

Lacrimal  
system

الداكتور مقّداد فوّاد

## Basic Knowledge

The lacrimal system consists of two sections

- Structures that secrete tear fluid.
- Structures that facilitate tear drainage.

### Anatomy of the lacrimal system.

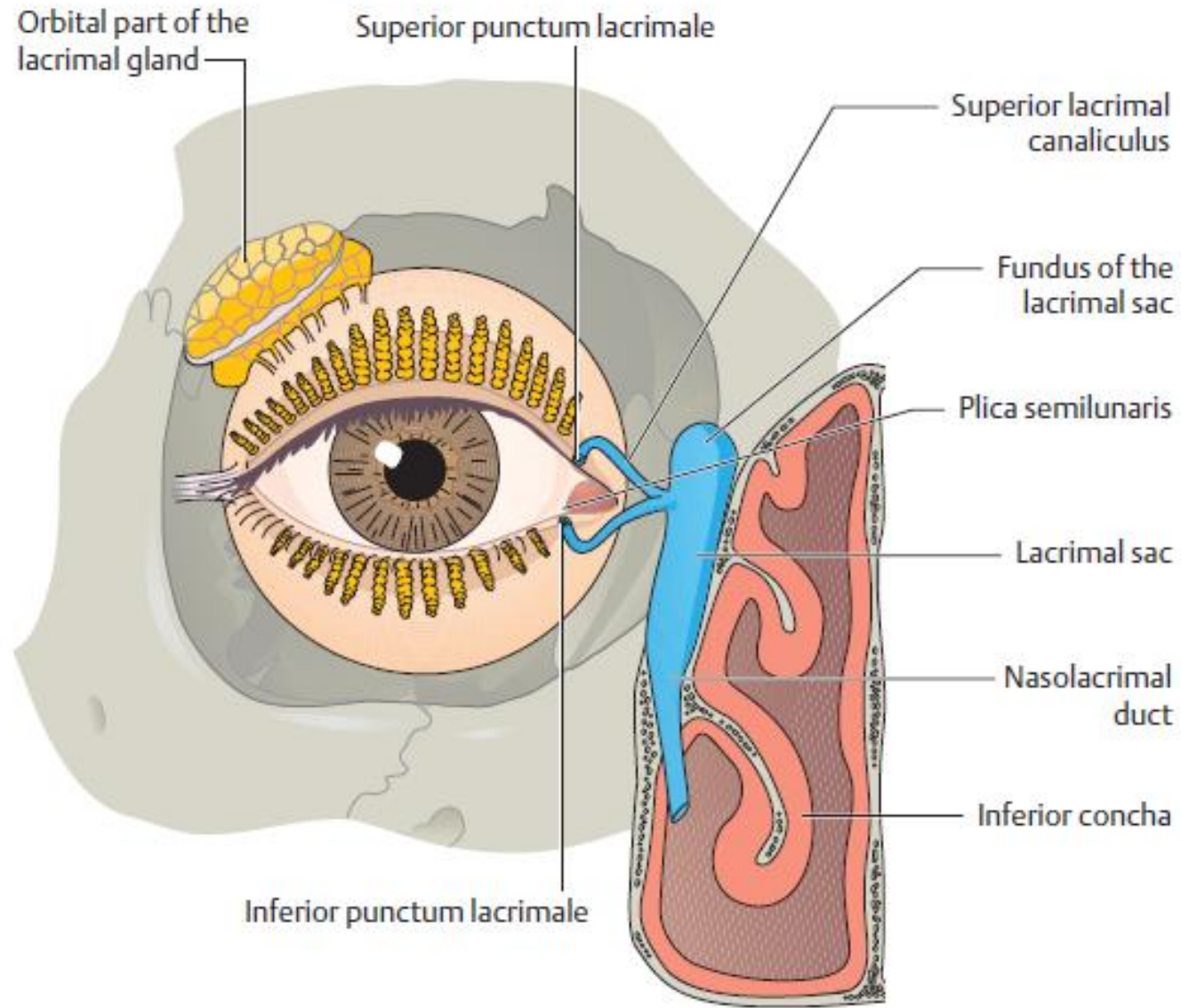


Fig. 3.1 The lacrimal system consists of tear secretion structures and tear drainage structures.

# Position, structure, and nerve supply of the lacrimal gland:

- The **lacrimal gland** is about the **size of a walnut**; it lies beneath the superior temporal margin of the orbital bone in the lacrimal fossa of the frontal bone and is *neither visible nor palpable*.
- A palpable lacrimal gland is usually a sign of a pathologic change such as **dacryoadenitis**.

- The tendon of the levator palpebrae muscle divides the lacrimal gland into a *larger orbital part* (two-thirds) and a *smaller palpebral part* (one-third).
- Several tiny **accessory lacrimal glands (glands of Krause and Wolfring)** located in the superior fornix secrete additional serous tear fluid.

- The lacrimal gland receives its **sensory supply** from the *lacrimal nerve*.
- Its **parasympathetic secretomotor** nerve supply comes from the *nervus intermedius*.
- The **sympathetic fibers** arise from the **superior cervical sympathetic ganglion** and follow the course of the blood vessels to the gland.

# Tear film

The tear film that moistens the conjunctiva and cornea is composed of **three layers**:

1. The **outer oily layer** (approximately 0.1  $\mu\text{m}$  thick) is a product of the *meibomian glands* and the *sebaceous glands and sweat glands of the margin of the eyelid*. The primary function of this layer is to stabilize the tear film.
  - With its hydrophobic properties, it prevents rapid evaporation like a layer of wax.

2. The **middle watery layer** (approximately 8  $\mu\text{m}$  thick) is produced by *the lacrimal gland and the accessory lacrimal glands (glands of Krause and Wolfring)*.

**Its functions are:**

- A. Clean the surface of the cornea
- B. Ensure mobility of the palpebral conjunctiva over the cornea and
- C. Ensure a smooth corneal surface *for high-quality optical images.*



3. The **inner mucin layer** (approximately 0.8  $\mu\text{m}$  thick) is secreted by the *goblet cells of the conjunctiva* and the *lacrimal gland*.

- It is hydrophilic with respect to the microvilli of the corneal epithelium, which also helps to *stabilize the tear film*.

- **This layer**

- A. Prevents the watery layer from forming beads on the cornea

- B. Ensures that the *watery layer moistens the entire surface of the cornea and conjunctiva*.

- Lysozyme, beta-lysin, lactoferrin, and gamma globulin (IgA) are **tear-specific proteins** that give the tear fluid *antimicrobial characteristics*.

## Structure of the tear film.

### Oily layer (approx. $0.1\ \mu\text{m}$ )

- cholesteryl esters
- cholesterol
- triglyceride
- phospholipids

### Water layer (approx. $8\ \mu\text{m}$ )

- 98-99% water
- approx. 1% inorganic salts
- approx. 0.2-0.6% proteins, globulins, and albumin
- approx. 0.02-0.06% lysozyme
- Rest: glucose, urea, neutral mucopolysaccharides (mucin), and acidic mucopolysaccharides

