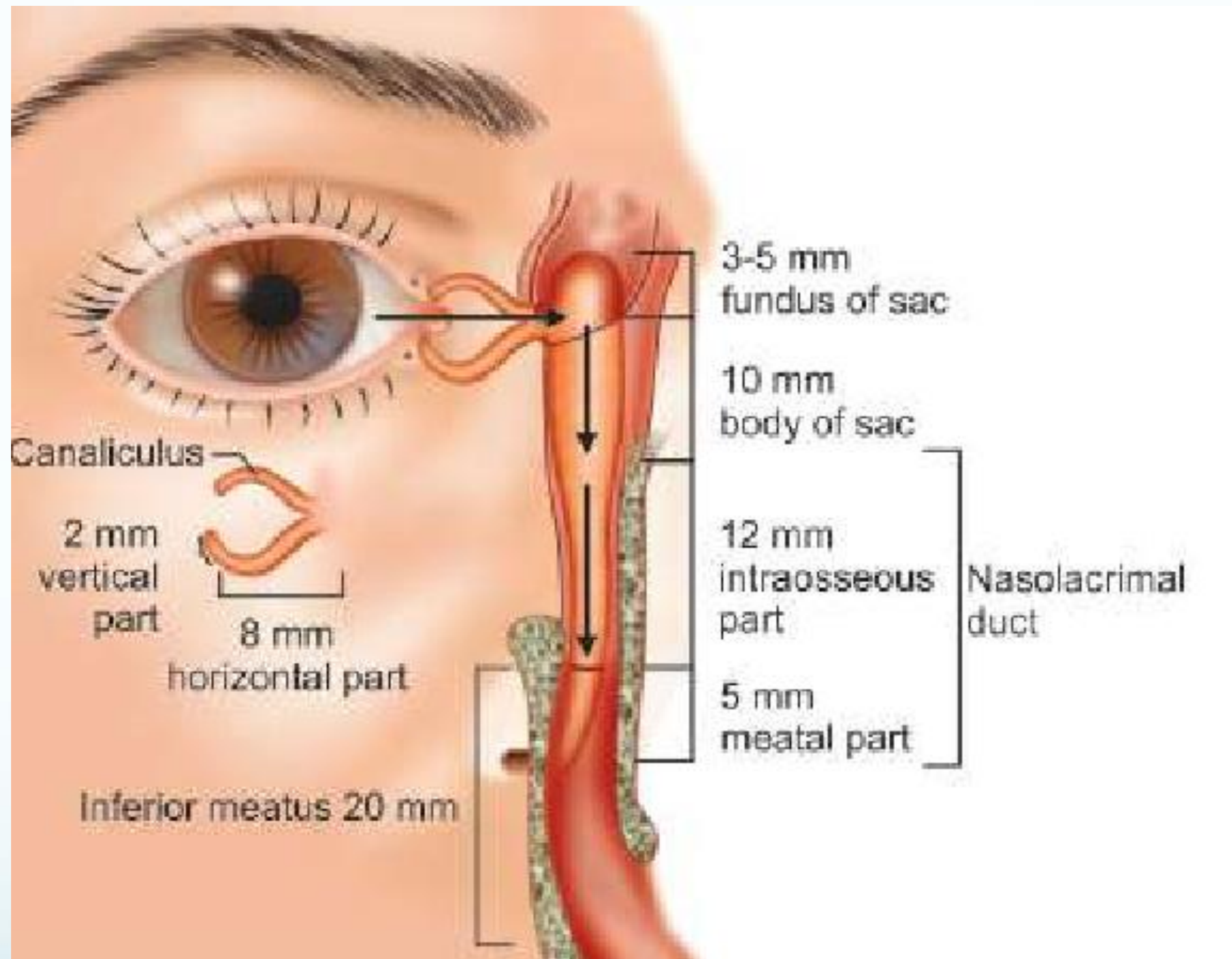


# Dacryocystitis

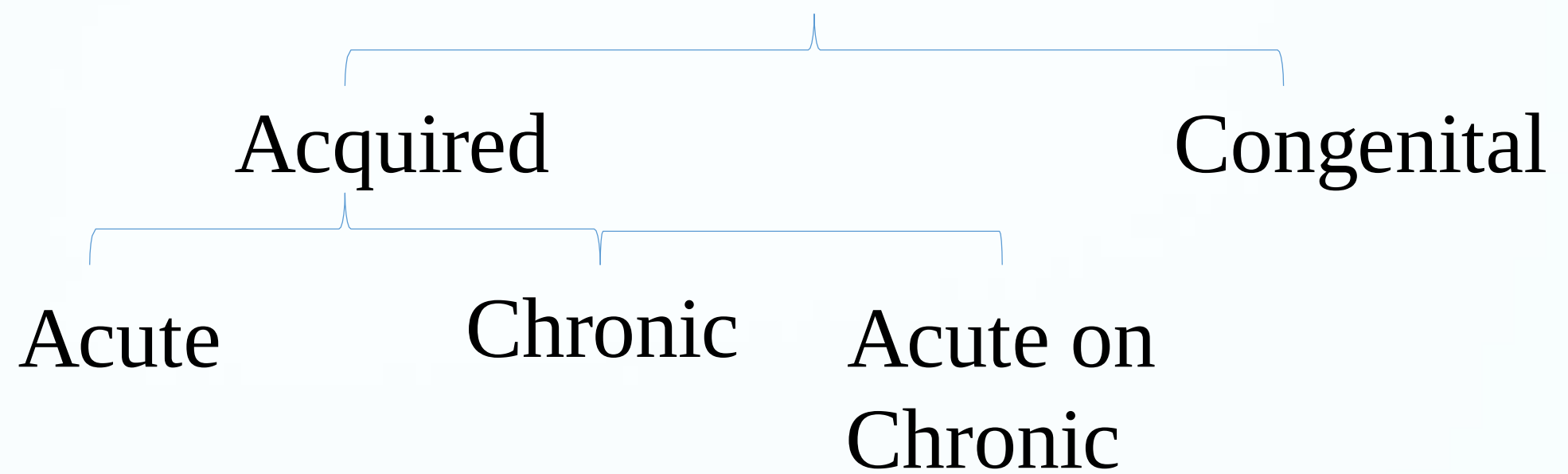
Dr Reshma Ramakrishnan  
Assistant professor  
Dept of Ophthalmology

