will make the orbital space larger, and as a result the eye will sink in.



The patient has lid retraction.
You can see the sclera clearly under the upper eyelid.



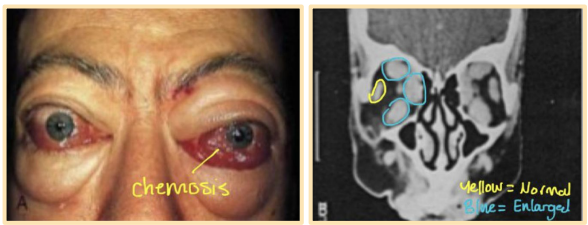
One eye is sunken in → endppthaloms of the left eye

Proptosis

Inflammatory

Graves disease

- Most common cause of unilateral or bilateral proptosis.
- May occur with any thyroid status.
  - It can happen with hyperthyroidism, euthyroidism, or hypothyroidism, but most commonly with hyperthyroidism.
- Eye disease not controlled by thyroid ablation (because Graves' disease is autoimmune disease, there are antibody antigen reaction in the orbit stimulating the thyroid gland, so even if the thyroid is removed there are still antigens in the bloodstream. Thyroidectomy or radioactive uptake won't fix).
- Strabismus due to abnormality in the extraocular muscle due to accumulation of the inflammatory changes especially glucose aminoglycan as a result of antigen antibody reaction
- lid retraction the eye is wide opened , may occur with upper or lower eyelid, both can be affected.
- Lid lag when you ask the patient to look up and down and the eyelid is will be lagging behind the eyeball
- Visual loss
- Cosmetic abnormal inflammation affects the eye (it's a common presentation)
- Treatment options:
  - Steroids.(If it is active and severe inflammation)
  - Radiation (to the orbit to control the inflammatory process).
  - Optic nerve decompression (surgery, if failed medical treatment).
  - Immunomodulators.
- CT scan: A patient with an active thyroid eye disease has multiple extraocular muscle enlargement.
- The most common muscles to be affected are the medial rectus and inferior rectus. They may develop strabismus, lid retraction, lid lag, and visual loss.
- Visual loss can occur due to corneal ulceration or exposure keratopathy or compression of the optic nerve that is caused by the huge extraocular muscle → compressive optic neuropathy.
- Second picture: chemosis (swelling) is seen with lid retraction. Because of severe proptosis, the patient cannot close his eyes.



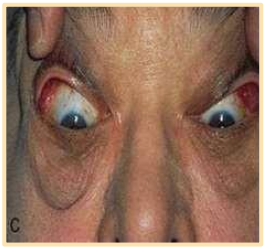
Sarcoidosis

- Lacrimal gland.

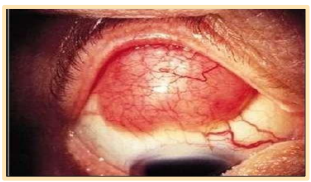
Vasculitis

- GCA, PAN, SLE, Wegener's granulomatosis, RA.

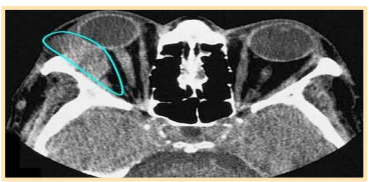
Proptosis

Idiopathic Orbital Inflammation (diagnosis of exclusion) Usually present with pain, proptosis, eyelid swelling, involvement of any orbital structures	• Orbital pseudotumor. • Myositis. • Prompt response to steroids. • OU or systemic think vasculitis (*except in kids). 

Lymphoproliferative Disorders (space-occupying lesions)	• Lymphoid hyperplasia and lymphoma (2nd most common cause for orbital pathology)
	  ○ 20% of all orbital mass lesions
	  ○ Salmon patch appearance (reddish mass Under the eyelid, in the lacrimal gland usually)
	  ○ Molds to orbital structures
	  ○ 50% arise in lacrimal fossa
	  ○ 17% bilateral
	• We usually treat it with chemotherapy (rituximab) and radiotherapy
	• Plasma cell tumors
	• Histiocytic disorders
	  ○ Macrophage based d/o.