### Mucin layer (approx. $0.8\ \mu\text{m}$ )

Epithelium with microvilli and folds

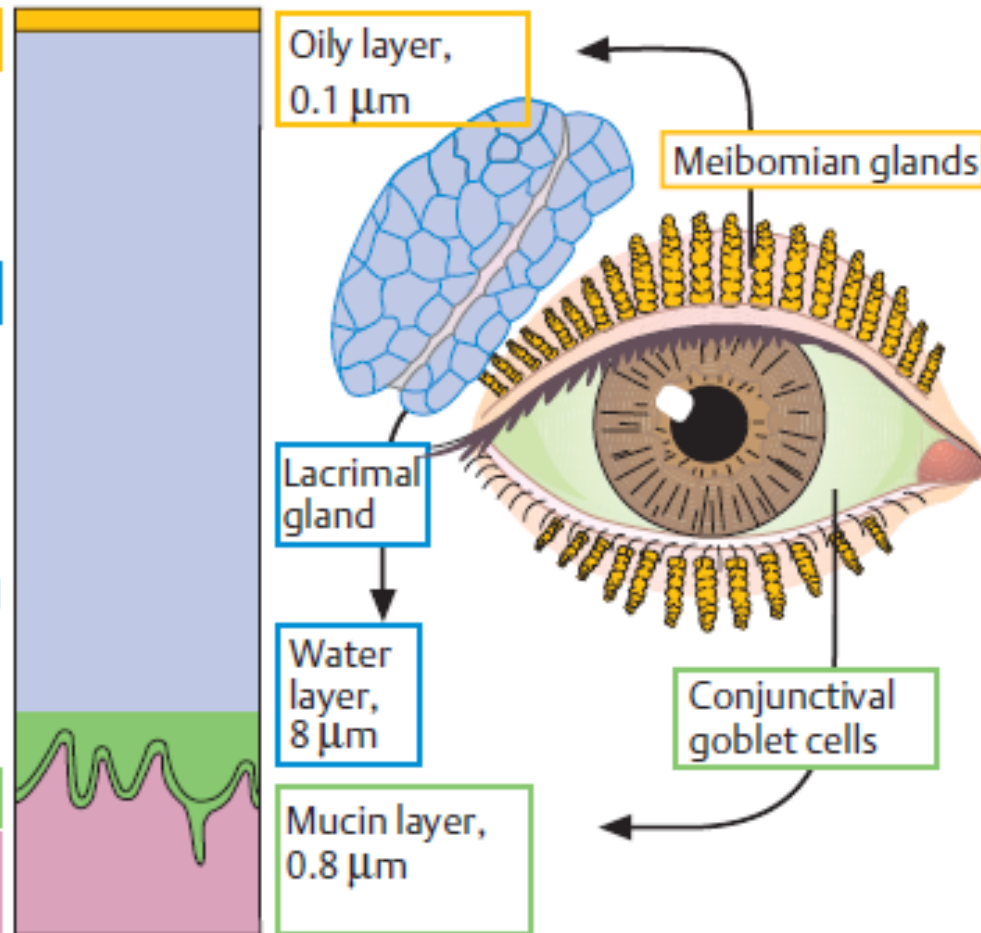


Fig. 3.2 The tear film is composed of three layers:

- ❖ An oily layer (prevents rapid desiccation).
- ❖ A watery layer (ensures that the cornea remains clean and smooth for optimal transparency).
- ❖ A mucin layer (like the oily outer layer, it stabilizes the tear film).

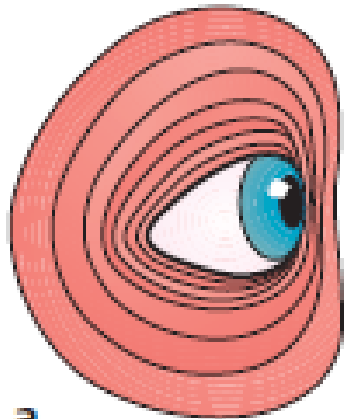
## Tear drainage

The shingle-like arrangement of the **fibers of the orbicularis oculi muscle** (supplied by the facial nerve) causes the eye to close progressively from lateral to medial; instead the eyelids simultaneously closing along their entire length. This *windshield wiper motion* moves the tear fluid medially across the eye toward the medial canthus (Figs. 3.3a–c).

- The **superior and inferior puncta lacrimales** collect the tears, which then drain through the superior and inferior **lacrimal canaliculi** into the **lacrimal sac**. From there they pass through the **nasolacrimal duct** into the **inferior concha** (see Fig. 3.1).

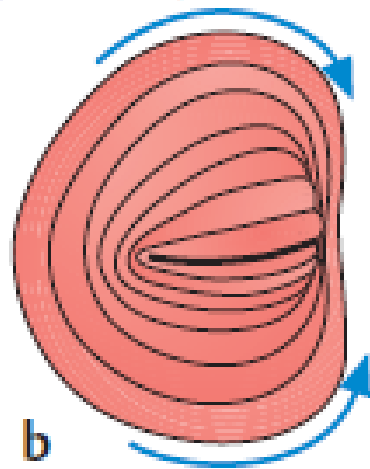
## Combined function of the orbicularis oculi muscle and the lower lacrimal system.

Opening the eye  
Levator palpebrae  
superioris muscle  
(oculomotor nerve)

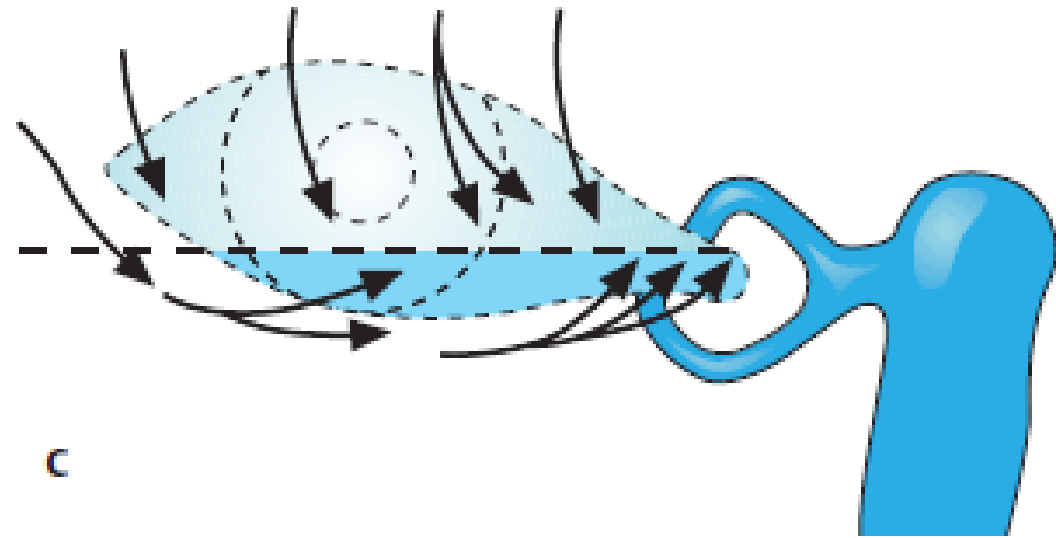


a

Closing the eye  
Orbicularis oculi  
muscle (facial  
nerve)



b



c

Figs. 3.3 a–c As the eyelids close, they act like a windshield wiper to move the tear fluid medially across the eye toward the puncta and lacrimal canaliculi.

# Examination Methods

Evaluation of Tear Formation include:

1. Schirmer tear testing
2. Tear break-up time (TBUT)
3. Rose bengal test
4. Impression cytology

Evaluation of Tear Drainage include

1. Conjunctival fluorescein dye test
2. Probing and irrigation
3. Radiographic contrast studies
4. Digital subtraction dacryocystography
5. Lacrimal endoscopy

- **Schirmer tear testing:** This test (Fig. 3.4) provides information on the **quantity of watery component in tear secretion.**
- ***Test:*** A strip of litmus paper is inserted into the conjunctival sac of the temporal third of the lower eyelid.
- ***Normal:*** After about five minutes, at least 15mm of the paper should turn blue due to the alkaline tear fluid.
- ***Abnormal:*** Values less than 5mm are abnormal (although they will not necessarily be associated with clinical symptoms).



## Measuring tear secretion with Schirmer tear testing.



Fig. 3.4 A strip of litmus paper is folded over and inserted into the conjunctival sac of the temporal third of the lower eyelid. Normally, at least 15 mm of the paper should turn blue within five minutes.



- **Tear break-up time (TBUT):** This test evaluates the **stability of the tear film**.
- **Test:** Fluorescein dye (10  $\mu$ l of a 0.125% fluorescein solution) is added to the precorneal tear film. The examiner observes the eye under 10–20 power magnification with slit lamp and cobalt blue filter and notes when the first signs of drying occur **(i) *without the patient closing the eye*** and **(ii) *with the patient keeping the eye open as he or she would normally***.
- **Normal:** TBUT of *at least* 10 seconds is normal.