# Anatomy



- Dacryocystitis is an infection of the lacrimal sac, secondary to obstruction of the nasolacrimal duct at the junction of lacrimal sac.
- Signs and symptoms may differ according to the etiology of the clinical picture.
- Under normal conditions, the mucosa of the lacrimal sac is highly resistant to infection.
- Although there are several causes, the main mechanism for the occurrence of dacryocystitis is **distal obstruction of the nasolacrimal duct**, which leads to the retention of tears and detritus at the bottom of the conjunctival sac at the level of the lacrimal sac.
- A “critical mass” of bacteria may be reached, overwhelming the anti-infection response of the lacrimal sac mucosa, leading to an acute or chronic infection.

# Dacrocystitis



# Acute Dacrocystitis

- Acute dacryocystitis consists of inflammation of the lacrimal sac, in general caused by infection.
- This pathology is predominantly found in adult women, while it is also relatively common in young infants.
- The most notable common **signs and symptoms** are reddening, oedema and the presence of a painful area of induration overlying the nasolacrimal sac, specifically just below the anatomical boundary of the medial canthal ligament.
- Epiphora and discharge may also be observed. In particular, when pressure is applied to the inflamed tear duct, purulent material may be expressed through the lacrimal punctum.
- Frequently, patients may present conjunctivitis and preseptal cellulitis.
- Rarely, the infection extends beyond the septum, and causes orbital cellulitis.

# Chronic Dacryocystitis

This is more common than acute dacryocystitis and there are several stages of presentation:

- ❖ **Catarrhal:** there is intermittent conjunctival hyperaemia and epiphora, with mucoid discharge that is normally sterile.
- ❖ **Lacrimal sac mucocele:** stagnant tears collect and there is dilation of the lacrimal sac, with mucoid content.
- ❖ **Chronic suppurative:** epiphora and chronic conjunctivitis are observed, with erythema of the lacrimal sac. There is reflux of purulent material with pressure, and microorganisms are often isolated.



# Risk Factors

- Most common risk factor is **Nasolacrimal duct obstruction**.
- Higher rates of both acute and chronic dacryocystitis have been reported among **women** even 70% in some case series.
- Upto 28.6% have associated **nasal pathology** like DNS, rhinitis, inferior turbinate hypertrophy.
- **Dacroliths** seen in 6 to 18% patients undergoing DCR.

# Etiology

- Staphylococcus aureus and Streptococcus pneumoniae being the most common among Gram-positive.
- Haemophilus influenzae, Serratia marcescens and Pseudomonas aeruginosa being the most common among Gram-negative bacteria.
- Anaerobic microorganisms have been isolated in as many as 15.7% of the positive cultures, in some studies, the most common genus being Bacteroides (5.7%).
- As for fungi, they have been reported to be present in 4% to 7% of cases, the most commonly isolated genus being Candida, although Aspergillus and Mucor may also be found.

# Clinical Tests

1. Examination of adnexa and puncta
2. ROPLAS
3. Snap back test/ Pinch test and Examination of lids
4. Fluorescein Dye Disappearance Test
5. Tear Film Break up Time
6. Jones Dye Test
7. Syringing and Probing
8. Schirmer's Test