Salmon patch under the eyelid



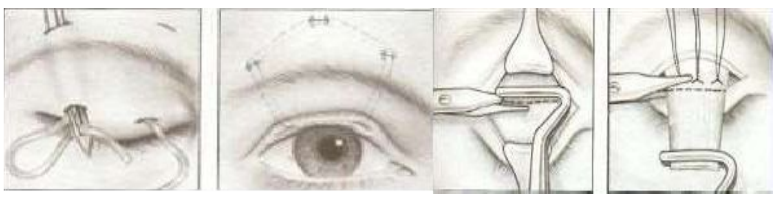
Enlarged lacrimal gland

❖ Evaluation: Levator Function (this is the way we evaluate the muscle)

◇ We ask the patient to look all the way down, and then we measure how much they go up. Normally it should be 15 cm and above, like in this picture.

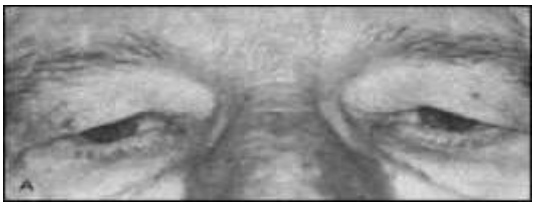
❖ Treatment (all surgical)

◇ Mild ptosis, good levator function: Mullerectomy.
◇ Any ptosis, reasonable levator function: Levator resection.
◇ Severe ptosis, poor levator function: Frontalis suspension.
◇ Children with ptosis covering the pupil need to be treated as soon as possible to prevent amblyopia.



Proptosis

❖ Dermatochalasis (pseudo-ptosis)



There's excess skin hanging over the eyelid

Before and after blepharoplasty

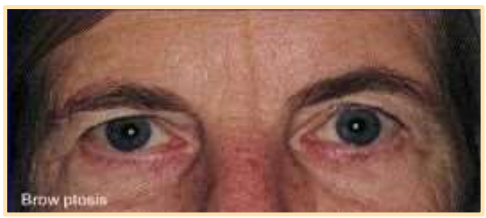
Before surgery →

After surgery →

Brow ptosis

The eyelid opening is normal, but the brow is drooping.

Unilateral Brow ptosis

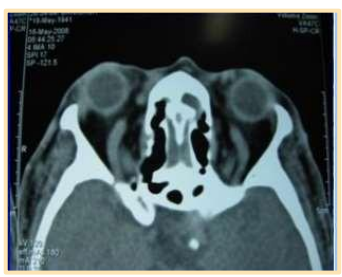


The most common cause for unilateral brow ptosis is facial nerve palsy.
The frontalis muscle of the eyebrow is supplied by the facial nerve.

4. Palpation:

- Patient presented with a mass outside the orbit → dermoid cyst (very common)
- Dermoid cyst tend to occur at the suture line
- TREATMENT: Excision , but we do it later on life not in the first year, I wait for example 2-3 yrs

5. Pulsation:

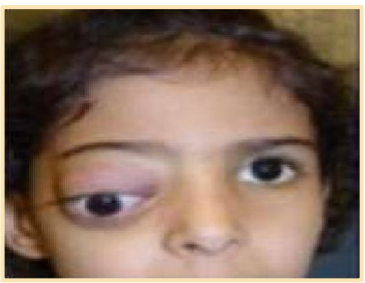


- **With bruits :**
  - Cavernous carotid fistula Orbital
  - Arteriovenous fistula
  - Dural-Arteriovenous (a-v) fistula.
- **Without bruits:**
  - Meningoencephalocele.
  - Neurofibromatosis.
  - Orbital roof defect (condition after surgical removal of orbital roof, sphenoid wing dysplasia).

Pre-orbital change

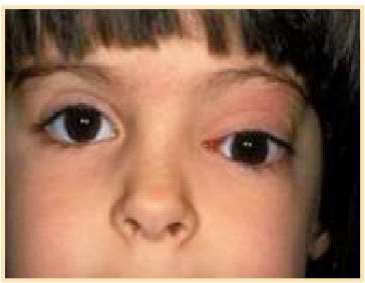
Rhabdomyosarcoma (VERY IMP)

- Most common primary orbital malignancy of childhood.
- Average age: 7-8.
- Sudden onset and rapid evolution of unilateral proptosis (within day to weeks) Emergency.
- 90% survival, if you treat it before metastasis happens.
- Any child with **unilateral** proptosis that progressed within a few days → you need to consider it as a medical emergency.
    - Unilateral proptosis is an important sign for rhabdomyosarcoma, leukemia, and other malignant tumors. In other words, unilateral proptosis is a sign of a bad (malignant) disease.
    - If a pt presented with pain, swelling, and redness → orbital cellulitis.
    - **If they don't present with any symptoms except for unilateral proptosis →Rhabdomyosarcoma.**
    - What's the difference between retinoblastoma and rhabdomyosarcoma? retinoblastoma is more common and they only present with proptosis in late stages. Retinoblastoma occurs in the orbit only whereas rhabdomyosarcoma can occur in other parts of the body.
    - 1st & 2nd picture: This patient was presented with a huge proptosis that developed within 2 weeks. Because the patient came to the hospital early, it was unlikely that she had any metastasis. **A biopsy was taken to confirm** the diagnosis and she was treated with chemotherapy and radiation therapy. The 2nd picture is the same patient after one year. In conclusion, you can save the patient's life if you diagnose them early.