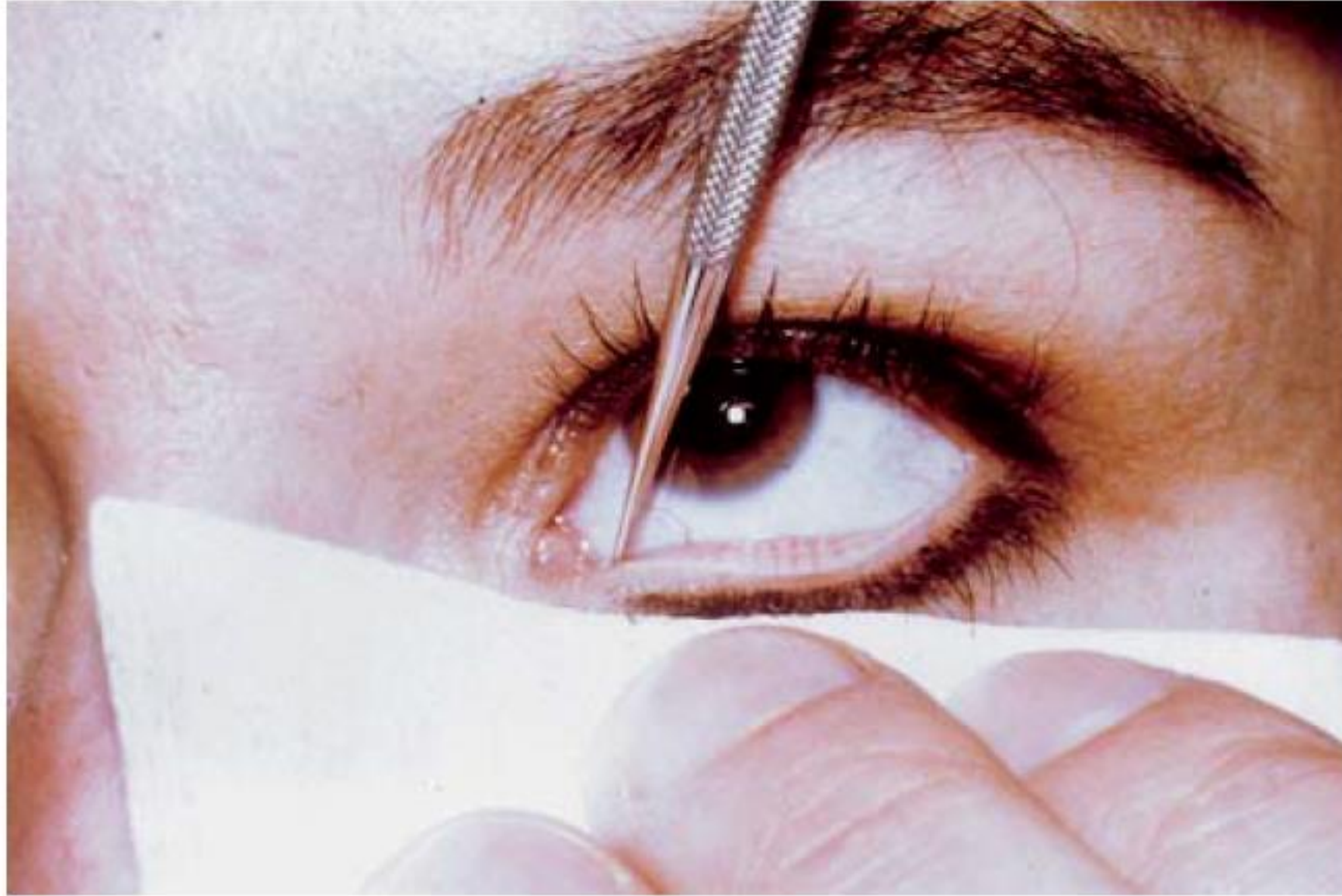
- **Rose bengal test:** Rose bengal dyes dead epithelial cells and mucin. This test has proven particularly useful in evaluating *dry eyes* (**keratoconjunctivitis sicca**) as it reveals conjunctival and corneal symptoms of desiccation.

- **Impression cytology:** A Millipore filter is fastened to a tonometer and pressed against the superior conjunctiva with 20–30mm Hg of pressure for two seconds. The **density of goblet cells** is estimated under a microscope (*normal density* is 20–45 goblet cells per square millimeter of epithelial surface).
- The number of mucus-producing goblet cells is reduced in various disorders such as keratoconjunctivitis sicca, ocular pemphigoid, and xerophthalmia.

- **Conjunctival fluorescein dye test:** Normal **tear drainage** can be demonstrated by having the patient blow his or her nose into a facial tissue following application of a 2% fluorescein sodium solution to the inferior fornix.

- **Probing and irrigation:** These examination methods are used to **locate stenoses**.
- After application of a topical anesthetic, a conical probe is used to dilate the punctum. Then the lower lacrimal system is flushed with a physiologic saline solution introduced through a blunt cannula (Figs. 3.5 a and b).
- If the passage is *unobstructed*, the solution will drain freely into the nose.
- Canalicular stenosis will result in reflux through the irrigated punctum.
- If the stenosis is deeper, reflux will occur through the opposite punctum (Fig. 3.6).
- A probe can be used to determine the site of the stricture, and possibly to eliminate obstructions (Fig. 3.7).

## Irrigation of the lower lacrimal system under topical anesthesia.



Figs. 3.5 a and b  
First the punctum is dilated by rotating a conical probe. Then the lacrimal passage is flushed with a physiologic saline solution. The examiner should be particularly alert to good drainage or possible reflux.

