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CORE TRAINING FOR DOCTORS



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# Epiphora

## Introduction

Watery eyes are a common presenting complaint in any ophthalmology department, affecting all age groups. Epiphora is a term used to describe the overflow of tears onto the cheek. It can be a vexatious problem for patients and can lead to surrounding skin excoriation and soreness from constant wiping of tears. Not all patients will complain of the literal overflow but rather of the persistent welling up of tears. There are many abnormalities that may prompt a patient to seek advice. Accurate history taking and appropriate investigations can establish the underlying cause. This article focuses on the common causes of epiphora and the relevant investigations used in any eye unit with the respective treatments.

## Causes

*Table 1* lists the causes of epiphora, which are generally one of two main causes:

1. Overproduction of tears
2. Inadequate or blocked lacrimal outflow.

In assessing epiphora, the doctor should bear these two generalized causes in mind. Tear overproduction is a physiological response to ocular irritation. Patients can complain of sore and/or gritty eyes. Reflex tearing is a response to evaporative dry eye, poor tear film or poor blinking. Common aggravating factors include hay fever, blepharitis, trichiasis or corneal disease. These factors should be addressed and their respective treatments are usually sufficient to alleviate tear overflow.

Conversely, in lacrimal drainage insufficiency, the eye is pain free. The lacrimal outflow system has four major components shown in *Figure 1*: the puncta, the canaliculi, the lacrimal sac and nasolacrimal duct. Punctal stenosis is a common cause of epiphora and should be sought (Mathew and Olver, 2011). Canalicular

**Table 1. Causes of epiphora**

| | |
|---|---|
| Overproduction of tears | Tear film deficiency leading to reflex tearing |
| | Trichiasis (aberrant eyelashes) |
| | Entropion (rolling of eyelid inwards) |
| | Blepharitis (inflammation of eyelid margins) |
| | Lagophthalmos (inability to close eyes) |
| | Conjunctivitis |
| | Foreign body |
| | Corneal disease |
| | Crocodile tears (tearing while eating or chewing as a result of aberrant facial nerve (re)innervation) |
| Inadequate or blocked outflow | Ectropion (folding of eyelid outwards) |
| | Lacrimal pump failure, e.g. facial palsy |
| | Punctal stenosis or ectropion |
| | Canalicular stenosis or obstruction |
| | Nasolacrimal duct stenosis or obstruction |
| | Nasal obstruction, e.g. tumour, scarring |
| | Surgery or trauma |

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stenosis can be a result of chronic ocular surface inflammation, trauma or topical medication for diseases such as glaucoma (McNab, 1998). Patients receiving docetaxel or 5-fluorouracil as chemotherapy are at risk of canalicular stenosis (Esmaeli et al, 2006).

Epiphora caused by tumours of the nasolacrimal duct or lacrimal sac is rare. The term 'functional nasolacrimal duct obstruction' refers to lacrimal drainage incompetence in the presence of anatomical patency but this term has been challenged (Chan et al, 2012) as normally a cause can be ascertained.

## History

The first thing to establish is whether a patient presents with true epiphora, i.e. actual spillage of tears. Sore, gritty eyes indicate an ocular surface disease. A history of sticky eyes, usually in the morning, would suggest a nasolacrimal duct obstruction. Exacerbation of epiphora by cold or windy weather, with symptoms being nonexistent when inside, suggests reflex tearing. Likewise, watery eyes that come on after prolonged reading or computer use can suggest reflex tearing secondary to dry eyes (car air conditioners have the same effect). Bloody tears, epistaxis or nasal obstruction should alert the clinician to the possibility of malignancy, although this is a rarity as mentioned earlier.

Atopy or eczema are risk factors for corneal or canalicular disease. A history of herpes simplex keratitis should prompt suspicions of canalicular dysfunction. Topical medications may raise the suspicions of allergy, e.g. allergic conjunctivitis from glaucoma medication. It is important to note that tear overflow that runs medially to the eye is more characteristic of outflow obstruction, whereas lateral overflow of tears is more indicative of lacrimal pump failure or lid laxity.

It is perfectly possible and quite typical for several factors to contribute to epiphora. For example, a patient with watery eyes that are worse on reading might have a poor tear film as a result of meibomian gland dysfunction and blepharitis. The resultant reflex tearing can overwhelm a compromised tear clearance system, e.g. lid laxity and punctual stenosis. As with any history taking, this should be tailored to the patient him-/herself. The common causes of epiphora in each age group are listed in *Table 2* (Leatherbarrow, 2002). The assessment and management of epiphora in children is dealt with separately.