Pic 1

Pic 2



Pic 3

This patient had a tumor (squamous cell carcinoma) removed from the cheek, but he had a recurrence. The right eye is pushed up because of the tumor recurrence.

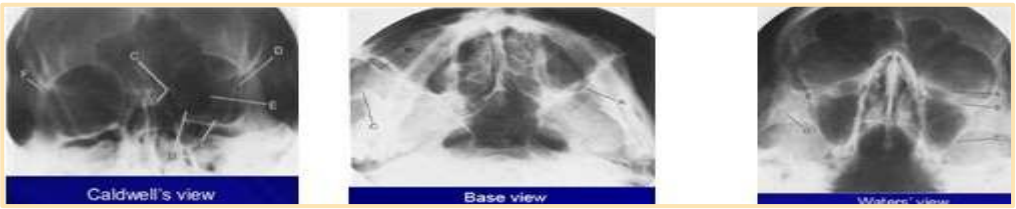
Encephalocele Right eye

Past medical history

- Past medical history is very important, because for example, if a patient with a known history of Graves' disease was presented with proptosis, then it's most likely related to Graves' disease.
- If a patient with a known history of chronic sinus disease was presented with eyelid swelling and proptosis, then it's most likely orbital cellulitis.
- **Imaging Option:**
  - Plain films not used anymore, we only use it if we suspect metallic foriegn body in the orbit.
  - CT scan helps showing the bone and the soft tissue. Most common used
  - MRI best to visualize soft tissue.
  - Ultrasound not as good as MRI and CT scan.

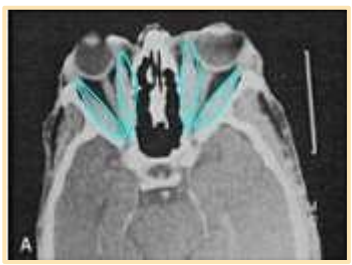
Plain film

- Quick In ER
- R/o foreign bodies
- Infrequently used

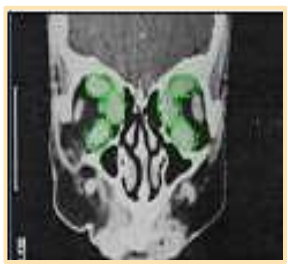


CT Scan (most commonly used)

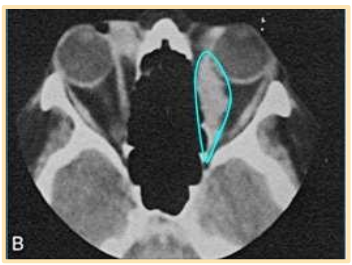
Strengths	Weakness	Protocols
• Spatial resolution. • Bone: fracture, destruction, calcification. • Quick: emergencies trauma. • Cheaper.	• Radiation: 1-2 cGy. Risk for 2dry tumor especially in children • Soft tissue definition. • Contrast iodinated: avoid it in case of allergy. • May need MRI anyway (not cheaper)	• Axial and coronal. • +/- Contrast.



- This patient has an active thyroid eye disease (Graves).
- You can see enlargement of the extraocular muscles
- Axial image

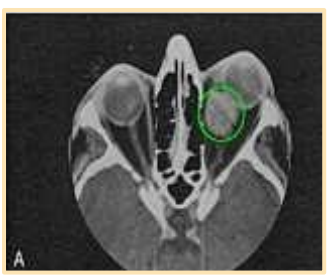


Coronal image of enlarged extraocular muscles



- Single extraocular muscle enlargement. Less likely caused by Graves disease.
- More likely caused by other inflammatory causes, or a tumor.

Multiple fractures are seen. (arrows)



This patient has an orbital mass behind the eyeball.