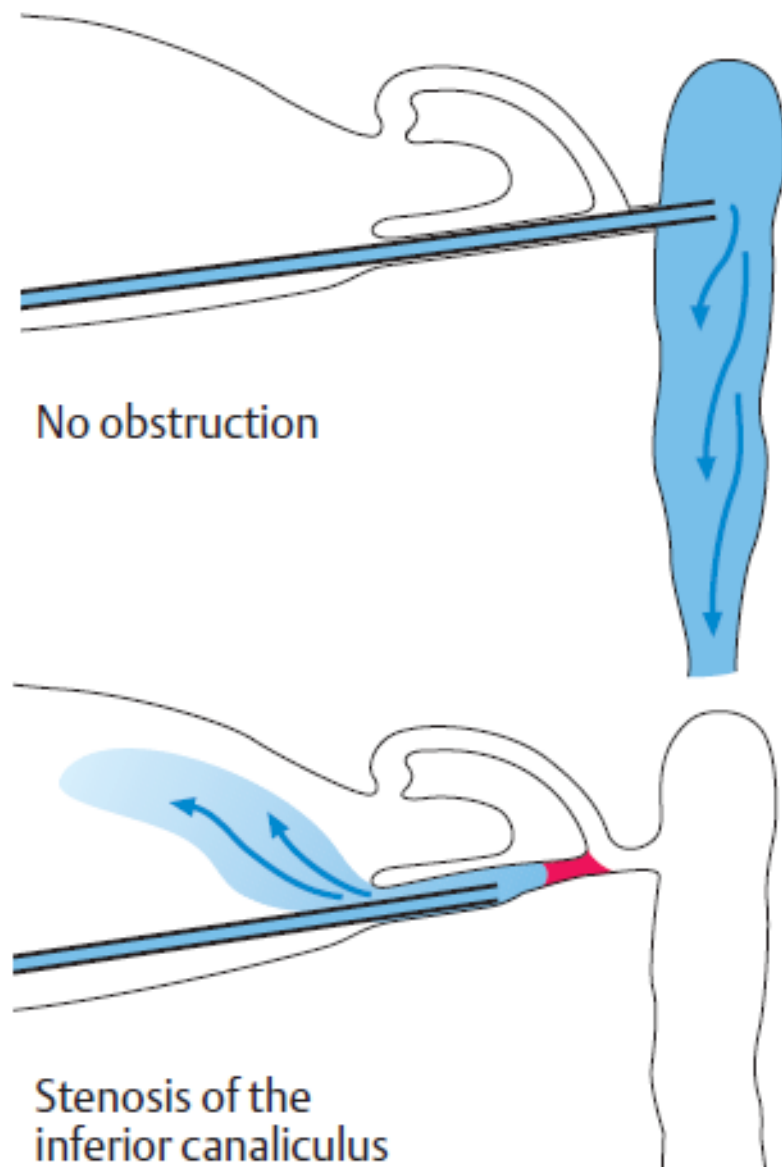
a





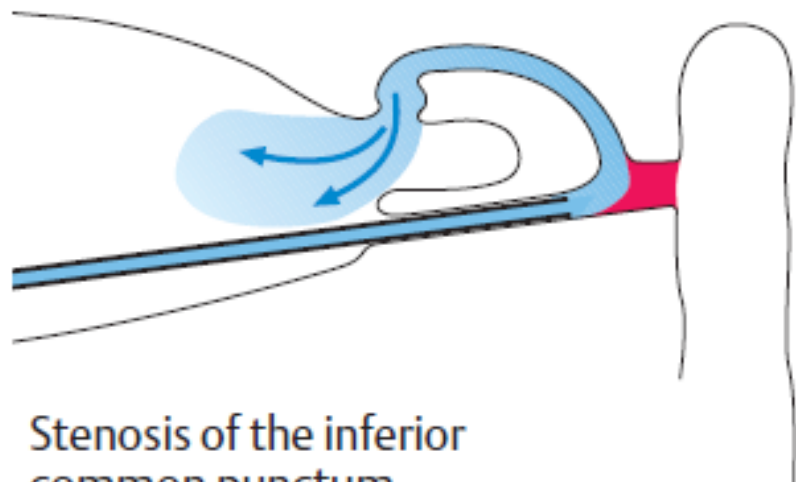
**b**

**Localizing an obstruction by irrigating the lower lacrimal system.**

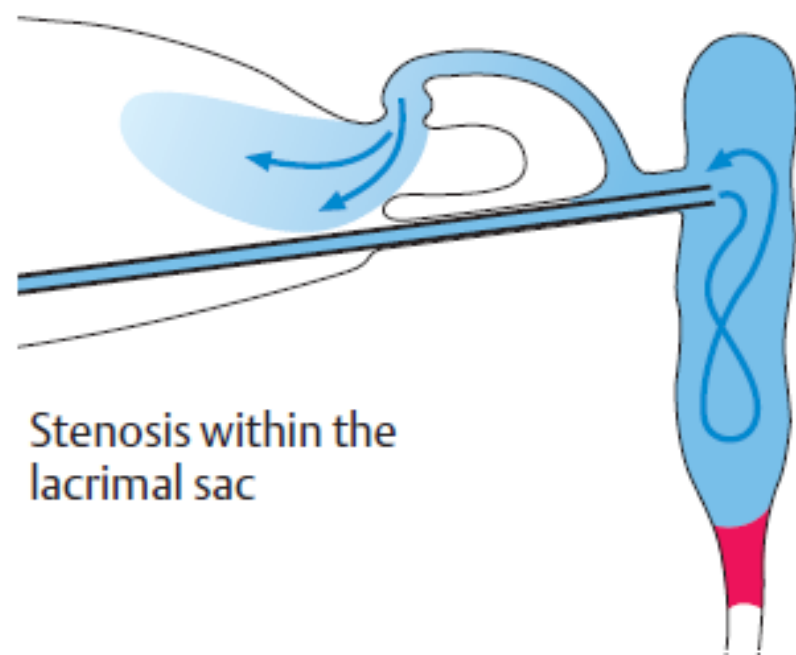


**Fig. 3.6** The lower lacrimal system should be irrigated with care by an experienced ophthalmologist. Failure to locate the passage will inflate the eyelid and provide no diagnostic information.





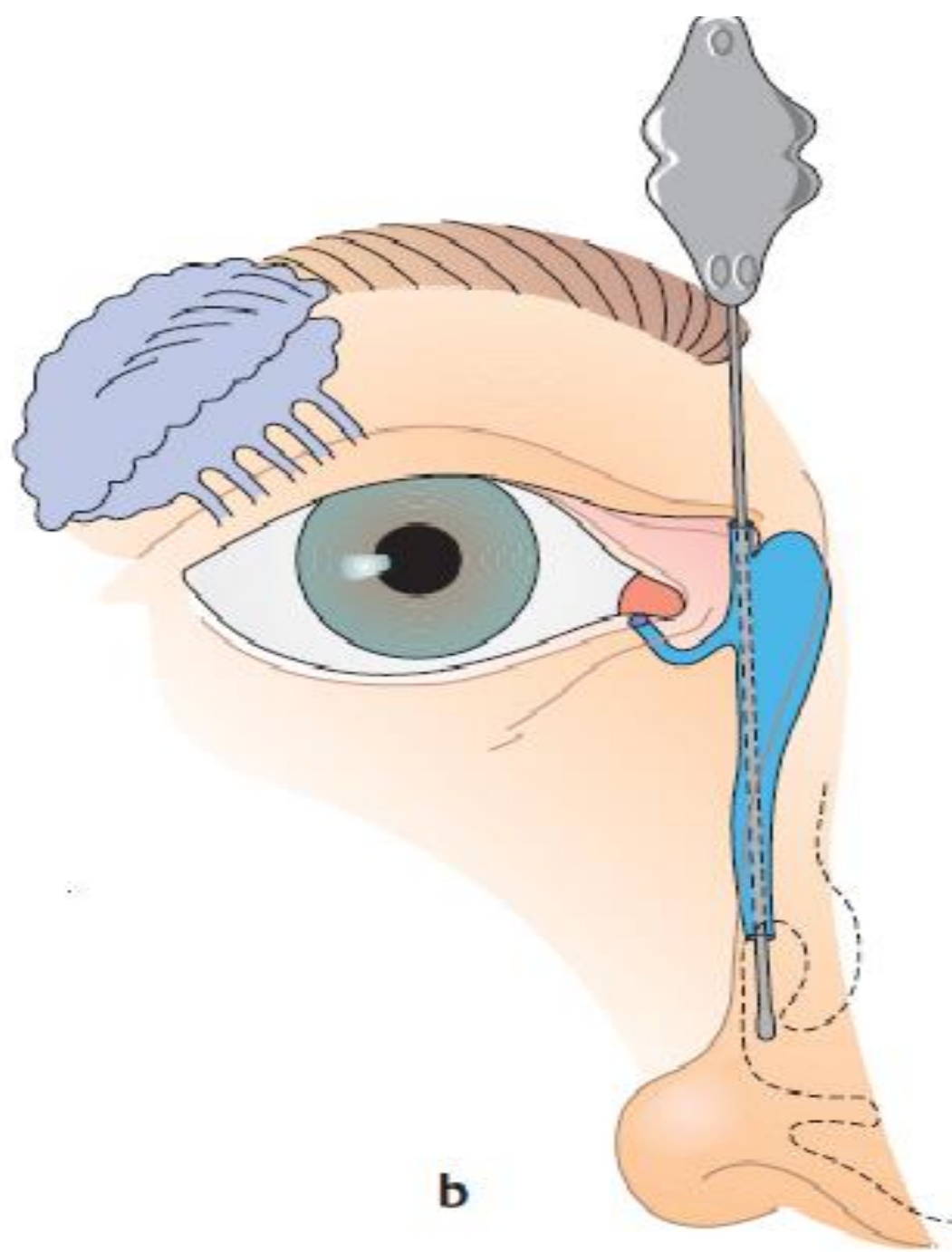
Stenosis of the inferior  
common punctum



Stenosis within the  
lacrimal sac

**Opening a stenosis of the lower lacrimal system with a probe.**





**b**



Figs. 3.7**a–c** After application of a topical anesthetic, the probe is carefully introduced into the lower lacrimal system. The puncta are dilated and then the valve of Hasner is opened (**a** and **b**). A dye solution can then be introduced to verify patency of the lower lacrimal system (**c**). In infants six months or older, the procedure is best performed under short-acting general anesthesia.

- **Radiographic contrast studies:** Radiographic contrast medium is instilled in the same manner as the saline solution. These studies demonstrate the **shape, position, and size** of the passage and possible **obstructions to drainage**.
- **Digital subtraction dacryocystography:** These studies demonstrate only the contrast medium and image the lower lacrimal system without superimposed bony structures. They are particularly useful as **preoperative diagnostic studies** (Fig. 3.8).



Radiographic image of the lower lacrimal system.