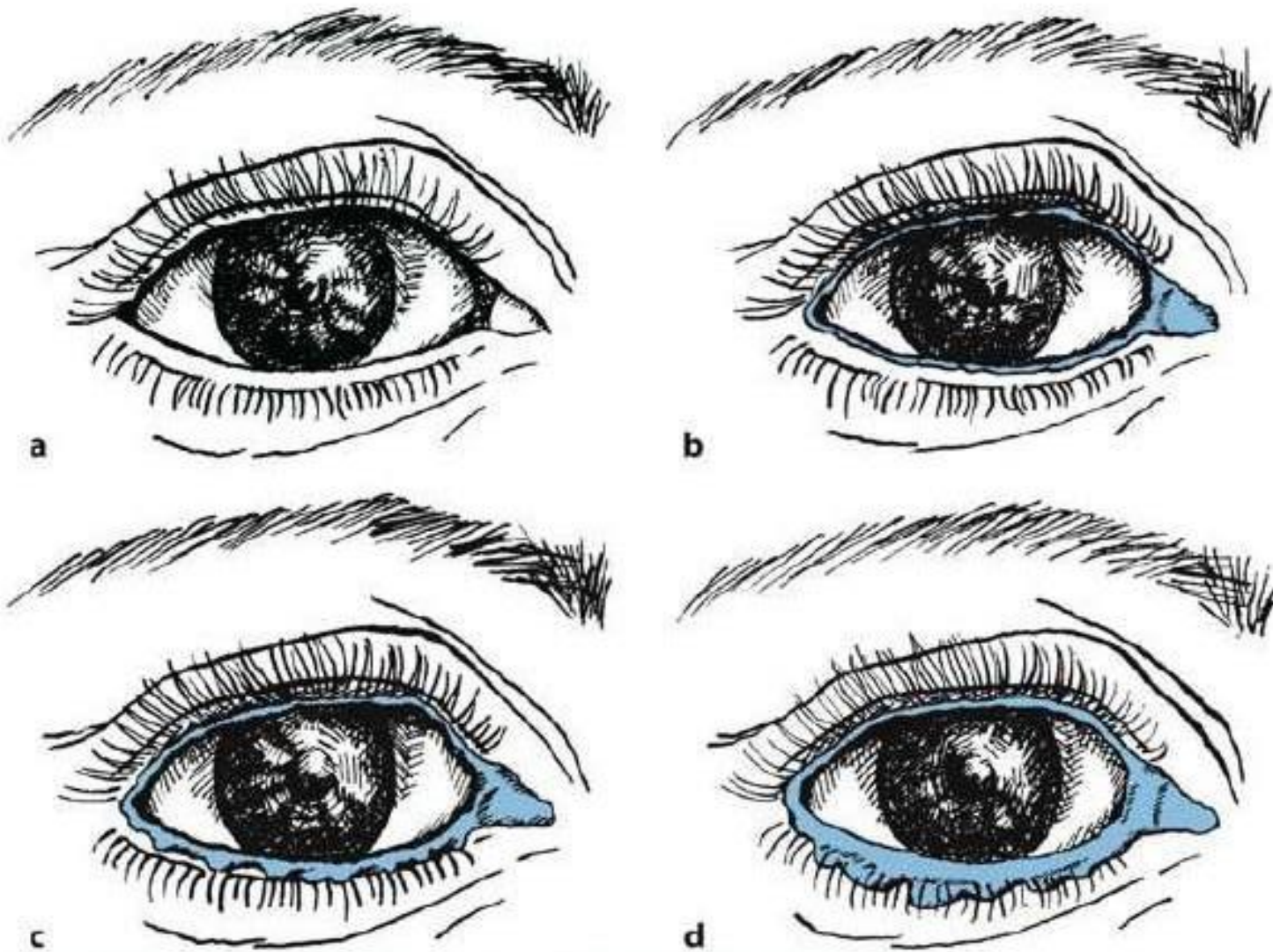
# ROPLAS

- **Technique:** The anterior lacrimal crest is identified by tracing the inferior orbital margin medially and superiorly. The index finger is then directed behind the crest and used to apply pressure on the sac area in an upward and medial direction so as to express the contents of the lacrimal sac into the conjunctiva. Any reflux of fluid or purulent material from the puncta is noted.
- ROPLAS has a **sensitivity of 88.9%** and **specificity of 99.0%** as compared to syringing when used for cataract patients.



# Fluorescein Dye Disappearance Test

**Fig. 3.5.** Fluorescein dye disappearance test. **a** Grade 0=no fluorescence in the conjunctival sac. **b** Grade 1=thin fluorescing marginal tear strips only. **c** Grade 2=between 1 and 2. **d** Grade 3=brightly fluorescing tear strip. **e** Asymmetry in test: retention of fluorescein on the left side in a congenital nasolacrimal obstruction. (From [14])