Past medical history

MRI

Strengths	Weakness	Protocols

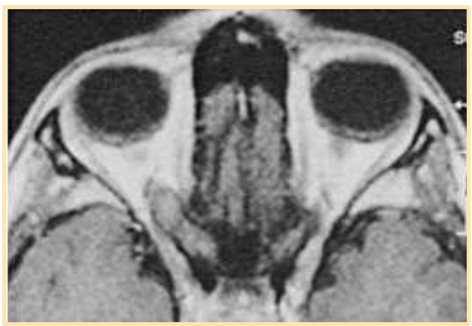
• Tissue.
  ○ T1 anatomy
  ○ T2 pathology
• No radiation
	• Magnetic: pacemakers, surgical clips
	• Claustrophobia
		• Axial/coronal/sagittal
		• Gadolinium contrast
		  ○ Non-iodinated.
		  ○ Allergies RARE
		• Orbital lesions.
		• Fat suppression (allows you to see the structures inside the orbit clearly)

Examples

- How to differentiate between T1 & T2?
  - In T1 the fluid appears dark, which is why the eyeball are black in T1; In T2 the fluid appears bright, which is why the eyeballs are white in T2

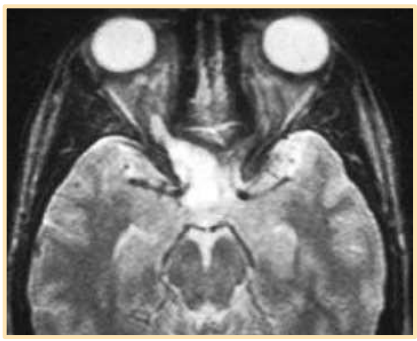
T1

- No fat suppression.
- Orbital structures cannot be seen.
- Dark eyeballs = T1.



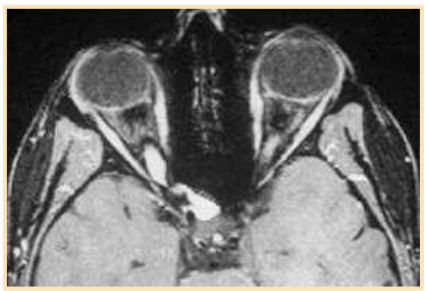
T2

Bright eyeballs = T2.



T1

- With fat suppression.
- The orbital structures can be seen clearly.
- Dark eyeballs = T1.

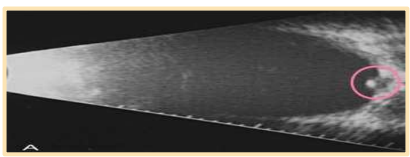


Ultrasound (Orbital Echography)

Features:

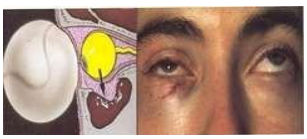
- Dynamic.
- Less expensive.
- +/-Availability variable.

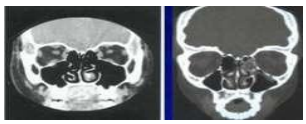
This is an ultrasound showing an orbital cyst behind the eyeball

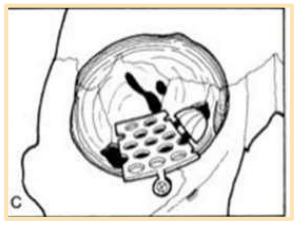


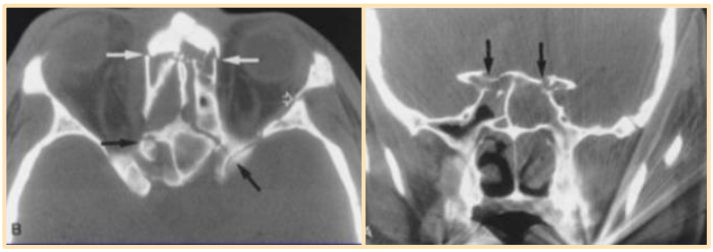
Facial trauma and fractures

- Midfacial fractures.
- Zygomaticomaxillary Complex (ZMC) fracture.
- Wall and floor fractures:
  - Medial wall: lamina papyracea.
  - Orbital floor: blow out vs rim involvement (blow out fractures can easily be missed, especially in children).
  - Lateral wall and orbital roof (less common).
- Optic canal fractures:
  - Traumatic optic neuropathy.