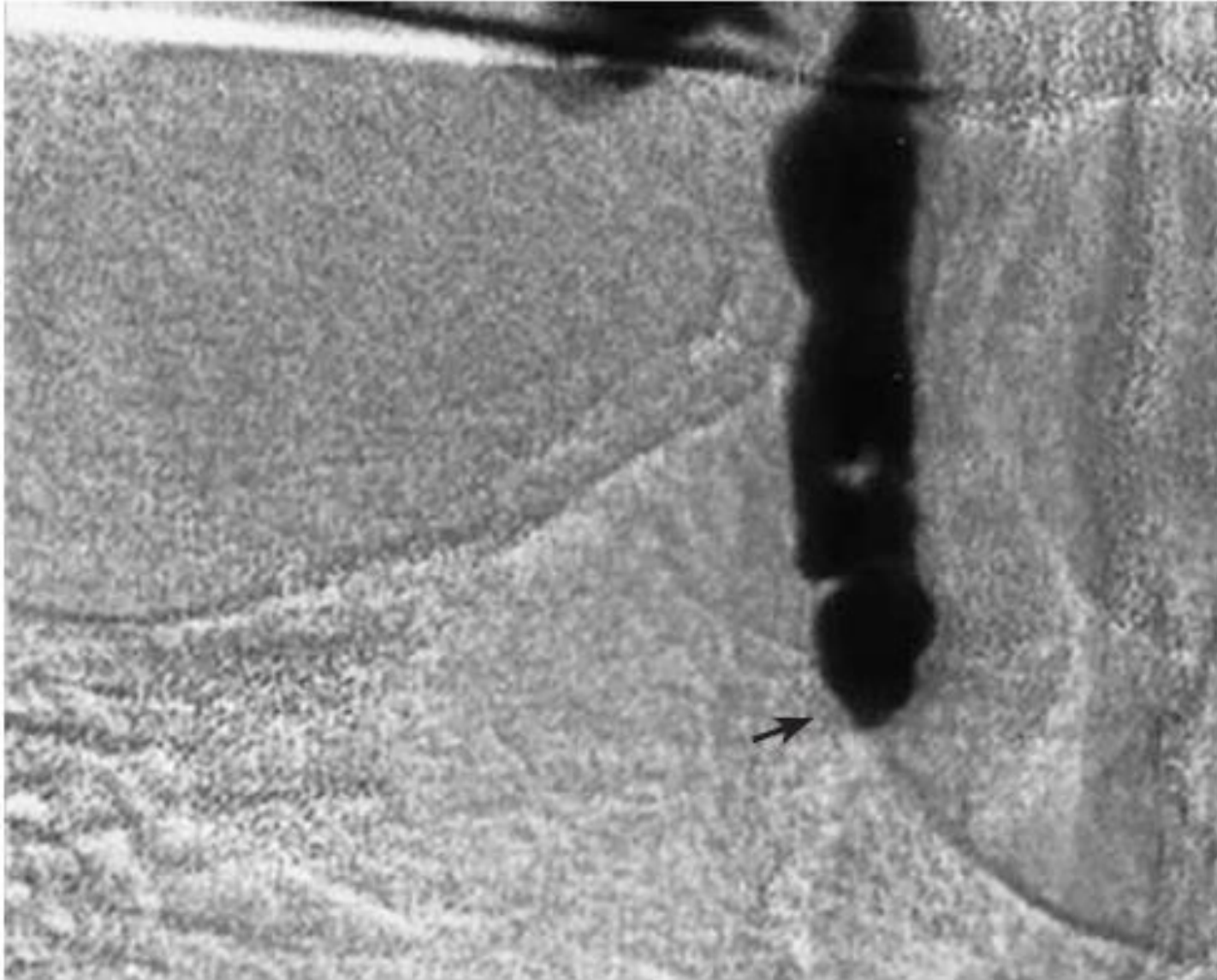


Fig. 3.8 Digital subtraction dacryocystography images the lower lacrimal system and can demonstrate a possible stenosis (arrow) without superimposed bony structures.

- **Lacrimal endoscopy:** Fine endoscopes now permit **direct visualization of the mucous membrane of the lower lacrimal system.** Until recently, endoscopic examination of the lower lacrimal system was not a routine procedure.

# Disorders of the Lower Lacrimal System

1. Acute Dacryocystitis
2. Chronic Dacryocystitis
3. Neonatal Dacryocystitis
4. Canaliculitis



# Disorders of the Lower Lacrimal System

## Dacryocystitis

- A. Inflammation of the lacrimal sac
- B. Is the *most frequent* disorder of the lower lacrimal system.
- C. It is usually the result of obstruction of the nasolacrimal duct
- D. Is *unilateral in most cases*.

# Acute Dacryocystitis

- **Epidemiology:** The disorder most frequently affects adults between the ages of 50 and 60.
- **Etiology:** The cause is usually a ***stenosis within the lacrimal sac***. The retention of tear fluid leads to infection from staphylococci, pneumococci, *Pseudomonas*, or other pathogens.
- **Symptoms:**
  - A. Highly inflamed, painful swelling in the vicinity of the lacrimal sac
  - B. Malaise, fever,
  - C. involvement of the regional lymph nodes.
  - D. The pain may be referred as far as the forehead and teeth.
  - E. An abscess in the lacrimal sac may form in advanced disorders; it can spontaneously rupture the skin and form a draining fistula.

**Acute dacryocystitis.**



**Fig. 3.9** Typical symptoms include highly inflamed, painful swelling in the vicinity of the lacrimal sac.

# Note

Acute inflammation that has spread to the surrounding tissue of the eyelids and cheek entails a risk of sepsis and cavernous sinus thrombosis, which is a life-threatening complication.

## Diagnostic considerations:

- Radiographic contrast studies or digital subtraction **dacryocystography** can visualize the obstruction for preoperative planning.
- These studies should be avoided during the acute phase of the disorder because of the risk of pathogen dissemination.
- **Differential diagnosis:**
  - A. Hordeolum** (small, circumscribed, non-mobile inflamed swelling).
  - B. Orbital cellulitis** (usually associated with reduced motility of the eyeball).





**Orbital cellulitis**



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**Internal hordeolum**



**External hordeolum**

# Treatment:

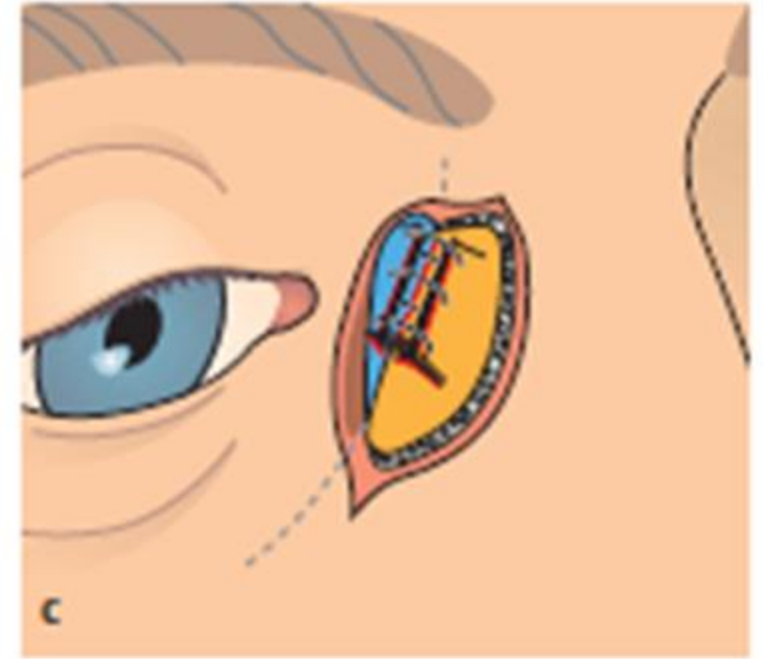
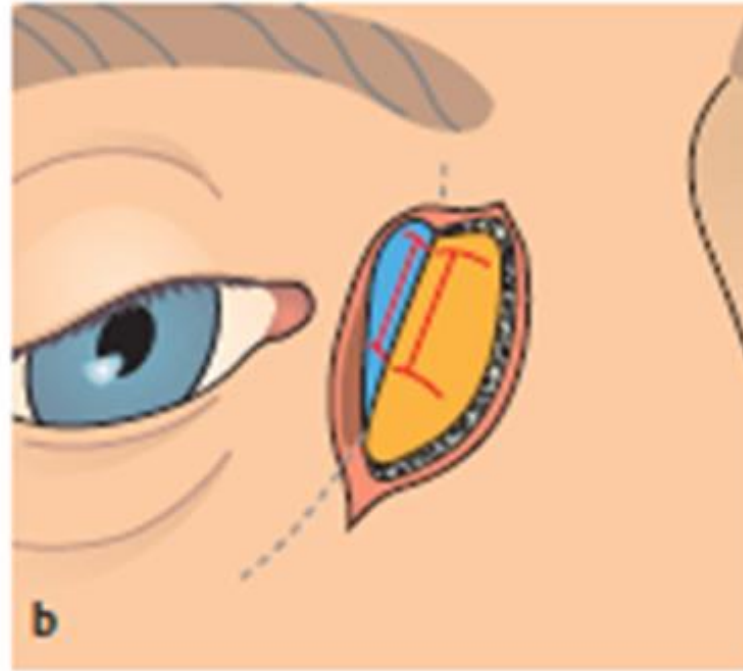
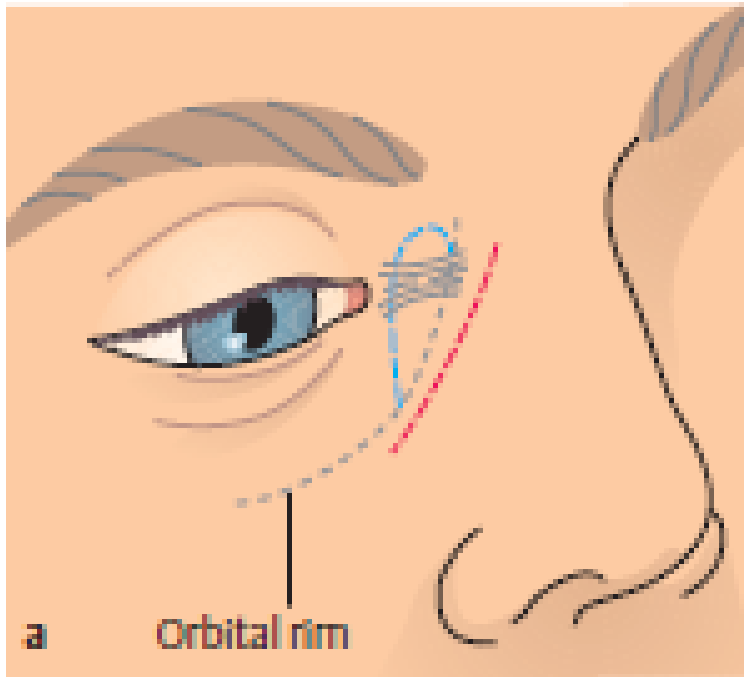
**Acute cases** are treated with *local and systemic antibiotics* according to the specific pathogens detected. *Disinfectant compresses* (such as a 1:1000 Rivanol solution) can also positively influence the clinical course of the disorder.