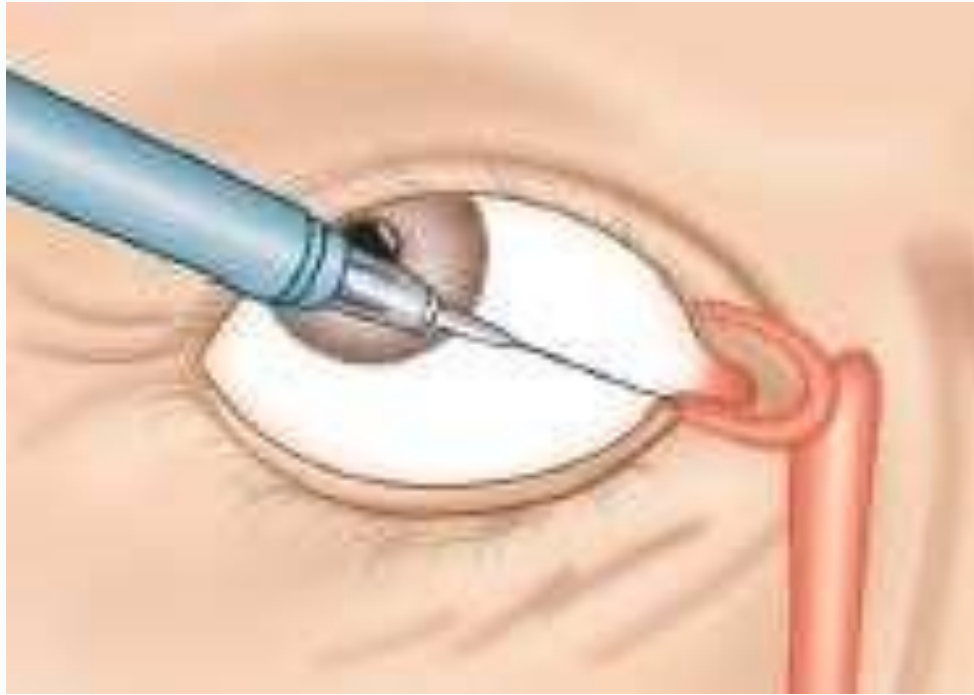


# Schirmer's Test

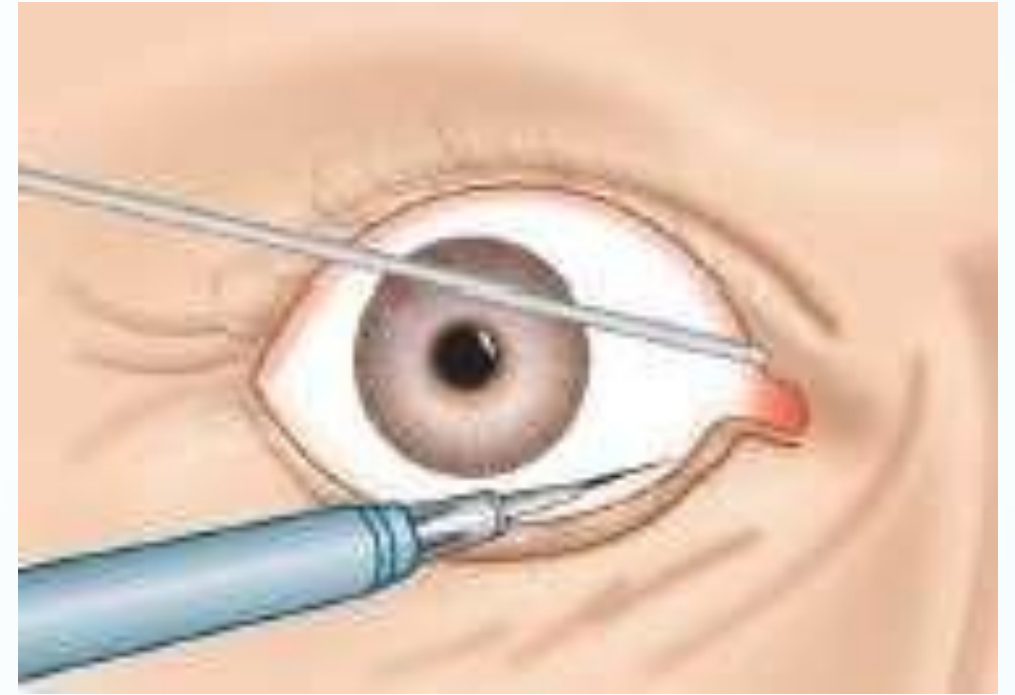


| Test                                                          | Measured tear production | Normal                                                |
|---------------------------------------------------------------|--------------------------|-------------------------------------------------------|
| Schirmer I without anesthetic                                 | Basic + reflex           | 10–35 (under 40 years, >15 mm; over 40 years, <10 mm) |
| Schirmer I with anesthetic                                    | Basic                    | Under 40 years, 10 mm; over 40 years, 5 mm            |
| Schirmer II with anesthetic<br>(trigeminal nerve stimulation) | Reflex                   | 15 mm and more                                        |