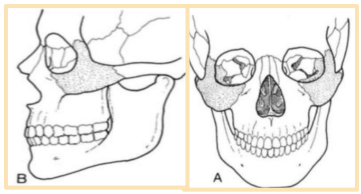




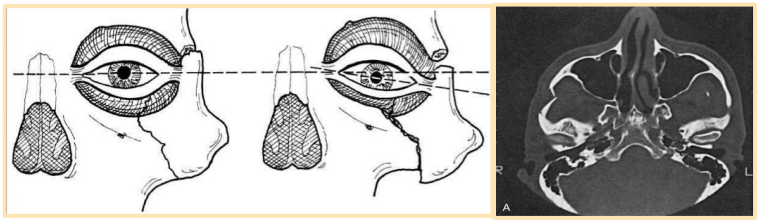




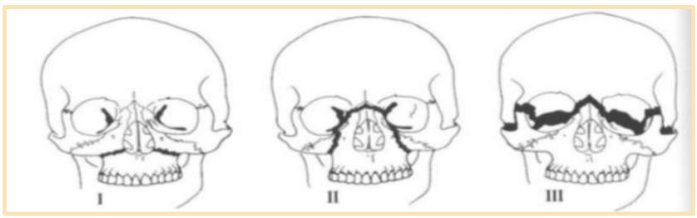
- Optic canal fracture:
  - May be with or without displaced bony fragments



Zygoma



ZMC fractures



- LeForte fracture:
  - Class 1: transverse maxillary
  - Class 2: pyramid
  - Class 3: craniofacial disjunction

Pic 1

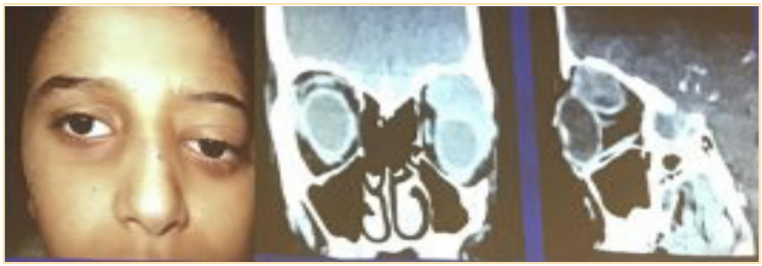
Floor Fractures

- 1st picture: This boy had a trauma in his right eye at school. He was taken to a general emergency room. There was no pain in his eye, no redness, and no swelling. And because of that he was discharged, but the boy was still complaining.
- In the picture you can see that when he tries to look up, the right eye looks abnormal because there's **entrapment of the inferior rectus muscle caused by a small fracture, so he cannot look up. This type of fracture that causes muscle entrapment typically happens in children more than adults because the bones are more elastic.** This causes small fractures that will cause some of the orbital contents to herniate and then they'll get entrapped.
- So, it's very important to check the eye motility in every patient that presents with orbital trauma because it's tricky to pick up this kind of fracture if you don't check the eye motility.
- No entrapment: enophthalmos.
- **This patient needs urgent surgery because if the muscle remains entrapped, there will be necrosis and he'll end up with permanent double vision.** Another thing that can happen if the muscle remains entrapped is oculocardiac reflex, which means that they can develop abnormal cardiac rhythm.

Cases From 435

CASE1:

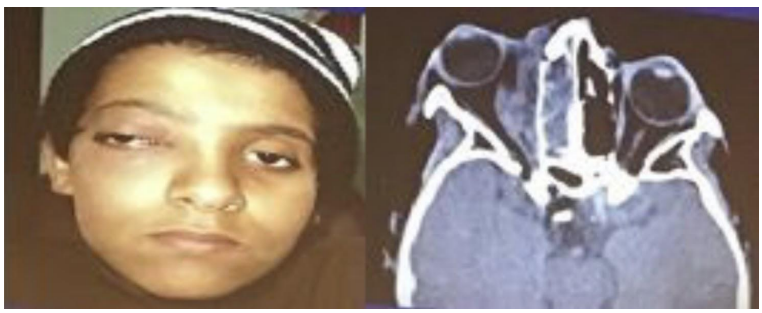
A 9 y/o child brought to ER with history of recent unilateral proptosis, when the ER on call asked the family about hx of trauma, they said we don't know we just noticed the eye bulging, however when the doctor asked the child he said yes i had trauma in my left eye.



- ❖ **CT:**
  - ➢ Shows mass in the left eye
- ❖ **Dx:**
  - ➢ Rhabdomyosarcoma
- Any recent unilateral proptosis in a child is tumor until proven otherwise

CASE2:

11 y/o boy presented with pain and redness in the right eye for 3 days duration.