**Pus** from a *fluctuating abscess* is best drained through a *stab incision* following cryoanesthesia with a refrigerant spray.



- Treatment after **acute symptoms have subsided** often requires surgery (**dacryocystorhinostomy**; Figs. 3.10a–c) to achieve persistent relief.
- Also known as a **lower system bypass**, this operation involves opening the lateral wall of the nose and bypassing the nasolacrimal duct to create a direct connection between the lacrimal sac and the nasal mucosa.

## Dacryocystorhinostomy.



A skin incision is made, and the orbital rim is exposed. Then a window is opened to expose the nasal mucosa. The nasal mucosa and the lacrimal sac are both incised in an H-shape and door-like flaps are raised. The anterior and posterior mucosal flaps are then sutured together. This creates a new drainage route for the tear fluid that bypasses the nasolacrimal duct.

# Chronic Dacryocystitis

- **Etiology:** Obstruction of the nasolacrimal duct is often secondary to chronic inflammation of the connective tissue or nasal mucosa.
- **Symptoms and diagnostic considerations:**
  - A. The *initial characteristic* of chronic dacryocystitis is *increased lacrimation*.
  - B. Signs of inflammation are not usually present.
  - C. Applying pressure to the inflamed lacrimal sac causes *large quantities of transparent mucoïd pus* to regurgitate through the punctum.
  - D. Chronic inflammation of the lacrimal sac can lead to a serpiginous corneal ulcer.
- **Treatment:** Surgical intervention is the only effective treatment in the vast majority of cases. This involves either a dacryocystorhinostomy (creation of or removal of the lacrimal sac).

# Neonatal Dacryocystitis

**Etiology:** Approximately **6%** of newborns have a stenosis of the mouth of the nasolacrimal duct due to a ***persistent mucosal fold*** (lacrimal fold or valve of Hasner). The resulting retention of tear fluid provides ideal growth conditions for bacteria, particularly staphylococci, streptococci, and pneumococci.

- **Symptoms and diagnostic considerations:** Shortly after birth (usually within two to four weeks), *pus is secreted from the puncta*. The disease continues subcutaneously and pus collects in the palpebral fissure. The *conjunctiva is not usually involved*.
- **Differential diagnosis:**
  1. Gonococcal conjunctivitis
  2. inclusion conjunctivitis.
  3. Silver catarrh (harmless conjunctivitis with slimy mucosal secretion following Credé's method of prophylaxis with silver nitrate).



**Gonococcal conjunctivitis**

# Treatment:

**During the first few weeks**, the infant should be monitored for *spontaneous opening of the stenosis*. During this period, *antibiotic and anti-inflammatory eye drops and nose drops* (such as **erythromycin** and **xylometazoline 0.5% for infants**) are administered.

- **If symptoms persist**, *irrigation* or *probing* under short-acting general anesthesia may be indicated (see Figs. **3.7a–c**). Often massaging the region several times daily while carefully applying pressure to the lacrimal sac will be sufficient to open the valve of Hasner and eliminate the obstruction.

# Canaliculitis

## Definition

- This usually involves *inflammation of the canaliculus*.

**Epidemiology and etiology:** *Genuine canaliculitis is rare. Usually a stricture will be present and the actual inflammation proceeds from the conjunctiva.*

- Actinomycetes (fungoid bacteria) often cause persistent purulent granular concretions that are difficult to express.

**Symptoms and diagnostic considerations:** The canaliculus region is swollen, reddened, and often tender to palpation. Pus or granular concretions can be expressed.

**Treatment:** The disorder is treated with antibiotic eyedrops and ointments according to the specific pathogens detected in cytologic smears. Successful treatment occasionally requires surgical incision of the canaliculus.

# Tumors of the Lacrimal Sac



# Tumors of the Lacrimal Sac

- **Epidemiology:** Tumors of the lacrimal sac are *rare* but are *primarily malignant*
- when they do occur. They include papillomas, carcinomas, and sarcomas.
- **Symptoms and diagnostic considerations:** Usually the tumors cause unilateral painless swelling followed by dacryostenosis.
- **Diagnostic considerations:** The irregular and occasionally bizarre form of the structure in radiographic contrast studies is typical. Ultrasound, CT, MRI, and biopsy all contribute to confirming the diagnosis.
- **Differential diagnosis:** Chronic dacryocystitis (see above), mucocele of the ethmoid cells.
- **Treatment:** The entire tumor should be removed.



# Carcinoma of the lacrimal sac



# Lacrimal System Dysfunction

1. Keratoconjunctivitis Sicca
2. Illacrimation

# Keratoconjunctivitis Sicca

## Definition

**Noninfectious keratopathy** characterized by reduced moistening of the conjunctiva and cornea (dry eyes).

- **Epidemiology:** Keratoconjunctivitis sicca as a result of dry eyes is one of the **most common eye problems between the ages of 40 and 50**.
- As a result of hormonal changes in menopause, *women are far more frequently affected (86%) than men*.
- There are also indications that keratoconjunctivitis sicca is more prevalent in regions with higher levels of environmental pollution.

**Etiology:** Keratoconjunctivitis sicca results from dry eyes, which may be due to one of two causes:

**1. Reduced tear production** associated with certain systemic disorders (such as Sjögren's syndrome and rheumatoid arthritis) or as a result of atrophy or destruction of the lacrimal gland.

**2. Altered composition of the tear film.** The composition of the tear film can alter due to:

- A. Vitamin A deficiency,
- B. Medications (such as oral contraceptives and retinoids),
- C. Certain environmental influences (such as nicotine, smog, or air conditioning).
- D. The tear film breaks up too quickly and causes corneal drying.

• ***Dry eyes can represent a disorder in and of itself.***

✓ Smog is fog combined with smoke and other atmospheric pollutants.