## Examination

### Slit lamp

It is best practice to examine the patient using a slit lamp to assess for ocular surface disease and any other coexistent pathology (*Figure 2*, *Table 1*). Dry eyes may reveal the presence of punctate epithelial erosions. Examination of the eyelids may reveal a number of abnormalities already mentioned. Eyelid inflammation is indicative of blepharitis. The puncta should be examined for eversion. The medial canthus should be palpated for any lacrimal sac obstruction, e.g. mucocoele. An egress of mucous when digital pressure is put over the lacrimal sac is diagnostic for this.

### Fluorescein disappearance tests

Drops of 2% fluorescein are instilled into the inferior conjunctival fornix at the start of the history. After several minutes have elapsed, the tear film is examined for any residual fluorescein. If the drainage system is patent, the dye should disappear. A compromised drainage system will show fluorescein in the tear film or in a high tear strip. Spillage of the tears onto the cheek can also differentiate between the causes: while medial spillage suggests impaired drainage, lateral spillage is more common in lower lid laxity.

*Figure 1. Anatomy of the nasolacrimal duct.*

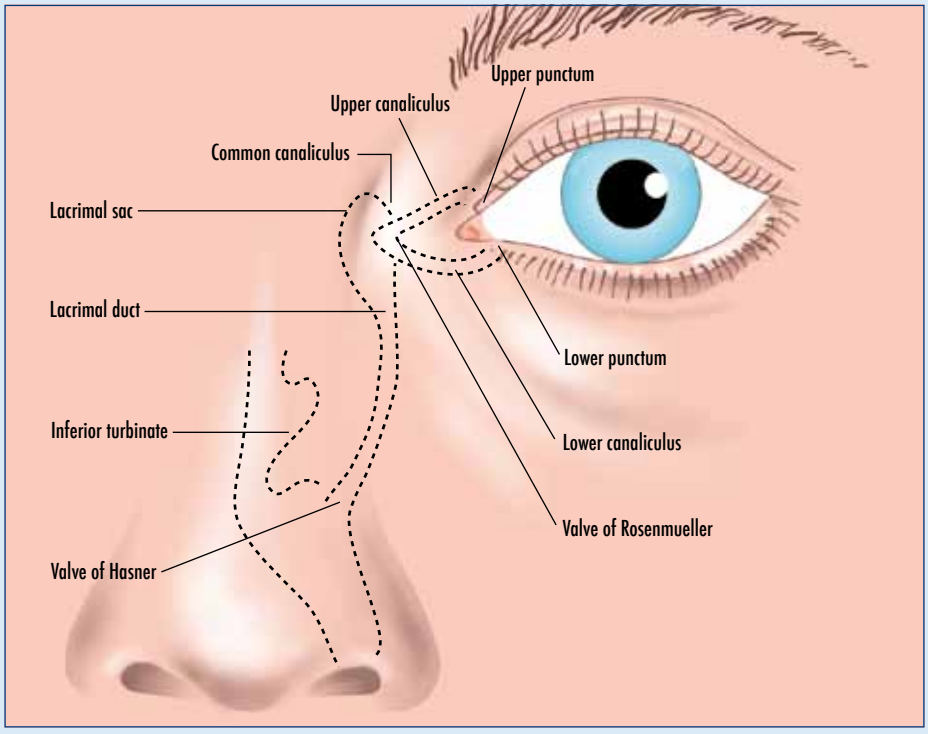



**Table 2. Common causes of epiphora according to age group**

| | |
|---|---|
| Infants and children | Congenital nasolacrimal duct obstruction – most common |
| | Congenital anomalies of the lacrimal drainage system (lacrimal sac fistula, punctal atresia) |
| Young patients | Trauma (canalicular or lacrimal sac lacerations, nasoethmoidal fractures) |
| | Canalicular scarring (herpes simplex) |
| Middle-aged patients | Dacryoliths (actinomyces infection) |
| | Cicatrical disorders of the lower eyelid lamella |
| Older patients | Idiopathic primary acquired nasolacrimal duct obstruction |
| | Entropion or ectropion |