- ❖ **On examination:**
  - ➢ The right eye is deviated and pushed, some swelling
- ❖ **CT:**
  - ➢ Subperiosteal abscess + ethmoidal sinusitis (normally the sinus is black but here the right one is opacified)
- ❖ **Dx:**
  - ➢ Orbital cellulitis, it's not preseptal because there's ptosis
- ❖ **Rx:**
  - ➢ IV antibiotics admission, consult ENT and ID group. If no improvement with antibiotics → do surgical drainage

Eyelids Lesions

1 Eyelid Trauma

- Types: Blunt, sharp/penetrating
- If one or all of the following involved in an eyelid trauma call ophthalmology (lid margin, canthal, canaliculi).

❖ Classification:

- ◇ The lid margin is spared (not involved): examine eyelid
  - ■ Skin and orbicularis only injured → skin sutures. You don't need to suture the orbicularis muscle; you only need to suture the skin.
  - ■ FAT protrusion = septum violated, DO NOT suture the orbital septum. You need to do a thorough evaluation of the eye to rule out eyeball (cornea and globe) laceration.
- ◇ The Lid margin involved:
  - ■ You need to suture the lid margin properly and meticulously because if the suturing wasn't properly done, the cornea will be irritated with every blink and Causes corneal ulceration.
- ◇ The canthals involved:- call ophthalmology
  - ■ You need to call ophthalmology because the medial and lateral canthal ligaments are what stabilize the eyelid. If the canthal ligaments are injured, they need to be sutured to their proper positions to avoid any eyelid abnormalities.
- ◇ The canaliculi involved: duct from the eye to the lacrimal sac
  - ■ You need to call ophthalmology immediately because you need to treat the patient with suturing the canaliculus and putting a stent or a silicone tube through it to avoid permanent closure of the duct, This needs to be done acutely.
  - ■ You will remove the stent after a few months.

Lid laceration medially with canalicular involvement.
A metallic probe (called Bowman probe) is introduced through the punctum.+ silicone stent

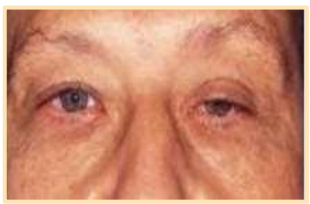
Eyelids Lesions

2 Eyelids Malposition

❖ Blepharoptosis:

- ◇ Blepharoptosis is drooping or inferior displacement of the upper lid. This can either happen in the upper eyelid where the eyelid is drooping and covering the cornea from superior or from lower eyelid where the eyelid is pushed up and cover the cornea from inferior
- ◇ Classification:
  - Congenital vs acquired:
  - Myogenic →a problem with the levator muscle.
  - Aponeurotic → a problem with the levator aponeurosis.
  - Neurogenic → a problem with the innervation of the levator muscle (3rd nerve palsy) or the muller muscle (Horner's syndrome).
  - Mechanical → a mass or swelling in the eyelid that's causing ptosis.
  - Traumatic → trauma affecting the nerve, muscle, or aponeurosis.

Myogenic	• Congenital (most common cause of myogenic ptosis).
	  ○ Dysgenesis of levator (malformation of the levator muscle).
	• Acquired
	  ○ Localized or diffuse disease.
	  ○ Muscular dystrophy.
	  ○ CPEO (chronic progressive external ophthalmoplegia).
	  ○ MG (myasthenia gravis).
	  ○ Oculopharyngeal dystrophy.
	For Acquired during adulthood we need to do The surgery for improving the visual field However, the patient will not have amblyopia
	 
	This child has congenital dysgenesis of the levator muscle. The levator muscle of the right eye is underdeveloped. Some children lift their chin to be able to see properly, but some children don't do that which allows the eyelid to block the pupil and this results in amblyopia. If the pupil is blocked by the eyelid, we need to do surgery as soon as possible to prevent amblyopia.

Aponeurotic	• Most common form of ptosis.
	  ○ Most common cause is aging.
	  ○ It is commonly seen in contact lens wearers because they tend to stretch their eyelids strongly when applying the contact lens.
	  ○ High lid crease with normal levator function.
	  