# Symptoms:

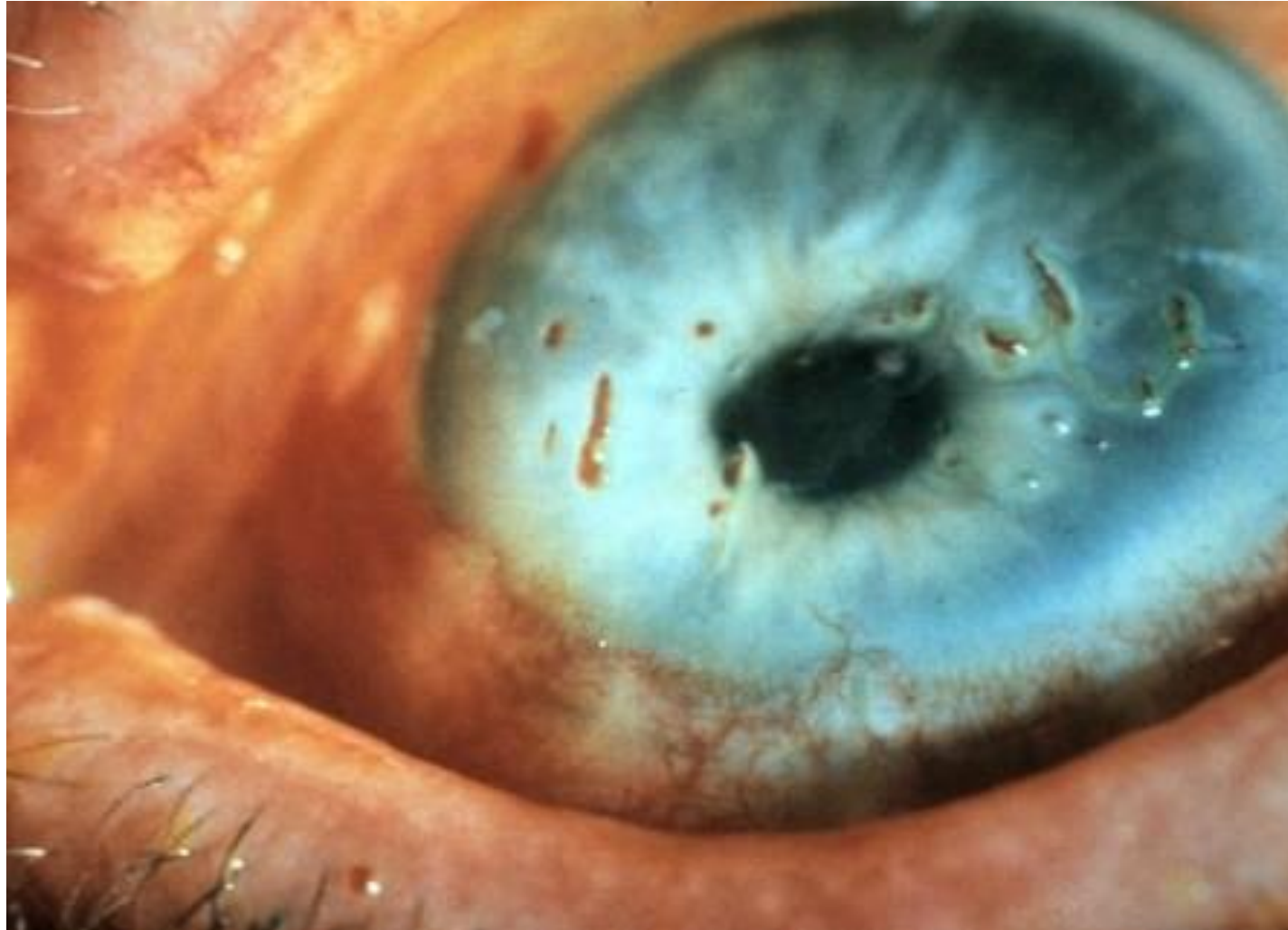
- Burning,
- Reddened eyes,
- Excessive lacrimation (reflex lacrimation) from only slight environmental causes such as wind, cold, low humidity, or reading for an extended period of time.
- A foreign body sensation is also present.
- There may be an accompanied intense pain.
- Eyesight is usually minimally compromised if at all.

## Diagnostic considerations:

- Often there is a discrepancy between the *minimal clinical findings* that the ophthalmologist can establish and the *intense symptoms reported by the patient*.
- Results from **Schirmer tear testing** usually show reductions of the watery component of tears, and the **tear break-up time** (which provides information about the mucin content of the tear film which is important for its stability) is reduced. Values of at least 10 seconds are normal; the tear break-up time in keratoconjunctivitis sicca is less than 5 seconds.

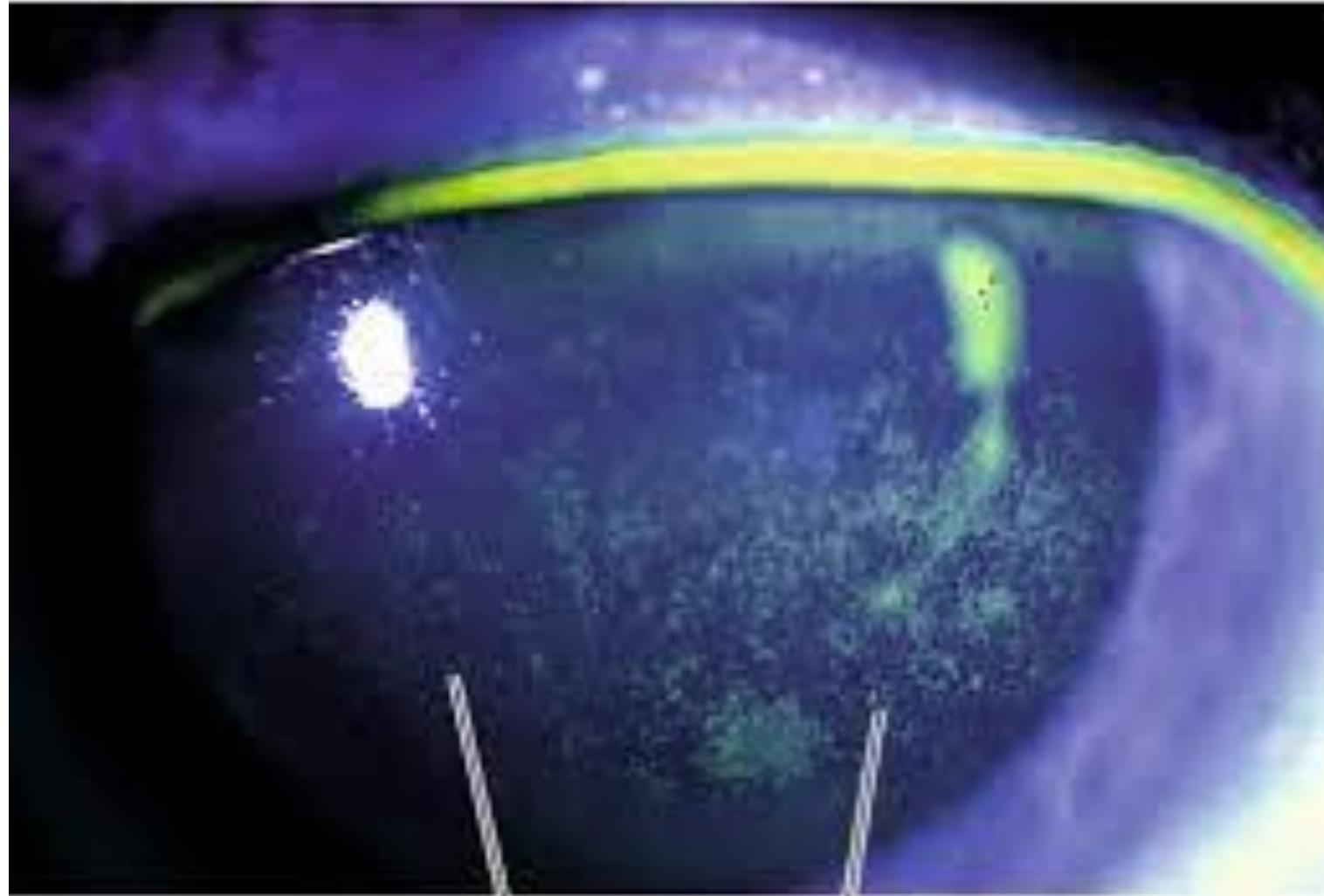
- **Slit lamp examination** will reveal dilated conjunctival vessels and minimal pericorneal injection.
- A tear film meniscus cannot be demonstrated on the lower eyelid margin, and the lower eyelid will push the conjunctiva along in folds in front of it.
- In *severe cases* the eye will be reddened, and the tear film will contain thick mucus and small filaments that proceed from a superficial epithelial lesion (filamentary keratitis; see Fig. 5.11). The corneal lesion can be demonstrated with **fluorescein dye**.

# Filamentary keratitis



- In less severe cases the eye will only be reddened, although application of fluorescein dye will reveal corneal lesions (superficial punctate keratitis; see p. 138). The **rose bengal test** (see p. 52) and **impression cytology** (see p. 53) are additional diagnostic tests that are useful in evaluating persistent cases.

# superficial punctate keratitis



Superficial punctate keratitis

## Treatment:

- Depending on the severity of findings, **artificial tear solutions** in varying viscosities are prescribed.
- These range from **eyedrops** to high-viscosity long-acting **gels** that may be applied every hour or every half hour, depending on the severity of the disorder.
- **In persistent cases**, the puncta can be temporarily closed with silicone **punctal plugs** to at least retain the few tears that are still produced.
- **Surgical obliteration of the puncta** may be indicated in severe cases.



- Patients should also be informed about the possibility of installing an **air humidifier** in the home and redirecting blowers in automobiles to avoid further drying of the eyes. Dry eyes in women may also be due to hormonal changes, and a **gynecologist should be consulted** regarding the patient's hormonal status.
- **Prognosis:** The prognosis is good for those treatments discussed here. However, the disorder cannot be completely healed.

Treatment of dry eyes.