# Syringing Test

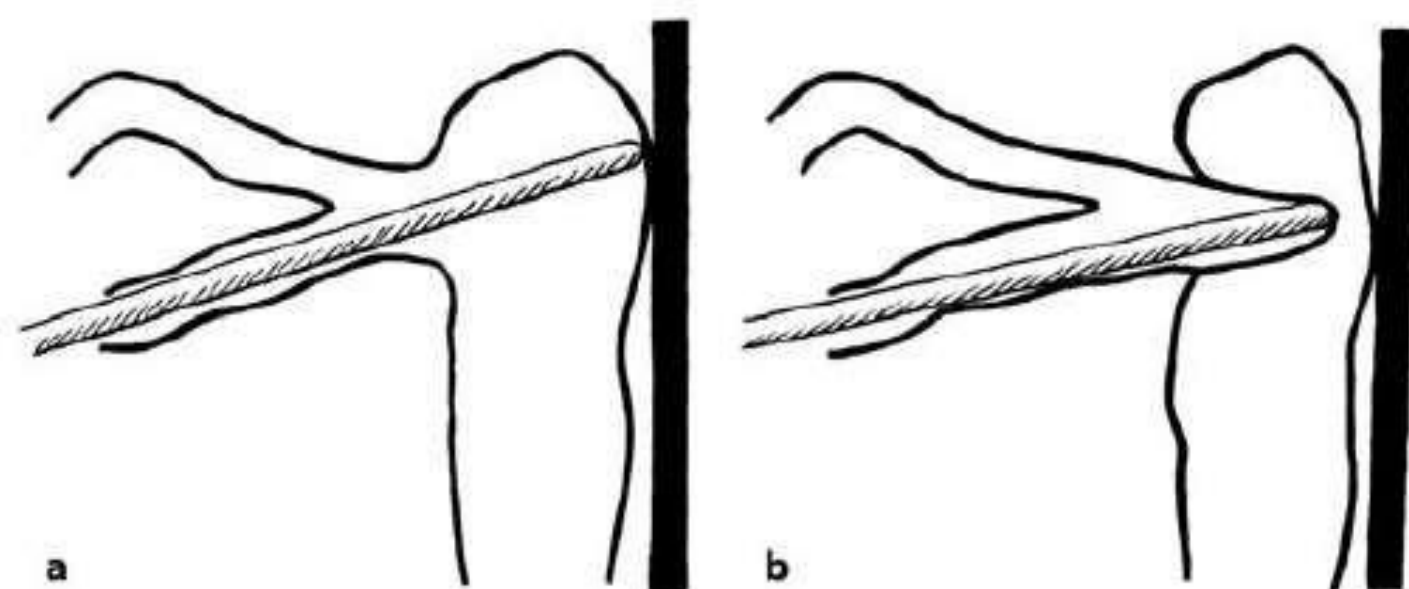


Syringing



Pressure Syringing

|           | Pharynx<br>and nose | Reflux lower<br>canaliculus | Reflux upper<br>canaliculus | Lacrimal system results                                             |
|-----------|---------------------|-----------------------------|-----------------------------|---------------------------------------------------------------------|
| Hard stop | Yes                 | No                          | No                          | Normal                                                              |
|           | Yes                 | No                          | Yes                         | Nasolacrimal duct stenosis                                          |
|           | No                  | No                          | Yes                         | Subsaccal obstruction (usually<br>mucoid or mucopurulent discharge) |
| Soft stop | No                  | Yes                         | No                          | Medial canicular or common<br>canaliculus block                     |
|           | No                  | No                          | Yes                         | Distal common canaliculus block                                     |



**Fig. 3.7.** Hard and soft stops. **a** Hard stop: the probe passed into the sac touches its medial wall, and the common canaliculus is patent. **b** Soft stop: spongy feeling; the probe presses the common canaliculus against the medial wall of the sac. A medial shift in the inner canthus is observed from the outside. (From [14])

# IMAGING

- Dacryocystography (DCG)
- Nuclear lacrimal scintigraphy
- Computed Tomography (CT)
- Magnetic Resonance Imaging (MRI)

# DCG

- Dacryocystography is an anatomical investigation and is indicated if there is a block on syringing in the lacrimal system, and thus it can help in creating an image of how the internal anatomy of the lacrimal system looks.

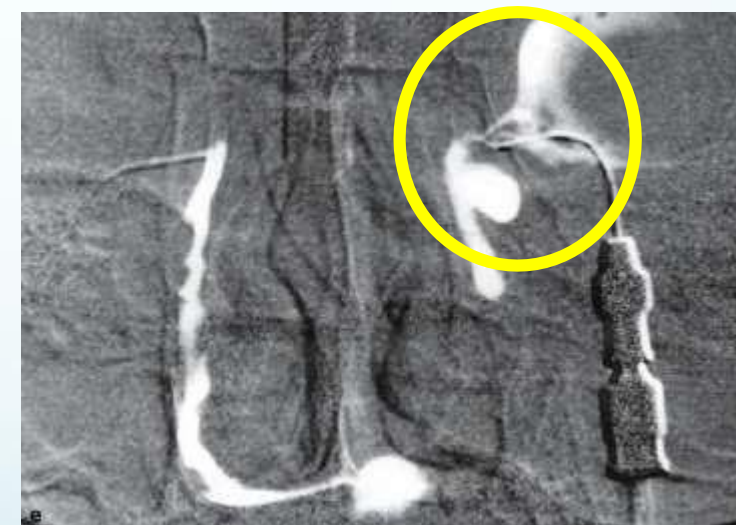
tearing:  
and no

- Indications of DCG:

1. Complete obstructions: the size of sac, determination of exact location of an obstruction
2. Incomplete obstructions and intermittent location of the stenosis; diverticuli; stones; anatomical pathology (functional disorders)
3. Failed lacrimal surgery: size of the sac
4. Suspicion of sac tumors, traumatic injury to the face

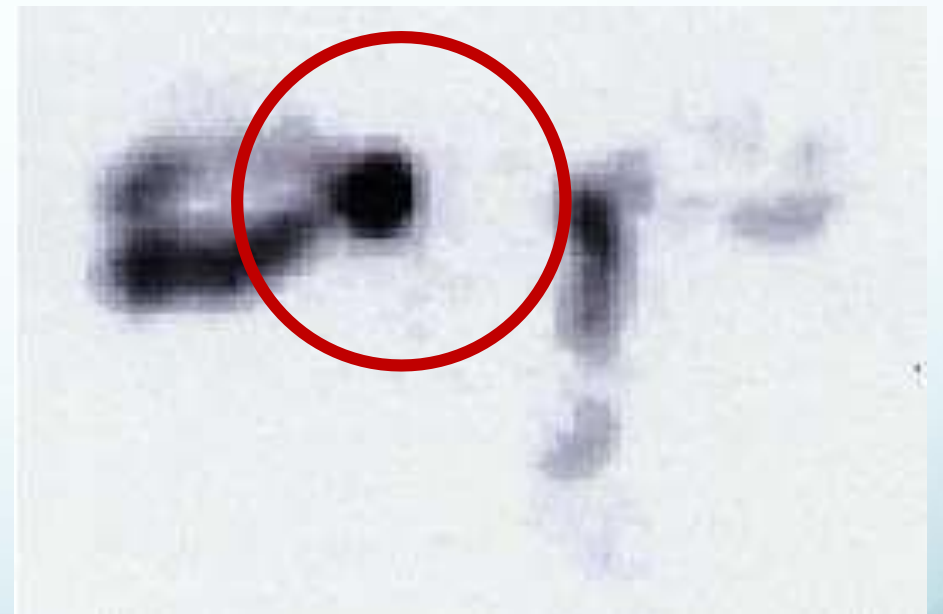
# Radiological Criteria of Lacrimal Pathology:

1. Regurgitation of (radio-opaque) fluid into the conjunctival sac (retention of fluid, absence of fluid in the nose, fluctuation of lumen of lacrimal system)
2. Irregularity in contrast
3. Cystic dilation and aneurysm
4. Deformation and drawing of the lacrimal sac



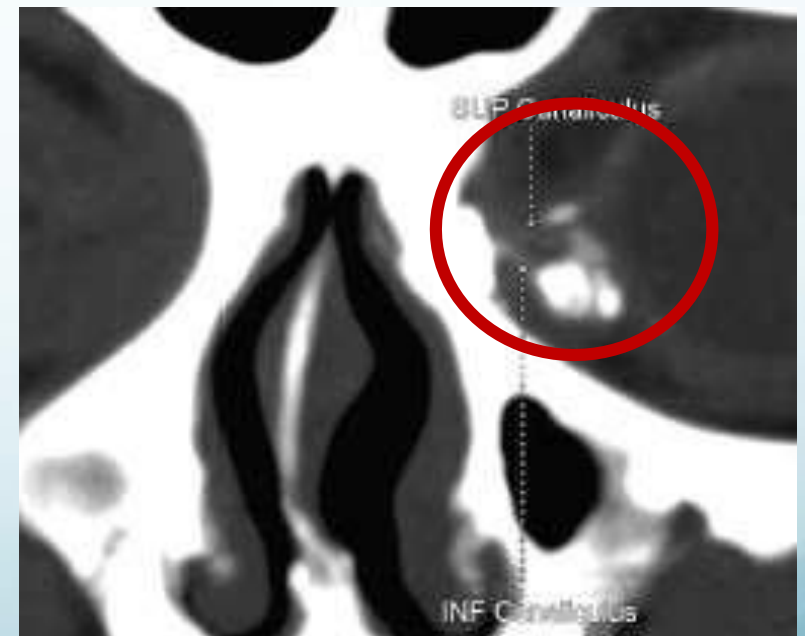
# Nuclear Lacrimal Scintigraphy

- Nuclear lacrimal scintigraphy is a simple, non-invasive physiological test that evaluates patency of the lacrimal system.
- Scintigraphy uses a radiotracer (technetium-99m pertechnetate), which is very easily detectable with a gamma camera.



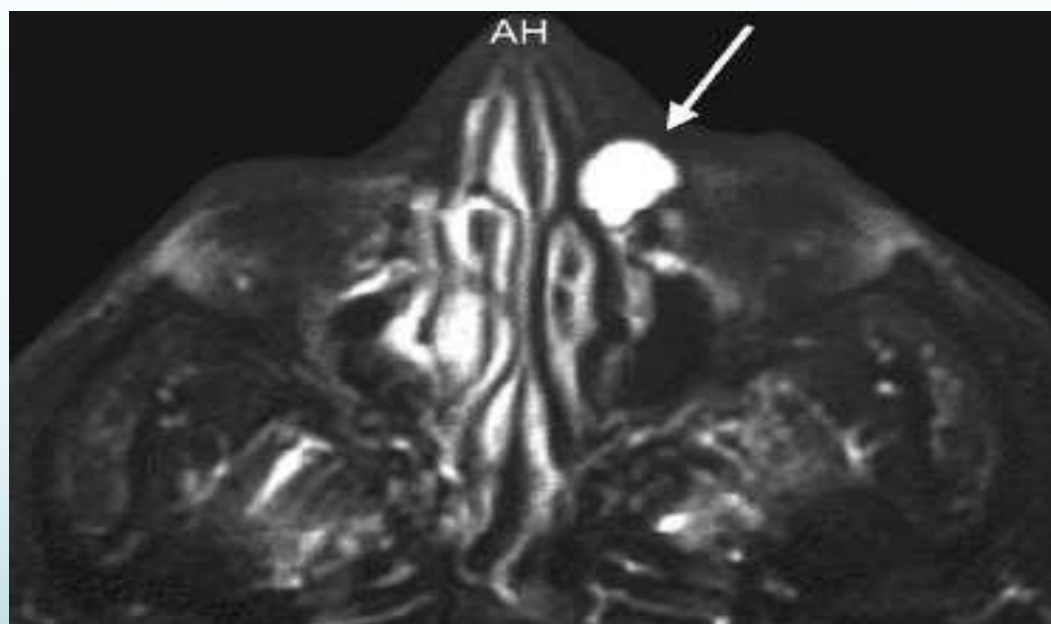
# CT Scan

- CT is required in the following situations:
  1. Following trauma
  - 2.To evaluate a patient with a suspected lacrimal sac malignancy
  3. To evaluate the infant with a medial canthal mass



# MRI and MRDCG

- Magnetic resonance imaging combined with contrast agent offers many advantages over other imaging studies. Here lacrimal system is not cannulated and is not under increased hydrostatic pressure, which gives a true functional status of nasolacrimal drainage system.
- Gadolinium is used as topical solution (1:10–1:100 in normal saline)—one drop per minute for 5 minutes.
- MRI is reserved in cases where tumors are suspected.