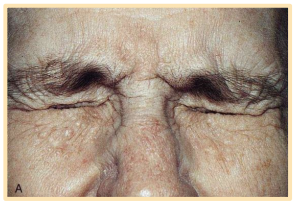
Neurogenic	• Acquired and congenital forms.
	  ○ Acquired:
	  ■ 3rd nerve palsy
	  ■ Horner syndrome (partial ptosis, due to the blockage of the Sympathetic ganglion)
	  ■ Myasthenia gravis
	  

Eyelids Lesions

3 Abnormal Eyelids Movements

❖ Blepharospasm (both eyes are affected)

- ◇ Involuntary tonic, spasmodic contraction of orbicularis. All of a sudden can not open
- ◇ Dermatochalasis.
- ◇ Rubbing.
- ◇ Brow ptosis.
- ◇ Frontalis spasm.
- ◇ Blepharoptosis.
- ◇ Levator dehiscence.
- ◇ Ectropion/entropion.
- ◇ Dry eye (we need to rule out local causes of irritation such as; dry eyes, foreign body, or eyelid malposition).
- ◇ Idiopathic cause, treatment is yet to be recognised.



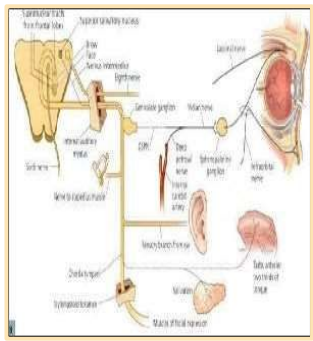
This patient has spasmodic contraction of the orbicularis and he has no control over it

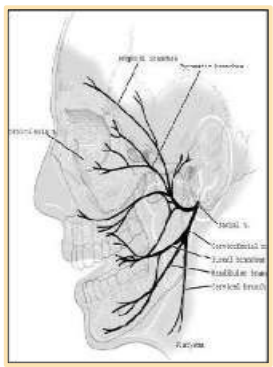
❖ Hemifacial Spasm (one eye is affected)

- ◇ Intermittent and involuntary contractions of the entire unilateral side of face. (twitching of both eyelids of that eye + face)
- ◇ Present during sleep.
- ◇ Compression of 7th nerve at the level of the brain stem. (if both eyes are affected → idiopathic).
- ◇ Spasm in the face can be a sequelae of a healing facial nerve palsy.
- ◇ MRI evaluation.

❖ 7th nerve palsy

- ◇ Lower motor neuron lesion.
- ◇ The most common cause for facial nerve palsy is Bell's palsy.
- ◇ Manifestations:
  - ■ Lagophthalmos (cannot close eyes (loss of orbicularis muscle) → exposure keratopathy and corneal ulceration.
  - ■ Tearing. Failure of pumping the tear from eye to the lacrimal drainage because of compromised orbicularis muscle .
  - ■ Eyelid Ectropion.
  - ■ Brow ptosis.
- ◇ Location of lesion:
  - ■ Supranuclear, brain stem, peripheral.
- ◇ Cause of paralysis:
  - ■ Bell's, infection, infarct, demyelination, neoplasm, trauma or miscellaneous.





Lagophthalmos

- Treat with lubricating drops or ointment and ask the patient tape their eyes when they go to sleep. Though, these are only temporary measures.

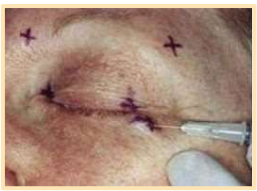
Botox in Ophthalmology

❖ Botulinum toxin:

- ◇ Clostridium botulinum anaerobic bacteria
- ◇ Neurotoxin types A,B,C1,D,E,F,G
- ◇ Botox = Botulinum Toxin A
- ◇ Blocks the cholinergic nerve terminals, thereby decreasing release of acetylcholine at neuromuscular junction
- ◇ Onset 3 days
- ◇ Peak effect 1-2 weeks, Duration 6-12 weeks

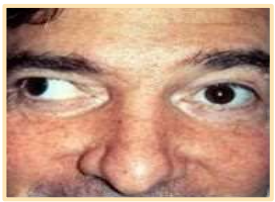
Uses

Blepharospasm



Inject the orbicularis

Strabismus



Glabellar Botox

Cosmetic use

Botox for Crow's-Feet

Cosmetic use

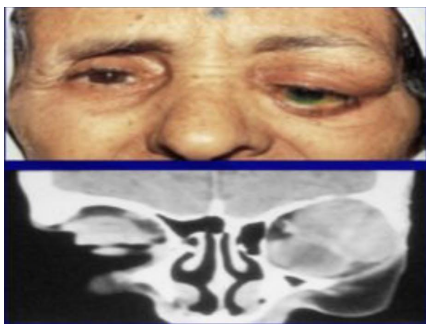
Lacrimal gland fossa lesions

Skipped by Dr

Disease	Duration	Presence of pain	Ultrasound reflectivity	CT	Management
Orbital pseudotumor	Days to chronic	Yes	Low	Localized or diffuse, molds to bone and globe	Systemic steroids, XRT
Lymphoma	Months	No	Low	Homogenous, oblong, molds to globe/bone	XRT, CTX (systemic disease)
Pleomorphic adenoma (benign mixed tumor)	Often > 1 year	No	Medium to high, regular internal structure	Well circumscribed, globular, possible bony expansion or excavartion	Complete excision with capsule without biopsy
Adenoid cystic carcinoma, malignant epithelial tumors	< 1 year	Yes (perineural invasion)	Medium to high, irregular internal structure	Round to oval mass with bony erosion	Incisional biopsy, await permanent sections; exenteration