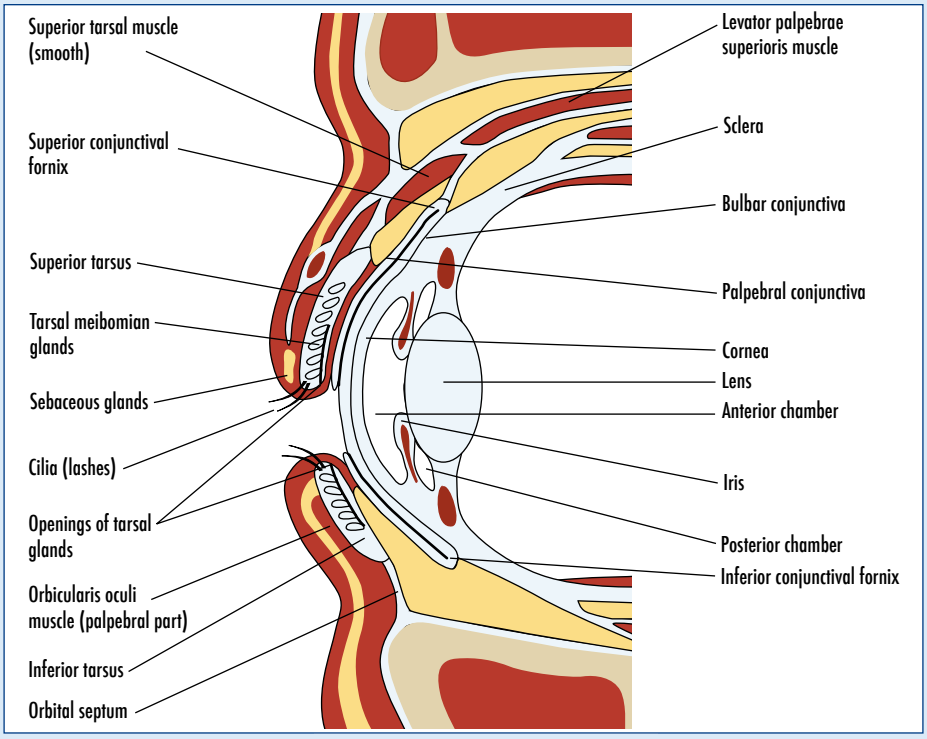



***Figure 2. Anatomy of the eye and adnexae.***

## Syringing and probing

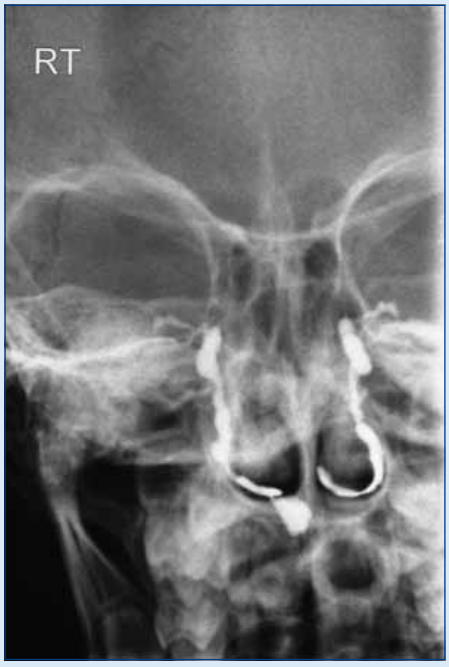
Nasolacrimal duct patency can be assessed by flushing the nasolacrimal sac with saline (syringing) – in a normal duct there is free flow of saline into the nose and/or throat; resistance to flow and/or reflux via the upper punctum suggests a degree of nasolacrimal duct stenosis or obstruction.

Patency of the canalicular system can be assessed by probing and is performed on the patient in a supine position. A specialized probe is introduced into the inferior punctum and advanced as the examiner feels for any resistance encountered along the passage leading to the medial bony wall of the lacrimal sac. Mannor et al (1999) showed that probing should be the first-line treatment in children. In children the probing is not only of the canalicular system but also of the nasolacrimal duct itself and needs to be performed under anaesthesia. It is recommended that probing should be delayed in infants with epiphora until 10–12 months of age, as there is usually a high rate of spontaneous remission of symptomatic nasolacrimal duct obstruction (Paul and Shepherd, 1995).

## Imaging

Imaging is rarely needed in the vast majority of patients, as a good history and examination will usually suffice. For complex cases, e.g. post trauma or mid-facial abnormalities, further investigations may be required. Dacryocystography (*Figure 3*) provides radiographic visualization of the lacrimal sacs and associated structures after injection of radio-opaque dye. The test is particularly useful in detecting the site of a nasolacrimal duct obstruction (Irfan et al, 1998). Computed tomography may be required in cases of previous surgery and suspected malignancy of the nasolacrimal duct or lacrimal sac.

***Figure 3. Example of a dacryocystogram.***




## Management

Conjunctivitis and corneal disease should be dealt with promptly and this usually provides symptomatic relief. The mainstay of treatment for blepharitis is lid hygiene by cleansing the eyelid margins with commercial preparations or baby shampoo using a cotton bud. Tetracyclines are useful in treating rosacea-associated lid margin disease. Steroid or antibiotic ointments are also effective but the use of periocular steroids can cause elevated intraocular pressure and steroids should be avoided in herpetic disease unless under expert supervision.

Entropion is surgically corrected: the most usual method is by lid tightening or shortening with or without everting sutures or retractor plication. Ectropion (*Figure 4*) can be corrected with lid tightening or shortening with a medial spindle procedure. Trichiasis will involve either epilation (plucking) of the offending lashes or electrolysis for a more permanent correction.