# Management: Acute Dacrocystitis

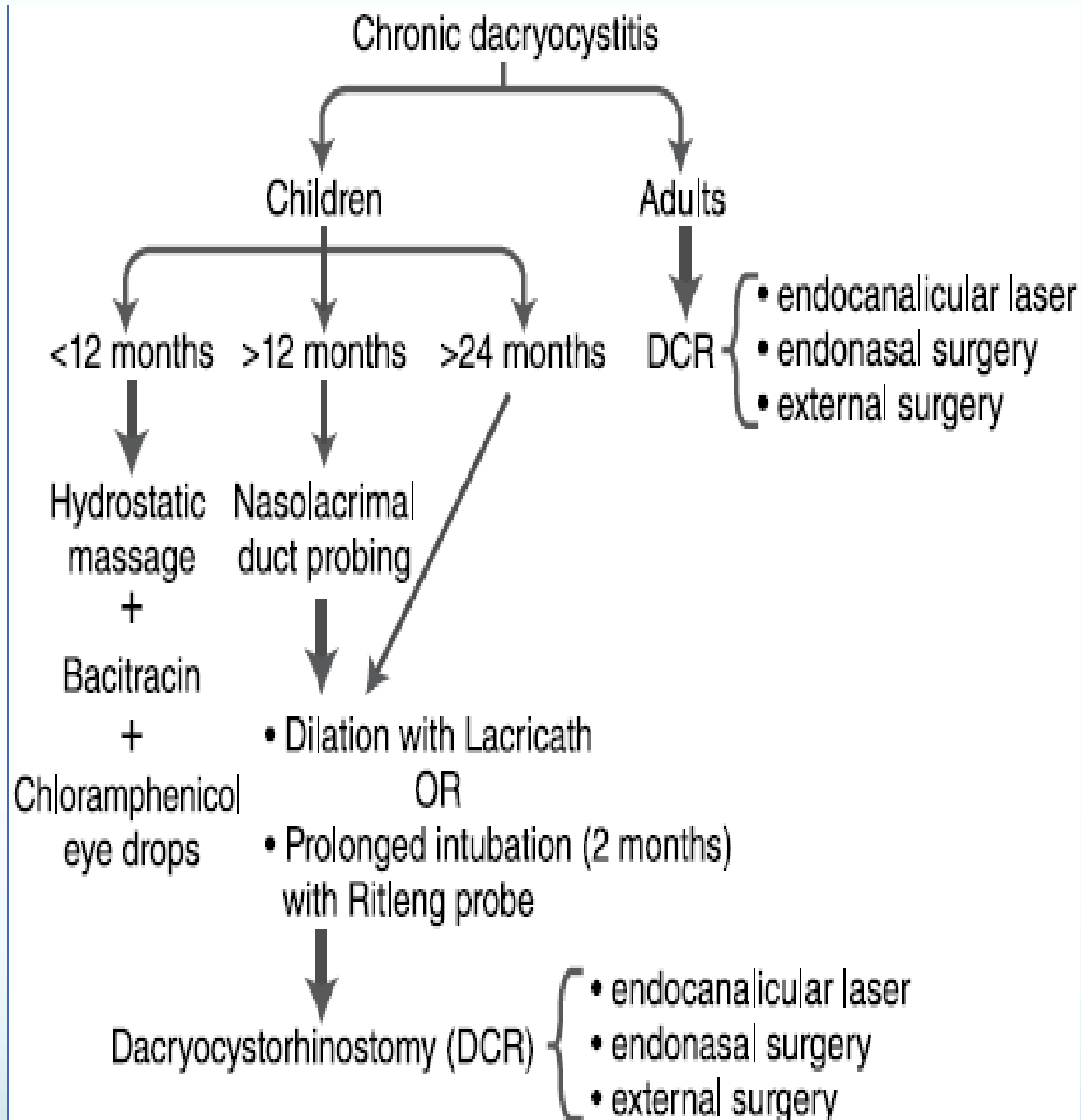
Management of people with **acute dacryocystitis** consists of the application of heat with massage, systemic antibiotics (oral or intravenous administration, as appropriate) and percutaneous abscess drainage.

- On the other hand, for cases that course with a clear abscess, drainage by puncture and aspiration of the lacrimal sac seems to be the technique of choice for treatment, as well as for the diagnostic information it provides.
- Sometimes it is not possible to drain sufficient mucopurulent material from the sac, leading to recurrent and prolonged inflammation, the formation of lacrimal cutaneous fistulae adjacent to the medial canthal ligament, and of fibrous and granulation tissue in the lacrimal sac.

- Classically, surgical intervention has not been considered an option for the treatment of purulent acute dacryocystitis due to the risk of clinical worsening and spread of the infection.
- However, there is a growing interest in the role of **transcanalicular endoscopic laser-assisted dacryocystorhinostomy** and nasal endoscopic surgery for the management of this type of infection.
- This allows simultaneous diagnosis and treatment of the nasal abnormality underlying the infection (nasal septum deviation, middle turbinate hypertrophy, or chronic ethmoid sinusitis).
- Recent studies show that endoscopic technique can be treatment of choice from the start, since it is more effective than conservative treatment and achieves earlier resolution of the condition than with external dacryocystorhinostomy.

## Management: Chronic Dacrocystitis

- Management of chronic dacryocystitis varies according to the age of patients.
- In **adults**, it has been proposed that patients with lacrimal sac swelling and suspicion of obstruction of the lacrimal drainage system associated with tear stones should be treated **conservatively**; using lacrimal sac massage and lacrimal irrigation until symptoms improve, reserving surgery for cases refractory to these techniques.
- If surgery is planned, studies recommend the use of prophylactic antibiotics for dacryocystorhinostomy especially in patients who have had prior episodes of mucocele, mucopyocele, or acute dacryocystitis.