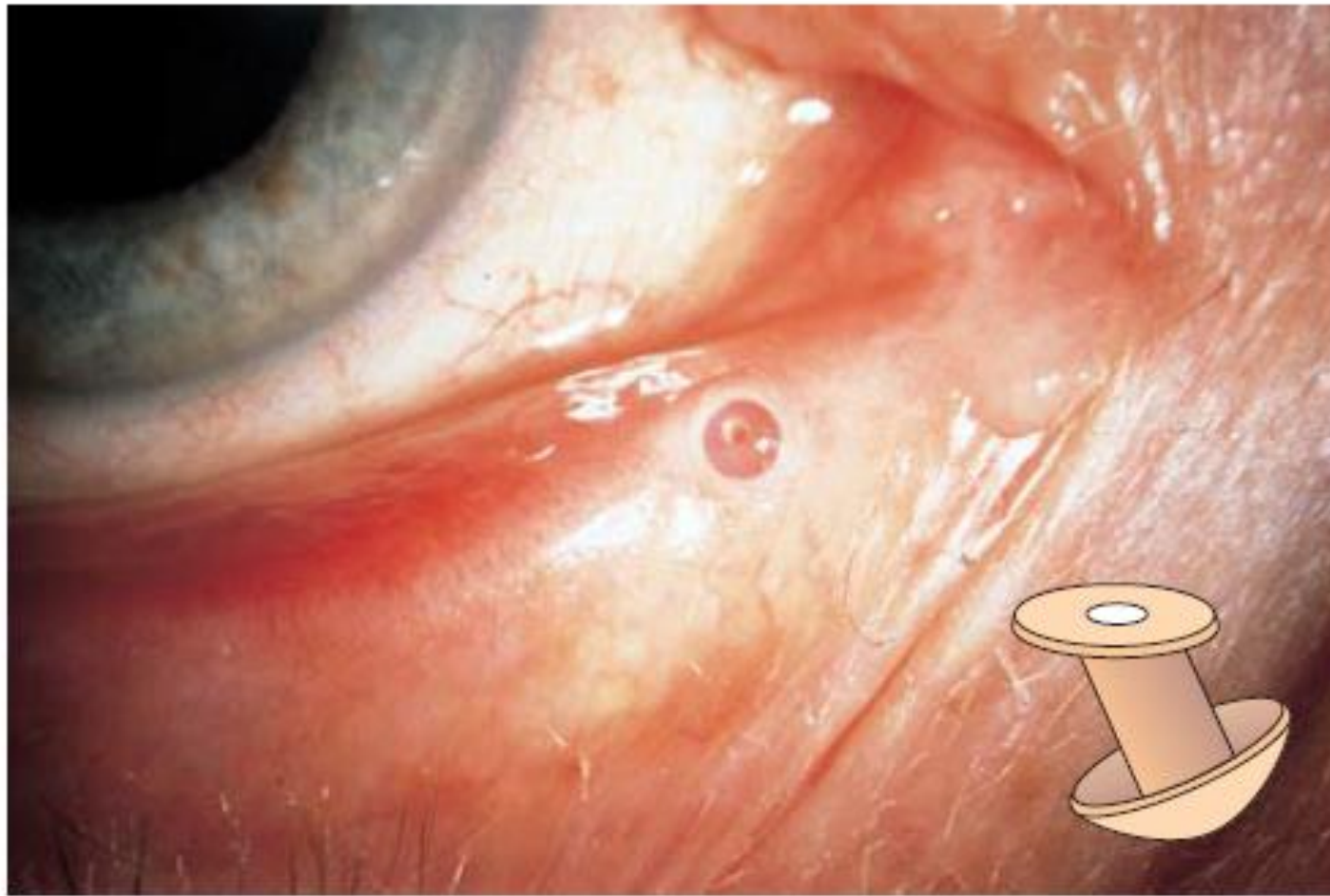


Fig. 3.11 Treatment can be augmented by temporarily closing the puncta with silicone punctal plugs.

- **Illacrimation**
- Illacrimation or epiphora may be due to *hypersecretion from the lacrimal gland*. However, it is more often caused by *obstructed drainage through the lower lacrimal system*.
- **Causes of hypersecretion:**
  - *Emotional distress* (crying).
  - *Increased irritation of the eyes* (by smoke, dust, foreign bodies, injury, or intraocular inflammation) leads to excessive lacrimation in the context of the defensive triad of blepharospasm, photosensitivity, and epiphora.
- **Causes of obstructed drainage:**
  - Stricture or stenosis in the lower lacrimal system.
  - Eyelid deformity (eversion of the punctum lacrimale, ectropion, or entropion).

# Disorders of the Lacrimal Gland

1. Acute Dacryoadenitis
2. Chronic Dacryoadenitis

# Acute Dacryoadenitis

## Definition

- Acute inflammation of the lacrimal gland is a *rare* disorder characterized by intense inflammation and extreme tenderness to palpation.
- **Etiology:**
  1. The disorder is often attributable to **pneumococci** and **staphylococci**, and less frequently to **streptococci**.
  2. There may be a relationship between the disorder and infectious diseases such as **mumps**, **measles**, **scarlet fever**, **diphtheria**, and **influenza**.
- **Symptoms and diagnostic considerations:** Acute dacryoadenitis usually occurs *unilaterally*. The inflamed *swollen gland* is especially *tender to palpation*.

- The upper eyelid exhibits a characteristic S-curve.
- **Differential diagnosis:**
  1. Internal hordeolum (smaller and circumscribed).
  2. Eyelid abscess (fluctuation).
  3. Orbital cellulitis (usually associated with reduced motility of the eyeball).
- **Treatment:** This will depend on the *underlying disorder*. *Moist heat, disinfectant compresses* (Rivanol), and local *antibiotics* are helpful.
- **Clinical course and prognosis:** Acute inflammation of the lacrimal gland is characterized by a rapid clinical course and *spontaneous healing within eight to ten days*. The prognosis is good, and complications are not usually to be expected.



**Acute dacryoadenitis.**



**Fig. 3.12**  
Characteristic  
S-curve of the  
upper eyelid.

# Chronic Dacryoadenitis

## Etiology:

- ✓ The chronic form of inflammation of the lacrimal gland may be the result of an incompletely healed *acute* dacryoadenitis.
- ✓ Diseases such as tuberculosis, sarcoidosis, leukemia, or lymphogranulomatosis can be causes of chronic dacryoadenitis.
- ✓ Bilateral chronic inflammation of the lacrimal and salivary glands is referred to as Mikulicz's syndrome.

## **Symptoms and diagnostic considerations:**

- ✓ Usually there is no pain.
- ✓ The symptoms are less pronounced than in the acute form.
- ✓ The S-curve deformity of the palpebral fissure resulting from swelling of the lacrimal gland is readily apparent.

## Differential diagnosis:

1. Periostitis of the upper orbital rim (rare)
  2. Lipodermoid (no signs of inflammation).
- **Treatment:** This will depend on the *underlying disorder*.
  - *Systemic corticosteroids* may be effective in treating unspecific forms.
  - **Prognosis:** The prognosis for chronic dacryoadenitis is good when the underlying disorder can be identified.

# Tumors of the Lacrimal Gland

# Tumors of the Lacrimal Gland

- **Epidemiology:**
  - Tumors of the lacrimal gland account for 5–7% of orbital neoplasms.
  - Lacrimal gland tumors are *much rarer in children* (approximately 2% of orbital tumors).
  - The relation of benign to malignant tumors of the lacrimal gland specified in the literature is 10:1.
  - **The most frequent benign epithelial lacrimal gland tumor is the *pleomorphic adenoma*. Malignant tumors include the *adenoid cystic carcinoma* and *pleomorphic adenocarcinoma*.**

## **Etiology:**

The WHO classification of 1980 divides lacrimal gland tumors into the following categories:

- I.** Epithelial tumors.
- II.** Tumors of the hematopoietic or lymphatic tissue.
- III.** Secondary tumors.
- IV.** Inflamed tumors.
- V.** Other and unclassified tumors.



- **Symptoms:** Tumors usually *grow very slowly*. After a while, they displace the
- eyeball inferiorly and medially, which can cause double vision.
- **Diagnostic considerations:** Testing **motility** provides information about the
- infiltration of the tumor into the extraocular muscles or mechanical changes
- in the eyeball resulting from tumor growth. The echogenicity of the tumor in
- **ultrasound studies** is an indication of its consistency. **CT** and **MRI** studies
- show the exact location and extent of the tumor. A biopsy will confirm
- whether it is malignant and what type of tumor it is.

## Treatment

- To the extent that this is possible, the entire tumor should be removed
- orbital exenteration (removal of the entire contents of the orbit) may be required
- Systemic administration of corticosteroids is indicated for unspecific tumors.

## Prognosis

This depends on the degree of malignancy of the tumor. Adenoid cystic carcinomas have the most unfavorable prognosis.

**That's all about the lacrimal system at the  
time being.....**