❖ Lacrimal gland masses

- ◇ Inflammatory:
  - ■ Sarcoidosis.
  - ■ Orbital Pseudotumor.
  - ■ Vasculitis.
- ◇ Non-inflammatory:
  - ■ Lymphoproliferative.
  - ■ Epithelial neoplasms.



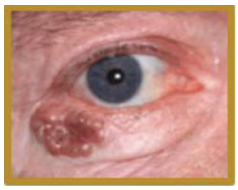
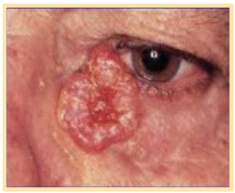
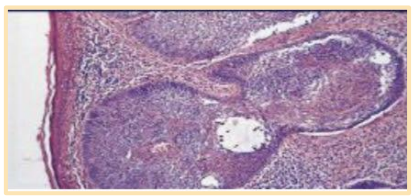
Pleomorphic adenoma

Skipped by Dr

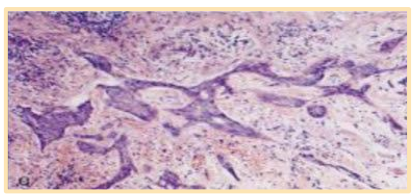
Eyelids Tumors

Basal Cell Carcinoma

- 90-95% of malignant eyelid.
- Tumors Lower lid and medial canthal areas.
- Nodular and morpheaform types.
- Medial canthal lesions can be problematic.
- 3% mortality

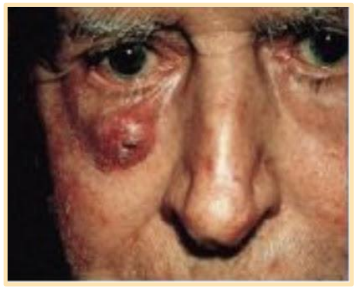
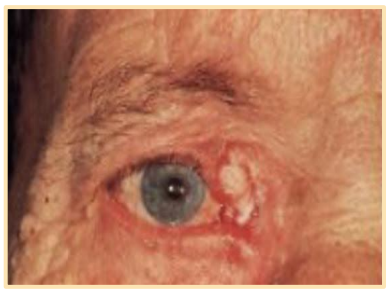
Nodular



Morpheaform

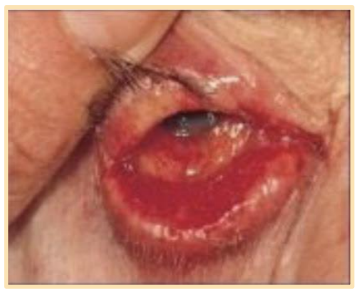
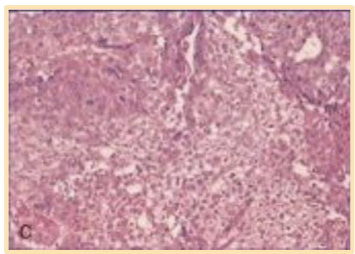
Squamous cell

- 40 times less common than BCC.
- More aggressive, associated with perineural invasion.
- Most arise from pre-existing lesions.
- Variable presentations.

Sebaceous Adenocarcinoma

- Highly malignant.
- 2x more common in the upper lid.
- Multicentric.
- Separate upper and lower lid lesions in 6-8%.
- Pagetoid spread.

SAQs/OSCE

Q1: Which one of these walls is the thickest/strongest bone ?

- The lateral wall; because the eyes are in most danger from the lateral side.

Q2: Which wall is the thinnest?

- The medial wall.

Q3: Which bone is the thinnest ?

- Ethmoid bone (0.3 mm) that is why it is easy to get fractures in facial trauma, and it is also easy for infections in the sinus to go to the orbit.

Q4: What other name is there for the ethmoid bone?

- Lamina papyracea (paperlike), because it is the weakest/thinnest bone.

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