# Surgical Options

- DCR
  - ❖ External
  - ❖ Endonasal
- Conjunctivodacryocystorhinostomy (CDCR)
- Minimal Invasive Lacrimal Surgery
  - ❖ Balloon Dacroplasty
  - ❖ 9mm Balloon assisted DCR

# DCR

- Dacryocystorhinostomy (DCR) introduced by Toti in 1904 is a lacrimal drainage operation in which a fistula is created between the lacrimal sac and the nasal cavity in order to bypass an obstruction in the nasolacrimal duct.
- The procedure can be performed via an external skin incision (external DCR) or through the nose (endoscopic DCR), either under local anesthesia, with or without intravenous sedation, or under general anesthesia.

# External DCR

- **Indications**

1. Chronic epiphora due to a nasolacrimal duct obstruction
2. Recurrent or chronic dacryocystitis
3. Failed probings and silicone intubations in a child
4. Proposed intraocular surgery in the presence of nasolacrimal duct obstruction

- **Contraindications**

1. Acute dacryocystitis
2. Malignant lacrimal sac tumor

# External DCR

## **Surgical Procedure**

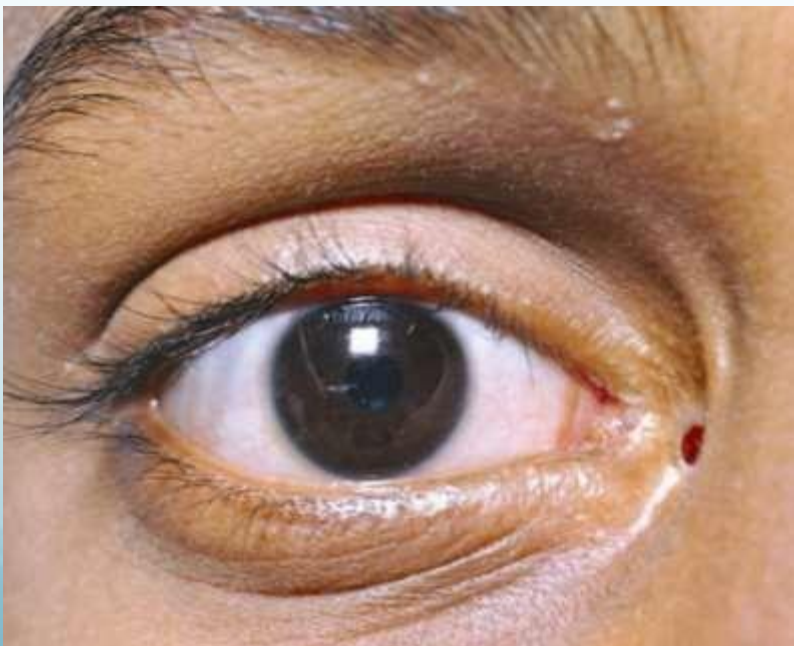
The operation consists of four parts:

1. Skin incision, retraction of the wound, and exposure of the lacrimal fossa
2. The osteotomy
3. The mucosal flaps and stent placement
4. The wound closure

### **KEY POINT**

Performing a successful DCR is greatly facilitated by a bloodless field.

- Early complications include wound dehiscence, wound infection, tube displacement, excessive rhinostomy crusting and intranasal synechiae.
- Intermediate complications include granulomas at the rhinostomy site, tube displacements, intranasal synechiae, punctal cheese-wiring, prominent facial scar and nonfunctional DCR.
- Late complications include rhinostomy fibrosis, webbed facial scar, medial canthal distortion, and failed DCR.



# Endonasal DCR

The operation consists of **four** parts:

1. The fashioning of a nasal mucosal flap
2. The osteotomy
3. The opening of the lacrimal sac and the creation of anterior and posterior flaps
4. The manipulation and replacement of the nasal mucosal flap and placement of the silicone stent

# Conjunctivodacryocystorhinostomy (CDCR)

- Conjunctivodacryocystorhinostomy (CDCR) is the creation of a passage for drainage of tears from the conjunctival culde-sac, at the medial canthus, to the middle meatus of the nose.
- To maintain the patency, a pyrex glass or other tube is inserted in the fistula.
- The procedure was first described by Lester Jones in 1965, and the standard glass tubes are named Jones tubes.

# Balloon Dacryoplasty

- Balloon dacryoplasty is a term used for a set of minimally invasive lacrimal procedures that utilizes specially designed balloons, targeted at different points in the lacrimal system for a wide range of indications.
- Balloons were first used by Becker and Berry in 1989.
- A 2 mm balloon is used for patients less than 30 months of age and 3 mm for children more than 30 months of age. Also available are 4mm and 5mm balloons.
- The **indications of balloon dacryoplasty for CNLDOs** are:
  - ❖ Failed probing
  - ❖ Failed intubation
  - ❖ Older children (> 12 months of age)
  - ❖ Down's syndrome or any syndromic association with CNLDO.

# 9mm Balloon assisted DCR

- Primary endoscopic DCR using the 9 mm nasal balloon catheter is a good alternative to an external or endoscopic DCR. It was introduced and popularized by Silbert DI.
- The **advantages** of this procedure include:
  - ❖ Reduced operative trauma
  - ❖ Less bleeding
  - ❖ Faster and less time consuming
  - ❖ No need for powered endoscopic instruments
  - ❖ Less postoperative morbidity
  - ❖ Early rehabilitation
  - ❖ High success rates.



THANK YOU