Punctal ectropion (*Figure 5*) is readily addressed by performing a retropunctal

***Figure 4. Ectropion.***

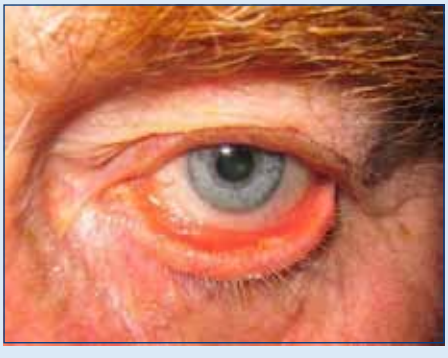
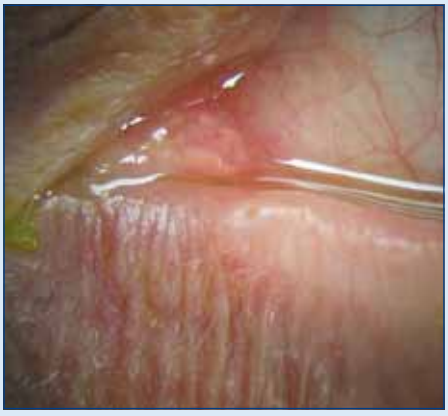


***Figure 5. Punctal ectropion.***



cautery or by excision of a small diamond of conjunctival and tarsus tissue with closure of the excision site. Punctal stenosis can be tackled by a 'one snip' punctoplasty (opening of the punctum) with placement of a canalicular stent for 6 weeks (mini monoka intubation). Canalicular narrowing can also be treated with the same mini monoka stents – Hussain et al (2012) reported a success rate of 82%.

Nasolacrimal duct stenosis can be treated with stenting of the nasolacrimal system (canaliculodacryocystoplasty) and requires endoscopic control to ensure that the stent is passed correctly through the nasolacrimal duct all the way to the ostium underneath the inferior turbinate in the nose. The stent is left for 6 weeks and removed at slit lamp examination.

Nasolacrimal obstruction requires a dacryocystorhinostomy where a direct connection is made from the nose to the lacrimal sac, bypassing the obstruction. This is usually performed under general anaesthetic and can be performed externally or internally via an endoscope. Silicone stents are placed and left for 6 weeks and removal after endonasal evaluation. Canalicular obstruction can usually be addressed at the same time (using the external approach). Ben Simon et al (2005) report this procedure to have a 95% success rate.

## Epiphora in infants and children

Epiphora is thought to affect up to 20% of neonates (MacEwen and Young, 1991). Congenital nasolacrimal duct obstruction is by far the most common cause and is usually the result of failure of canalization of the distal end of the nasolacrimal duct (Schwartz, 1935; Lavrich and Nelson, 1993). In a study of 64 children, Soares and França (1987) found that obstruction most commonly occurred at the valve of Hasner (66.6%). Such children commonly present with watery eyes with mucoid discharge, often confused with infective conjunctivitis. Other anatomical abnormalities include obstruction of duct by impaction with inferior turbinate, punctal atresia and lacrimal sac fistula. Congenital abnormalities such as buphthalmos (enlargement of the eye from elevated intraocular pressure) and distichiasis (abnormal growth of eye lashes from meibomian orifices) should be excluded.

### Assessment

A thorough history and examination is usually sufficient to establish a diagnosis in most cases. A frank mucocoele may be visualized. The fluorescein dye test is useful to perform in children as it is painless. A congenital fistula will usually produce leakage from a dimple in the eyelid. It is important to check that the puncta are present. Patients with craniofacial abnormalities may require a dacrocystogram or computed tomography scan.

### Management

Congenital nasolacrimal duct obstruction should initially be managed conservatively by lacrimal sac massage and topical antibiotics. Over 90% of epiphora cases resulting from congenital obstruction resolve in the first year of life (MacEwen and Young, 1991) and so surgical intervention is only required for persistent cases. Nasolacrimal probing (under general anaesthesia) is often a successful treatment for epiphora in the first year of life but success is reduced with increasing age (Paul and Shepherd, 1995; Robb, 1998). Silicone intubation is reserved for failed probing and has a high success rate (Casady et al, 2006). Lacrimal sac fistulas tend to be rare but can be easily treated with silicone tubing and fistula excision.

## Conclusions

Epiphora is a common problem and the underlying cause can be diagnosed in an outpatient setting without requiring specialist equipment or investigations. Proximal problems can be addressed using relatively local anaesthetic surgery. More distal causes of epiphora need specialist surgical intervention usually on a day case basis. **BJHM**

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## KEY POINTS

- A detailed history and examination should be taken and is usually sufficient to diagnose the cause of epiphora.
- Ocular surface irritation and eyelid malpositions should be addressed promptly.
- Nasolacrimal probing is an effective diagnostic tool for epiphora.
- Specialized imaging is not normally required in most cases.
- Extensive canalicular blockage may require complex surgery.